EAGLE MOUNTAIN
CITY COUNCIL MEETING

AUGUST 18, 2026, 4:00 PM
EAGLE MOUNTAIN CITY COUNCIL CHAMBERS
1650 E STAGECOACH RUN, EAGLE MOUNTAIN, UT 84005

4:00 PM WORK SESSION - CITY COUNCIL CHAMBERS

1. DISCUSSION AND INFORMATION ITEMS

   This is an opportunity to provide information to the City Council. These items are for information only and do not require action by the City Council.

   1.A. DISCUSSION - Pony Express Business Park.
   (anticipated time 15 minutes)

   1.B. DISCUSSION - Archery Overlay Zone.
   (anticipated time 15 minutes)

   1.C. DISCUSSION - City Staffing Analysis.
   (anticipated time 15 minutes)

   1.D. DISCUSSION - Proposed Policy Regarding Property Tax Funding for the Sheriff's Office.
   (anticipated time 10 minutes)

2. CITY MANAGER INFORMATION ITEMS

   This is an opportunity for the City Manager to provide information to the City Council.

3. AGENDA REVIEW

   The City Council will review items on the Consent Agenda and Policy Session Agenda.

4. ADJOURN TO A CLOSED SESSION

   The City Council will adjourn into a Closed Session for the purpose of discussion of pending or reasonably imminent litigation; the character, professional competence, or physical or mental health of an individual; the purchase, lease, sale, or exchange of real property; a proposed development agreement, project proposal, or financing proposal related to the development of land owned by the state or a political subdivision; and/or the deployment of security personnel, devices, or systems, pursuant to Section 52-4-205(1) of the Utah Code, Annotated.

7:00 PM POLICY SESSION - CITY COUNCIL CHAMBERS

5. CALL TO ORDER

6. PLEDGE OF ALLEGIANCE

7. PUBLIC COMMENTS

Time has been set aside for the public to express their ideas, concerns, and comments. (*Please limit your comments to three minutes each.*)

8. CITY COUNCIL/MAYOR ITEMS

Time has been set aside for the City Council and Mayor to make comments.

CONSENT AGENDA

9. BOND RELEASES

9.A. The Towns at Brylee Farms Phase B, Plat 4 - Into Warranty

10. MINUTES

10.A. July 30, 2026 Minutes - Transportation Interlocal Meeting

10.B. August 4, 2026 Minutes - Regular City Council Meeting

10.C. August 6, 2026 Minutes - Council Meeting - Truth-in-Taxation

10.D. August 10, 2026 Minutes - Council Meeting - Special Session

11. RESOLUTIONS

11.A. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Awarding the Bid for EMC 6.0 MGD Wastewater Treatment Facility Expansion - GMP-2 Oxidation Ditch and Miscellaneous Site Improvements to MGC Contractors, Inc. and Approving the Contract.

11.B. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Accepting the Eagle Mountain City Fiscal Year 2025 Audited Financial Statements.

SCHEDULED ITEMS

12. ORDINANCES/PUBLIC HEARINGS

12.A. ORDINANCE/PUBLIC HEARING - An Ordinance of Eagle Mountain City, Utah, Amending the Eagle Mountain Municipal Code 16.20.040 (Preliminary Plats) regarding Street Names.

BACKGROUND: (*Presented by Senior Planner, David Stroud*) The proposed ordinance amends Eagle Mountain Municipal Code Section 16.20.040 regarding street names on Preliminary Plats.

12.B. ORDINANCE/PUBLIC HEARING - An Ordinance of Eagle Mountain, Utah, Amending Eagle Mountain Municipal Code 16.25.040, Final Plats.

BACKGROUND: *(Presented by Senior Planner, David Stroud)* The proposed ordinance amends Eagle Mountain Municipal Code Section 16.25.040 to include street naming standards required of final plats, and other plat requirements.

13. TRUTH-IN-TAXATION

13.A. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Repealing a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026-2027.

BACKGROUND: On August 6, 2026, the City Council held a Truth in Taxation public hearing and approved a property tax rate of 0.001500 for Fiscal Year 2026–2027, exceeding the certified tax rate of 0.000530. The proposed resolution formally rescinds the previously approved property tax increase.

13.B. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026–2027.

BACKGROUND: Following the required Truth in Taxation public hearing, the City Council will consider approval of the proposed property tax increase above the certified tax rate for Fiscal Year 2026–2027, as required by Utah law. Approval of the proposed increase allows the City to incorporate the associated property tax revenue into the final Fiscal Year 2026–2027 budget.

13.C. RESOLUTION/PUBLIC HEARING - A Resolution of Eagle Mountain City, Utah, Adopting the Fiscal Year 2026-2027 Annual Budget Totaling $363,992,973.

BACKGROUND: *(Presented by Administrative Services Director Kimberly Ruesch)* State statute requires taxing entities proposing a property tax increase above the certified tax rate to complete the Truth-in-Taxation process prior to adopting a final property tax rate and budget. A Truth-in-Taxation public hearing was held on August 6, 2026, to receive public comment regarding the proposed property tax increase and the Council adopted a tax rate of 0.001500. This rate was a reduction from the interim budget proposed rate and reduces property tax revenue by $1,151,343.

14. MID-VALLEY COMMUNITY REINVESTMENT PROJECT AREA

14.A. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving an Interlocal Cooperation Agreement between the Redevelopment Agency of Eagle Mountain City and Eagle Mountain City for the Collection and Remittance of Incremental Property Taxes Collected from Property within the Mid-Valley Community Reinvestment Project Area.

BACKGROUND: *(Presented by Director of Legislative and Strategic Services, Evan Berrett):* The Mid-Valley CRA encompasses approximately 53 acres currently under review for commercial retail development. The proposed Interlocal Agreement

outlines the City's participation in tax increment financing for off-site project improvements and establishes the related administrative procedures and terms.

14.B. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving the Mid-Valley CRA Participation Agreement between Eagle Mountain City, the Redevelopment Agency of Eagle Mountain City, and Terra Smith's Eagle Mountain, LLC.

BACKGROUND: *(Presented by Director of Legislative and Strategic Services, Evan Berrett):* The Mid-Valley CRA encompasses approximately 53 acres currently under review for commercial retail development. The proposed resolution establishes the terms and conditions for the distribution and use of project area funds and addresses the obligations agreed upon by the participating parties through the negotiation process.

14.C. ORDINANCE - An Ordinance of Eagle Mountain City, Utah, Adopting the Mid-Valley Community Reinvestment Project Area Plan, as Approved by the Redevelopment Agency of Eagle Mountain City, as the Official Community Reinvestment Project Area Plan for the Project Area and Directing that Notice of the Adoption be Given as Required by Statute.

BACKGROUND: *(Presented by Director of Legislative and Strategic Services, Evan Berrett):* The proposed ordinance adopts the Mid-Valley Community Reinvestment Project Area Plan as the official plan for the Mid-Valley Project Area. The Plan outlines the proposed development and establishes the framework for community reinvestment activities within the Project Area.

14.D. ORDINANCE - An Ordinance of Eagle Mountain, Utah Approving the 5th Amendment to the Amended and Restated Overland Master Development Agreement.

BACKGROUND: (*Presented by City Attorney, Marcus Draper*) This item was approved at the March 25, 2026 Special City Council meeting. The parties have corrected some clerical errors in the document and have altered the language in sections 5.3, 5.4, and 5.6 for the City Council's review. The changes in the language relate to the infrastructure funding and directly incorporate the provisions of the participation agreement to ensure that there is no discrepancy between the agreements. It also adds some stronger language that reinforces existing language that the infrastructure improvements discussed in the agreement will be fully reimbursed.

15. LEGISLATIVE ITEMS

15.A. UPDATE - Legislative Priorities List

16. CITY COUNCIL/MAYOR'S BUSINESS AND LIAISON REPORTS

This time is set aside for the City Council's and Mayor's comments on City business, and for Councilmembers to report on the boards they are assigned to as liaisons to the City Council.

17. COMMUNICATION ITEMS

17.A. Financial Report

17.B. Upcoming Agenda Items

18. ADJOURNMENT

THE PUBLIC IS INVITED TO PARTICIPATE IN PUBLIC MEETINGS FOR ALL AGENDAS.

In accordance with the Americans with Disabilities Act, Eagle Mountain City will make reasonable accommodations for participation in all Public Meetings and Work Sessions. Please call the City Recorder's Office at least 3 working days prior to the meeting at 801-789-6611. This meeting may be held telephonically to allow a member of the public body to participate. This agenda is subject to change with a minimum 24-hour notice.

CERTIFICATE OF POSTING

The undersigned, duly appointed City Recorder, does hereby certify that the above agenda notice was posted on this 13 day of August, 2026, on the Eagle Mountain City bulletin boards, the Eagle Mountain City website www.eaglemountain.gov, posted to the Utah State public notice website http://www.utah.gov/pmn/index.html.

Lacie Messerly
City Recorder

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	DISCUSSION - Pony Express Business Park
ITEM TYPE:	Discussion Item
FISCAL IMPACT:	N/A
APPLICANT:	Georgia Bales

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
General Plan Designation: Community Commercial Zone: Commercial Community	1.29 Acres

PUBLIC HEARING
No

PREPARED BY
Steven Lehmitz, Planner

PRESENTED BY
Steven Lehmitz

RECOMMENDATION:
Staff recommends that the City Council discuss the project proposal and provide feedback on what they would like to see in the development agreement.

BACKGROUND:
The applicant is seeking to develop two lots (4040 E and 4068 E Pony Express Parkway) along Tickville Wash with three commercial buildings. On May 26, 2026, the Planning Commission denied a variance request for the Pony Express Business Park project that would have permitted the sites to be developed as the applicant wishes. They are now seeking a development agreement that would grant the following exceptions:

1. The ability to work and construct buildings/structures within the 50'/75' buffer along the wash (EMMC 17.35.050(G));
2. The ability to construct retaining walls greater than 6' in height (EMMC 17.60.130(B)); and
3. To not be required to construct a drive-through escape lane (EMMC 17.72.050(C)).

As Staff has reviewed the submitted site plans, there are other development requirements that have not been met, but the applicant hasn't expressed a need for any other exceptions. Staff will ensure that the sites meet the City's development standards.

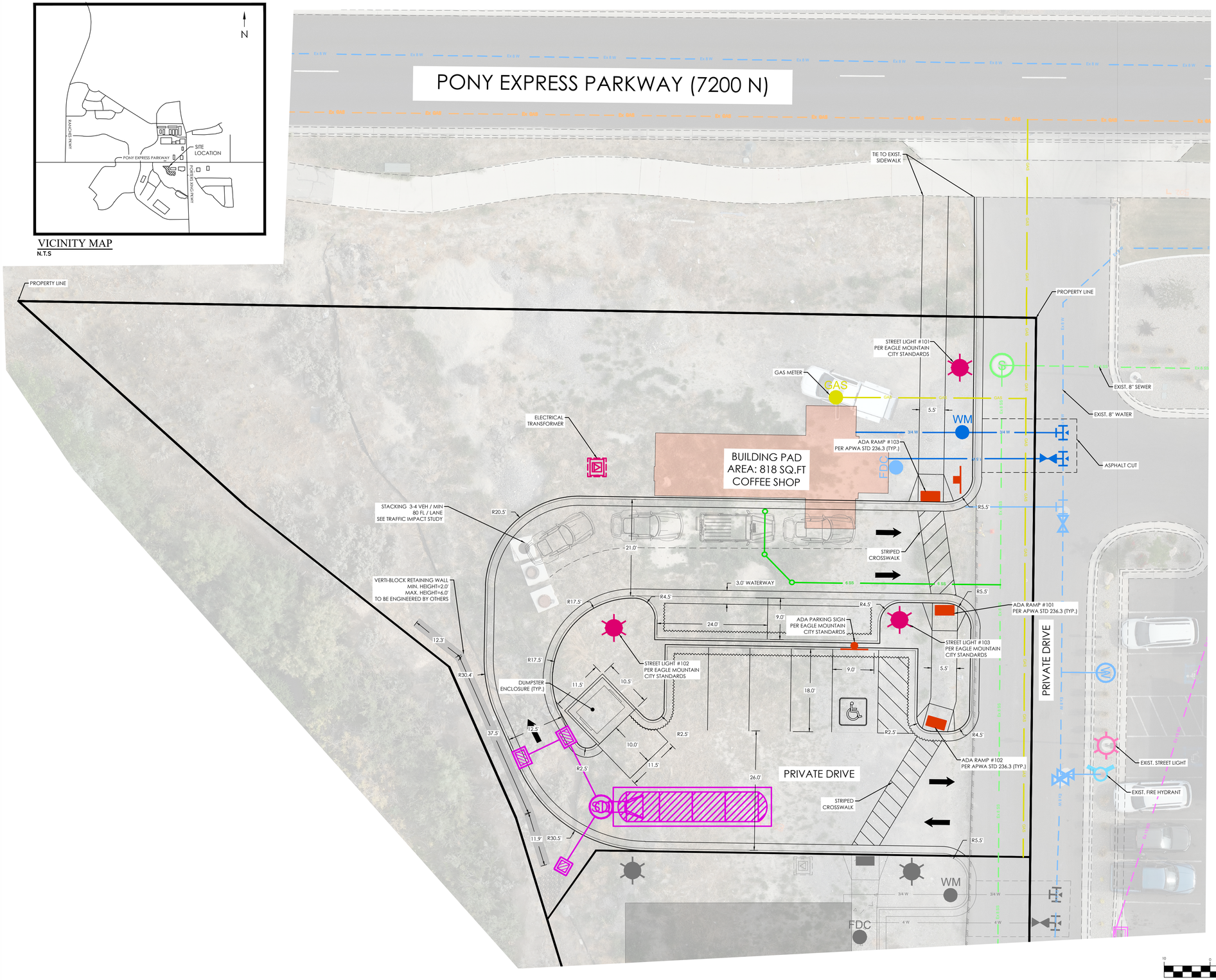
ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:

1. Site Plans
2. Wash Setbacks
3. Presentation

VICINITY MAP
N.T.S



LEGEND

- BOUNDARY
- ROW
- CENTERLINE
- LOT LINE
- EASEMENT
- XX" STORM DRAIN
- XX" SANITARY SEWER
- XX" CULINARY WATER
- XX" PRESSURE IRRIGATION
- XXXX CONTOUR MAJOR
- XXXX CONTOUR MINOR
- EXIST. STORM DRAIN
- EXIST. SANITARY SEWER
- EXIST. CULINARY WATER
- EXIST. FENCE
- (XXXX) EXIST. CONTOUR MAJOR
- (XXXX) EXIST. CONTOUR MINOR
- SIGN
- STREET LIGHT
- SD MH, INLET, AND COMBO
- SEWER MANHOLE
- SECONDARY METER, WATER METER
- CULINARY VALVE, TEE & BEND
- SECONDARY VALVE, TEE & BEND
- WATER BLOW-OFF
- FIRE HYDRANT
- STREET MONUMENT (TO BE SET)
- EXIST. STREET MONUMENT
- EXIST. SD INLET & MH
- EXIST. SEWER MH
- EXIST. VALVE, TEE, & BEND
- EXIST. FIRE HYDRANT
- o XXXX.XX SPOT ELEVATION

CONCEPT TABULATIONS:

TOTAL ACREAGE:	0.42 ACRES
LANDSCAPE:	0.20 ACRES (47.9%)
CURRENT ZONE:	COMMERCIAL COMMUNITY (CC)

BUILDING PAD

BUILDING USE:	FAST FOOD/DRIVE-THRU
BUILDING AREA:	818 SQ. FT

PARKING REQUIREMENT BUILDING A

REQUIRED:	7 STALLS
PROVIDED:	7 STALLS
	(1 ADA STALL)

NOTE:
ALL APPLICABLE ELEMENTS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES WILL BE ADHERED TO.

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

N
S

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CONSULTING
6949 S. HIGH TECH DRIVE SUITE 200
MIDVALE, UTAH 84047 PH: (801) 352-0075
www.focus-es.com

LICENSED PROFESSIONAL ENGINEER
NO. 8028955-2202
THOMAS M. ROMNEY
04/22/26
STATE OF UTAH

PONY EXPRESS COFFEE SHOP
EAGLE MOUNTAIN, UT
SITE PLAN

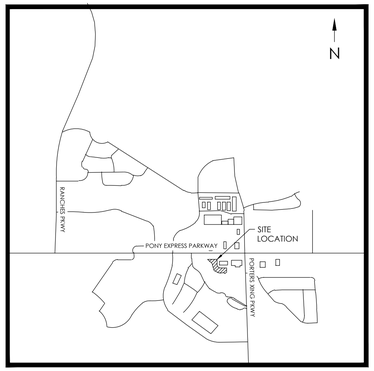
REVISION BLOCK

#	DATE	DESCRIPTION
1	----	----
2	----	----
3	----	----
4	----	----
5	----	----
6	----	----

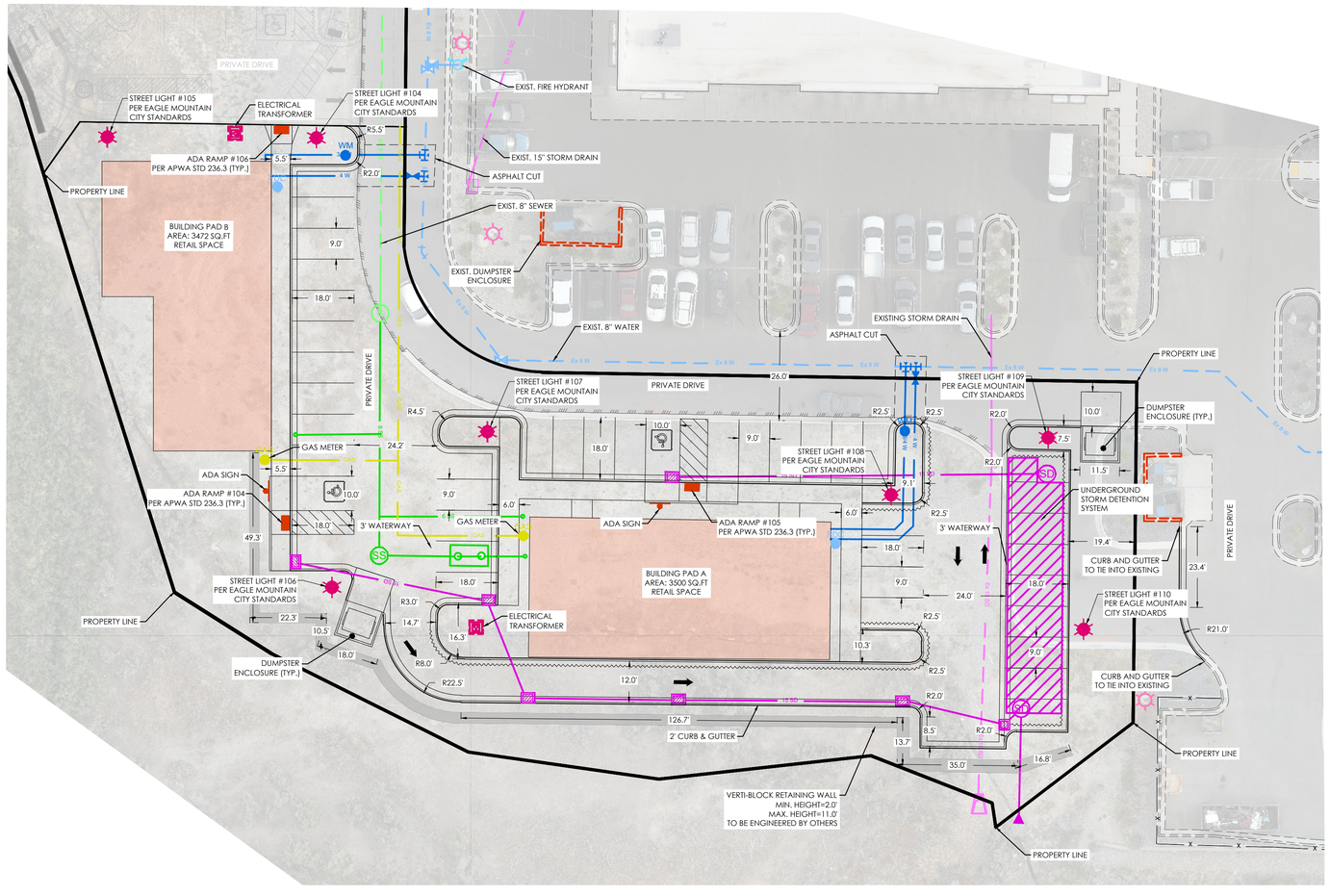
SITE PLAN

Scale:	1"=10'	Drawn:	GB
Date:	04/22/26	Job #:	25-0015
Sheet:	C3.0		

Z:_2025\25-0015 Pony Express Business Park Phase 3\design 25-0015\dwg\sheets\COFFEE SHOP\C3.0 SITE PLAN.dwg



VICINITY MAP
N.T.S



LEGEND

- BOUNDARY
- ROW
- CENTERLINE
- LOT LINE
- EASEMENT
- XX" STORM DRAIN
- XX" SANITARY SEWER
- XX" CULINARY WATER
- XX" PRESSURE IRRIGATION
- CONTOUR MAJOR
- CONTOUR MINOR
- EXIST. STORM DRAIN
- EXIST. SANITARY SEWER
- EXIST. CULINARY WATER
- EXIST. FENCE
- EXIST. CONTOUR MAJOR
- EXIST. CONTOUR MINOR
- SIGN
- STREET LIGHT
- SD MH, INLET, AND COMBO
- SEWER MANHOLE
- SECONDARY METER, WATER METER
- CULINARY VALVE, TEE & BEND
- SECONDARY VALVE, TEE & BEND
- WATER BLOW-OFF
- FIRE HYDRANT
- STREET MONUMENT (TO BE SET)
- EXIST. STREET MONUMENT
- EXIST. SD INLET & MH
- EXIST. SEWER MH
- EXIST. VALVE, TEE, & BEND
- EXIST. FIRE HYDRANT
- SPOT ELEVATION

CONCEPT TABULATIONS:

TOTAL ACREAGE:	0.86 ACRES
LANDSCAPE:	0.25 ACRES (29.5%)
CURRENT ZONE:	COMMERCIAL COMMUNITY (CC)

BUILDING PAD B

BUILDING USE:	RETAIL
BUILDING PAD AREA:	3,472 SQ. FT

PARKING

REQUIRED:	12 STALLS
PROVIDED:	13 STALLS (2 ADA STALLS)

BUILDING PAD A

BUILDING USE:	FAST FOOD/DRIVE-THRU
BUILDING PAD AREA:	3,500 SQFT

PARKING

REQUIRED:	28 STALLS
PROVIDED:	28 STALLS (2 ADA STALLS)

NOTE:
ALL APPLICABLE ELEMENTS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES WILL BE ADHERED TO.

GRAPHIC SCALE
20 0 20 40 80
(IN FEET)
1 inch = 20 ft.

N S

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MIDVALE, UTAH 84047 PH: (801) 352-0075
www.focus-eng.com

PONY EXPRESS BUSINESS PARK
EAGLE MOUNTAIN, UTAH
SITE PLAN

REVISION BLOCK

#	DATE	DESCRIPTION
1	----	----
2	----	----
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6	----	----

SITE PLAN

Scale:	1"=20'	Drawn:	GB
Date:	04/22/26	Job #:	25-0015
Sheet:	C3.0		

Z:_2025\25-0015 Pony Express Business Park Phase 3\design 25-0015\dwg\sheets\C3.0 SITE PLAN.dwg

PONY EXPRESS PARKWAY (W 7200 N)

AREA DEDICATED TO EAGLE MOUNTAIN CITY
PER ORIGINAL PLAT BOUNDARIES

BUILDING PAD
AREA: 818 SQ.FT
COFFEE SHOP

RETAINING WALL

BUILDING PAD B
AREA: 3672 SQ.FT
RETAIL SPACE

BUILDING PAD A
AREA: 5500 SQ.FT
RETAIL SPACE

75.0' SETBACK FROM
FLOWLINE OF WASH

50.0' SETBACK FROM
TOP OF WASH BANK

RETAINING WALL

TICKVILLE WASH RIVERBANK

AREA DEDICATED TO EAGLE MOUNTAIN CITY
PER ORIGINAL PLAT BOUNDARIES

75' setback from flowline of wash

50' setback from top of wash bank

Staff's estimation of the top of the wash bank

N

S

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

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PONY EXPRESS RETAIL

EAGLE MOUNTAIN

TICKVILLE WASH EXHIBIT

REVISION BLOCK

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6	----	----

TICKVILLE WASH EXHIBIT

Scale: 1"=30'	Drawn: GB
Date: 3/27/26	Job #: 25-0015
Sheet: ----	

Z:_2025\25-0015 Pony Express Business Park Phase 3\design 25-0015\civil\exhibits\25-0015 tickville wash setback exhibit.dwg

1.A.
Pony Express Business Park
Discussion

49:755:0010
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58:034:0135
49:955:0006
N89°03'47"W 261.58
S89°03'47"E 261.58
70:036:0001
70:036:0003
49:975:0001
58:040:0368
70:036:0002
49:955:0005
58:040:0258
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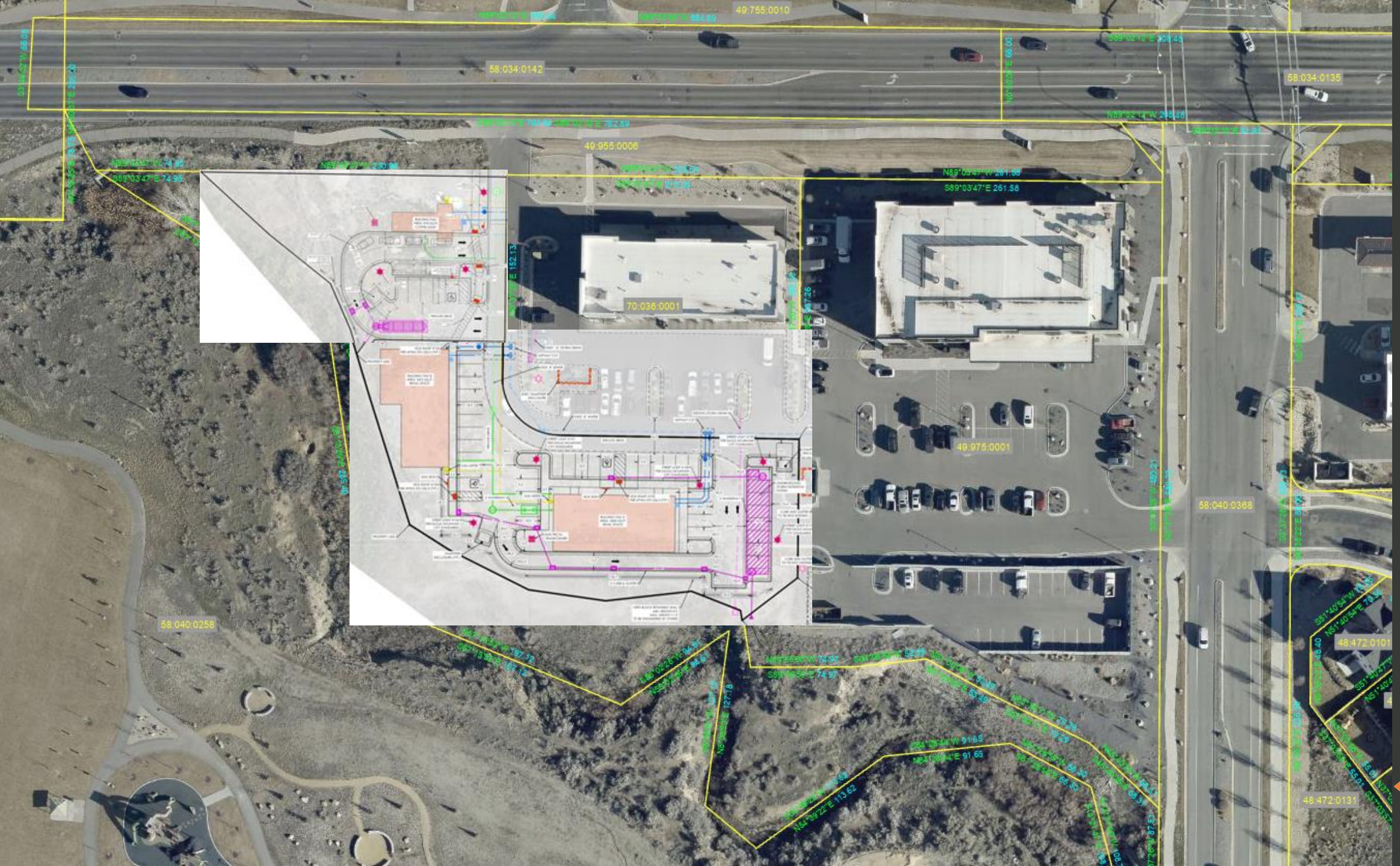
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58:034:0135
49:955:0006
N89°03'47"W 261.58
S89°03'47"E 261.58
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49:975:0001
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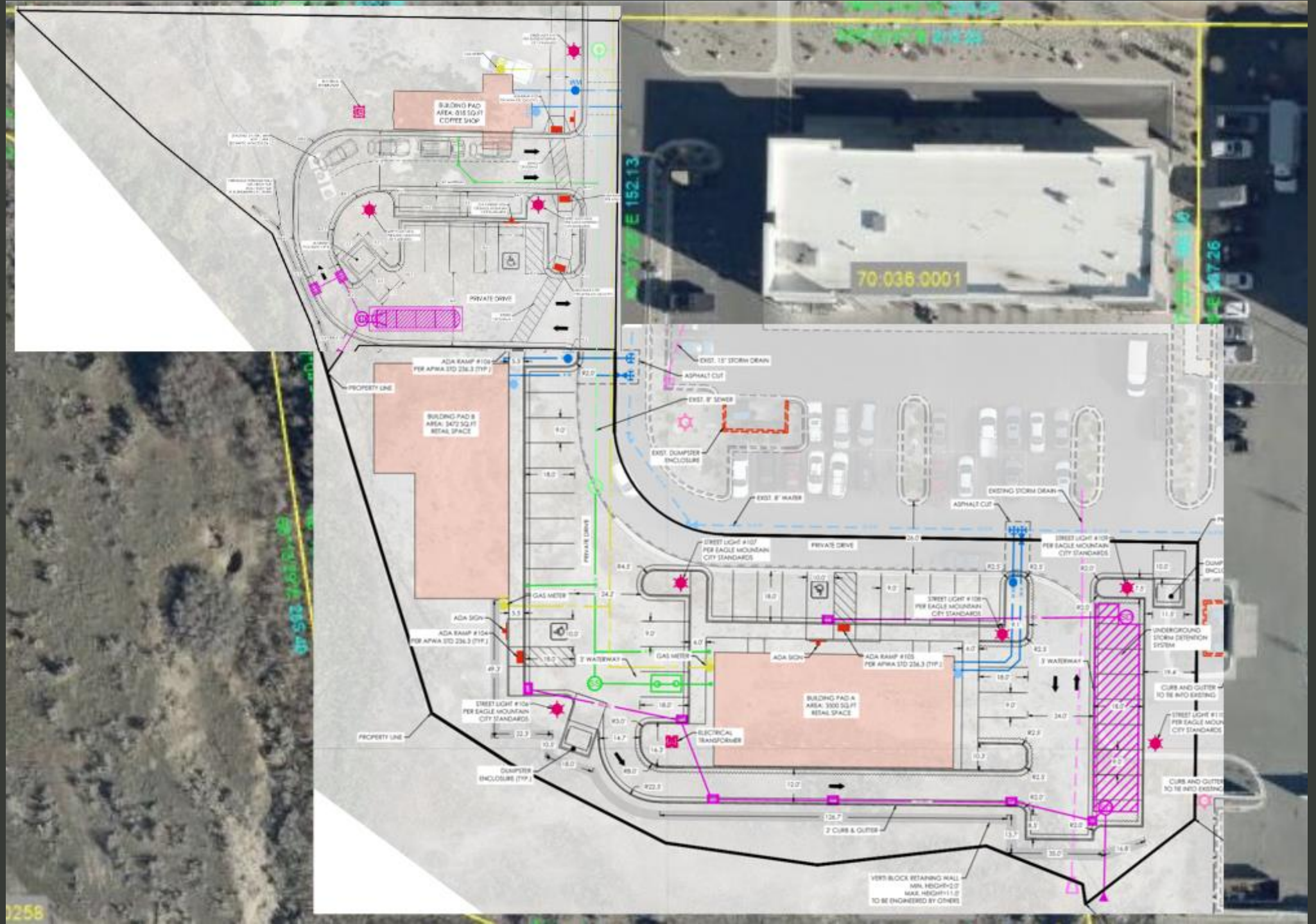
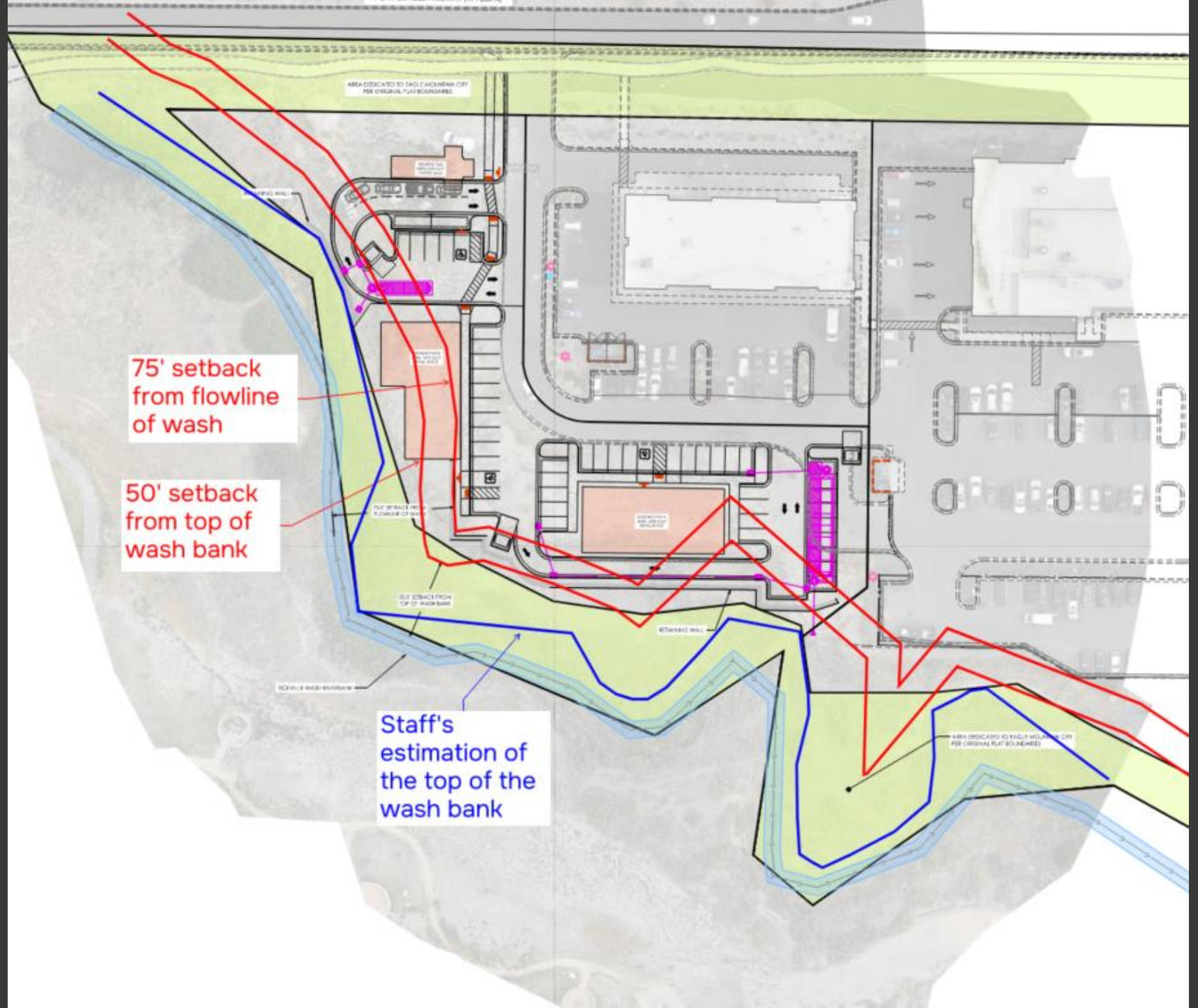
58:040:0258
48:472:0101
48:472:0131


BUILDING PAD
AREA: 815 SQ.FT
COFFEE SHOP
PRIVATE DRIVE
ADA RAMP #108
PER APWA STD 236.3 (TYP.)
PROPERTY LINE
BUILDING PAD B
AREA: 3472 SQ.FT
RETAIL SPACE
EXIST. 15" STORM DRAIN
ASPHALT CUT
EXIST. 8" SEWER
EXIST. DUMPSTER
ENCLOSURE
EXIST. 8" WATER
EXISTING STORM DRAIN
STREET LIGHT #107
PER EAGLE MOUNTAIN
CITY STANDARDS
STREET LIGHT #108
PER EAGLE MOUNTAIN
CITY STANDARDS
GAS METER
ADA SIGN
ADA RAMP #104
PER APWA STD 236.3 (TYP.)
3' WATERWAY
ADA RAMP #105
PER APWA STD 236.3 (TYP.)
UNDERGROUND
STORM DETENTION
SYSTEM
CURB AND GUTTER
TO BE INFO EXISTING
STREET LIGHT #106
PER EAGLE MOUNTAIN
CITY STANDARDS
BUILDING PAD A
AREA: 3000 SQ.FT
RETAIL SPACE
ELECTRICAL
TRANSFORMER
DUMPSTER
ENCLOSURE (TYP.)
2' CURB & GUTTER
VERTI-BLOCK RETAINING WALL
MIN. HEIGHT=2.0'
MAX. HEIGHT=11.0'
TO BE ENGINEERED BY OTHERS
70:036:0001


75' setback from flowline of wash
50' setback from top of wash bank
Staff's estimation of the top of the wash bank

Applicant's Requests

1. The ability to work and construct buildings/structures within the 50'/75' buffer along the wash (EMMC 17.35.050(G));

2. The ability to construct retaining walls greater than 6' in height (EMMC 17.60.130(B)); and

3. To not be required to construct a drive-through escape lane (EMMC 17.72.050(C)).

49:955:0006
70:036:0001
70:036:0003
70:036:0002
49:975:0001
49:955:0005
58:040:0258
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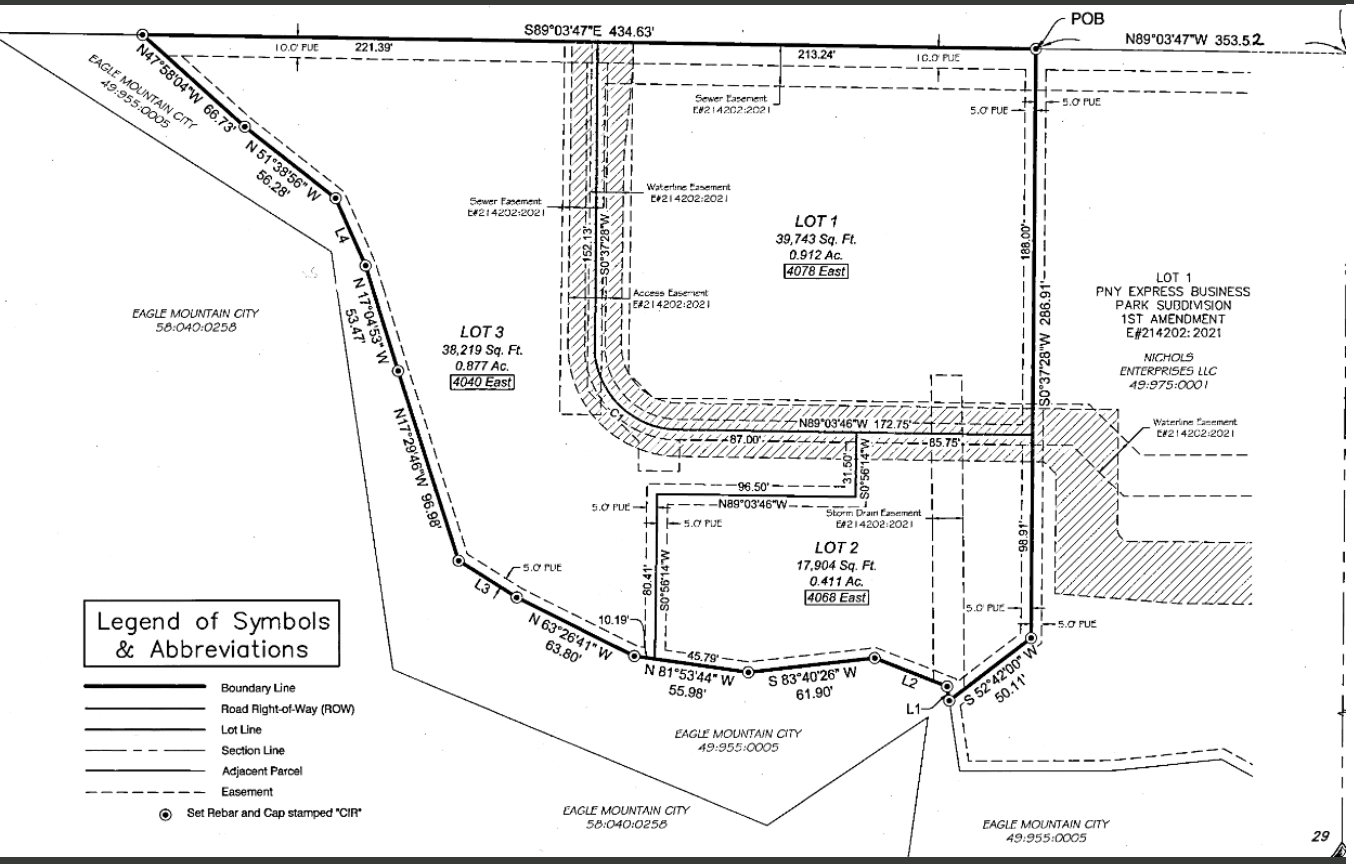
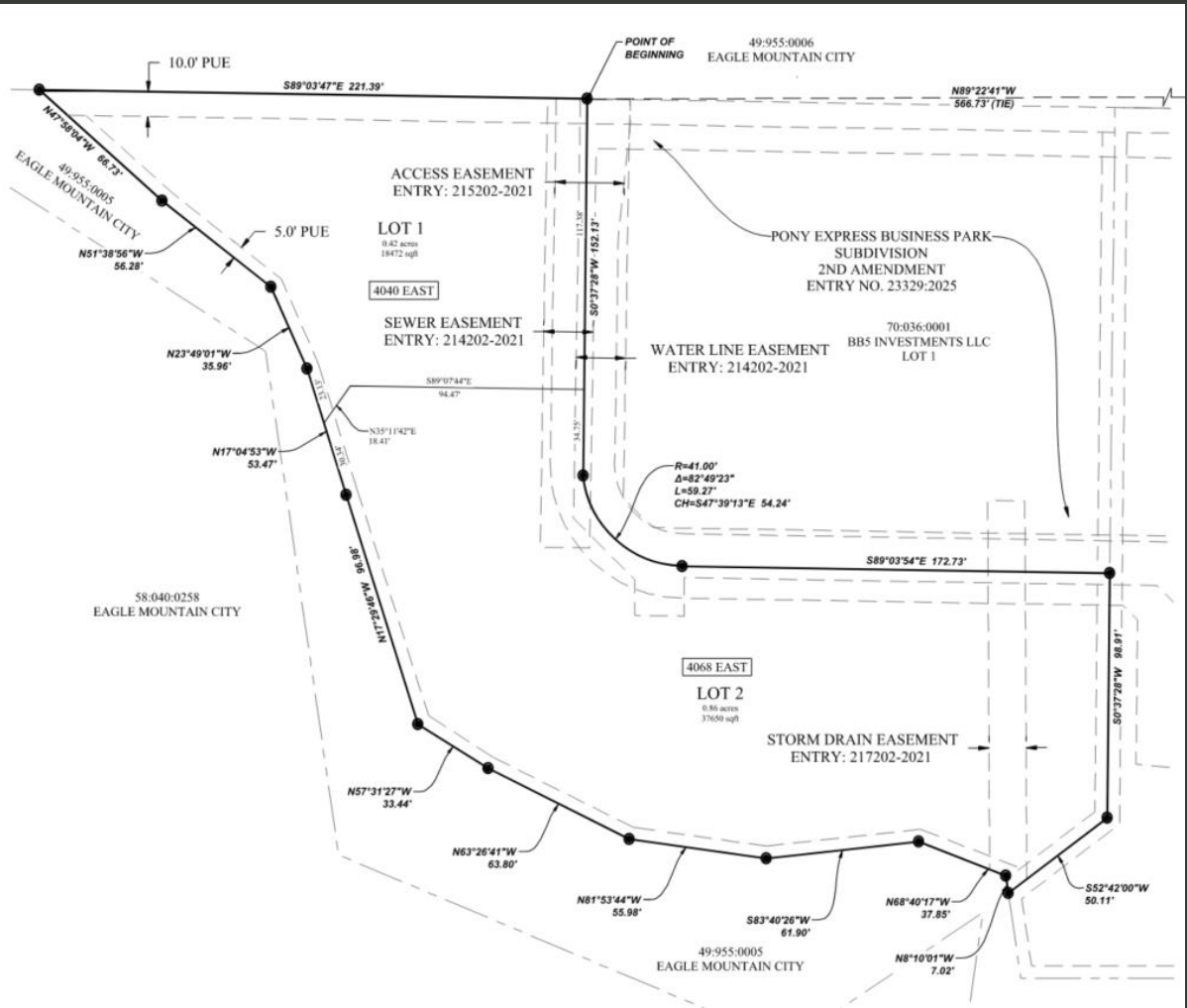
BURT BROTHERS
TIRE & SERVICE
AutoZone

Current Plat



Expected Plat Amendment



	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	DISCUSSION - Archery Overlay Zone.
ITEM TYPE:	Discussion Item
FISCAL IMPACT:	N/A
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING	PREPARED BY	PRESENTED BY
No	Ethan Jacobsen	Ethan Jacobsen

RECOMMENDATION:
City Council discuss the amendments made to the code to allow for archery ranges to be housed in the city including safety standards and other regulations for both indoor and outdoor archery.

BACKGROUND:
Staff were directed to prepare a code amendment to provide a regulatory framework to house archery ranges within the city. This code amendment comes from residents inquiring about where, if at all, archery is legal within the city. Until now, archery was prohibited throughout the city because there are no archery ranges within the city and little to no framework for an archery range to be constructed. City staff were approached by the council to provide a way for archery to be practiced legally to deter residents from doing so in their backyards or public spaces. This amendment provides a clearer framework for archery ranges and sets safety standards by incorporating them into the outdoor shooting range overlay zone and indoor shooting ranges as a special use.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Redlines
2. Clean
3. Presentation

9.10.010 Discharge of firearms prohibited.

It shall be unlawful for any person except peace officers in the pursuit of their lawful duties or private citizens acting in legitimate self-defense or other legally justified defense to discharge any firearm within the municipal boundaries of Eagle Mountain City. [Ord. 98-04 § 1].

9.10.020 "Firearm" defined.

For the purposes of this article, a "firearm" shall mean a pistol, revolver, shotgun, sawed-off shotgun, rifle, sawed-off rifle, or any device that could be used as a dangerous weapon from which is expelled a projectile by action of an explosive. [Ord. 98-04 § 2].

9.10.030 Discharge allowed at firing ranges.

This article shall not prevent the firing of firearms at any rifle, pistol or shotgun range lawfully designated by the city council of Eagle Mountain. [Ord. 98-04 § 3].

Article II. Crossbows and Bows

9.10.040 Discharge of bows and crossbows prohibited.

~~A. It shall be unlawful to discharge a bow or crossbow within the corporate limits of Eagle Mountain City except as provided in this article.~~

B. It shall be unlawful to discharge a bow or crossbow with a pull weight of more than 10 pounds within the corporate limits of Eagle Mountain City except as provided in this article. [Ord. 99-22 §§ 1, 2].

9.10.050 "Bow" and "crossbow" defined.

For the purposes of this article,

A. "Bow" shall mean any device consisting of a flexible material with a string connecting its ends, designed to propel an arrow or similar projectile.

B. "Crossbow" shall mean a bow mounted horizontally on a stock or frame and equipped with a trigger mechanism to release the string.

9.10.0~~5~~60 Discharge allowed at archery ranges.

The discharge of crossbows and bows with a pull weight of more than 10 pounds shall be limited to archery ranges expressly authorized for the practice of archery within Eagle Mountain City. [Ord. 99-22 § 3].

9.10.0~~6~~70 Land use authority ~~Planning Commission~~ review of proposed archery ranges.

The land use authority ~~planning commission of Eagle Mountain City~~ shall review all applications for the establishment and operation of archery ranges and may recommend to the city council the approval of a suitable site for an archery range under such conditions and upon compliance with such requirements as may be established for an archery range by the Utah County sheriff's office and the city planning commission. [Ord. 99-22 § 4].

Outdoor Shooting and Archery Range Overlay Zone

17.47.010 What this chapter does.

This chapter contains land use provisions that regulate the development of outdoor shooting ranges and archery ranges on properties appropriately zoned. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.020 Purpose and objective.

The purpose of the outdoor shooting ~~range~~ and archery range overlay zone is to provide for the locational control and safety standards for outdoor shooting and archery ranges, and to provide proper buffering and protection for neighboring development and uses. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.030 Rezone criteria.

In addition to meeting the rezoning requirements in Chapter 17.90 EMMC, the following criteria shall be considered when evaluating proposed rezones to the outdoor shooting ~~range~~ and archery range overlay zone:

A. Proximity to Residential. Applicant shall provide proof that proposal is not located too close to residential development and that the proposed use may be safely accomplished on site without putting neighboring developments in danger.

B. Property Size. Outdoor shooting range properties shall generally be at least 10 acres in size; however, the city council may consider mitigating factors in approving the rezone on a smaller parcel. Archery ranges have no minimum parcel size, although should be large enough to incorporate the archery range safety plan.

C. Underlaying Zoning. The outdoor shooting and archery range overlay zone shall only be considered on lots with the following underlaying zoning:

1. Agriculture.

2. Industrial.

3. Open space – natural. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.040 Standards.

A. Liability. Range operator/owner assumes all liability for the operation of outdoor shooting ranges and archery ranges.

B. Access to the facility shall be from a public right-of-way or road.

C. The applicant shall submit a plan of operations to the land use authority for the shooting range and/or archery range, including all ancillary uses and activities. ~~Such~~ The plan shall include a health and safety plan that addresses the safety and security of patrons, guests, staff, and persons on adjacent parcels or lots of land.

D. Applicant shall provide documentation to demonstrate that such facility has been designed, and shall be operated, to contain, on-site, all projectiles and debris caused by firing ammunition resulting from the discharge of firearms, bows, crossbows, and similar projectile-launching devices.

E. Food services, as well as groceries, sporting goods, merchandise, guns and ammunition, bows and projectiles shall only be provided or sold to patrons, guests, staff, or operators of the facility.

F. Outdoor shooting ranges and archery ranges may be exempted from commercial design standards by the city council.

G. Outdoor shooting ranges and archery ranges shall not be located within one-quarter of a mile of the wildlife corridor. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.050 Safety regulations.

A. The range shall conform to all federal, state, and industry regulations and standards for health and safety.

B. Material and construction shall be designed and certified to capture all fired rounds and/or projectiles.

C. No ammunition or projectiles shall be permitted to be fired that exceeds the certified design specifications of the range.

D. No alcoholic beverages shall be sold, consumed, or permitted on the premises.

E. A written log of all range users shall be maintained by the range operator.

F. All archery lanes shall be equipped with backstops designed to fully stop arrows at the maximum draw weight and shooting distance proposed for the range.

G. Minors shall not be permitted on the outdoor shooting range unless accompanied by a responsible adult at all times, and at no time shall a child under the age of eight be permitted to discharge or handle firearms or crossbows on the outdoor shooting range or archery range. Children under the age of eight may be permitted to handle a bow with the supervision of a responsible adult and in accordance with USA Archery.

H. On-site supervision and monitoring shall be provided by the range operator/owner.

I. Applicant shall submit a fire mitigation and safety plan.

J. Use of exploding incendiary targets (such as Tannerite) is prohibited ~~discouraged~~. [Ord. O-04-2022 § 2 (Exh. A)].

K. Use of exploding or incendiary rounds is prohibited

17.47.060 Additional components.

In addition to the above an outdoor shooting range or archery range may include the following components:

A. A retail component for the sale (and on-site rental) of firearms, ammunition, bows, projectiles and other related accessories~~. related to firearms.~~ Such facility shall comply with all licensing and operation requirements of the Federal Bureau of Alcohol, Tobacco and Firearms (ATF), state agencies, and other regulator organizations.

B. Classroom facilities to be used for community education, public forums, and seminars on gun safety and use.

C. Restaurant or dining component.

D. Event facilities.

E. Office, gathering/event spaces, restrooms.

F. Shooting platforms.

G. Storage structures.

H. Outdoor shooting ranges shall be permitted to reclaim brass, copper, steel, lead and other materials commonly associated with shooting. [Ord. O-04-2022 § 2 (Exh. A)].

17.75.072 Indoor shooting and archery ranges.

Indoor shooting and archery ranges may be permitted only where:

A. Safety Regulations.

1. The range shall conform to all federal, state, and industry regulations and standards for health and safety.

2. Material and construction shall be designed and certified to capture all fired rounds. All archery lanes shall be equipped with backstops designed to fully stop arrows at the maximum draw weight and shooting distance proposed for the range.

3. No ammunition shall be permitted to be fired that exceeds the certified design specifications of the range.

4. No alcoholic beverages shall be sold, consumed, or permitted on the premises.

5. A written log of all range users shall be maintained by the range operator.

6. Minors shall not be permitted on the shooting range unless accompanied by a responsible adult at all times, and at no time shall a child under the age of eight be permitted to discharge or handle firearms or crossbows on the shooting/archery range. Children under the age of eight may be permitted to handle a bow with the supervision of a responsible adult and in accordance with USA Archery.

7. On-site supervision and monitoring shall be provided by the range operator/owner.

8. An alarm system, cut wire protected, shall be provided for general security of the premises.

B. Sound Study. A sound study shall be performed and submitted with the application indicating decibel levels at the property lines and on the interior of neighboring properties

(if connected by a shared/party wall); a measurement of 65 decibels or above shall be considered a nuisance per EMMC 8.15.070(B).

C. Additional Components. In addition to the above an indoor shooting or archery range may include the following components:

1. A retail component for the sale and on-site rental of firearms, ammunition, bows, projectiles and other related accessories ~~related to firearms~~. Such facility shall comply with all licensing and operation requirements of the Federal Bureau of Alcohol, Tobacco and Firearms (ATF), state agencies, and other regulator organizations.

2. Classroom facilities to be used for community education, public forums, and seminars on gun safety and use.

3. Restaurant or dining component. [Ord. O-04-2022 § 2 (Exh. A)].

9.10.010 Discharge of firearms prohibited.

It shall be unlawful for any person except peace officers in the pursuit of their lawful duties or private citizens acting in legitimate self-defense or other legally justified defense to discharge any firearm within the municipal boundaries of Eagle Mountain City. [Ord. 98-04 § 1].

9.10.020 “Firearm” defined.

For the purposes of this article, a “firearm” shall mean a pistol, revolver, shotgun, sawed-off shotgun, rifle, sawed-off rifle, or any device that could be used as a dangerous weapon from which is expelled a projectile by action of an explosive. [Ord. 98-04 § 2].

9.10.030 Discharge allowed at firing ranges.

This article shall not prevent the firing of firearms at any rifle, pistol or shotgun range lawfully designated by the city council of Eagle Mountain. [Ord. 98-04 § 3].

Article II. Crossbows and Bows

9.10.040 Discharge of bows and crossbows prohibited.

B. It shall be unlawful to discharge a bow or crossbow with a pull weight of more than 10 pounds within the corporate limits of Eagle Mountain City except as provided in this article. [Ord. 99-22 §§ 1, 2].

9.10.050 “Bow” and “crossbow” defined.

For the purposes of this article,

A. “Bow” shall mean any device consisting of a flexible material with a string connecting its ends, designed to propel an arrow or similar projectile.

B. “Crossbow” shall mean a bow mounted horizontally on a stock or frame and equipped with a trigger mechanism to release the string.

9.10.060 Discharge allowed at archery ranges.

The discharge of crossbows and bows with a pull weight of more than 10 pounds shall be limited to archery ranges expressly authorized for the practice of archery within Eagle Mountain City. [Ord. 99-22 § 3].

9.10.070 Land use authority review of proposed archery ranges.

The land use authority shall review all applications for the establishment and operation of archery ranges and may recommend to the city council the approval of a suitable site for an archery range under such conditions and upon compliance with such

requirements as may be established for an archery range by the Utah County sheriff's office and the city planning commission. [Ord. 99-22 § 4].

Outdoor Shooting and Archery Range Overlay Zone

17.47.010 What this chapter does.

This chapter contains land use provisions that regulate the development of outdoor shooting ranges and archery ranges on properties appropriately zoned. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.020 Purpose and objective.

The purpose of the outdoor shooting and archery range overlay zone is to provide for the locational control and safety standards for outdoor shooting and archery ranges, and to provide proper buffering and protection for neighboring development and uses. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.030 Rezone criteria.

In addition to meeting the rezoning requirements in Chapter 17.90 EMMC, the following criteria shall be considered when evaluating proposed rezones to the outdoor shooting and archery range overlay zone:

A. Proximity to Residential. Applicant shall provide proof that proposal is not located too close to residential development and that the proposed use may be safely accomplished on site without putting neighboring developments in danger.

B. Property Size. Outdoor shooting range properties shall generally be at least 10 acres in size; however, the city council may consider mitigating factors in approving the rezone on a smaller parcel. Archery ranges have no minimum parcel size, although should be large enough to incorporate the archery range safety plan.

C. Underlaying Zoning. The outdoor shooting and archery range overlay zone shall only be considered on lots with the following underlaying zoning:

1. Agriculture.

2. Industrial.

3. Open space – natural. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.040 Standards.

A. Liability. Range operator/owner assumes all liability for the operation of outdoor shooting ranges and archery ranges.

B. Access to the facility shall be from a public right-of-way or road.

C. The applicant shall submit a plan of operations to the land use authority for the shooting range and/or archery range, including all ancillary uses and activities. The plan shall include a health and safety plan that addresses the safety and security of patrons, guests, staff, and persons on adjacent parcels or lots of land.

D. Applicant shall provide documentation to demonstrate that such facility has been designed, and shall be operated, to contain, on-site, all projectiles and debris caused by firing ammunition resulting from the discharge of firearms, bows, crossbows, and similar projectile-launching devices.

E. Food services, as well as groceries, sporting goods, merchandise, guns and ammunition, bows and projectiles shall only be provided or sold to patrons, guests, staff, or operators of the facility.

F. Outdoor shooting ranges and archery ranges may be exempted from commercial design standards by the city council.

G. Outdoor shooting ranges and archery ranges shall not be located within one-quarter of a mile of the wildlife corridor. [Ord. O-04-2022 § 2 (Exh. A)].

17.47.050 Safety regulations.

A. The range shall conform to all federal, state, and industry regulations and standards for health and safety.

B. Material and construction shall be designed and certified to capture all fired rounds and/or projectiles.

C. No ammunition or projectiles shall be permitted to be fired that exceeds the certified design specifications of the range.

D. No alcoholic beverages shall be sold, consumed, or permitted on the premises.

E. A written log of all range users shall be maintained by the range operator.

F. All archery lanes shall be equipped with backstops designed to fully stop arrows at the maximum draw weight and shooting distance proposed for the range.

G. Minors shall not be permitted on the outdoor shooting range unless accompanied by a responsible adult at all times, and at no time shall a child under the age of eight be permitted to discharge or handle firearms or crossbows on the outdoor shooting range or

archery range. Children under the age of eight may be permitted to handle a bow with the supervision of a responsible adult and in accordance with USA Archery.

H. On-site supervision and monitoring shall be provided by the range operator/owner.

I. Applicant shall submit a fire mitigation and safety plan.

J. Use of exploding incendiary targets (such as Tannerite) is prohibited. [Ord. O-04-2022 § 2 (Exh. A)].

K. Use of exploding or incendiary rounds is prohibited

17.47.060 Additional components.

In addition to the above an outdoor shooting range or archery range may include the following components:

A. A retail component for the sale (and on-site rental) of firearms, ammunition, bows, projectiles and other related accessories. Such facility shall comply with all licensing and operation requirements of the Federal Bureau of Alcohol, Tobacco and Firearms (ATF), state agencies, and other regulator organizations.

B. Classroom facilities to be used for community education, public forums, and seminars on gun safety and use.

C. Restaurant or dining component.

D. Event facilities.

E. Office, gathering/event spaces, restrooms.

F. Shooting platforms.

G. Storage structures.

H. Outdoor shooting ranges shall be permitted to reclaim brass, copper, steel, lead and other materials commonly associated with shooting. [Ord. O-04-2022 § 2 (Exh. A)].

17.75.072 Indoor shooting and archery ranges.

Indoor shooting and archery ranges may be permitted only where:

A. Safety Regulations.

1. The range shall conform to all federal, state, and industry regulations and standards for health and safety.

2. Material and construction shall be designed and certified to capture all fired rounds. All archery lanes shall be equipped with backstops designed to fully stop arrows at the maximum draw weight and shooting distance proposed for the range.

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7. On-site supervision and monitoring shall be provided by the range operator/owner.

8. An alarm system, cut wire protected, shall be provided for general security of the premises.

B. Sound Study. A sound study shall be performed and submitted with the application indicating decibel levels at the property lines and on the interior of neighboring properties (if connected by a shared/party wall); a measurement of 65 decibels or above shall be considered a nuisance per EMMC 8.15.070(B).

C. Additional Components. In addition to the above an indoor shooting or archery range may include the following components:

1. A retail component for the sale and on-site rental of firearms, ammunition, bows, projectiles and other related accessories. Such facility shall comply with all licensing and operation requirements of the Federal Bureau of Alcohol, Tobacco and Firearms (ATF), state agencies, and other regulator organizations.

2. Classroom facilities to be used for community education, public forums, and seminars on gun safety and use.

3. Restaurant or dining component. [Ord. O-04-2022 § 2 (Exh. A)].

City Council Meeting
August 18th, 2026

Archery Ranges within Eagle Mountain City

9.10.050 Discharge allowed at archery ranges.

The discharge of crossbows and bows with a pull weight of more than 10 pounds shall be limited to archery ranges expressly authorized for the practice of archery within Eagle Mountain City. [Ord. 99-22 § 3].

9.10.060 Planning commission review of proposed archery ranges.

The planning commission of Eagle Mountain City shall review all applications for the establishment and operation of archery ranges and may recommend to the city council the approval of a suitable site for an archery range under such conditions and upon compliance with such requirements as may be established for an archery range by the Utah County sheriff's office and the city planning commission. [Ord. 99-22 § 4].

What does this amendment do?

1. Adds archery ranges to the outdoor shooting range overlay zone and indoor shooting range standards for special use

2. Sets safety and operational standards for archery

3. Requires land use authority approval of safety and operation plans

Key Changes

- Requires applicant to adhere to national safety standards (USA Archery)
- Archery specific safety standards for backstops and projectile containment
- Differentiates between bows and crossbows
- All amendments are mirrored in EMCC 17.75.072 Indoor shooting range

Discussion

Article II. Crossbows and Bows

9.10.040 Discharge of bows and crossbows prohibited.

~~A. It shall be unlawful to discharge a bow or crossbow within the corporate limits of Eagle Mountain City except as provided in this article.~~

B. It shall be unlawful to discharge a bow or crossbow with a pull weight of more than 10 pounds within the corporate limits of Eagle Mountain City except as provided in this article. [Ord. 99-22 §§ 1, 2].

9.10.050 "Bow" and "crossbow" defined.

For the purposes of this article,

A. "Bow" shall mean any device consisting of a flexible material with a string connecting its ends, designed to propel an arrow or similar projectile.

B. "Crossbow" shall mean a bow mounted horizontally on a stock or frame and equipped with a trigger mechanism to release the string.

17.47.040

B. Property Size. Outdoor shooting range properties shall generally be at least 10 acres in size; however, the city council may consider mitigating factors in approving the rezone on a smaller parcel. Archery ranges have no minimum parcel size, although should be large enough to incorporate the archery range safety plan.

17.47.050

F. Material and construction shall be designed and certified to capture all fired rounds. All archery lanes shall be equipped with backstops designed to fully stop arrows at the maximum draw weight and shooting distance proposed for the range.

G. Minors shall not be permitted on the shooting range unless accompanied by a responsible adult at all times, and at no time shall a child under the age of eight be permitted to discharge or handle firearms or crossbows on the shooting/archery range. Children under the age of eight may be permitted to handle a bow with the supervision of a responsible adult and in accordance with USA Archery.

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	DISCUSSION - City Staffing Analysis.
ITEM TYPE:	Discussion Item
FISCAL IMPACT:	N/A
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING
No

PREPARED BY
Adison Cragun, Management Intern

PRESENTED BY
Adison Cragun

RECOMMENDATION:
N/A

BACKGROUND:
The purpose of this presentation is to share a new analysis being conducted on neighboring cities and to gather input from the City Council on any changes or modifications they would like to see in the data being collected and analyzed.

As Eagle Mountain City continues to experience significant growth, it is important to regularly evaluate staffing levels and workloads to ensure the organization can effectively meet community needs. This analysis will compare Eagle Mountain's staffing and workload data with that of neighboring and similarly situated cities. The goal is to identify areas where the City may need additional resources, improve operational efficiency, and better plan for future growth.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

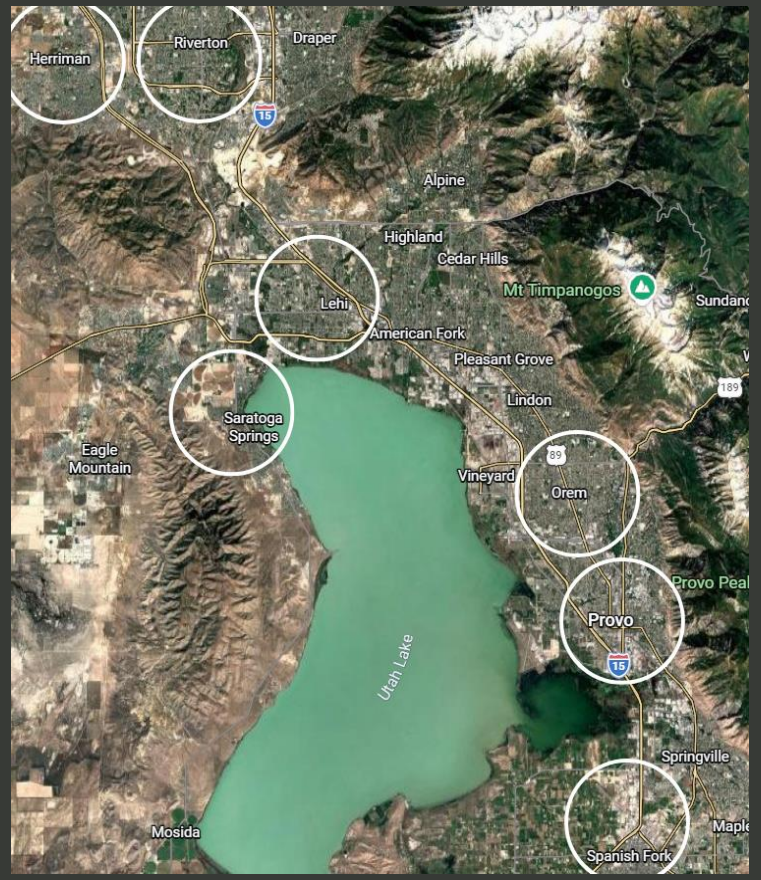
ATTACHMENTS:
1. Presentation

City Staffing Analysis

Neighboring City Comparison

Who will we be gathering data from?

- Herriman
- Riverton
- Saratoga Springs
- Lehi
- Orem
- Provo
- Spanish Fork



Areas of Investigation

- Demographics
- Parks
- Streets
- Trails & Open Space
- Water
- Recreation Center
- Fire
- Staffing Numbers (Overall)

City Staffing Evaluation Data

Contacts	
Parks	
Streets	
Trails/Open Space	
Water	

Demographics	City Name	
	City Square Miles	
	City Population	
	How do you estimate current population?	
Parks	How many acres of parks do you have?	
	How many total parks do you have?	
	How many regional parks do you have?	
	Are your parks maintained 100% in-house? Including cutting grass?	
Streets	How many lane miles of road do you maintain?	
	How many miles or lane miles of road are you responsible to snow plow?	
	Does your city plow snow in house or contracted out?	
	How many snow plow technicians do you have?	
Trails & Open Space	How many miles of paved trails do you have?	
	How many miles of unpaved trails do you have?	
	How many acres of unimproved open space do you have?	
Water	How many residential water connections do you have?	
	How many commercial water connections do you have?	
	How many industrial water connections do you have?	
	Does your city have secondary water?	
Rec Center	Do you have a rec center?	
	How many of your employees work at/for the rec center?	
Fire	Does your fire department run on 3 hand crews or 4 hand crews?	
Overall	How many total employees do you have working for your city?	

Staffing Numbers	Please provide a list of the departments/divisions you have and how many employees work in each.
	Example: Separated out by parks, recreation, recorder's office, communications, water, etc.

What we hope to learn

- Are we understaffed in any areas?
- Are we overstaffed in any areas?
- What services do other cities provide that we do not?
- What departments do other cities have that we do not?
- Are there services we should consider outsourcing?
- How many employees will we need as the city grows?
- How does our workload compare to other cities?

What changes would you like to see?

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	DISCUSSION - Proposed Policy Regarding Property Tax Funding for the Sheriff's Office.
ITEM TYPE:	Discussion Item
FISCAL IMPACT:	TBD
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING
No

PREPARED BY
Lacie Messerly, City Recorder

PRESENTED BY
Evan Berrett

RECOMMENDATION:
N/A

BACKGROUND:
During the Truth in Taxation hearing on August 6, 2026, it was recommended that legislation be brought forward to review the property tax rate and funding for the Sheriff's Office. This discussion is intended to provide the City Council with an opportunity to review a draft version of the proposed code and discuss next steps.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. DRAFT - EMMC 3.50

2565 N PONY EXPRESS PKWY
EAGLE MOUNTAIN, UT 84005
EAGLEMOUNTAINCITY.ORG

ENGINEERING

Monday, August 11, 2026

City Recorder's Office
Eagle Mountain City
1650 East Stage Coach Run
Eagle Mountain City, UT 84005

SUBJECT: **The Towns at Brylee Farms phase 'B' plat 4 into warranty Bond Release**

City Recorder:

The above-mentioned subdivision has completed all the required improvements as of this date. With the approval of the installed infrastructure, we are recommending this subdivision begin the required one-year warranty period. A reduced bond letter has been generated, reducing all bond items which have been completed. A warranty bond for the remaining warranty amount must be issued and maintained until released from the warranty period by the city.

Please contact me should you have any comments, questions, or concerns. Thank you.

Sincerely,

Vince Hogge

Vince Hogge, P.E.
Engineering Director
Eagle Mountain City

Cc: Lacie Messerly, City Recorder

BOND RELEASE REQUEST LETTER
The Towns at Brylee Farms
phase "B" plat 4

Engineering Division
2565 North Pony Express Parkway
Eagle Mountain City, Utah 84005
(801) 789-6671

1st Bond Release		
Original Bond Amount:	$	100,401.76
Previous Release Amount:	$	-
Amount to Release this Period:	$	1,000.00
Amount Remaining in Bond :	$	99,401.76

Bond Releases Summary		
#1	$	1,000.00
#2	$	-
#3	$	-
#4	$	-
TOTAL	$	1,000.00

8/11/2026

							QUANTITIES COMPLETED			MONIES RELEASED	
ITEM	DESCRIPTION	ORIGINAL QUANTITY	REDUCED QUANTITY	UNIT	UNIT COST	TOTAL	Previous Period	This Period	% to date	This Period	To Date
1	**SITE PREP.**										
a	Mobilization	1	0	LS	$15,000.00	$0.00	1	0	100%	$0.00	$0.00
b	Clear and grub	11457.59	0	SF	$4.00	$0.00	11,458	0	100%	$0.00	$0.00
c	SWPPP	1	0	LS	$32,000.00	$0.00	1	0	100%	$0.00	$0.00
2	**ROADWAY IMPROVEMENTS**										
a	3-inch Surface Course	33527	0	SF	$2.25	$0.00	33,527	0	100%	$0.00	$0.00
b	6-inch Road base (also behind curb)	35555	0	SF	$1.05	$0.00	35,555	0	100%	$0.00	$0.00
c	12-inch sub-base (e-fill) (behind curb)	33527	0	SF	$1.70	$0.00	33,527	0	100%	$0.00	$0.00
d	30" curb & gutter prep.	2666	0	LF	$9.00	$0.00	2,666	0	100%	$0.00	$0.00
e	5' Sidewalk	1387	0	LF	$50.00	$0.00	1,387	0	100%	$0.00	$0.00
f	8' asphalt trail prep.	403	0	LF	$110.00	$0.00	403	0	100%	$0.00	$0.00
g	Waterways	1401	0	LF	$45.00	$0.00	1,401	0	100%	$0.00	$0.00
h	Temp. turn around	1	0	LS	$20,000.00	$0.00	1	0	100%	$0.00	$0.00
i	ADA ramps	2	0	EA	$1,550.00	$0.00	2	0	100%	$0.00	$0.00
j	Street/stop signs	2	2	EA	$500.00	$1,000.00	0	2	100%	$1,000.00	$1,000.00
k	Testing	1	0	EA	$3,000.00	$0.00	1	0	100%	$0.00	$0.00
3	**CULINARY WATER**										
a	8" culinary water c-900	1387	0	LF	$62.00	$0.00	1,387	0	100%	$0.00	$0.00
b	8" gate valve	5	0	EA	$3,500.00	$0.00	5	0	100%	$0.00	$0.00
c	8" bend	2	0	EA	$995.00	$0.00	2	0	100%	$0.00	$0.00
d	Fire Hydrant	2	0	EA	$11,500.00	$0.00	2	0	100%	$0.00	$0.00
e	3/4" water service	54	0	EA	$2,150.00	$0.00	54	0	100%	$0.00	$0.00
f	Sand bedding	227.38	0	TON	$16.00	$0.00	227	0	100%	$0.00	$0.00
g	Import fill	421.3	0	TON	$16.00	$0.00	421	0	100%	$0.00	$0.00
4	**STORM DRAIN**										
a	15" ADS HP storm pipe	324	0	LF	$71.00	$0.00	324	0	100%	$0.00	$0.00
b	Combo box	3	0	EA	$7,150.00	$0.00	3	0	100%	$0.00	$0.00
c	Curb inlet boxes	3	0	EA	$3,650.00	$0.00	3	0	100%	$0.00	$0.00
d	Bedding gravel	83.88	0	TON	$26.00	$0.00	84	0	100%	$0.00	$0.00
e	Import fill	164.03	0	TON	$16.00	$0.00	164	0	100%	$0.00	$0.00
5	**SEWER-ON SITE**										
a	8" Sewer pipe	1063	0	LF	$50.00	$0.00	1,063	0	100%	$0.00	$0.00
b	48" manhole	3	0	EA	$5,500.00	$0.00	3	0	100%	$0.00	$0.00
c	4" sewer service	54	0	EA	$1,850.00	$0.00	54	0	100%	$0.00	$0.00
d	Bedding gravel	174.27	0	TON	$26.00	$0.00	174	0	100%	$0.00	$0.00
e	Imported trench fill	896.91	0	TON	$16.00	$0.00	897	0	100%	$0.00	$0.00
	TOTAL CONSTRUCTION COST					**$1,000.00**					
	Original 10% Bond Coverage					$99,401.76					
									Released this Period	$1,000.00	
	TOTAL BOND AMOUNT:					**$100,401.76**					

Vince Hogge
Vince Hogge, P.E.
Engineering Director

8-12-2026
Date

Robert Ballif
Robert Ballif
Engineering Tech. II

8/12/26
Date

2565 N PONY EXPRESS PKWY
EAGLE MOUNTAIN, UT 84005
EAGLEMOUNTAINCITY.ORG

ENGINEERING

DATE: Monday, August 10, 2026
TO: Vince Hogge
FROM: Robert Ballif Engineering Tech. II
SUBJECT: The Towns at Brylee Farms phase 'B' plat 4 walk through

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A walk-thru was performed on the above subdivision. The following were present.

Robert Ballif – Engineering Tech. II

After performing a walk-through, we have the following comments:

General Notes:

1. All water cans to be checked at time of meter install, the water cans will need to meet Eagle MTN City standards, i.e. level to 1 inch above the plane of the curb & sidewalk and the setters are to be 18 to 22 inches from top of lid to top of setter. Setters to be centered in the can. All water cans to have collar and EM City lid w/2 inch hole.
2. ~~AutoCAD as build drawings.~~

Ryegrass Dr.:

1. ~~Lot #414 sewer manhole add step.~~
2. ~~Lot #455 sewer manhole add step and place vented sewer lid. Remove the broken piece from the cone on the inside and grout the area.~~
3. ~~Lot #407 fire hydrant to have a hydrant pad according to the city details.~~

Inland Way:

1. ~~Lot #441 missing the street and stop sign.~~
2. ~~Intersection of Ryegrass sewer manhole add step and place vented sewer lid.~~

Willow Tree Rd:

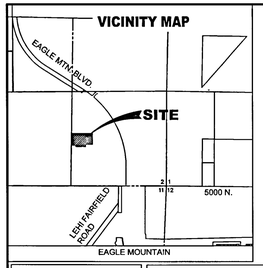
1. ~~Lot #433 fire hydrant to have a hydrant pad according to the city details.~~

Please provide us with your schedule to correct the above listed items. Once the punch list items have been verified for completion, the subdivision can be presented to the city for entering warranty.

THE TOWNS AT BRYLEE FARMS
PHASE B PLAT 4

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 6 SOUTH, RANGE 2 WEST, SALT LAKE BASE AND MERIDIAN
EAGLE MOUNTAIN, UTAH

VICINITY MAP



NOTES:

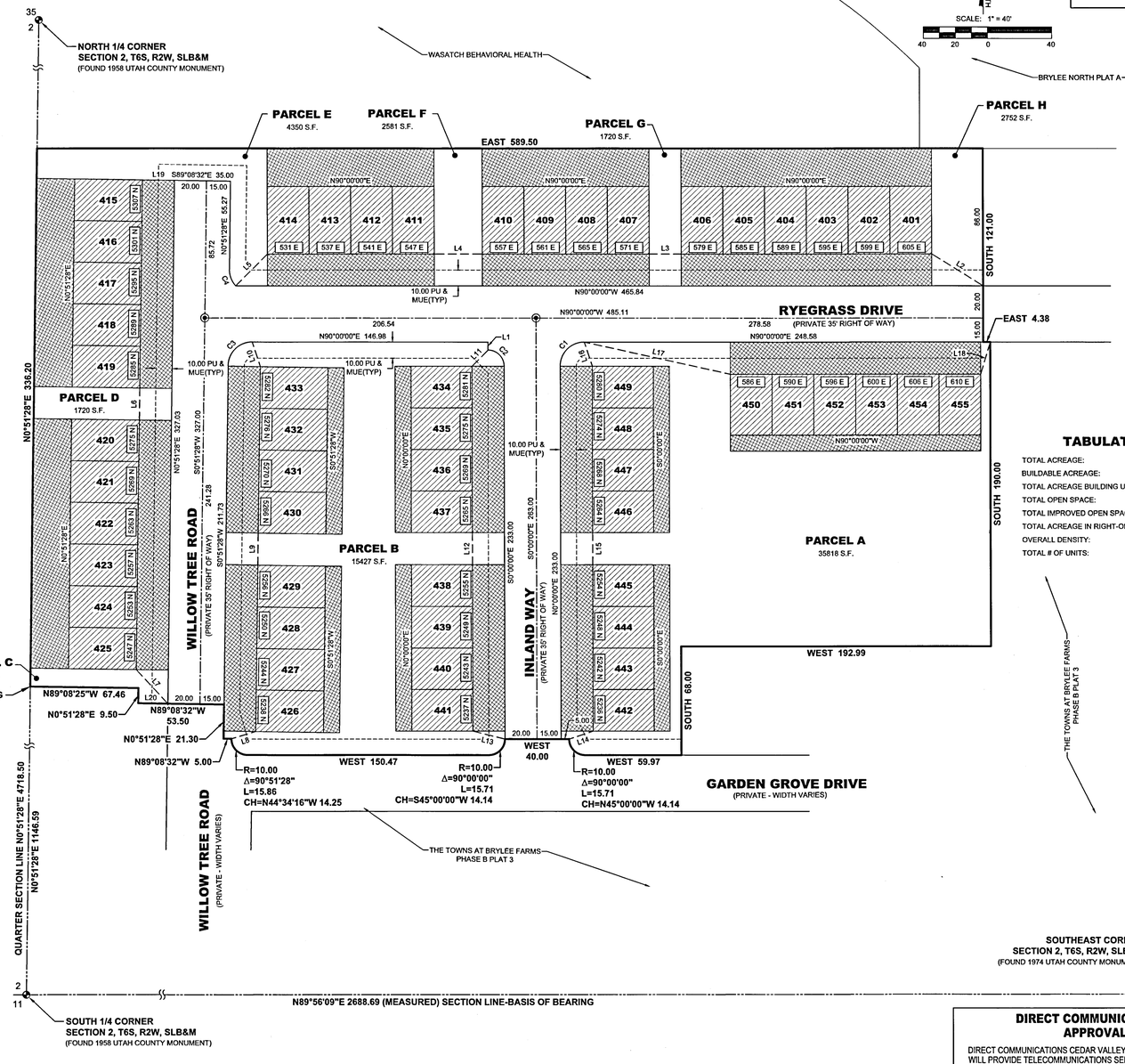
1. ⦿ ... TYPE III MONUMENT (ALUMINUM CAP AND REBAR) TO BE SET. #5 REBAR & CAP TO BE SET AT ALL LOT CORNERS. NAIL AND BRASS WASHER TO BE SET IN TOP OF CURB @ PROJECTION OF SIDE LOT LINES.
2. ALL SITE PLANS SUBMITTED WITH BUILDING PERMIT APPLICATION SHALL SHOW THE LOCATION OF UTILITY CONNECTIONS. NO WATER METERS ALLOWED IN DRIVEWAYS.
3. ALL COMMON AREAS SHALL BE DEDICATED TO THE TOWNS AT BRYLEE FARMS OWNERS SUB ASSOCIATION.
4. ALL PRIVATE ROADWAY AREAS TO BE PUBLIC UTILITY AND MUNICIPAL UTILITY EASEMENTS.
5. PARCEL "A" TO BE OWNED AND MAINTAINED BY THE TOWNS AT BRYLEE FARMS OWNERS SUB-ASSOCIATION.
6. PHASE "B" PLAT 4 SEWER SERVICED AND DELIVERED BY LIFT STATION IN BRYLEE FARMS WHICH IS OWNED AND MAINTAINED BY BRYLEE FARMS HOA.
7. ALL STORM DRAIN SHALL BE PRIVATE AND NOT MAINTAINED BY EAGLE MOUNTAIN CITY.

LINE TABLE

LINE	DIRECTION	LENGTH
L1	S0°00'00"E	5.00
L2	S57°59'41"E	37.74
L3	S90°00'00"E	20.00
L4	N90°00'00"E	30.00
L5	N44°47'02"E	28.18
L6	N0°51'28"E	20.00
L7	N42°43'45"W	29.01
L8	S73°11'00"W	15.74
L9	S0°51'28"W	20.00
L10	S18°03'34"E	16.12
L11	S45°00'00"W	14.14
L12	S0°00'00"E	20.00
L13	S75°57'49"E	20.62
L14	S71°33'55"W	15.81
L15	N0°00'00"E	20.00
L16	S18°26'05"E	15.81
L17	N77°36'16"W	93.17
L18	N16°35'35"E	20.87
L19	N89°08'32"W	20.00
L20	S89°08'32"E	18.50

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	CHORD
C1	15.00	90°00'00"	23.56	S45°00'00"W 21.21
C2	10.00	90°00'00"	15.71	S45°00'00"E 14.14
C3	15.00	89°08'32"	23.34	S45°25'44"W 21.05
C4	15.00	42°40'05"	11.17	N20°28'34"W 10.91

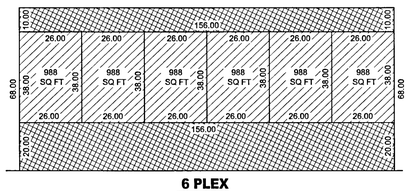


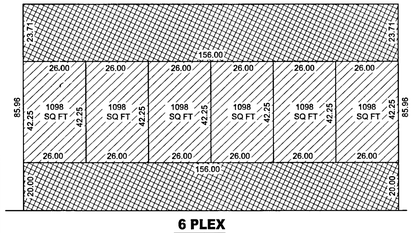
LEGEND

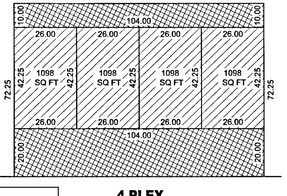
- BOUNDARY LINE
- CENTERLINE
- EASEMENT LINE
- EXISTING LOT LINES
- PROPOSED LOT LINE
- PROPOSED MONUMENT
- EXISTING MONUMENT
- LIMITED COMMON AREA
- PRIVATE AREA
- COMMON AREA

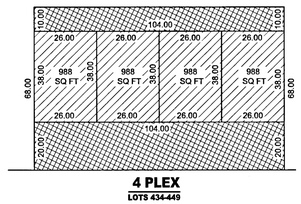
TABULATIONS

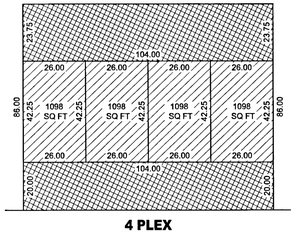
TOTAL ACREAGE:	4.76 ACRES
BUILDABLE ACREAGE:	4.76 ACRES
TOTAL ACREAGE BUILDING UNITS:	1.33 ACRES
TOTAL OPEN SPACE:	1.40 ACRES
TOTAL IMPROVED OPEN SPACE:	1.40 ACRES
TOTAL ACREAGE IN RIGHT-OF-WAY:	0.84 ACRES
OVERALL DENSITY:	11.55 UNITS/ACRE
TOTAL # OF UNITS:	55 UNITS

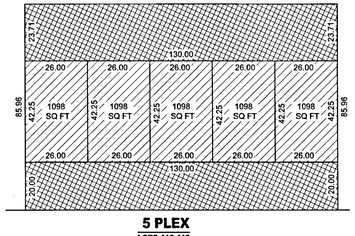


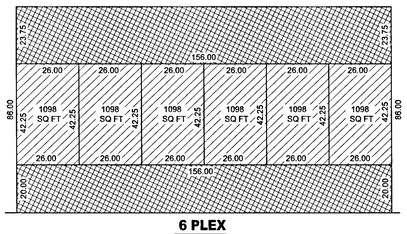












SURVEYOR'S CERTIFICATE

I, CHAD A. POULSEN, DO HEREBY CERTIFY THAT I AM A PROFESSIONAL LAND SURVEYOR, AND THAT I HOLD CERTIFICATE NO. 501182 IN ACCORDANCE WITH TITLE 58, CHAPTER 22, OF UTAH STATE CODE. I FURTHER CERTIFY BY AUTHORITY OF THE OWNER(S), THAT I HAVE COMPLETED A SURVEY OF THE PROPERTY DESCRIBED ON THIS PLAT IN ACCORDANCE WITH SECTION 17-23-17, OF SAID CODE, AND HAVE SUBDIVIDED SAID TRACT OF LAND INTO LOTS, BLOCKS, STREETS, AND EASEMENTS, AND THE SAME HAS, OR WILL BE, CORRECTLY SURVEYED, STAKED, AND MONUMENTED ON THE GROUND AS SHOWN ON THIS PLAT, AND THAT THIS PLAT IS TRUE AND CORRECT.

BOUNDARY DESCRIPTION

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 6 SOUTH, RANGE 2 WEST, SALT LAKE BASE & MERIDIAN, LOCATED IN EAGLE MOUNTAIN, UTAH, DESCRIBED AS FOLLOWS:

BEGINNING ON THE EAST LINE OF PINNACLES, PHASE A, PLAT 2, ENTRY NUMBER 55147:2025, ACCORDING TO THE OFFICIAL PLAT THEREOF ON FILE IN THE OFFICE OF THE UTAH COUNTY RECORDER, LOCATED N00°51'28"E ALONG THE QUARTER SECTION LINE 1146.59 FEET FROM THE SOUTH QUARTER CORNER OF SECTION 2, TOWNSHIP 6 SOUTH, RANGE 2 WEST, SALT LAKE BASE & MERIDIAN; THENCE ALONG SAID EAST LINE ALSO BEING THE QUARTER SECTION LINE BETWEEN THE SOUTH QUARTER CORNER AND NORTH QUARTER CORNER OF SECTION 2, TOWNSHIP 6 SOUTH, RANGE 2 WEST, N00°51'28"E 336.20 FEET; THENCE ALONG THE SOUTH LINE OF BRYLEE NORTH, PLAT A, ENTRY NUMBER 42776:2025, ACCORDING TO THE OFFICIAL PLAT THEREOF ON FILE IN THE OFFICE OF THE UTAH COUNTY RECORDER, TOGETHER WITH ITS WESTERLY EXTENSION, EAST 589.50 FEET; THENCE SOUTH 121.00 FEET; THENCE EAST 4.38 FEET; THENCE SOUTH 190.00 FEET; THENCE WEST 192.99 FEET; THENCE SOUTH 68.00 FEET; THENCE WEST 59.97 FEET; THENCE ALONG THE ARC OF A CURVE TO THE RIGHT 15.71 FEET WITH A RADIUS OF 10.00 FEET THROUGH A CENTRAL ANGLE OF 90°00'00", CHORD: N45°00'00"W 14.14 FEET; THENCE WEST 40.00 FEET; THENCE ALONG THE ARC OF A NON-TANGENT CURVE TO THE RIGHT 15.71 FEET WITH A RADIUS OF 10.00 FEET THROUGH A CENTRAL ANGLE OF 90°00'00", CHORD: S45°00'00"W 14.14 FEET; THENCE WEST 150.47 FEET; THENCE ALONG THE ARC OF A CURVE TO THE RIGHT 15.86 FEET WITH A RADIUS OF 10.00 FEET THROUGH A CENTRAL ANGLE OF 90°51'28", CHORD: N44°34'16"W 14.25 FEET; THENCE N89°08'32"W 5.00 FEET; THENCE N00°51'28"E 21.30 FEET; THENCE N89°08'32"W 53.50 FEET; THENCE N00°51'28"E 9.50 FEET; THENCE N89°08'25"W 67.46 FEET TO THE POINT OF BEGINNING.

CONTAINS: ±4.76 ACRES
207,421 SQ. FT.

Aug. 25, 2025
DATE

SURVEYOR
(See Seal Below)

OWNERS DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT WE, ALL OF THE UNDERSIGNED OWNERS OF ALL OF THE PROPERTY DESCRIBED IN THE SURVEYOR'S CERTIFICATE HEREON AND SHOWN ON THIS MAP, HAVE CAUSED THE SAME TO BE SUBDIVIDED INTO LOTS, BLOCKS, STREETS AND EASEMENTS AND DO HEREBY DEDICATE THE STREETS, EASEMENTS AND OTHER PUBLIC AREAS AS INDICATED HEREON FOR PERPETUAL USE OF THE PUBLIC, PURSUANT TO UTAH CODE 10-9A-604(D). THE OWNER(S) HEREBY CONVEYS THE COMMON AREA, AS INDICATED HEREON, TO THE TOWNS AT BRYLEE FARMS OWNERS SUB ASSOCIATION, WITH A REGISTERED ADDRESS OF 134 W 13100 SOUTH, SUITE 200 DRAPER, UT 84020.

IN WITNESS HEREOF WE HAVE HEREUNTO SET OUR HANDS THIS 27 DAY OF May, A.D. 2025

John D. Hatfield

Brylee Estates Development, Inc

ACKNOWLEDGMENT

STATE OF UTAH
S.S.
COUNTY OF Utah

ON THE 27 DAY OF May, A.D. 2025 PERSONALLY APPEARED BEFORE ME John D. Hatfield THE SIGNER(S) OF THE FOREGOING DEDICATION WHO DULY ACKNOWLEDGE TO ME THAT THEY DID EXECUTE THE SAME.

MARYLOU WAKAMATSU
NOTARY PUBLIC-STATE OF UTAH
COMMISSION# 746338
COMM. EXP. 12-02-2029

NOTARY PUBLIC FULL NAME: Marylou Wakamatsu
COMMISSION NUMBER: 746338
MY COMMISSION EXPIRES: 12-02-2029
A NOTARY PUBLIC COMMISSIONED IN UTAH

ACCEPTANCE BY LEGISLATIVE BODY

THE City OF Eagle Mountain
COUNTY OF UTAH, APPROVES THIS SUBDIVISION AND HEREBY ACCEPTS THE DEDICATION OF ALL STREETS; EASEMENTS, AND OTHER PARCELS OF LAND INTENDED FOR PUBLIC PURPOSES FOR THE PERPETUAL USE OF THE PUBLIC
THIS 9 DAY OF June, A.D. 2026

APPROVED David R. Gray MAYOR — ATTEST CITY ATTORNEY

APPROVED ENGINEER (See Seal Below) — ATTEST Cecily M. Haugen CLERK-RECORDER (See Seal Below)

ENBRIDGE GAS UTAH ACCEPTANCE

QUESTAR GAS COMPANY DBA ENBRIDGE GAS UTAH, HEREBY APPROVES THIS PLAT SOLELY FOR THE PURPOSE OF CONFIRMING THAT THE PLAT CONTAINS PUBLIC UTILITY EASEMENTS. ENBRIDGE GAS UTAH MAY REQUIRE ADDITIONAL EASEMENTS IN ORDER TO SERVE THIS DEVELOPMENT. THIS APPROVAL DOES NOT CONSTITUTE ABROGATION OR WAIVER OF ANY OTHER EXISTING RIGHTS, OBLIGATIONS OR LIABILITIES INCLUDING PRESCRIPTIVE RIGHTS AND OTHER RIGHTS, OBLIGATIONS OR LIABILITIES PROVIDED BY LAW OR EQUITY. THIS APPROVAL DOES NOT CONSTITUTE ACCEPTANCE, APPROVAL OR ACKNOWLEDGMENT OF ANY TERMS CONTAINED IN THE PLAT, INCLUDING THOSE SET FORTH IN THE OWNERS DEDICATION OR IN THE NOTES, AND DOES NOT CONSTITUTE A GUARANTEE OF PARTICULAR TERMS OR CONDITIONS OF NATURAL GAS SERVICE. FOR FURTHER INFORMATION PLEASE CONTACT ENBRIDGE GAS UTAH'S RIGHT-OF-WAY DEPARTMENT AT 800-366-8532.

QUESTAR GAS COMPANY DBA ENBRIDGE GAS UTAH

APPROVED THIS 11 DAY OF DEC, 2025

BY- Joan Ott-Eppler

TITLE- Joan Ott-Eppler

ENT 62349:2026 MAP# 20225
ANDREA ALLEN
UTAH COUNTY RECORDER
2026 Jul 28 12:45 PM FEE 176.00 BY KC
RECORDED FOR EAGLE MOUNTAIN CITY

DIRECT COMMUNICATIONS APPROVAL

DIRECT COMMUNICATIONS CEDAR VALLEY, LLC CERTIFIES THAT IT WILL PROVIDE TELECOMMUNICATIONS SERVICES TO THIS SUBDIVISION UTILIZING THE TRENCHES PROVIDED BY THE DEVELOPER AS PER THE DIRECT COMMUNICATIONS CEDAR VALLEY P.S.C. UTAH NO.1 TARIFF.

Marjorie Tuttle 12/19/25
DIRECT COMMUNICATIONS — DATE

ROCKY MOUNTAIN POWER APPROVAL

1. PURSUANT TO UTAH CODE ANN. §54-3-27 THIS PLAT CONVEYS TO THE OWNER(S) OR OPERATORS OF UTILITY FACILITIES A PUBLIC UTILITY EASEMENT ALONG WITH ALL THE RIGHTS AND DUTIES DESCRIBED THEREIN.
2. PURSUANT TO UTAH CODE ANN. §17-27a-603(4)(c)(ii) ROCKY MOUNTAIN POWER ACCEPTS DELIVERY OF THE PUE AS DESCRIBED IN THIS PLAT AND APPROVES THIS PLAT SOLELY FOR THE PURPOSE OF CONFIRMING THAT THE PLAT CONTAINS PUBLIC UTILITY EASEMENTS AND APPROXIMATES THE LOCATION OF THE PUBLIC UTILITY EASEMENTS, BUT DOES NOT WARRANT THEIR PRECISE LOCATION. ROCKY MOUNTAIN POWER MAY REQUIRE OTHER EASEMENTS IN ORDER TO SERVE THIS DEVELOPMENT. THIS APPROVAL DOES NOT AFFECT ANY RIGHT THAT ROCKY MOUNTAIN POWER HAS UNDER:
   (1) A RECORDED EASEMENT OR RIGHT-OF-WAY.
   (2) THE LAW APPLICABLE TO PRESCRIPTIVE RIGHTS.
   (3) TITLE 54, CHAPTER 8a, DAMAGE TO UNDERGROUND UTILITY FACILITIES
   (4) ANY OTHER PROVISION OF LAW.

12/15/2025
ROCKY MOUNTAIN POWER — DATE

PHASE B PLAT "4"

THE TOWNS AT BRYLEE FARMS

SUBDIVISION

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 6 SOUTH, RANGE 2 WEST, SALT LAKE BASE & MERIDIAN
EAGLE MOUNTAIN, UTAH

SCALE: 1" = 40'

SHEET 1 OF 1

SURVEYOR'S SEAL	NOTARY PUBLIC SEAL	CITY-COUNTY ENGINEER SEAL	COUNTY RECORDER SEAL
CHAD A. POULSEN No. 501182 PROFESSIONAL LAND SURVEYOR 8/25/2025	MARYLOU WAKAMATSU NOTARY PUBLIC-STATE OF UTAH COMMISSION# 746338 COMM. EXP. 12-02-2029	PROFESSIONAL ENGINEER No. 5148730 2202 VINCE R. HODGE 6-4-2026 STATE OF UTAH	EAGLE MOUNTAIN 19 96 CORPORATE SEAL

This form approved by Utah County and the municipalities therein.

LEI #18-0021

CIVIL
STRUCTURAL
SURVEY
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
Fax: 801.798.9393
office@lei-eng.com
www.lei-eng.com

2025

G:\LEI PROJECTS\2018-0021 BRYLEE ESTATES, PHASE B PLAT 4 NEW\2018-0021 BRYLEE ESTATES, PHASE B PLAT 4 SHEET NEW.DWG 8/21/2025 9:44 AM

Sec.2,T6S,R2W,SLB&M TC 08 NL

EAGLE MOUNTAIN
CITY COUNCIL INTERLOCAL MEETING MINUTES

JULY 30, 6:00 PM
EAGLE MOUNTAIN CITY COUNCIL CHAMBERS
1650 E STAGECOACH RUN, EAGLE MOUNTAIN, UT 84005

Eagle Mountain City Council Representatives: Councilmember Melissa Clark, Craig Whiting, Brett Wright and Rich Wood.

Eagle Mountain City Staff: Ben Reeves, City Manager; Steve Mumford, Deputy City Manager; David Salazar, Assistant City Engineer; Brad Hickman, Public Works Director; Vince Hogge, City Engineer; Brandon Larsen, Community Development Director and Lacie Messerly, City Recorder.

Saratoga Springs City Council Representative: Councilmember Edon Davenport.

Saratoga Springs City Staff: Jeremy Lapin, City Engineer & Public Works Director.

Representatives from Utah Department of Transportation (UDOT) – Region 3: Rob Clayton and Jeff Lewis.

Representatives from Mountainland Association of Governments (MAG): Bob Allen, Kevin Feldt, LaNiece Davenport and Tim Hereth.

Representatives from Alpine/Lake Mountain School District: Julie King

Representatives from Avenue Consultants: Rick Torgerson and Nick Betts.

6:00 PM SPECIAL SESSION – INTERLOCAL TRANSPORTATION MEETING

1. WELCOME BY CITY MANAGER BEN REEVES

City Manager Ben Reeves opened the meeting at 6:12PM and excused Mayor Gray and Mayor Carn for a County Event. He also welcomed representatives from Saratoga Springs, Avenue Consultants, UDOT, and Mountainland Association of Governments (MAG)

2. TRANSPORTATION PROJECTS

2.A. Lake Mountain Corridor (UDOT facility formally known as Mid Valley Road).

DRAFT

Representatives provided an overview of the Mid Valley Corridor study, including potential alignments, roadway grades, feasibility, and estimated costs. Several alignment options were reviewed, with consideration given to roadway grades, property impacts, future connectivity, and regional transportation needs. Property representatives discussed concerns regarding impacts to existing and planned development and suggested exploring alternative alignments farther south. The group discussed the potential for additional traffic modeling and further evaluation of alternative alignments before determining a preferred option. Continued coordination among the City, property owners, and regional partners was encouraged.

2.B. Silverlake Neighborhood to School District Connections.

Representatives discussed a potential connection from Silver Lake Parkway into Saratoga Springs and the surrounding area. Discussion included roadway alignment, traffic and safety considerations, impacts to the surrounding area, and coordination with the school district. The importance of evaluating the connection as part of the broader transportation network, rather than as an isolated roadway project, was emphasized. Additional study and coordination were discussed, including potential impacts related to sewer and other infrastructure.

Participants further discussed anticipated growth in the Cedar Valley and the resulting impacts on schools and the regional transportation network. The need to plan for future traffic associated with residential and school development was discussed, along with the importance of providing safe and efficient connections between communities.

3. OTHER CONNECTIONS (TIME PERMITTING)

3.A. Pony Express Pkwy Widening to 7 Lanes from Lake Mountain Corridor to Mountain View Corridor.

The City discussed its interest in future improvements and widening of Pony Express Parkway. Potential improvements and connections were discussed in the context of planned development and regional transportation needs. Staff and regional partners discussed coordinating future studies, access management, and roadway planning to ensure improvements are consistent with long-term transportation goals.

3.B. Inverness Ln to Talus Ridge Dr Connection.

3.C. Wild Blossom Boulevard.

3.D. Wagstaff Way East Alignment.

4. OTHER GENERAL QUESTIONS AND DISCUSSION (TIME PERMITTING)

The group discussed the significant costs associated with the proposed transportation projects and the challenges of securing regional and state funding. Participants emphasized the importance of continued collaboration and planning ahead of project funding and construction. Additional modeling, evaluation of alternative alignments, and coordination among the participating jurisdictions and property owners were identified as potential next steps.

5. ADJOURNMENT

The meeting was adjourned at 8:05 PM.

Approved by the City Council on August 18, 2026.

_____

Lacie A. Messerly
City Recorder

EAGLE MOUNTAIN
CITY COUNCIL MEETING MINUTES

AUGUST 4, 2026, 4:00 PM
EAGLE MOUNTAIN CITY COUNCIL CHAMBERS
1650 E STAGECOACH RUN, EAGLE MOUNTAIN, UT 84005

ELECTED OFFICIALS PRESENT: Mayor Jared R. Gray; Councilmembers Craig Whiting, Melissa Clark, Rich Wood, Brett Wright and Zachory Huish.

CITY STAFF PRESENT: Benjamin Reeves, City Manager; Steve Mumford, Deputy City Manager; Carson Stapley, Information Systems Manager; John Magness, Legislative and Policy Analyst; Evan Berrett, Director of Legislative and Strategic Services; Marcus Draper, City Attorney; Lacie Messerly, City Recorder; Kimberly Ruesch, Director of Administrative Services; Kyle Ireland, Communications Manager; Sariah Farmer, Digital Communications Specialist; Natalie Winterton, Assistant to the City Manager; Brandon Larsen, Planning Director; Steven Lehmitz, Planner; Stephanie Allred, Deputy Recorder; Mack Straw, Assistant Public Works Director; Vince Hogge, City Engineer; Brad Hickman, Public Works Director; David Salazar, Assistant City Engineer; Kiara Polee, Affordable Housing Coordinator; David Ulibarri, Public Safety Director; Embret Fossum, UFA Battalion Chief; and Jeff Robinson, Utah County Sheriff's Department Lieutenant.

CITY STAFF PRESENT ELECTRONICALLY: Michele Graves, Library Director.

4:00 PM WORK SESSION – CITY COUNCIL CHAMBERS

Mayor Gray called the meeting to order at 4:00 PM.

1. DISCUSSION AND INFORMATION ITEMS

1.A. DISCUSSION – Towns at Brylee Farms Phase B Update

The recording of the discussion can be found online here at 00:00:26.

Applicant Greg Wall presented revised townhome plan for Brylee Farms Phase B that included an extended garage depth, as previously requested by the City Council, and responded to questions from the City Council. The City Council provided feedback and direction for moving the project forward.

1. B. DISCUSSION – Healthy Utah Community Designation

The recording of the discussion can be found online here at 00:23:04.

Deputy City Manager Steve Mumford provided background on the item and outlined the steps necessary to achieve Healthy Utah Community designation. Mr. Mumford discussed how Eagle Mountain compares to state averages, reviewed survey results, and presented three new strategies to be implemented over the next three years as part of the Community Health Plan. Mr. Mumford responded to questions from the City Council.

1.C. DISCUSSION – LBiSat Property – Maintaining Clear Lines of Sight

The recording of the discussion can be found online here at 00:42:55.

LBiSat LLC CEO/Owner Rodger Lyman provided background on the business, discussed the importance of maintaining clear lines of sight for the company's satellite dishes, and expressed concerns regarding future development on surrounding properties. President Cory Wofford, Executive Director Rusty Layton, and Mr. Lyman responded to questions from the City Council.

Community Development Director Branson Larsen and Public Works Director Brad Hickman presented additional information regarding the surrounding properties and current zoning regulations.

1.D. DISCUSSION – Consolidated Project List

The recording of the discussion can be found online here at 01:12:51.

City Manager Ben Reeves shared Eagle Mountain's Strategic Goals, emphasizing their connection to current City initiatives and the importance of establishing and prioritizing goals. Mr. Reeves provided an overview of current projects and initiatives by department and requested City Council feedback and direction on project priorities moving forward.

2. CITY MANAGER INFORMATION ITEMS

Item was not discussed.

3. AGENDA REVIEW

15.A. PUBLIC HEARING ONLY – Program Year 2026 HUD CDBG Annual Action Plan.

The recording of the discussion can be found online here at 01:54:10.

Director of Legislative and Strategic Services Evan Berrett requested that a Special City Council meeting be held to consider Community Development Block Grant (CDBG) action items that must be addressed before the scheduled August 18 City Council meeting.

17.A. UPDATE – Legislative Priorities List

The recording of the discussion can be found online here at 01:58:20.

Management and Policy Analyst John Magness provided updates on items included in the Legislative Priorities List and responded to questions from the City Council.

4. ADJOURN TO A CLOSED SESSION

MOTION: *Councilmember Whiting moved to adjourn to a Closed Session for the purpose of discussion of pending or reasonably imminent litigation; the character, professional competence, or physical or mental health of an individual; the purchase, lease, sale, or exchange of real property; a proposed development agreement, project proposal, or financing proposal related to the development of land owned by the state or a political subdivision; and/or the deployment of security personnel, devices, or systems, pursuant to Section 52-4-205(1) of the Utah Code, Annotated. Councilmember Huish seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The Work Session was adjourned at 6:06 PM.

The recording of the motion can be found online here at 02:04:53.

7:00 PM POLICY SESSION – CITY COUNCIL CHAMBERS

5. CALL TO ORDER

Mayor Gray called the meeting to order at 7:05 PM.

The recording of the discussion can be found online here at 02:06:14.

6. PLEDGE OF ALLEGIANCE

Miss Eagle Mountain Trieste Smith led the Pledge of Allegiance.

7. INFORMATION ITEMS/UPCOMING EVENTS

The recording of the discussion can be found online here at 02:07:01.

City Manager Ben Reeves provided updates.

8. APPOINTMENTS

8.A. APPOINTMENTS

1. KJ Call – Youth City Council Mayor

MOTION: *Councilmember Whiting moved to approve the appointment of KJ Call as Youth City Council Mayor through May 2027. Councilmember Wood seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 02:08:31.

2. Youth City Council Members

MOTION: *Councilmember Whiting moved to approve the appointment of Youth City Council Members through May 2027. Councilmember Wood seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 02:09:00.

City Recorder Lacie Messerly administered the Oath of Office to Youth City Council Mayor KC Call and the Youth City Council members.

The recording of the discussion can be found online here at 02:09:58.

9. INTRODUCTIONS

9.A. INTRODUCTION – 2026 Miss Eagle Mountain Royalty Introduction

The recording of the discussion can be found online here at 02:12:17.

The 2026 Miss Eagle Mountain Royalty introduced themselves and shared the community service initiative they will focus on during their year of service.

- Trieste Smith – Miss Eagle Mountain
- Brighton Haws – Miss Eagle Mountain Teen
- Emeline Smith – Miss Eagle Mountain Teen 1st Attendant

10. PUBLIC COMMENTS

Mayor Gray opened the public comment period at 7:16 PM.

The following individuals spoke during the Public Comment period:

- Duncan Searcy – spoke regarding the proposed tax increase, expressed concern about the potential hardship it could create for residents and requested transparency regarding how the additional funds would be used.

Mayor Gray closed the public comment period at 7:19 PM.

The recording of the discussion can be found online here at 02:15:54.

11. CITY COUNCIL/MAYOR ITEMS

The Mayor and Councilmembers offered comments to the public.

The recording of the discussion can be found online here at 02:21:06.

CONSENT AGENDA

12. MINUTES

12.A. July 21, 2026 Minutes – Regular City Council Meeting

13. PRELIMINARY PLATS & SITE PLANS

13.A. SITE PLAN – Eagle Mountain Chapel and Recreation Building

14. ORDINANCES

14.A. ORDINANCE – An Ordinance of Eagle Mountain City, Utah, Approving the Eagle Mountain Chapel and Recreation Building Development Agreement.

MOTION: *Councilmember Clark moved to approve the Consent Agenda. Councilmember Wright seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 02:33:36.

SCHEDULED ITEMS

15. PUBLIC HEARING ONLY

15.A. PUBLIC HEARING ONLY – Program Year 2026 HUD CDBG Annual Action Plan

Mayor Gray announced that a Special Council Meeting would be held virtually on August 10, 2026, at 3:30 p.m., to complete action items necessary prior to the August 18, 2026, City Council meeting.

Affordable Housing Coordinator Kiara Polee stated that the public hearing is necessary to fulfill the second requirements for receiving Community Development Block Grant (CDBG) funds.

Mayor Gray opened the Public Hearing period at 7:36 PM.

The following individuals spoke during the public hearing period:

- Charlotte Ducos – Stated that the local high school would like to add a facility to support at-risk populations and requested that the project be considered as a potential use for CDBG funds.

Mayor Gray closed the Public Hearing at 7:37 PM.

CDBG Consultant Elizabeth McNannay responded to questions from the City Council regarding the use of CDBG funds for proposed projects.

The recording of the discussion can be found online here at 02:55:23.

16. ORDINANCES/PUBLIC HEARINGS

16.A. ORDINANCE/PUBLIC HEARING – An Ordinance of Eagle Mountain City, Utah, Rezoning Certain Lands Knows as Scenic Mountain.

The recording of the discussion can be found online here at 02:55:23.

Community Development Director Brandon Larsen provided a background on the item and the reason for the proposed rezone, presented the proposed rezone area, and responded to questions from the City Council.

Mayor Gray opened the Public Hearing period at 7:50 PM. Seeing no one wished to speak Mayor Gray closed the Public Hearing at 7:50 PM.

MOTION: *Councilmember Whiting moved to approve Agenda Item 16.A. according to the chart of effected properties. Councilmember Wood seconded the motion.*

The recording of the motion can be found online here at 02:50:56.

Councilmember Wright suggested that a substitute motion be considered to approve the General Plan Amendment according to the chart of affected properties for this item and to approve the zoning in accordance with the proposed rezoning map for each of the properties.

MOTION: *Councilmember Whiting moved to amend the motion to approve the General Plan Amendment according to the chart of affected properties for this item and to approve the zoning in accordance with the proposed rezoning map for each of the properties. Councilmember Wood seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 02:53:02.

16.B. ORDINANCE/PUBLIC HEARING – An Ordinance of Eagle Mountain City, Utah, Amending the Master Plan know as Transportation Master Plan (TMP) and Impact Fee Facilities Plan (IFFP).

The recording of the discussion can be found online here at 02:54:23.

Assistant City Engineer David Salazar presented the item, reviewing the proposed updates and highlighting revisions needed to reflect current roadway planning, project priorities, functional classifications, cost estimates and anticipated funding contributions. The revisions are intended to ensure the Transportation Master Plan and Impact Fee Facilities Plan remain consistent with the City's current transportation network, planned improvements, and infrastructure funding assumptions. Mr. Salazar responded to questions from the City Council.

Mayor Gray opened the Public Hearing period at 8:35 PM.

The following individuals spoke during the public hearing period:

- Quinn Linde – Provided comments regarding the need for a connecting road from Silverlake to the new high school to provide additional transportation options for students and families. Stated that when communities are physically connected, it becomes easier for people to interact, participate, and build relationships. A document was provided for the record.

- Melissa Powers – Addressed the Silverlake Parkway connection to the new high school, stating that it would provide additional connections for students and families. Expressed support for the Transportation Master Plan.

- Ben Perez – Expressed support for the proposed Transportation Master Plan. Raised concerns about student safety, emphasizing the need for traffic control measures and additional connections to improve safety and mobility.

Mayor Gray closed the Public Hearing at 8:43 PM.

MOTION: *Councilmember Wright moved to adopt an Ordinance of Eagle Mountain City, Utah, amending the Master Plan Known as the Transportation Master Plan (TMP) and Impact Fee Facilities Plan (IFFP), with the staff recommendations presented, with the addition of E 1000 N as Minor Collector from Pony Express Pkwy to East Expressway and the removal*

of the connection at Canyon Wash. Councilmember Whiting seconded the motion.

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 03:47:17.

17. LEGISLATIVE ITEMS

17.A. UPDATE – Legislative Priorities List

Mayor Gray stated the item was discussed during the Work Session.

18. CITY COUNCIL/MAYOR'S BUSINESS AND LIAISON REPORTS

Mayor Gray and the City Councilmembers offered comments and reports on committees to which they are assigned as liaisons.

The recording of the discussion can be found online here at 03:49:40.

20. ADJOURN TO A CLOSED SESSION

MOTION: *Councilmember Wood moved to adjourn to a Closed Session for the purpose of discussion of pending or reasonably imminent litigation; the character, professional competence, or physical or mental health of an individual; the purchase, lease, sale, or exchange of real property; a proposed development agreement, project proposal, or financing proposal related to the development of land owned by the state or a political subdivision; and/or the deployment of security personnel, devices, or systems, pursuant to Section 52-4-205(1) of the Utah Code, Annotated. Councilmember Whiting seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 03:52:30.

21. ADJOURNMENT

MOTION: *Councilmember Wood moved to adjourn the meeting at 9:41 PM. Councilmember Wright seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 03:54:14.

The meeting was adjourned at 9:41 PM.

Approved by the City Council on August 18, 2026.

_____

Lacie A. Messerly
City Recorder

EAGLE MOUNTAIN
CITY COUNCIL MEETING – SPECIAL SESSION MINUTES

AUGUST 6, 6:00 PM
EAGLE MOUNTAIN CITY COUNCIL CHAMBERS
1650 E STAGECOACH RUN, EAGLE MOUNTAIN, UT 84005

ELECTED OFFICIALS PRESENT: Councilmembers Craig Whiting, Melissa Clark, Rich Wood, Brett Wright and Zachory Huish.

ELECTED OFFICIALS PRESENT ELECTRONICALLY: Mayor Jared R. Gray.

CITY STAFF PRESENT: Benjamin Reeves, City Manager; Steve Mumford, Deputy City Manager; Carson Stapley, Information Systems Manager; Evan Berrett, Director of Legislative and Strategic Services; Marcus Draper, City Attorney; Lacie Messerly, City Recorder; Kimberly Ruesch, Director of Administrative Services; Kyle Ireland, Communications Manager; Natalie Winterton, Assistant to the City Manager; Stephanie Allred, Deputy Recorder; Penny Vigil, Deputy Recorder; David Ulibarri, Public Safety Director; and Uth County Sheriff Mike Smith.

7:00 PM CITY COUNCIL – SPECIAL SESSION

1. CALL TO ORDER

Mayor Gray called the meeting to order at 6:02 PM.

The recording of the discussion can be found online here at 00:04:38.

2. PLEDGE OF ALLEGIANCE

Councilmember Whiting led the Pledge of Allegiance.

3. PUBLIC HEARING: PROPOSED TAX INCREASE (TRUTH-IN-TAXATION)

3.A. PUBLIC HEARING ONLY – Proposed Property Tax Increase

Mayor Gray provided information regarding the packets available to those in the audience, which included an agenda, the Utah County Notice of Proposed Tax Increase, the Proposed Property Tax Impact Schedule, and Information regarding Eagle Mountain City property tax basics. Mayor Gray also reviewed the rules and procedures for the public hearing.

DRAFT

Mayor Gray opened the public comment period at 6:07 PM.

The following individuals provided public comment regarding the proposed tax increase: John Breeding, Melissa Bradley, Adam Bradley (whose comment was read by his wife, Melissa Bradley), Duncan Searcy, Charles Peterson, Dave Bresnahan, Bryan Free, Matthew Endicott, Andrew Burke, Kelly Horton, Anthony Wood, Bruno Hunziker, Nathan Thornburg, Matt Everett, Mark McConkie, Betty Peralta, Joseph Petillot, Josh Schadt, Mark Espinoza, Jeff Ruth, Denver Dorrall, Mark Cookson, Traci Porretta, Steve Porretta, Charlotte Ducos, Michael Valentini, Elba Maria Perez, Walter Peterson, Jacob Moore, Jason Rasmussen, Joy Rasmussen, Michael Carey, Camille Gardner, KB Bergeson, Steve Campbell, Cedric De Chermont, Daniel Laub, Shana Clark, Kristen Meyer, Cheryl Karr, Roger Laird, Zeke Magdaleo, Megan Strader, Tony Castillo, Melanie Castillo, Matthew Joseph, JoAnna Brown, Chris Waldran, Eric Nelson, Elisa Harless, and James Russon.

The following individuals submitted comments by email or requested that their comments be read by City Recorder Lacie Messerly regarding the proposed tax increase: Garrett Haueter, Isaac Gardner, Dax Steidley, Colton Hart, Sadie Hart, Melissa Gordet, David Gordet, Jessica Demers, Alex Nelson, Briana Nelson, M. Patrick Mayo, Derek Rappleye, Trenton Webb, Briti Mitchell, Liliana Elliot, Kami Watterson, Jill Jones, Suzanna Norris, Brenda Martinez, Zachary Vance, Martin Indreboe, David Salazar, Gary Fewkes, Steve Proffit, Vienna Porretta, and Ethan Neal.

The following individuals provided virtual public comment regarding the proposed tax increase: Alex Washburn, Ben Crabtree, Cam Pew, Carli King, Steve Mugleston, Joel Anderson, Joe Richmond, Zachary Vance, Tim Blair, Roxanne Richmond, and Tyler Duchos.

After all individuals who wished to speak had been given an opportunity to comment, *Mayor Gray closed the public comment period at 9:00 PM*

The public hearing was held to receive public comment regarding the proposed tax increase. Individuals speaking during the hearing expressed both support for and opposition to the proposed increase. Comments included concerns regarding the financial impact on property owners and residents, the necessity and intended use of the additional revenue, municipal services and infrastructure needs, and other matters related to the proposed tax increase.

The recording of the discussion can be found online here at 00:07:07.

4. RESOLUTIONS

4.A. RESOLUTION – A Resolution of Eagle Mountain City, Utah, Approving a Property Tax Increase above the Certified Tax Rate for Fiscal Year 20226-2027.

Mayor Gray read the Proposed Property Tax Impact Schedule.

The City Council discussed the proposed property tax increase, including concerns raised by citizens, the reason for the proposed increase and the use of additional funds.

The recording of the discussion can be found online here at 03:32:53.

MOTION: *Councilmember Whiting moved to adopt a Resolution of Eagle Mountain City, Utah, to approve and adopt a property tax rate of 0.001500 for Fiscal Year 2026-2027. This rate exceeds the certified tax rate of 0.000530 and will result in an increase in the City's ad valorem property tax budgeted revenue of approximately $5,591,594.00 or 183.02% above the City's property tax budgeted revenue for the prior year, exclusive of new growth. Councilmember Wright seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 04:37:27.

5. ADJOURNMENT

MOTION: *Councilmember Wood moved to adjourn the meeting at 10:38 PM. Councilmember Wright seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The recording of the motion can be found online here at 04:40:07.

The meeting was adjourned at 10:38 PM.

Approved by the City Council on August 18, 2026.

_____
Lacie A. Messerly
City Recorder

EAGLE MOUNTAIN
CITY COUNCIL SPECIAL SESSION MINUTES

AUGUST 10, 2026, 3:30 PM
EAGLE MOUNTAIN CITY COUNCIL CHAMBERS
1650 E STAGECOACH RUN, EAGLE MOUNTAIN, UT 84005

ELECTED OFFICIALS PRESENT: Mayor Jared R. Gray; Councilmembers Melissa Clark and Brett Wright.

ELECTED OFFICIALS PRESENT ELECTRONICALLY: Councilmembers Craig Whiting, Rich Wood and Zachory Huish.

CITY STAFF PRESENT: Evan Berrett, Director of Legislative and Strategic Services; Steve Mumford, Deputy City Manager; Marcus Draper, City Attorney; Lacie Messerly, City Recorder.

CITY STAFF PRESENT ELECTRONICALLY: Kiara Polee, Affordable Housing Coordinator

3:30 PM WORK SESSION – CITY COUNCIL CHAMBERS

Mayor Gray called the meeting to order at 3:32 PM. Councilmembers Craig Whiting, Rich Wood and Zachory Huish appeared electronically.

1. CALL TO ORDER

Mayor Gray called the meeting to order at 3:32PM.

2. PLEDGE OF ALLEGIANCE

Councilmember Wright led the Pledge of Allegiance.

3. RESOLUTIONS

15.A. RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving the Fiscal Year 2026 Community Development Block Grant (CDBG) Annual Action Plan and Authorizing Its Submission to the U.S. Department of Housing and Urban Development.

The recording of the discussion can be found online here at 00:01:57.

DRAFT

Affordable Housing Coordinator, Kiara Polee presented the Annual Action Plan for the City's Community Development Block Grant (CDBG) funds for the upcoming program year. The plan identifies the proposed use of CDBG funds in accordance with the City's 2025–2029 Consolidated Plan. Staff noted that the required public participation process had been completed and that Council approval was needed to submit the plan to HUD by the August 14, 2026 deadline. Representative of Resource Consultants, Elizabeth McNannay appeared electronically and answered questions from the City Council.

MOTION: *Councilmember Clark moved to approve a Resolution of Eagle Mountain City, Utah, Approving the Fiscal Year 2026 Community Development Block Grant (CDBG) Annual Action Plan and Authorizing Its Submission to the U.S. Department of Housing and Urban Development. Councilmember Wright seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

4. ADJOURNMENT

MOTION: *Councilmember Wood moved to adjourn the meeting at 3:51 PM. Councilmember Clark seconded the motion.*

Melissa Clark	Yes
Zachory Huish	Yes
Craig Whiting	Yes
Rich Wood	Yes
Brett Wright	Yes

The motion passed with a unanimous vote.

The meeting was adjourned at 3:51 PM.

Approved by the City Council on August 18, 2026.

_____

Lacie A. Messerly
City Recorder

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Awarding the Bid for EMC 6.0 MGD Wastewater Treatment Facility Expansion - GMP-2 Oxidation Ditch and Miscellaneous Site Improvements to MGC Contractors, Inc. and Approving the Contract.
ITEM TYPE:	Bid Award
FISCAL IMPACT:	$4,053,663.19
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING

PREPARED BY
Mack Straw, Public Utilities Manager

PRESENTED BY
Mack Straw

RECOMMENDATION:
Staff recommends that City Council approves a Resolution of Eagle Mountain City, Utah, Awarding the Bid for EMC 6.0 MGD Wastewater Treatment Facility Expansion - GMP-2 Oxidation Ditch and Miscellaneous Site Improvements to MGC Contractors, Inc. and Approving the Contract.

BACKGROUND:
The 6 million gallon daily MBR expansion is scheduled to be completed in early 2029. The current oxidation ditch does not have sufficient capacity to treat the 2029 projected influent to the plant. This GMP authorizes installation of equipment, controls, SCADA integration, and related site improvements that will optimize the oxidation ditch process, essentially bridging the capacity gap before the MBR expansion is online. Additionally, this capacity increase in the oxidation ditch is part of the master plan for the facility to eventually reach 14 mgd average daily flow capacity. Other improvements included in GMP 2 are related to either optimizing the City's reuse water infrastructure or to keeping the MBR expansion project on schedule.

ITEMS FOR CONSIDERATION:
To maintain acceptable treatment performance, the city is currently using a 6-inch trash pump to recirculate flows; however, this is only a temporary solution.

PLANNING COMMISSION ACTION/RECOMMENDATION:

ATTACHMENTS:
1. Resolution
2. Proposed Work Authorization - Unsigned
3. Recommendation of Award

4. WCD 02-01 Markups
5. WWTF Oxidation Ditch Upgrades
6. WWTF Oxidation Ditch Improvements

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, AWARDING THE BID FOR THE 6.0 MG WASTEWATER TREATMENT FACILITY EXPANSION (GMP-2 OXIDATION DITCH AND MISCELLANEOUS SITE IMPROVEMENTS) TO MGC CONTRACTORS AND APPROVING THE CONTRACT

PREAMBLE

WHEREAS, the City Council of Eagle Mountain City, Utah, finds that it is in the public interest to award the bid for the EMC 6.0 MGD MBR Wastewater Treatment Facility Expansion - GMP-2 Oxidation Ditch and Miscellaneous Site Improvements to MGC Contractors, Inc. and Approving the Contract, as set forth herein;

BE IT RESOLVED by the City Council of Eagle Mountain City, Utah:

1. The bid award and contract are hereby approved as set forth more specifically in Exhibit A.

2. The Mayor is authorized to execute the contract as set forth more specifically in Exhibit A.

3. This Resolution shall take effect upon passage.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Exhibit A

SECTION 00 54 50

WORK AUTHORIZATION: GMP 2 – OXIDATION DITCH & MISC SITE IMPROVEMENTS

		Project No.
Owner:	Eagle Mountain City	EMC_FY26-04
Owner's Advisor:	Advanced Engineering (AE2S, LLC)	P13139-2023-002
Engineer:	Advanced Engineering (AE2S, LLC)	P13139-2023-002
CM/GC:	MGC Contractors, Inc.	
Project:	EMWWTF 6.0 MGD Expansion	
Contract Name:	CMGC 6 MGD MBR Wastewater Expansion Pre-Construction	
Work Authorization:	GMP 2 – OXD & Misc. Site Improvements	
Date Issued: 8-18-2026	Effective Date of Work Authorization:	

Terms used in this Work Authorization have the meanings stated in the General Conditions and the Supplementary Conditions. This Work Authorization is both Notice of Award and Notice to Proceed.

The Contract is modified as follows upon execution of this Work Authorization:

ARTICLE 1—AUTHORIZED WORK

1.01 CM/GC shall complete all Work that is specified or indicated in this Work Authorization. The authorized Work is generally described as follows:

A. **GMP 2 - Oxidation Ditch Improvements (subject to paragraphs 1.02B and 1.03A)**

1. Installation of pumps and piping, with all valves and other appurtenances necessary for complete and functional improvements to the Oxidation Ditch.

2. Integration of OXD improvements into site SCADA system.

B. **GMP 2 – Miscellaneous Site Improvements**

1. Integration of Tertiary Treatment Building into site SCADA system.

2. HVAC related improvements in the Tertiary Treatment Building.

3. Manhole procurement and installation for effluent flow control valve.

C. **Contingency:** It is anticipated that the contingency identified in Exhibit B will be used to begin site earthworks including: excavation, haul off, subgrade prep, stockpiling, testing, clearing/grubbing.

1. All Work funded through the Contingency shall require prior written authorization from Owner through an executed Contingency Release Form.

2. Any unused contingency shall be returned to Owner in full or available to use for future Work Authorizations.

3. Contingencies exceeding the amount authorized by this and other Work Authorizations are not permitted unless authorized in writing by the Owner.

1.02 Immediate Authorized Work

A. Work in 1.01B Miscellaneous Site Improvements is authorized immediately upon execution of this Work Authorization.

B. CM/GC is authorized immediately upon execution of this Work Authorization to perform submittal review, provide procurement support, coordinate shop drawings, and other preconstruction services related to 1.01A Oxidation Ditch Improvements

1.03 Work Requiring Permit Approval

A. CM/GC is authorized to proceed with construction activities identified in 1.01A Oxidation Ditch Improvements upon receipt of written Notice of Permit Approval from the Owner.

1.04 The authorized Work Package is more fully defined in Exhibit A.

ARTICLE 2—COMPENSATION

2.01 Owner shall pay CM/GC for the completion of the Work Package described in this Work Authorization in accordance with the provisions set forth in the Agreement.

2.02 Lump Sum Work

A. Compensation for all Work is a lump sum amount of **$4,053,663.19.**

B. For all Unit Price Work, an amount equal to the sum of the extended prices established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item. Unit Price Work is itemized in Exhibit B. The extended prices for Unit Price Work set forth as of the Effective Date of the Work Authorization are based on estimated quantities. As provided in Paragraph 13.02 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Owner's Advisor.

ARTICLE 3—CONTRACT TIMES

3.01 CM/GC agrees to perform the Work set forth in this Work Authorization pursuant to the schedule in Exhibit B. CM/GC will complete the Work covered in this Work Authorization in a timely manner that will (a) allow CM/GC to meet the Substantial Completion and final completion requirements of the Contract, and (b) avoid any adverse impact on the completion of other Work Authorizations for which a Milestone has been established.

3.02 Milestones and Associated Damages

A. Work included in this Work Authorization is a Milestone and must be substantially completed on or before the number of days from the effective date of this Work Authorization shown in Exhibit B.

1. Milestone 1 will be considered substantially complete when the following requirements have been met:

a. **Successful and operational installation of oxidation ditch improvements and other site improvements.**

ARTICLE 4—CONTRACT DOCUMENTS

4.01 Contract Documents for Work Authorization

A. The Contract Documents are identified in the Agreement, Article 16. The following provisions do not limit or modify the Contract Documents.

B. The Contract Documents with specific applicability to this Work Authorization consist of the following:

1. This Work Authorization, including any exhibits identified as Contract Documents.

2. Bonds

a. Performance bond, together with power of attorney.

b. Payment bond, together with power of attorney.

3. The following which may be delivered or issued on or after the Effective Date of the Work Authorization and are not attached hereto:

a. Contract Amendments pertaining to this Work Authorization

b. Change Orders, Work Change Directives, and Field Orders that modify this Work Authorization.

4. Drawings and Specifications shown in Exhibit A as included parts of the Work Package (or Work Packages) authorized in this Work Authorization.

C. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 5—EXECUTION

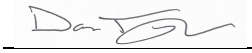
	Issued by Owner's Advisor
By:	Russell Sprague, P.E.
Title:	Project Manager
Date:	8-18-2026
	Accepted by CM/GC
By:	Dan Taylor
Title:	Project Manager
Date:	8/11/26
By *(signature)*:	
	Authorized by Owner
By:	Jared Gray
Title:	Mayor
Date:	
By *(signature)*:	

EXHIBIT A—DESIGN DOCUMENTS

ARTICLE 1—SPECIFICATIONS

1.01 Specifications entitled **GMP2 – Eagle Mountain WWTF Oxidation Ditch Improvements** dated **April, 2026.**

1.02 Specifications listed in the table of contents.

1.03 Work Change Directive number WCD 02-01 attached herein.

ARTICLE 2—DRAWINGS

2.01 Drawings, not attached but incorporated by reference, consisting of **78** sheets with each sheet bearing the following general title: **GMP2 – Eagle Mountain WWTF Oxidation Ditch Improvements – April 2026.**

2.02 Drawings listed on the sheet index in the Drawings.

2.03 Work Change Directive number WCD 02-01 attached herein.

ARTICLE 3—APPENDICES

3.01 The following appendices to this Work Authorization are hereby identified as Contract Documents:

A. **None.**

3.02 Other appendices to this Work Authorization, enumerated as follows; are not Contract Documents:

A. **None.**

Exhibit B - Work Authorization Compensation

Work Authorization No. 2 **Work Authorization:** GMP2 - Oxidation Ditch Improvements

Project Number:	**EMC_FY26-04**			**Date:**		**July 23, 2026**
Project Title:	**2025 CMGC RFP 6 MGD MBR Wastewater Expansion**					
CONSTRUCTION SERVICES						**AMOUNT**
Direct Cost						
1	Ox Ditch Improvements				$	2,350,000.00
2						
3	SKM Integration Scope				$	111,460.00
4	**Added Scope**					
5	Manhole for Valve				$	27,000.00
6	HVAC in Tertiary Building				$	126,000.00
7	SCADA & Programming for Tertiary Building					
8	Alt 1 Mixer Mounts ($104,000)					
A.			**SUBTOTAL DIRECT COSTS**		**$**	**2,614,460.00**
				CALCULATED RATE:		
B.	General Conditions (Excluding Bonds and Insurance)				$	147,213.52
C.			**SUBTOTAL DIRECT COST & GENERAL CONDITIONS**		**$**	**2,761,673.52**
D.	CMGC Fee - Overhead & Profit			5.50%	$	151,892.04
E.			**SUBTOTAL INCLUDING FEE**		**$**	**2,913,565.56**
F.	Contigency (Does Not Include Construction Fee)			0.00%	$	-
G.	Contingency for BNR and SBR Excvation, haul off, subgrade prep				$	1,000,000.00
H.						
I.			**SUBTOTAL INCLUDING CONTIGENCY**		**$**	**3,913,565.56**
J.	Sales Tax	Cost of Material	$ 1,150,000.00	7.35%	$	84,525.00
K.	Payment and Performance Bonds			0.75%	$	29,351.74
L.	Insurance (Excludes Builders Risk)			0.67%	$	26,220.89
M.	**Total GMP 2**			**$**		**4,053,663.19**

This price is valid with a pump cost Not To Exceed $208,000 including supply, delivery, startup, and warranty

Schedule

Milestone 1 - Substantial Completion - 365 days after Notice of Permit Approval

Final Completion - Substantial + 30 days

Table 2— General Conditions Basis of Compensation for Time Sensitive Construction Support Cost

a	b	c	d	e	f	g
CM/GC Number	Contract Reference	Description	Quantity	Units	Unit Cost	Amount
1	5.01.A.1	PROJECT EXECUTIVE	-	Mon	$ 36,821.95	$ -
2	5.01.A.1	OPERATIONS / GENERAL MANAGER	-	Mon	$ 38,913.89	$ -
3	5.01.A.1	SENIOR PROJECT MANAGER	-	Mon	$ 31,243.44	$ -
4	5.01.A.1	CONSTRUCTION MANAGER	-	Mon	$ 34,730.01	$ -
5	5.01.A.1-10	PROJECT MANAGER	1	Mon	$ 29,151.50	$ 29,151.50
6	5.01.A.1-10	GENERAL SUPERINTENDENT	-	Mon	$ 32,638.07	$ -
7	5.01.A.1-10	ASSISTANT PROJECT MANAGER	-	Mon	$ 24,270.30	$ -
8	5.01.A.10.d	SCHEDULER	-	Mon	$ 29,151.50	$ -
9	5.01.A.1-10	PROJECT ENGINEER	3	Mon	$ 22,875.67	$ 68,627.02
10	5.01.A.1-10	FIELD ENGINEER	-	Mon	$ 19,946.96	$ -
11	5.01.A.4	SAFETY MANAGER	-	Mon	$ 26,362.24	$ -
12	5.01.A.5	QUALITY CONTROL	-	Mon	$ 26,362.24	$ -
13	5.01.A.16	COMMISSIONING MANAGER	-	Mon	$ 22,875.67	$ -
14	5.01.A.5	BIM/VDC MANAGER	-	Mon	$ 20,783.73	$ -
15	5.01.A.1-10	ADMINISTRATIVE ASSISTANT	-	Mon	$ 12,769.80	$ -
16	5.01.A.2	E&IC MANAGER	-	Mon	$ 38,913.89	$ -
17	5.01.A.13	OFFICE TRAILER	3	Mon	$ 3,500.00	$ 10,500.00
18	5.01.A.13	COPY MACHINE	3	Mon	$ 750.00	$ 2,250.00
19	5.01.A.13	MGC OFFICE SUPPLIES	3	Mon	$ 400.00	$ 1,200.00
20	5.01.A.13	POSTAGE, UPS, FED EX	3	Mon	$ 125.00	$ 375.00
21	5.01.A.13	DRINKING WATER SERVICE	3	Mon	$ 400.00	$ 1,200.00
22	5.01.A.13	JANITOR SERVICES	3	Mon	$ 600.00	$ 1,800.00
23	5.01.A.13	TRAILER COMPLEX ELECTRICAL CONSUMPTION	3	Mon	$ 1,000.00	$ 3,000.00
24	5.01.A.13	TRAILER COMPLEX WATER CONSUMPTION	3	Mon	$ 250.00	$ 750.00
25	5.01.A.13	TRAILER COMPLEX SEWER TANKS	-	Mon	$ 450.00	$ -
26	5.01.A.13	TRAILER COMPLEX SEWER SERVICE	-	Mon	$ 450.00	$ -
27	5.01.A.13	TRAILER COMPLEX INTERNET SERVICE	3	Mon	$ 500.00	$ 1,500.00
28	5.01.A.4	PORTABLE TOILETS	3	Mon	$ 1,500.00	$ 4,500.00
29	5.01.A.4	HAND WASH STATIONS	3	Mon	$ 800.00	$ 2,400.00

(c) 2023 National Society of Professional Engineers for EJCDC.

a	b	c	d	e	f	g
CM/GC Number	**Contract Reference**	**Description**	**Quantity**	**Units**	**Unit Cost**	**Amount**
30	5.01.A.13	DUMPSTER; DUMP FEES	3	Mon	$ 3,500.00	$ 10,500.00
31	5.01.A.13	LAYDOWN/TEMPORARY ROAD PERIODIC MAINTENCE	3	Mon	$ 2,220.00	$ 6,660.00
32	5.01.A.13	PROJECT DOCUMENTS/PRINTING	3	Mon	$ 200.00	$ 600.00
33	5.01.A.10.A	TEAM BUILDING	-	Mon	$ 300.00	$ -
34	5.01.A.10.C	PROJECT PROGRESS PHOTOS	1	Mon	$ 150.00	$ 150.00
35	5.01.A.10.C	AERIAL PHOTOS	1	Mon	$ 250.00	$ 250.00
36	5.01.A.4	FIRST AID KITS, SUPPLIES	3	Mon	$ 200.00	$ 600.00
37	5.01.A.4	SAFETY INCENTIVES & AWARDS	3	Mon	$ 400.00	$ 1,200.00
						$ -
						$ -
1	**Total Time Sensitive Construction Support Cost**					**$ 147,213.52**
3	**Construction Support Cost Extended Rate**	$ 3,150.00	**per day**	Calendar days for 2 years		

(c) 2023 National Society of Professional Engineers for EJCDC.

WORK CHANGE DIRECTIVE NO.: WCD 02-01

		Project No.
Owner:	Eagle Mountain City	EMC FY26-04
Owner's Advisor:	Advanced Engineering (AE2S, LLC)	13139-2023-002
Engineer:	Advanced Engineering (AE2S, LLC)	13139-2023-002
CM / GC :	MGC Contractors, Inc.	
Project:	EMWWTF 6.0 MGD Expansion	
Contract Name:	CMGC 6 MGD MBR Wastewater Expansion Pre-Construction	
Work Authorization:	GMP 2 – OXD & Misc. Site Improvements	

1.01 This Work Change Directive is authorized with approval of Work Authorization : GMP2 – Oxidation Ditch & Misc Site Improvements

1.02 Construction Manager / General Contractor is directed to proceed promptly with the following change(s):

Description:

This Work Change Directive authorizes revisions to the Work associated with the GMP 2 – Oxidation Ditch Improvements to incorporate value engineering concepts intended to reduce construction cost, improve constructability, and optimize operational performance.

The revisions include, but are not limited to :

1. Removal of elevated platform above oxidation ditch and externalize the pump station from the oxidation ditch altogether.
2. Install pumps on concrete pad in the area southwest of the oxidation ditch.
3. Evaluation and implementation of alternative pumping technologies in lieu of the pumping system depicted in the Contract Documents.
4. Reroute site piping in accordance with the new location of the pumps.
5. Feasibility evaluation of repurposing existing storage structure to house the external pump station.
6. Repurpose electrical gear and/or otherwise install power to the pump station to power the pumps and other identified instruments in the Contract Documents. This portion of the scope change shall be finalized once the pumping technology is selected.

Attachments:

The changes are reflected in the attachments to this Directive named "WCD 02-01 Markups" as marked-up Contract Drawings and supplementary unsealed drawings depicting revised layouts, piping configurations, and site arrangements, which are incorporated herein for the purposes of

defining the scope and intent of the change. The future electrical redlined drawings are included in this Directive and will be issued once pumps are selected and final pipe layouts are agreed upon.

Purpose for the Work Change Directive:

The purpose of this Work Change Directive is to authorize implementation of the foregoing value engineering revisions and establish a basis for incorporation of the revised Work into the Guaranteed Maximum Price (GMP).

The Owner has determined that further redesign and preparation of fully detailed design documents is not in the best interest of the Project. Accordingly, the CM/GC is directed to proceed with development, coordination, pricing, procurement planning, and execution of the revised Work consistent with the intent described herein.

Final equipment selection, detailed configuration, and associated design refinements necessary to achieve the Project requirements shall be developed during performance of the Work in coordination with the Owner and Engineer. Such development shall remain consistent with the functional intent of the Project and the scope authorized by this Work Change Directive.

1.03 Assumptions and exclusions

1. The Guaranteed Maximum Price associated with this Work Change Directive is intended to include all labor, materials, equipment, coordination, detailing, and ancillary work reasonably necessary to furnish and install a complete and operable pumping system consistent with the functional requirements described herein.

2. The Contractor acknowledges that certain equipment selections, design details, and associated improvements remain under development. The GMP has been established with consideration of such development and includes all costs reasonably inferable from the concept documents, markups, and design criteria provided by Owner and Engineer.

3. $208,000 is the maximum cost of pumps including supply, delivery, start up and warranty.

4. The power available to each pump is less than 50 hp. Existing MCC capacity is sufficient.

1.04 - This directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

☐ Non-agreement on pricing of proposed change. ☒ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Guaranteed Maximum Price:	$		**No change**
Contract Time:		days	**No change**

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☒ Other (none)

www.ae2s.com

August 18, 2026

Eagle Mountain City
Attn: Mack Straw, Public Utilities Manager
1650 E Stagecoach Run
Eagle Mountain, UT 84005

RE: Recommendation of Award for EMC 6.0 MGD Wastewater Treatment Facility Expansion – GMP-2 Oxidation Ditch and Misc Site Improvements

Dear Mr. Straw:

Recommendation:
AE2S recommends that Eagle Mountain City award the Contract for **EMC 6.0 MGD Wastewater Treatment Facility Expansion – GMP-2 Oxidation Ditch and Misc Site Improvements** to MGC Contractors, Inc. MGC Contractors, Inc.'s Lump Sum Compensation for the GMP2 OXD & Misc Site Improvements is $4,053,663.19. We are confident that MGC Contractors, Inc. meets the qualifications required to supply the goods and scope of work requested for the EMC 6.0 MGD Wastewater Treatment Facility Expansion.

WORK AUTHORIZATION NO. 2 – GMP-2: Oxidation Ditch and Misc Site Improvements
MGC Contractors, Inc. will perform the following scope of work:

GMP 2 - Oxidation Ditch Improvements

Installation of pumps and piping, with all valves and other appurtenances necessary for complete and functional improvements to the Oxidation Ditch.

Integration of OXD improvements into site SCADA system.

GMP 2 – Miscellaneous Site Improvements

Integration of Tertiary Treatment Building into site SCADA system.

HVAC related improvements in the Tertiary Treatment Building.

Manhole procurement and installation for effluent flow control valve.

Contingency: It is anticipated that the contingency identified in Exhibit B will be used to begin site earthworks including: excavation, haul off, subgrade prep, stockpiling, testing, clearing/grubbing.

Substantial completion for this work is within 365 days of notice of permit approval. Substantial completion will be met following completion of:

Milestone: Successful and operational installation of oxidation ditch and other site improvements.

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PROPOSAL & WORK AUTHORIZATION EVALUATION:
MGC Contractors, Inc.'s project proposal was found to be responsive and complete. MGC Contractors, Inc. was selected as the CM/GC for the for EMC 6.0 MGD Wastewater Treatment Facility Expansion and is currently contracted for Preconstruction Services. Award will lead to successful completion of the project scope of work and keep the project on track.

REQUESTED EAGLE MOUNTAIN CITY COUNCIL ACTION:
AE2S recommends moving to approve the Work Authorization No. 2 – GMP-2 Oxidation Ditch & Misc Site Improvements.

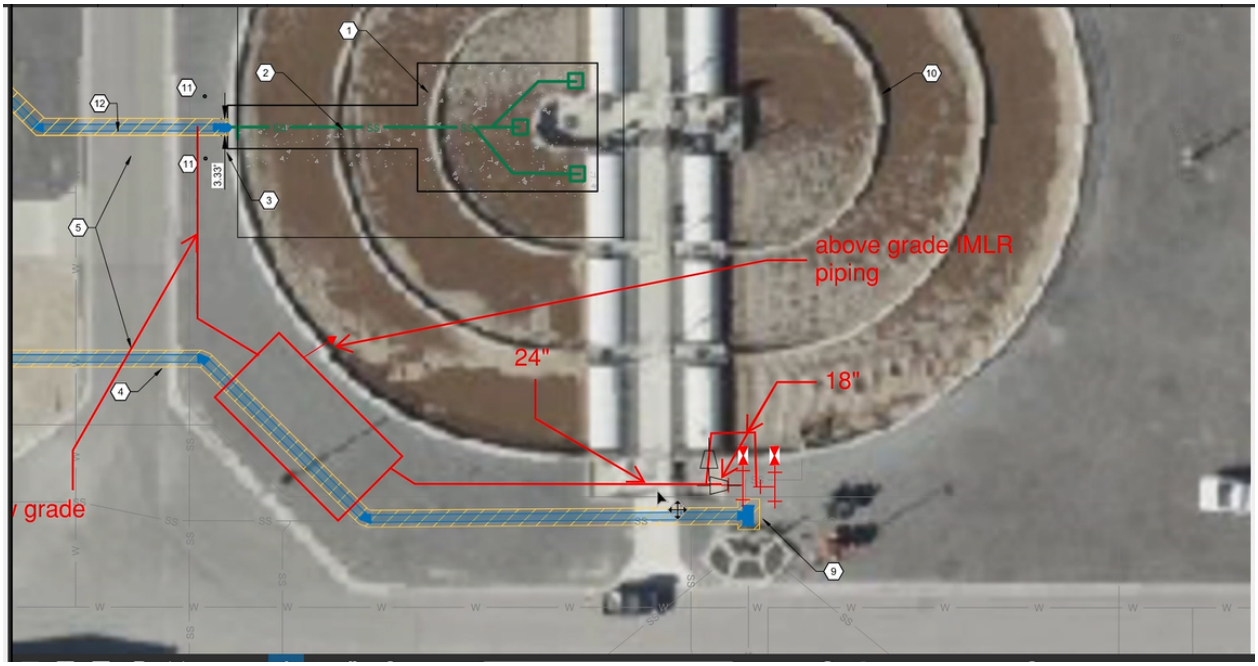
AE2S appreciates the opportunity to provide Eagle Mountain City with professional engineering services for this monumental project. If you wish to discuss any of this information or have questions prior to issuing the Notice of Award, please do not hesitate to contact me.

Sincerely,

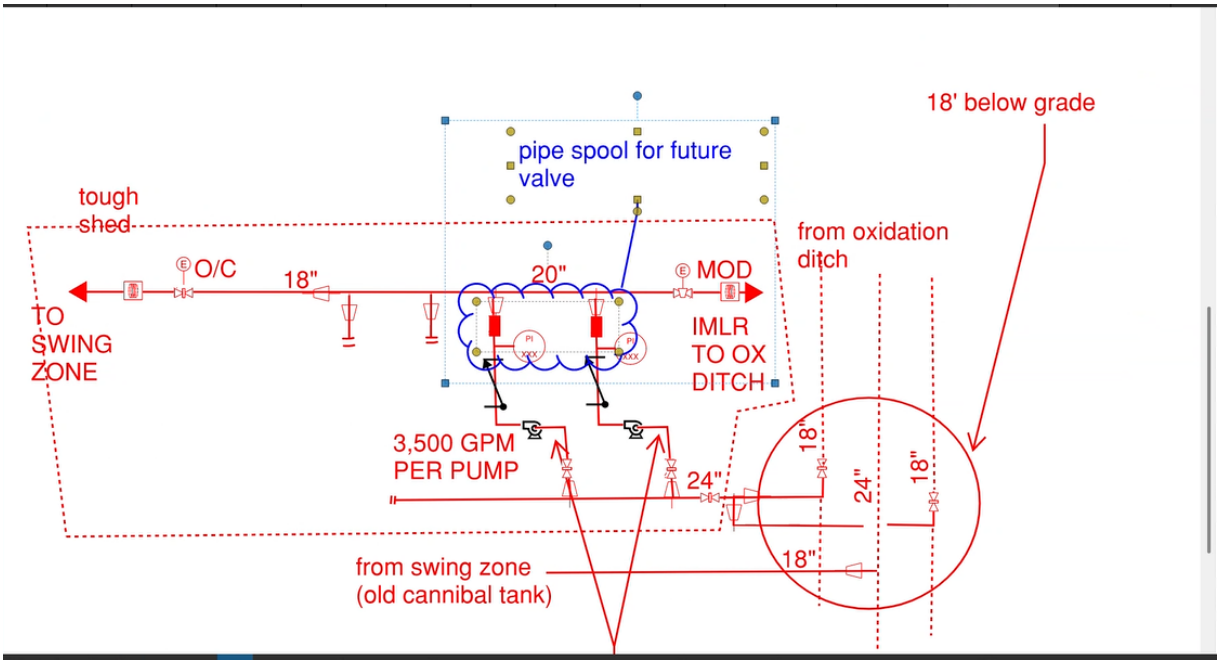
AE2S

Russell Sprague, PE
Project Manager

Encl.: MGC Contractors Inc. GMP 2 – Oxidation Ditch & Misc Site Improvements
Work Authorization Agreement Between Owner and Contractor for GMP 2| Unexecuted



initial concept, see updated conceptual drawings



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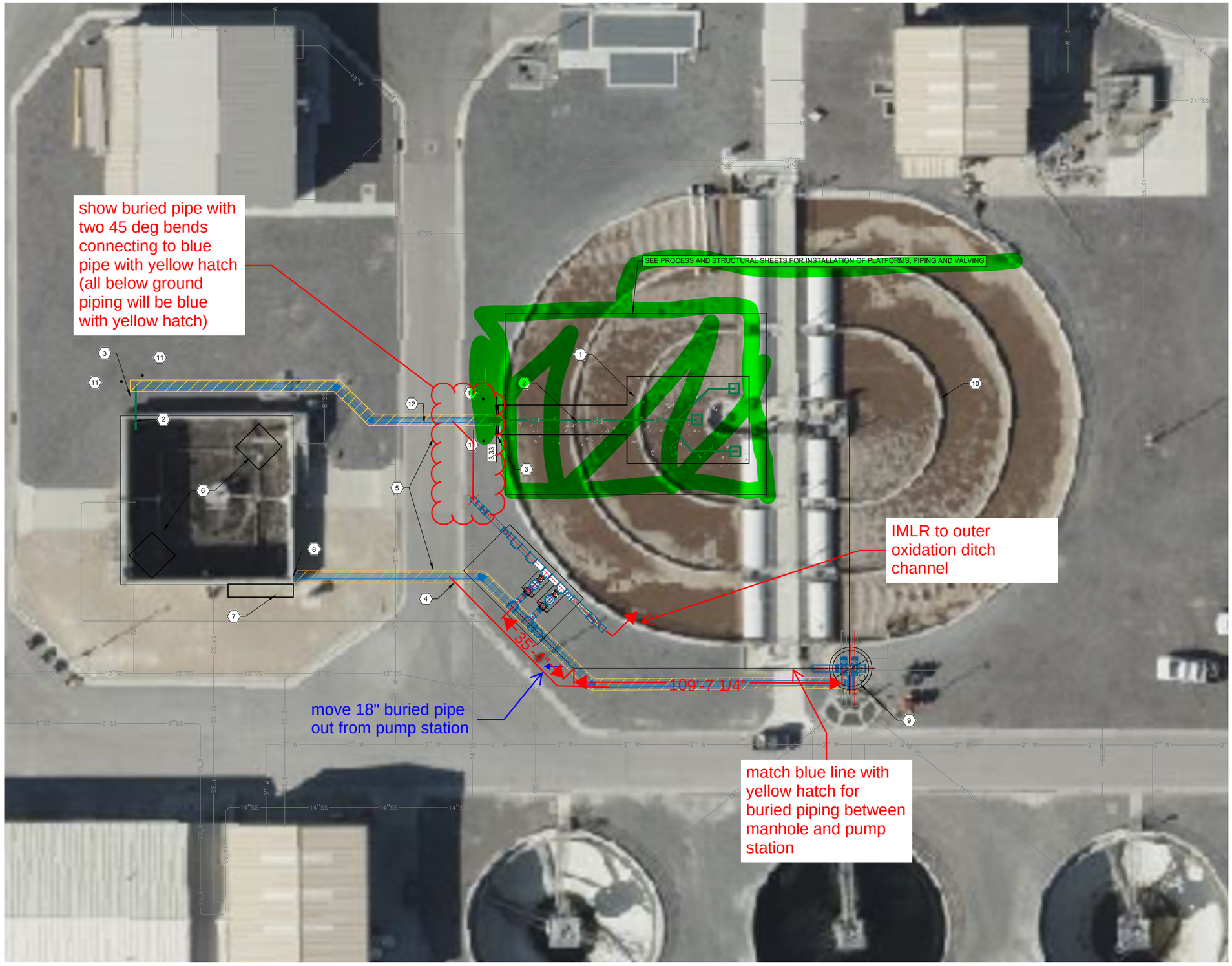


AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

Advanced Engineering and Environmental Services, LLC — NOT FOR CONSTRUCTION — PRELIMINARY

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS	SYM	DATE	APPR

NORTH

6'-8" 0 15 Scale in Feet

GENERAL NOTES

1. EXISTING UTILITIES LOCATIONS ARE APPROXIMATE. FIELD VERIFY POTENTIAL CONFLICTS.
2.

CONSTRUCTION NOTES

1. INSTALL TRANSFER PUMP PLATFORM WITH SUBMERSIBLE PUMPS. SEE PROCESS AND STRUCTURAL SHEETS.
2. NEW 16" PROCESS PIPE. SEE PROCESS SHEETS FOR YARD PIPING COORDINATION.
3. BEGIN TRANSFER YARD PIPE TO OSW AT STATION 0+00. SEE SHEET C101 FOR PLAN AND PROFILE. SEE PROCESS SHEETS FOR CONTINUATION COORDINATION.
4. 18" DI PIPE. SEE CIVIL DETAILS FOR TRENCH AND BACKFILL. 42" TRENCH REQUIRED, EXTENTS OUTLINED BY YELLOW HATCH.
5. RESTORE ASPHALT AND CURB. SEE CIVIL DETAILS.
6. INSTALL TRITON MIXER/AERATORS
7. INSTALL CONCRETE PLATFORM. SEE STRUCTURAL OSW SHEETS FOR DETAILS.
8. BEGIN EFFLUENT TO SCB YARD PIPE AT STA 0+00. SEE C101 FOR PLAN AND PROFILE. SEE PROCESS FOR PENETRATION DETAIL.
9. LOCATE EXISTING 24" DRAIN LINE AND CONNECT WITH 24" X 18" TEE.
10. NOT USED
11. INSTALL BOLLARD ACCORDING TO DETAIL.
12. 16" DI PIPE. SEE CIVIL DETAILS FOR TRENCH AND BACKFILL. 40" TRENCH REQUIRED, EXTENTS OUTLINED BY YELLOW HATCH.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

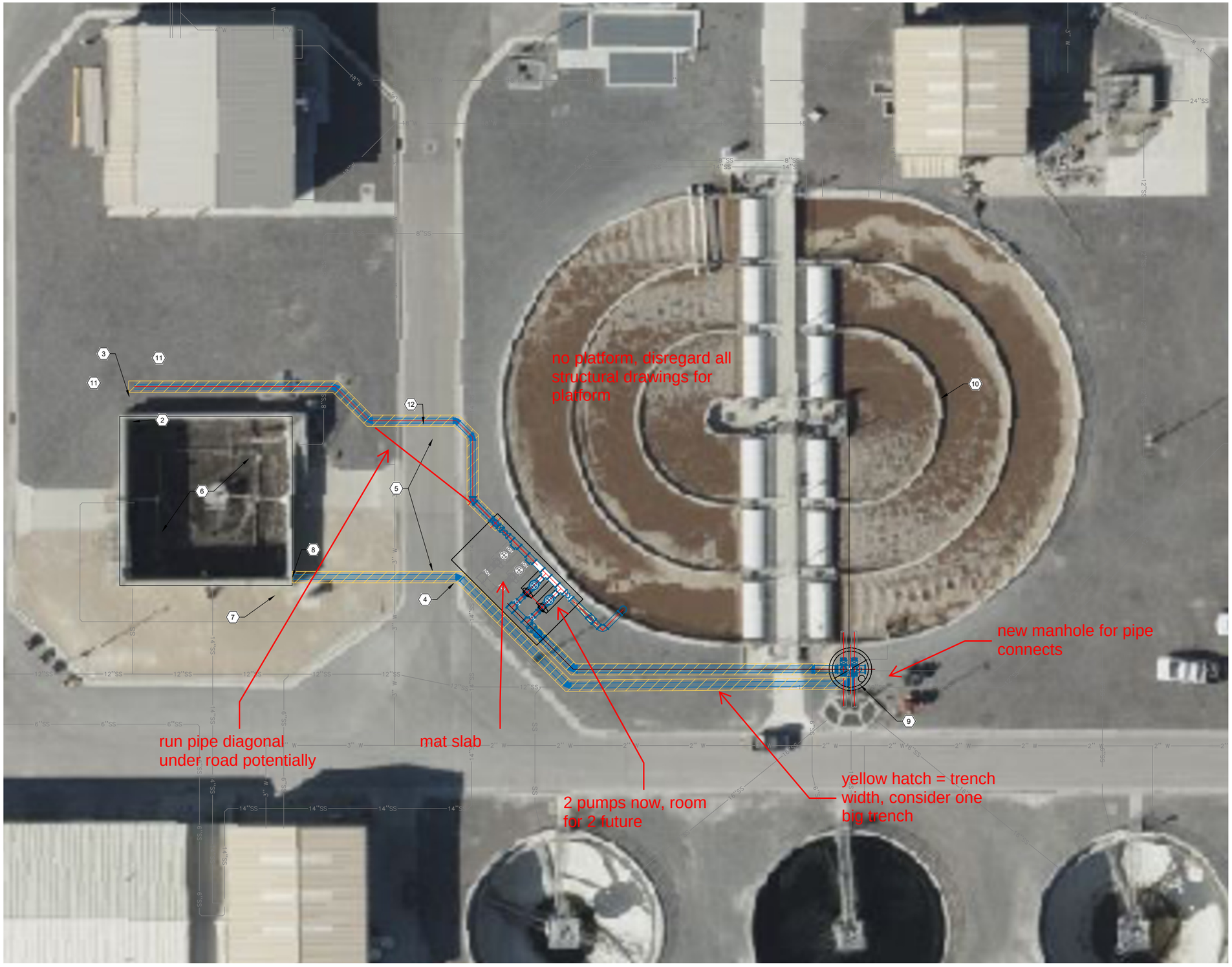
SHEET TITLE:
OXIDATION DITCH UPGRADES SITE PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A
SHEET DESIGNATOR: SW
SHEET NO: C100

Plotted By: Paul Hohn Date: Friday, July 24, 2026



Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

Advanced Engineering and Environmental Services, LLC — NOT FOR CONSTRUCTION — PRELIMINARY

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE		APPR

NORTH

0 15
Scale in Feet

GENERAL NOTES

1. EXISTING UTILITIES LOCATIONS ARE APPROXIMATE. FIELD VERIFY POTENTIAL CONFLICTS.
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CONSTRUCTION NOTES

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2. NEW 16" PROCESS PIPE. SEE PROCESS SHEETS FOR YARD PIPING COORDINATION.
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updated concept

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OXIDATION DITCH UPGRADES SITE PLAN

CLIENT: EAGLE MOUNTAIN CITY, EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A
SHEET DESIGNATOR: SW
SHEET NO: C100

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Plotted By: Russell Sprague Date: Friday, August 7, 2026

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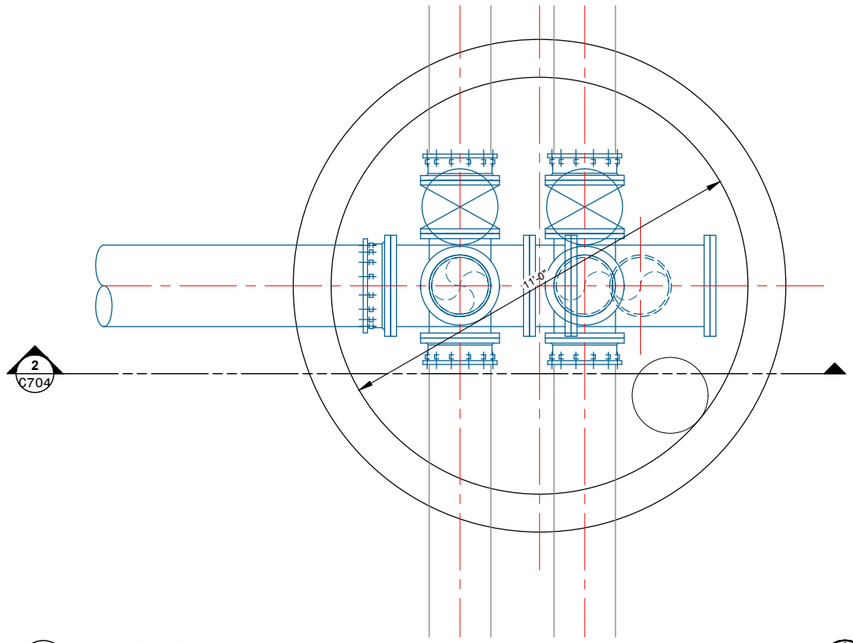
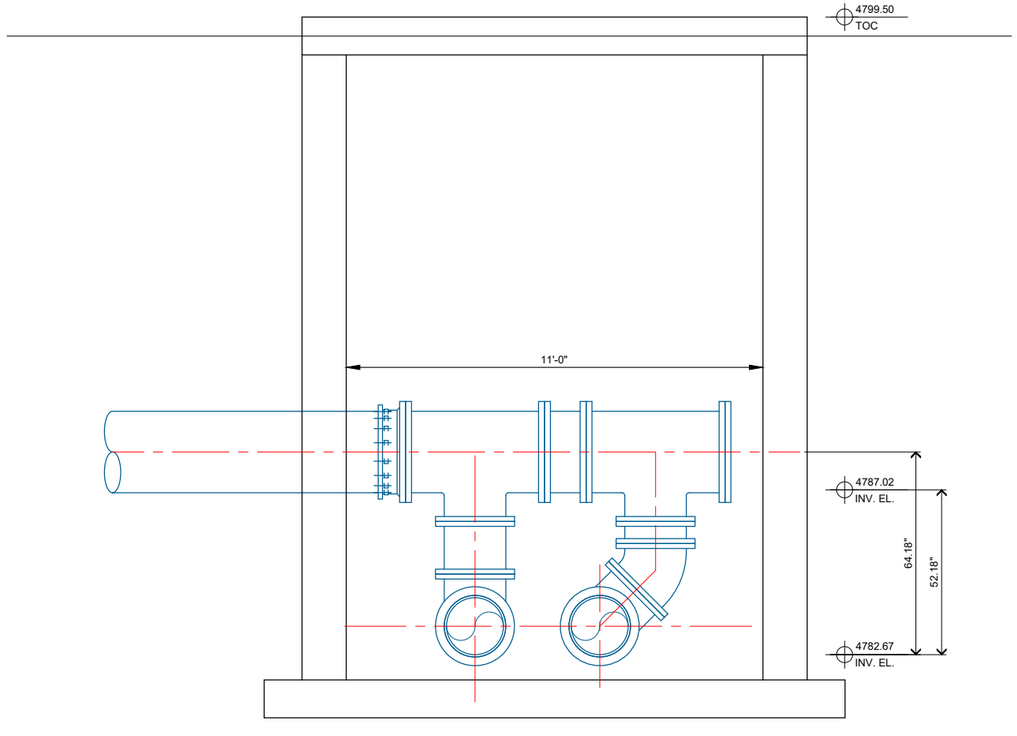


1 C704 **MANHOLE PLAN**

12" 0 1' 2' 3' 4' 5'

NORTH



2 C704 **MANHOLE SECTION**

12" 0 1' 2' 3' 4' 5'

AE2S
Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

Advanced Engineering and Environmental Services, LLC
NOT FOR CONSTRUCTION
PRELIMINARY

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

REVISIONS			
SYM	DATE		APPR

IMPROVEMENTS

1
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PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

DETAILS

CLIENT: **EAGLE MOUNTAIN CITY**, EAGLE MOUNTAIN CITY, UTAH	PREPARED BY: PWH
	CHECKED BY: XXX
	APPROVED BY: XXX
PROJECT NO: 13139-2023-002	SHEET DESIGNATOR: **SD**
DATE: APRIL 2026	SHEET NO: **C704**
ALT. PROJECT NO: N/A	

Plotted By: Russell Scogua Date: Friday, August 7, 2026

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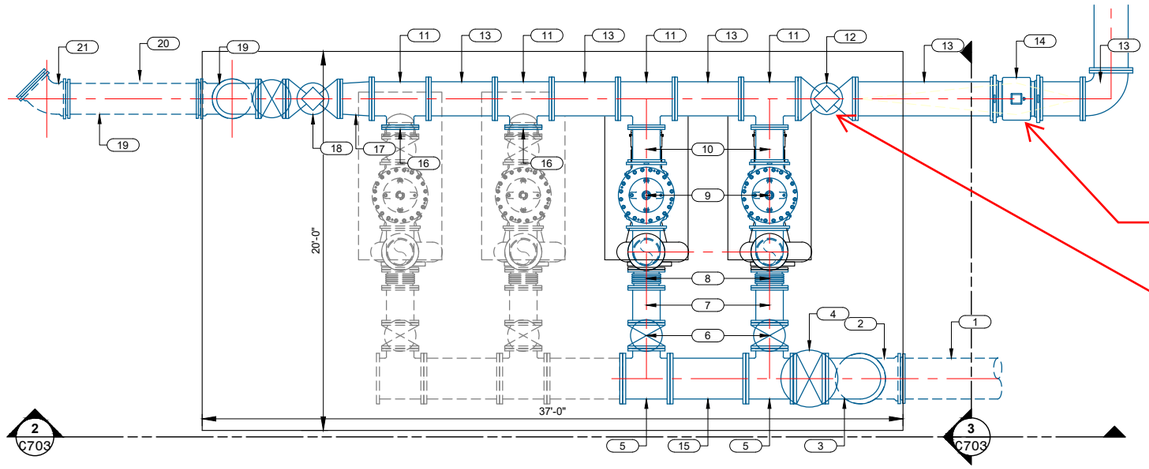
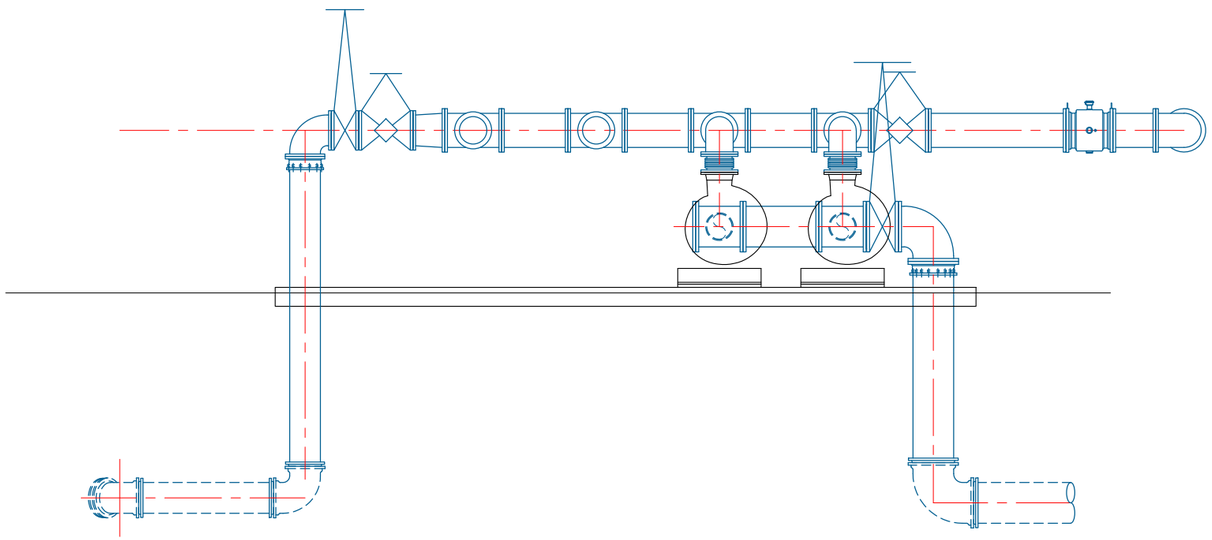
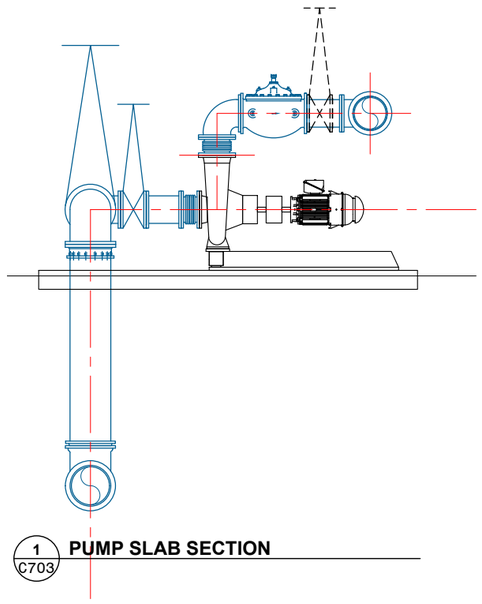


1 C703 **PUMP SLAB PLAN**

NORTH



2 C703 **PUMP SLAB SECTION**



1 C703 **PUMP SLAB SECTION**

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

Advanced Engineering and Environmental Services, LLC — PRELIMINARY — NOT FOR CONSTRUCTION

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

REVISIONS			
SYM	DATE		APPR

IMPROVEMENTS

1
2
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PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

DETAILS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PWH
CHECKED BY: XXX
APPROVED BY: XXX

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **C703**

Plotted: By: Russell Sprague Date: Friday, August 7, 2026

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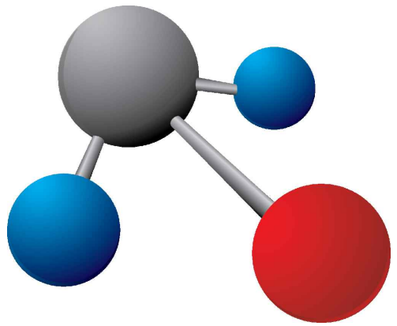
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
ISSUED FOR GMP (NOT FOR CONSTRUCTION)

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively



PREPARED FOR:

EAGLE MOUNTAIN CITY

LOCATION:

EAGLE MOUNTAIN CITY, UTAH

DATE:

APRIL 2026

AE2S PROJECT NO:

13139-2023-002

ALT. PROJECT NO:

N/A

ENGINEERING TEAM:

CIVIL ENGINEER
Advanced Engineering and Environmental Services, LLC

STRUCTURAL ENGINEER
Advanced Engineering and Environmental Services, LLC

PROCESS ENGINEER
Advanced Engineering and Environmental Services, LLC

ELECTRICAL ENGINEER
Advanced Engineering and Environmental Services, LLC

I&C ENGINEER
Advanced Engineering and Environmental Services, LLC

Plotted By: GrantLundahl Date: Friday, April 17, 2026

Advanced Engineering and Environmental Services, LLC www.ae2s.com

FACILITY DESIGNATOR	SHEET NUMBER	SHEET TITLE
GENERAL (GEN)		
GEN	G001	COVER SHEET
GEN	G002	INDEX OF DRAWINGS
GEN	G003	LOCATION MAP
GEN	C001	CIVIL CONVENTIONS AND ABBREVIATIONS
GEN	C002	CIVIL LEGENDS AND SYMBOLS
GEN	C003	CIVIL CONSTRUCTION NOTES
GEN	S001	STRUCTURAL GENERAL NOTES
GEN	S002	STRUCTURAL DESIGN TABLES
GEN	P001	PROCESS SYMBOLS AND ABBREVIATIONS
GEN	P002	PROCESS SCHEMATIC LEGEND
GEN	P003	PROCESS FLOW DIAGRAM
GEN	P004	PROCESS HYDRAULIC PROFILE
GEN	P005	PROCESS BASIS OF DESIGN - FLOWS AND LOADS
GEN	P006	PROCESS BASIS OF DESIGN - EQUIPMENT
GEN	M001	MECHANICAL SYMBOLS AND ABBREVIATIONS - HVAC
GEN	E001	ELECTRICAL SYMBOLS AND ABBREVIATIONS
GEN	E002	NETWORK DIAGRAMS
GEN	E003	HAZARDOUS AREA CLASSIFICATION SCHEDULE
GEN	IC001	P&ID SYMBOLS AND ABBREVIATIONS
GEN	IC002	P&ID SYMBOLS AND LEGEND
GEN	IC003	P&ID TAGGING ABBREVIATIONS
SITE WORK (SW)		
SW	C100	OXIDATION DITCH UPGRADES SITE PLAN
SW	C101	OXIDATION DITCH YARD PIPE PLAN & PROFILE
SW	C102	OXIDATION DITCH SITE PLAN - TTF VALVE
SW	E001	OVERALL OXIDATION DITCH ELECTRICAL SITE PLAN
SW	E002	OVERALL TERTIARY TREATMENT BUILDING ELECTRICAL SITE PLAN
HEADWORKS 1 (HW1)		
HW1	E101	MAIN LEVEL - PROCESS ELECTRICAL PLAN
HW1	E601	DP-HW ONE-LINE DIAGRAM
HW1	E602	HW1-DP2 ONE-LINE DIAGRAM
HW1	E603	HW1-DP2 ONE-LINE DIAGRAM
OXIDATION DITCH (OXD)		
OXD	S101	OPERATIONS LEVEL PLAN
OXD	S102	OPERATIONS LEVEL ENLARGED PLANS
OXD	S501	FRAMING SECTIONS
OXD	S901	ISOMETRIC VIEW
OXD	P101	SUBGRADE LEVEL - OVERALL PLAN
OXD	P102	MAIN LEVEL - OVERALL PLAN
OXD	P103	MAIN LEVEL - ENLARGED PLANS
OXD	P301	SECTIONS
OXD	P601	PROCESS SCHEDULES
OXD	P901	ISO VIEW
OXD	E101	MAIN LEVEL ELECTRICAL PROCESS PLAN
OXD	IC101	P&ID - OXIDATION DITCH - IMLR PUMP
OXIDATION DITCH SWING ZONE (OSW)		
OSW	S101	FOUNDATION PLAN
OSW	S102	OPERATIONS LEVEL PLAN
OSW	S301	SECTIONS
OSW	P100	PROCESS DEMOLITION - OSW
OSW	P101	SUBGRADE LEVEL - OVERALL PLAN
OSW	P102	MAIN LEVEL - OVERALL PLAN
OSW	P103	MAIN LEVEL - ENLARGED PLANS
OSW	P301	SECTION - LOOKING NORTH
OSW	P302	SECTION - LOOKING WEST
OSW	P303	SECTION - WEIR GATE
OSW	P601	PROCESS SCHEDULES
OSW	P901	ISO VIEW
OSW	E101	MAIN LEVEL ELECTRICAL PROCESS PLAN
OSW	E102	TJB-600 MODIFICATIONS
OSW	IC101	P&ID - OXIDATION DITCH SWING ZONE
TERTIARY TREATMENT FACILITY (TTF)		
TTF	M101	MAIN LEVEL MECHANICAL PLAN
TTF	M601	SPEC. NOTES, SCHEDULES, DETAILS
TTF	E101	TTF GRADE LEVEL ELECTRICAL PROCESS PLAN
SOLIDS BUILDING (SB)		
SB	E101	SOLIDS BUILDING CP-2 MODIFICATIONS
STANDARD DETAILS (SD)		
SD	C701	DETAILS
SD	C702	DETAILS CONT.
SD	P701	PROCESS STANDARD DETAILS
SD	P702	PROCESS STANDARD DETAILS
SD	P703	PROCESS STANDARD DETAILS
SD	P704	PROCESS STANDARD DETAILS
SD	E601	PLC IO SCHEDULE - OXD SCP1
SD	E602	PLC IO SCHEDULE - TTF SCP1
SD	E603	VARIOUS SCHEDULES
SD	E604	PANEL SCHEDULE - TTF
SD	E605	VARIOUS WIRING SCHEMATICS
SD	E606	VARIOUS WIRING SCHEMATICS
SD	E607	VFD WIRING SCHEMATICS
SD	E701	STANDARD DETAILS
SD	E702	STANDARD DETAILS
SD	E801	CABLE AND CONDUIT SCHEDULE - (OXD)
SD	E802	CABLE AND CONDUIT SCHEDULE - (TTF)

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
INDEX OF DRAWINGS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

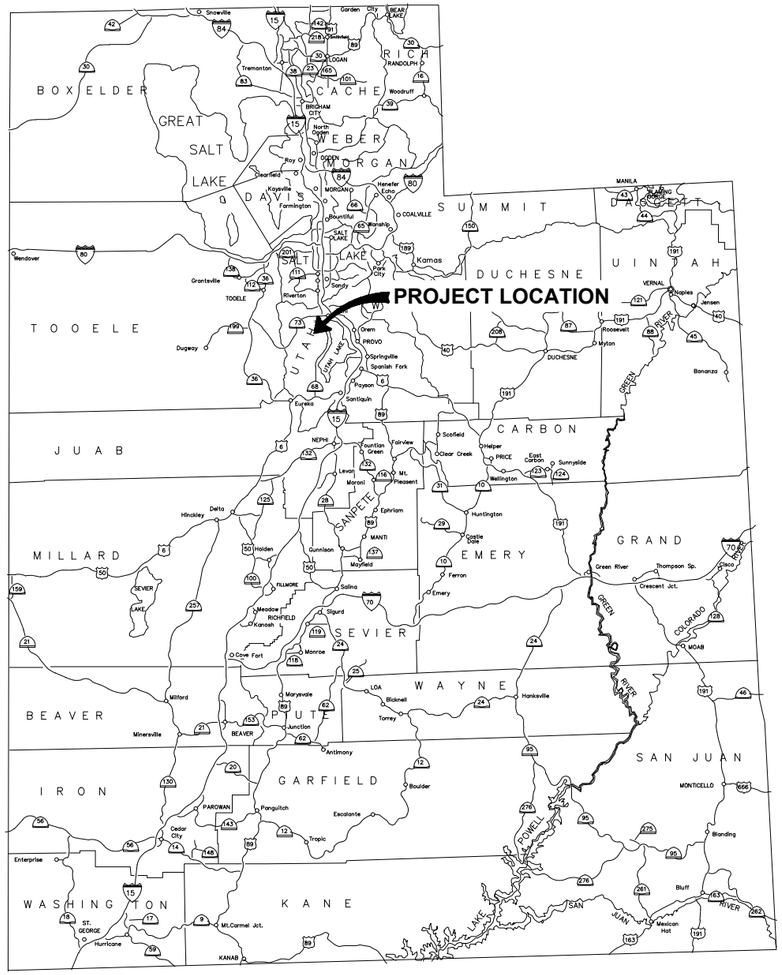
PREPARED BY: SAS
CHECKED BY: JC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN

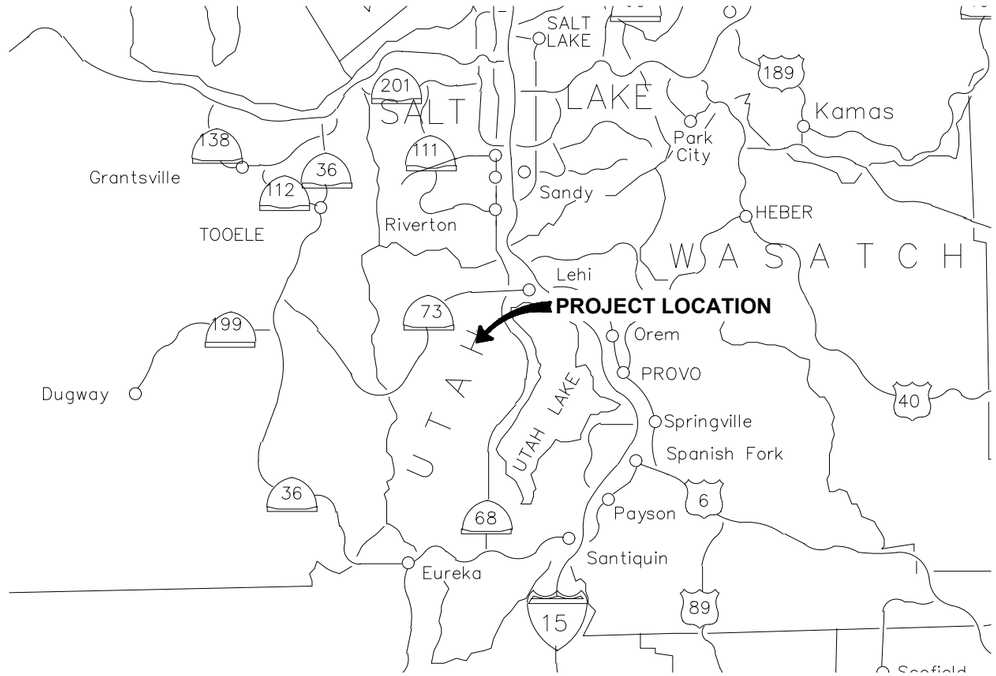
SHEET NO: G002

File: \\ae2s.com\ratsan\projects\E\Eagle Mountain\13139.2023-002\CAD Dwgs\00-General\Plan Sheet\Index of Drawings_OXD.dwg
Plotted By: Grant Lindahl Date: Friday, April 17, 2026



STATE OF UTAH

1 G003 PROJECT LOCATION MAP



2 G003 PROJECT VICINITY MAP
UTAH COUNTY

3 G003 PROJECT AERIAL MAP
UTAH COUNTY

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS	DATE	SYM	APPR
ISSUED FOR GMP (NOT FOR CONSTRUCTION)			

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
LOCATION MAP

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **G003**

File: I:\ae2s.com\esun\projects\EE\Eagle Mountain\13139-2023-002\CAD Dwgs\00-General\Plan Sheets\Location and Index_OXD.dwg
Plotted By: Grant Lindahl Date: Friday, April 17, 2026

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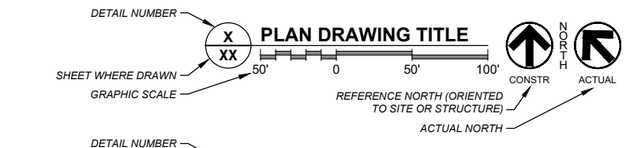
SHEET NUMBERING

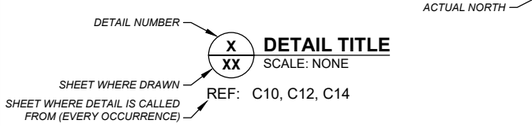
SHEET SERIES	SERIES DESCRIPTION
000	SYMBOLS LEGEND, DRAFTING CONVENTIONS, NOTES, ETC.
100	PLAN VIEWS AND COMBINATION PLAN & PROFILE VIEW (HORIZONTAL VIEWS)
200	ELEVATIONS AND PROFILES (VERTICAL VIEWS)
300	SECTIONS (SECTION VIEWS, WALL SECTIONS)
400	LARGE SCALE VIEWS (SCALED UP REPRODUCTIONS OF PLANS, ELEVATIONS OR SECTIONS NOT IN DETAILS
500	DETAILS (PROJECT SPECIFIC DETAILS)
600	SCHEDULES AND DIAGRAMS
700	STANDARD DETAILS
800	USER DEFINED

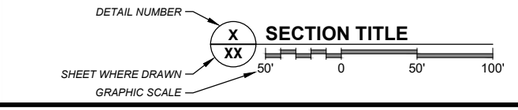
CIVIL ABBREVIATIONS

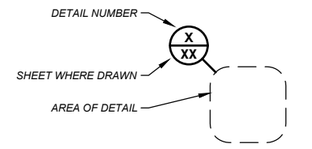
&	- AND	DWG.	- DRAWING	PC	- POINT OF CURVATURE
∠	- ANGLE	E.	- EAST	PC	- PRECAST
@	- AT	E-W	- EAST TO WEST	P.C.C.	- PORTLAND CEMENT CONCRETE
℄	- CENTERLINE	EA.	- EACH	PE	- POLYETHYLENE
°	- DEGREES	E.F.	- EACH FACE	PE or P.E.	- PLAIN END
Δ	- DELTA	EJ	- EXPANSION JOINT	PEP	- POLYETHYLENE PIPE
Ø	- DIAMETER	ELEC.	- ELECTRICAL	PI	- POINT OF INTERSECTION
□	- SQUARE	ELEV.	- ELEVATION	PO	- PUSH ON
±	- PLUS / MINUS	EP	- END OF PROJECT	POLY	
ABS	- ACRYLONITRILE-BUTADIENE-STYRENE	EQ.	- EQUAL	PRV	- PRESSURE REDUCING VALVE
ACI	- AMERICAN CONCRETE INSTITUTE	EVC	- END VERTICAL CURVE	PSI	- POUNDS PER SQUARE INCH
ACP	- ASBESTOS CEMENT PIPE	E.W.	- EACH WAY	PT	- POINT OF TANGENCY
ADD'L	- ADDITIONAL	EXIST.	- EXISTING	PLV	- PLUG VALVE
ADDM.	- ADDENDUM	EXP.	- EXPANSION	PVC	- POLYVINYL CHLORIDE
ADJ.	- ADJUSTABLE	FDN.	- FOUNDATION	PVI	- POINT OF VERTICAL INTERSECTION
AGGR.	- AGGREGATE	FIN.	- FINISH	R or RAD	- RADIUS
ALT.	- ALTERNATE	FL	- FLOW LINE OR FLANGE	R.	- RISER
APPR.	- APPROACH	FLR.	- FLOOR	RCCP	- REINFORCED CONCRETE CYLINDER PIPE
APPROX.	- APPROXIMATE	FM	- FORCE MAIN	RCP	- REINFORCED CONCRETE PIPE
APPURT.	- APPURTENANCE	FRP	- FIBERGLASS REINFORCED PLASTIC	RDL	- ROOF DRAIN LINE
ARCH.	- ARCHITECT or ARCHITECTURAL	FT.	- FOOT	RES	- RESERVOIR
AR MH	- AIR RELEASE MANHOLE	G&S	- GROOVE AND SHOULDER	REQ'D.	- REQUIRED
ARV	- AIR RELEASE VALVE	GA.	- GAGE	REQ'MTS.	- REQUIREMENTS
ASSY.	- ASSEMBLY	GALV.	- GALVANIZED	RJ	- RESTRAINED JOINT
ASTM	- AMERICAN SOCIETY FOR TESTING MATERIALS	GR.	- GRADE	S.	- SOUTH
AVE	- AVENUE	GRD.	- GROUND	S-N	- SOUTH TO NORTH
AVV	- AIR / VACUUM VALVE	GV	- GATE VALVE	SAN	- SANITARY
BFV	- BUTTERFLY VALVE	H	- HATCH	SCH.	- SCHEDULE
BITUM.	- BITUMINOUS	HDD	- HORIZONTAL DIRECTIONAL DRILLING	SD	- STORM DRAIN
BL	- BUILDING LINE	HDPE	- HIGH DENSITY POLYETHYLENE	SECT.	- SECTION
BLDG.	- BUILDING	HORZ.	- HORIZONTAL	SF	- SQUARE FEET
BLK.	- BLOCK	HR.	- HANDRAIL	SIM.	- SIMILAR
B.O.	- BY OTHERS	HT.	- HEIGHT	SS	- SANITARY SEWER
BP	- BEGINNING OF PROJECT	HYD	- HYDRANT	SSSL	- SANITARY SEWER SERVICE LEAD
BRG.	- BEARING	I.D.	- INSIDE DIAMETER	ST	- STREET
BSMT.	- BASEMENT	I.E.	- INVERT ELEVATION	STA	- STATION
BVC	- BEGIN VERTICAL CURVE	IN.	- INCH	STD.	- STANDARD
C-C	- CENTER TO CENTER	INSUL	- INSULATION	STL.	- STEEL
C&G	- CURB AND GUTTER	INV.	- INVERT	STN. STL.	- STAINLESS STEEL
CB	- CATCH BASIN	JT.	- JOINT	STR.	- STRUCTURAL
CDF	- CONTROLLED DENSITY FILL	K	- RATE OF CURVATURE	STRUCT	- STRUCTURAL
CF	- CUBIC FEET	L	- LENGTH OF CURVE	SUP.	- SUPPORT
CI	- CAST IRON	LB	- POUND	SWPP	- STORM WATER POLLUTION PROTECTION
CIP	- CAST IRON PIPE	LCCP	- LINED CONCRETE CYLINDER PIPE	SY	- SQUARE YARD
C.I.P.	- CAST IN PLACE	LF	- LINEAR FEET	TEMP.	- TEMPORARY
CJ	- CONSTRUCTION JOINT	LVC	- LENGTH OF VERTICAL CURVE	THK.	- THICK
CL	- CENTERLINE	LVL	- LEVEL	TOC	- TOP OF CASTING
CMP	- CORRUGATED METAL PIPE	MAX.	- MAXIMUM	T.O.P.	- TOP OF PIPE
CO	- CLEANOUT	MECH	- MECHANICAL	TOS	- TOP OF STEEL
CONC.	- CONCRETE	MFG.	- MANUFACTURER	TYP.	- TYPICAL
CONSTR.	- CONSTRUCTION	MH	- MANHOLE	UON	- UNLESS OTHERWISE NOTED
CONT.	- CONTINUOUS	MJ or M.J.	- MECHANICAL JOINT	USACE	- U.S. ARMY CORPS OF ENGINEERS
CNTRL.	- CONTROL	MIN.	- MINIMUM	VCP	- VITRIFIED CLAY PIPE
CSP	- CORRUGATED STEEL PIPE	MNDOT	- MINNESOTA DEPARTMENT OF TRANSPORTATION	VERT.	- VERTICAL
CSV	- CURB STOP VALVE	MTDOT	- MONTANA DEPARTMENT OF TRANSPORTATION	W.	- WEST
CTR	- CENTER	MTR.	- METER	W-E	- WEST TO EAST
CU	- COPPER	N.	- NORTH	W/	- WITH
CY	- CUBIC YARD	N-S	- NORTH TO SOUTH	W/O	- WITHOUT
DEPR.	- DEPRESSION	NA	- NOT APPLICABLE	WM	- WATERMAIN
DTL	- DETAIL	NDDOT	- NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	WRF	- WATER RECLAMATION FACILITY
DI or D.I.	- DUCTILE IRON	NPT	- NIPPLE	WSL	- WATER SERVICE LEAD
DIA.	- DIAMETER	NTS	- NOT TO SCALE	WTF	- WATER TREATMENT FACILITY
DIM.	- DIMENSION	O.C.	- ON CENTER	WTP	- WATER TREATMENT PLANT
DIP	- DUCTILE IRON PIPE	O.D.	- OUTSIDE DIAMETER	WWF	- WELDED WIRE FABRIC
DIST.	- DISTANCE	OH.	- OVERHEAD	WWTP	- WASTE WATER TREATMENT PLANT
DR	- DRIVE	OPNG.	- OPENING		
DRWY	- DRIVEWAY	OSHA	- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION		

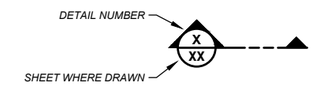
DRAWING, SECTION AND DETAIL CONVENTIONS

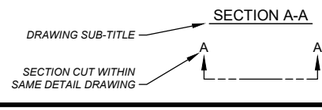












Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR	DATE	SYM

GENERAL NOTES

1. THE INFORMATION DEPICTED WITHIN THESE DRAWINGS IS COMPILED FROM LEGACY DRAWINGS AND FIELD SURVEYS FROM PREVIOUS PROJECTS, SITE VISITS, CONSTRUCTION OBSERVATION TIES AND PHOTOGRAPHS, AND THE MEMORIES OF CITY STAFF AND CONSTRUCTION OBSERVERS.
2. THE LOCATIONS OF KNOWN UNDERGROUND UTILITIES ARE SHOWN ON THE CONSTRUCTION DRAWINGS IN AN APPROXIMATE WAY ONLY. ADDITIONAL ACTIVE AND INACTIVE UTILITIES MAY BE PRESENT.
3. COORDINATE ALL ON-SITE STAGING WITH OWNER TO AVOID CONFLICTS WITH EXISTING UTILITIES.
4. MAINTAIN OWNER ACCESS TO SITE AT ALL TIMES.

CIVIL DRAWING SYMBOLS

100'-0"± FLOOR	EXISTING ELEVATION IN SECTION VIEW (CONTRACTOR TO VERIFY)
100'-0"± FLOOR	EXISTING ELEVATION IN PLAN VIEW (CONTRACTOR TO VERIFY)
108'-0" WALL	DESIGN ELEVATION IN SECTION VIEW
108'-0" FLOOR	DESIGN ELEVATION IN PLAN VIEW
	BREAKLINE
	DIRECTION OF FLOW
1	EXISTING NOTES
1	DEMOLITION NOTES
1	CONSTRUCTION NOTES
1	PIPING SCHEDULE ITEMS
EQUIP	EQUIPMENT SCHEDULE ITEMS

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
CIVIL CONVENTIONS AND ABBREVIATIONS

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **C001**

Plotted By: Steve Siebert Date: Tuesday, November 11, 2025

File: \\ae2s.com\nas\projects\EIE\Eagle Mountain\13139-2023-002\CAD\Dwgs\01-Civil\Plan Sheets\C_Symbols_Abbreviations.dwt 4x4.dwg

WATER

DESCRIPTION	EXISTING	NEW
PIPE		
WATER MAIN	W	
WATER SERVICE		
STRUCTURES		
MANHOLE	W	W
METER MANHOLE	M	M
ARV MANHOLE		
WELL	WW	WW
MONITORING WELL	MW	MW
PRV MANHOLE		
WATER HANDHOLE	W	W
VAULT	W	W
VALVES		
CURBSTOP		
GATE		
BUTTERFLY		
PLUG		
CHECK		
BALL		
HYDRANTS		
FIRE		
ARV		
BLOW OFF		
FITTINGS		
11.25° BEND		
22.50° BEND		
30° BEND		
45° BEND		
60° BEND		
90° BEND		
WYE (R)		
WYE (L)		
CAP		
COUPLING		
CROSS		
PLUG		
REDUCER		
TEE		
SADDLE TAP		

SANITARY

DESCRIPTION	EXISTING	NEW
PIPE		
SANITARY MAIN	SS	
SANITARY SERVICE		
STRUCTURES		
MANHOLE	S	S
CLEAN OUT	CO	CO
METER MANHOLE	M	M
SEPTIC TANK	ST	ST
VAULT	S	S
LIFTSTATION	L	L
VALVES		
GATE		
BUTTERFLY		
PLUG		
FITTINGS		
WYE (R)		
WYE (L)		
PLUG		
CAP		

STORM

DESCRIPTION	EXISTING	NEW
PIPE		
STORM MAIN	SD	
STORM LEAD		
STRUCTURES		
MANHOLE	D	D
AREA INLET		
BEEHIVE INLET		
CURB INLET		
DOUBLE CURB INLET		
OUTFALL		

GAS

DESCRIPTION	EXISTING	NEW
LINES		
NATURAL GAS	G	G
STRUCTURES		
MANHOLE	G	G
METER	G	G
VALVES		
GATE VALVE		

SITE

DESCRIPTION	EXISTING	NEW
VEGETATION		
CONIFEROUS TREE (LARGE)		
CONIFEROUS TREE (SMALL)		
DECIDUOUS TREE (LARGE)		
DECIDUOUS TREE (SMALL)		
SHRUB		
STUMP		
TREE LINE		
SIGNAGE		
STREET SIGN		
MILE POST	MP	MP
SITE		
BUILDING		
CURB		
CONCRETE		
FENCES		
BARBED WIRE		
CHAIN LINK		
WOOD		
VINYL		
WOVEN WIRE		
GUARD RAIL		
SILT	SF	SF
SUPER SILT	SSF	SSF
GATE POST	GP	
TOPOLOGY		
CONTOURS	900	900

ELECTRICAL

DESCRIPTION	EXISTING	NEW
LINES		
ELECTRIC	E	E
OVERHEAD	OHE	OHE
UNDERGROUND	UGE	UGE
STRUCTURES		
MANHOLE	E	E
HANDHOLE	E	E
UTILITY POLE		
GUY ANCHOR		
LIGHT POST		
PUSH TO WALK POST	P	P
STREET LIGHT		
SIGNAL		
SIGNAL WITH ARM		

COMMUNICATIONS

DESCRIPTION	EXISTING	NEW
LINES		
COMMUNICATIONS	C	
FIBER OPTIC	FO	
TELEPHONE	T	
CABLE TV	CATV	
CLOSED CIRCUIT TV	CCTV	
STRUCTURES		
MANHOLE	C	C
TELEPHONE MANHOLE	T	T
TELEPHONE PEDESTAL	T	T
TELEPHONE FIBER OPTIC PEDESTAL	FO	FO
TELEVISION PEDESTAL	TV	TV
UNKNOWN PEDESTAL	U	U

DEMOLITION

DESCRIPTION	EXISTING	NEW
LINES		
FEATURES TO BE REMOVED		
FEATURES TO BE ABANDONED		
REMOVE CURB & GUTTER		
STRUCTURES		
REMOVE TREE OR SHRUB		
AREA		
ITEMS TO BE REMOVED		

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR	DATE	SYM

GENERAL NOTES

1. THIS LEGEND SHEET IS FOR VISUAL REFERENCE OF THE SYMBOLS AND LINETYPES USED ON THIS PROJECT. SOME OF THE SYMBOLS AND LINETYPES MAY NOT BE USED BY THIS PARTICULAR PROJECT.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
CIVIL LEGENDS AND SYMBOLS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN
SHEET NO: C002

Plotted By: Steve Seibert Date: Tuesday, November 11, 2025

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GENERAL NOTES

1. CONTRACTOR SHALL ADHERE TO CLIENT CONSTRUCTION SPECIFICATIONS, UNLESS NOTED OTHERWISE. CONTRACTOR SHOULD NOTE THAT ADDITIONAL CONSTRUCTION NOTES AND SPECIFICATIONS ARE INCLUDED ON INDIVIDUAL DRAWINGS.
2. THIS PLAN SET HAS A LIST OF GENERAL ABBREVIATIONS AND SYMBOLS AND MATERIALS LEGENDS LISTED ON IT. SOME SYMBOLS, MATERIALS, AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
3. ALL CONTOURS, ELEVATIONS, AND COORDINATES FOR THE PROJECT ARE BASED ON NAD83 STATE PLANE COORDINATE SYSTEM, UTAH CENTRAL ZONE, US FOOT, AND NAVD88.
4. CONTRACTOR SHALL PROVIDE A ONE (1) WEEK NOTICE TO ENGINEER, OWNER, AND PROPERTY OWNERS PRIOR TO BEGINNING ANY CONSTRUCTION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING OSHA STANDARDS FOR TRENCH EXCAVATIONS.
6. DEPTH OF COVER SHALL BE A MINIMUM OF 4 FEET 0 INCHES MEASURED FROM THE FINISHED GRADE GROUND SURFACE TO THE TOP OF THE PIPE UNLESS OTHERWISE SHOWN ON THE PLANS. PIPES SHALL BE LOWERED, AS REQUIRED, TO AVOID CONFLICTS WITH EXISTING UTILITIES AND TO MAINTAIN SPECIFIED AND REQUIRED SEPARATIONS.
7. GATE VALVE AND CURB STOP BOXES, IF ANY, SHALL BE SET AS SHOWN IN THE CONSTRUCTION DETAILS, AS APPLICABLE.
8. EXCESS EXCAVATED MATERIAL INCLUDING PIPE, STUMPS, ROOTS, SOIL MATERIALS, ASPHALT AND CONCRETE PAVEMENT, SIDEWALK, CURB AND GUTTER, AND ANY OTHER ITEMS THE CITY DOES NOT WISH TO SALVAGE SHALL BECOME CONTRACTOR'S PROPERTY AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY, INCIDENTAL TO THE CONTRACT.
9. CONTRACTOR SHALL BE REQUIRED TO CLEAN STREETS AND SIDEWALKS AND REPAIR ALL DAMAGE TO THE CONDITION THEY WERE IN PRIOR TO THE START OF CONSTRUCTION. ALL REPAIRS AND CLEANING WILL BE COMPLETED BEFORE PAYMENT FOR ASSOCIATED BID ITEMS WILL BE MADE.
10. ALL BOLTS AND ANCHOR BOLTS INSTALLED THROUGHOUT THE PROJECT SHALL BE STAINLESS STEEL, UNLESS OTHERWISE NOTED IN THE DRAWINGS AND SPECIFICATIONS.
11. CONTRACTOR TO PROVIDE AND MAINTAIN ADEQUATE DEWATERING EQUIPMENT TO REMOVE AND DISPOSE OF ANY SURFACE AND GROUNDWATER ENTERING THE TRENCH.
12. THE CONTRACTOR SHALL PROVIDE MARKER TAPE IN ALL TRENCHES AND TRACER WIRE ON ALL PVC POTABLE WATER PIPE.
13. THE AERIAL PHOTOGRAPHY SHOWN ON THE CONSTRUCTION PLAN SHEETS MAY NOT REFLECT CURRENT CONDITIONS. THEREFORE, ACTUAL FIELD CONDITIONS MAY VARY FROM THOSE DISPLAYED IN THE CONSTRUCTION PLANS.
14. ITEMS NOT INCLUDED IN THE BID FORM AS A PAY ITEM BUT INCLUDED ELSEWHERE IN THE PLANS SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AND SHALL BE CONSIDERED INCIDENTAL ITEMS.
15. DEFLECTIONS FROM A STRAIGHT LINE OR GRADE ARE TO BE MADE WITH FITTINGS, DEFLECTED JOINTS, SHORTER PIPE SECTIONS, OR A COMBINATION OF THESE METHODS TO CONFORM TO THE ALIGNMENT AND PROFILE INDICATED ON THE DRAWINGS AND SPECIFIED. DEFLECTED JOINTS ARE NOT TO EXCEED THE VALUES SPECIFIED FOR THE PIPE JOINT. CONTRACTOR TO SUBMIT METHOD TO MEASURE DEFLECTION OF PIPE JOINTS.
16. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR IN ACCORDANCE WITH THESE SPECIFICATIONS AND DRAWINGS.
17. CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE.
18. CONTRACTOR SHALL INCORPORATE PROPER EROSION CONTROL MEASURES.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEFICIENCIES WITH THE INSTALLATION OF ALL THE PIPELINES AND ALL APPURTENANCES INSTALLED ON THE PROJECT FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE BY OWNER.
20. CONTRACTOR SHALL FOLLOW THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS AND GUIDES FOR TRAFFIC CONTROL FOR STREET AND HIGHWAY CONSTRUCTION.
21. CONTRACTOR SHALL LIMIT ALL WORK TO WITHIN THE CONSTRUCTION LIMITS AND SHALL NOT IMPEDE TRAFFIC ON ROADWAYS.
22. CONTRACTOR SHALL MAINTAIN INGRESS/EGRESS ACCESS TO INDIVIDUAL PROPERTY OWNERS AT ALL TIMES. CONTRACTOR SHALL COORDINATE DETOURS AND ANY TEMPORARY CLOSURES WITH EACH PROPERTY OWNER. CONTRACTOR SHALL KEEP DURATION OF ALL CLOSURES AND DETOURS TO A MINIMUM.
23. CONTRACTOR SHALL NOTIFY ALL PROPERTY OWNERS A MINIMUM OF 24 HOURS PRIOR TO ANY WATER SERVICE DISRUPTIONS. SERVICE DISRUPTIONS SHALL BE KEPT TO A MINIMUM.
24. THE CONTRACTOR SHALL UTILIZE HAND TAMPERS AND PNEUMATIC TAMPERS TO OBTAIN THE REQUIRED COMPACTION OF THE PIPE BED AND THE BACKFILL, AS SPECIFIED.
25. THE CONTRACTOR SHALL PROVIDE ALL APPROPRIATE HOISTING EQUIPMENT TO HANDLE THE PIPE WHILE UNLOADING AND PLACING IT IN ITS FINAL POSITION WITHOUT DAMAGE TO THE PIPE. PIPE, FITTINGS, VALVES, AND OTHER ACCESSORIES SHALL, UNLESS OTHERWISE DIRECTED, BE UNLOADED AT THE POINT OF DELIVERY, HAULED TO AND DISTRIBUTED AT THE SITE OF THE PROJECT BY THE CONTRACTOR. MATERIALS SHALL AT ALL TIMES BE HANDLED WITH CARE TO AVOID DAMAGE. UNDER NO CIRCUMSTANCES SHALL ANY MATERIALS BE DROPPED. PIPE HANDLED ON SKIDWAYS MUST NOT BE SKIDDED OR ROLLED AGAINST PIPE ALREADY ON THE GROUND. IN DISTRIBUTING THE MATERIALS AT THE SITE OF WORK EACH PIECE SHALL BE UNLOADED OPPOSITE OR NEAR THE PLACE WHERE IT IS TO BE LAID IN THE TRENCH. MATERIALS SHALL BE HANDLED IN SUCH A MANNER THAT NO DAMAGE TO THE PIPE WILL RESULT.
26. PVC AND POLYETHYLENE PIPE SHALL BE STORED COVERED OUT OF DIRECT SUNLIGHT.
27. SANITARY SEWER/WATER MAIN CROSSINGS: ALL SANITARY SEWER/WATER MAIN CROSSINGS SHALL BE INSTALLED WITH A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN PIPE OUTSIDE WALLS. ALL WATER MAIN SHALL BE INSTALLED ABOVE SANITARY SEWER WHEN POSSIBLE. WATER MAINS INSTALLED ABOVE AND WITHIN 5 FEET OF A SANITARY SEWER MAIN, AND ALL WATER MAINS INSTALLED BELOW A SANITARY SEWER MAIN SHALL HAVE A FULL 20-FOOT LENGTH OF WATER MAIN PIPE CENTERED ON THE SANITARY SEWER MAIN. WHEN WATER MAINS ARE INSTALLED BENEATH AN EXISTING SEWER MAIN THE SEWER MAIN SHALL BE REPLACED BY A FULL 20-FOOT LENGTH OF SEWER MAIN PIPE CENTERED OVER THE WATER MAIN UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THIS PROCEDURE SHALL ALSO BE FOLLOWED FOR INSTALLATIONS OF SANITARY SEWER PIPE.
28. SANITARY SEWER AND/OR WATER PIPELINE THAT IS TO BE PLACED PARALLEL TO EACH OTHER SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF 10 FEET.
29. CUTTING PIPE: CUTTING SHALL COMPLY WITH PIPE MANUFACTURER'S RECOMMENDATIONS. CUTS SHALL BE SMOOTH, STRAIGHT, AND AT RIGHT ANGLES TO PIPE AXIS. SHARP CORNERS SHALL BE REMOVED AND THE PIPE BEVELED TO MANUFACTURER'S RECOMMENDATION.
30. DUCTILE IRON PROTECTION: ALL DUCTILE IRON FITTINGS AND APPURTENANCES SHALL BE WRAPPED IN AN 8-MIL POLYETHYLENE SHEETING IN ACCORDANCE WITH AWWA C105.
31. CONTRACTOR SHALL INSTALL ALL PIPE WITH PIPE BEDDING AS INDICATED IN THE DETAILS, UNLESS OTHERWISE NOTED IN THE DRAWINGS AND SPECIFICATIONS.
32. RESTRAINING REQUIREMENTS: ALL VALVES, TEES, CROSSES, AND BENDS SHALL BE CONNECTED TO THE WATER MAIN WITH AN APPROVED JOINT RESTRAINT. COSTS OF ALL RESTRAINTS SHALL BE INCIDENTAL TO THE FITTINGS.
33. THE MINIMUM RESTRAINED LENGTHS REQUIRED FOR PROCESS MAIN PIPE AND FITTINGS SHALL BE AS SHOWN IN THE TABLE BELOW AND AS INDICATED ON THE DRAWINGS.

18-INCH PROCESS MAIN	LENGTH EACH SIDE OF FITTING
VALVE/DEADEND	80'
45° BEND	15'
TEE (BRANCH)	90'
90 DEG BEND	32'

34. AFTER THE CONTRACTOR HAS COMPLETED THE INSTALLATION OF THE UTILITIES AND ANY CLEANUP ITEMS, CONTRACTOR SHALL MAKE A WRITTEN REQUEST TO THE ENGINEER FOR A FINAL INSPECTION. UPON RECEIPT OF THIS REQUEST, THE ENGINEER WILL SET A DATE AND TIME FOR THE FINAL INSPECTION. DURING THE FINAL INSPECTION, GATE VALVES WILL BE CHECKED TO SEE IF THEY ARE ACCESSIBLE AND OPERABLE. ANY DEFICIENCIES FOUND WILL PROMPTLY BE CORRECTED BEFORE FINAL PAYMENT WILL BE MADE. THE FINAL INSPECTION REQUEST FORM IS ATTACHED AS PART OF THE SPECIFICATIONS.
35. **ANY PLANT SHUTDOWN DURING CONSTRUCTION SHALL BE FOR NO MORE THAN ONE (1) HOUR. NOTIFY ENGINEER AND OWNER 48 HOURS IN ADVANCE BEFORE SHUTDOWN FOR APPROVAL.**

UTILITY NOTES

1. THE APPROXIMATE LOCATION OF KNOWN EXISTING UNDERGROUND UTILITY LINES ARE SHOWN ON THE PLANS. OTHER UNKNOWN UTILITIES MAY EXIST. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES OR REPAIRING ANY DAMAGE WHICH OCCURS BECAUSE OF THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES. NOT ALL OVERHEAD UTILITIES, PERMANENT OR TEMPORARY, ARE SHOWN ON THE PLANS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION, ELEVATION, SIZE, AND MATERIAL OF THE EXISTING UNDERGROUND PIPING AT THE POINTS OF CONNECTION. APPROVED TRANSITIONS SHALL BE USED TO MAKE ALL CONNECTIONS. PRECISE LOCATION AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES ARE TO BE FIELD VERIFIED. PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES, HARNESSED MECHANICAL COUPLINGS, AND ROTATE FITTINGS, AND DEFLECT JOINTS AS REQUIRED TO MAKE CONNECTIONS. PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION. ANY DIFFERENT FITTINGS NECESSARY TO MAKE ALL CONNECTIONS SHALL BE INCIDENTAL.
3. THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT, OR REQUIRED RELOCATION OF ANY UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) IS TO BE COORDINATED WITH THE CONTRACTOR AND THE OWNER OF EACH UTILITY BEFORE CONSTRUCTION/INSTALLATION IS STARTED.
4. EARTHWORK ACTIVITIES ARE NOT ALLOWED OUTSIDE CONSTRUCTION LIMITS OR R.O.W. UNLESS APPROVED BY THE ENGINEER.
5. TRENCH BOX TECHNIQUES SHALL BE UTILIZED TO LIMIT WIDTHS OF OPEN-CUT TRENCHES.
6. WHERE EXISTING UTILITY WIRES (TELEPHONE, ELECTRIC, FIBER OPTIC) ARE LOCATED ADJACENT TO OR ABOVE THE PROPOSED WORK, CONTRACTOR SHALL TEMPORARILY SUPPORT EXISTING WIRES AND INSTALL PIPING UNDER EXISTING WIRES. ANY DECISION TO HAVE THE EXISTING UTILITIES RELOCATE WIRES WILL BE AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL HAVE THE UTILITY COMPANY PROVIDE AN ON-SITE REPRESENTATIVE TO INSPECT THE EXCAVATION AND TEMPORARY SUPPORT OF THE EXISTING UTILITY WIRES TO ENSURE THEY CONCUR WITH THE METHOD USED FOR TEMPORARY SUPPORT. THE CONTRACTOR IS RESPONSIBLE FOR COMPLETION OF WORK AS INDICATED AND MEETING ALL UTILITY REQUIREMENTS TO ENSURE A FINAL INSTALLATION THAT BENEFITS BOTH THE CITY AND THE UTILITY COMPANY.
7. UNKNOWN UTILITIES ARE ANTICIPATED TO EXIST WITHIN THE PROJECT AREA AND ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL LOCATE ALL UTILITIES AND COMPLETE ALL PROJECT WORK WHILE PROTECTING UTILITIES. PROTECTION OF UTILITIES SHALL BE INCIDENTAL TO THE PROJECT.
8. SHOULD GROUND WATER BE ENCOUNTERED DURING EXCAVATION, THE GENERAL CONTRACTOR SHALL MAKE PROVISIONS TO DE-WATER EXCAVATION AS NECESSARY TO MAINTAIN SAFE WORKING CONDITIONS. DE-WATERING WATER SHALL BE DISPOSED OF IN A MANNER THAT DOES NOT IMPACT ADJACENT PROPERTIES.

COORDINATION NOTES

1. CONTRACTOR SHALL COORDINATE SUPPORT OF UTILITY CROSSINGS AND/OR EXISTING UTILITY RELOCATIONS WITH UTILITY COMPANY, TRAFFIC CONTROL ISSUES WITH THE OWNER, AND MOBILITY ISSUES WITH OTHER CONSTRUCTION SITES IN THE AREA.
2. CONTRACTOR SHALL COORDINATE THE OPERATION OF EXISTING PIPELINES, VALVES, AND HYDRANTS WITH CITY PERSONNEL. GREAT CARE MUST BE USED IN OPERATING VALVES AND HYDRANTS ON THE EXISTING WATER SYSTEM. ANY MAIN BREAKS CAUSED BY CONTRACTOR WILL BE CORRECTED AND PAID FOR BY CONTRACTOR.
3. CONTRACTOR SHALL PRESSURE TEST PIPELINE AND REPAIR ANY LEAKS. CONTRACTOR MUST PROVIDE ENGINEER 48 HOURS NOTICE PRIOR TO TESTING.

PROTECTION NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE, STORE, AND REPLACE ANY EXISTING TRAFFIC SIGNS AFFECTED BY CONSTRUCTION ACTIVITY. ANY SIGNS DAMAGED OR LOST AS A RESULT OF THE PROJECT WILL BE REPLACED BY THE CONTRACTOR AND THE COST FOR REPLACEMENT SHALL BE DEDUCTED FROM THE CONTRACTOR'S FINAL PAYMENT.
2. MISCELLANEOUS ITEMS SUCH AS AND NOT LIMITED TO, MAILBOXES, STREET LIGHTS, TRAFFIC LIGHTS, SIGNS, FENCES, POLES, TREES, ETC. SHALL BE PROTECTED OR REMOVED AND REINSTALLED BY THE CONTRACTOR INCIDENTAL TO THE CONTRACT.
3. PROTECTION OR REMOVAL OF TREES, SHRUBS, AND LANDSCAPING IS TO BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND SHALL BE COORDINATED WITH THE ENGINEER AND THE PROPERTY OWNER.
4. CONTRACTOR MUST RE-ESTABLISH ANY DISTURBED PROPERTY PINS OR CONTROL POINTS WITH SERVICES OF REGISTERED LAND SURVEYOR (RLS) REGISTERED IN NORTH DAKOTA. CONTRACTOR MUST SUBMIT CERTIFICATE OF SURVEY FOR EACH PROPERTY WITH RE-ESTABLISHED PROPERTY PINS. THE COST FOR RLS SERVICES SHALL BE INCIDENTAL.
5. ANY EXISTING STRUCTURES DISTURBED BY CONSTRUCTION, INCLUDING CURB AND GUTTER, CONCRETE AND BITUMINOUS ROADS AND SIDEWALKS, FENCING, RETAINING WALLS, ETC., ARE TO BE RESTORED TO THEIR ORIGINAL LOCATION AND CONDITION.

Plotted By: Russell Sprague Date: Friday, November 14, 2025

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS	SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
CIVIL CONSTRUCTION NOTES

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN
SHEET NO: C003

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_S_v26.rvt

GENERAL REQUIREMENTS

1. REFER TO PROCESS, ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO: DIMENSIONS, ELEVATIONS, SLOPES, DOOR AND WINDOW OPENINGS, NON-BEARING WALLS, STAIRS, FINISHES, DRAINS, WATERPROOFING, RAILINGS, MECHANICAL UNIT LOCATIONS, INSERTS, EMBEDDED ITEMS, ANCHORAGES, AND OTHER NON-STRUCTURAL ITEMS
2. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR: COORDINATING DETAILS, ACCURACY OF THE WORK, VERIFICATION OF ALL QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCESSES, MEANS AND METHODS OF CONSTRUCTION, AND FOR PERFORMING THE WORK IN A SAFE AND SECURE MANNER
3. STRENGTH AND STABILITY OF THE STRUCTURE DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. PROVIDE TEMPORARY SHORING, BRACING AND OTHER ELEMENTS REQUIRED TO MAINTAIN STABILITY UNTIL THE STRUCTURE IS COMPLETE
4. DISCREPANCIES WITHIN THE CONSTRUCTION DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK
5. GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS, AND CONDITIONS AT THE SITE, INCLUDING FOUNDATIONS. CONFLICTS BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
6. NO STRUCTURAL MEMBER SHALL BE CUT OR NOTCHED OR OTHERWISE REDUCED IN STRENGTH UNLESS APPROVED BY THE ENGINEER OF RECORD.
7. CONSTRUCTION OBSERVATION BY THE STRUCTURAL ENGINEER IS FOR GENERAL CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING ALL WORK IN COMPLIANCE WITH THE CONTRACT DOCUMENTS.
8. PROTECT EXISTING CONSTRUCTION FROM DAMAGE DURING CONSTRUCTION OF NEW ADDITIONS. MAKE NO CUTS OR ALTERATIONS TO EXISTING CONSTRUCTION, OTHER THAN THOSE SHOWN ON THE DRAWINGS, WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER. PATCHING SHALL MATCH THAT OF WORK PREVIOUSLY COMPLETED.
9. SPECIAL INSPECTIONS SHALL BE PROVIDED BY AN INDEPENDENT TESTING AND INSPECTION AGENCY PER CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE AND AS NOTED WITHIN THE CONTRACT DOCUMENTS. REPORTS DOCUMENTING THE RESULTS OF THE TESTING AND INSPECTIONS SHALL BE SUBMITTED FOR REVIEW AND RECORD.

STRUCTURAL CODES AND STANDARDS

THE GOVERNING STRUCTURAL DESIGN CODES AND STANDARDS ARE TAKEN FROM IBC 2024.

CODES AND STANDARDS NOT LISTED HEREIN ARE NOT APPLICABLE TO THE SCOPE OF THE DESIGN.

1. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 7-22 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES
2. AMERICAN CONCRETE INSTITUTE (ACI) 318-19 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
3. ACI 315-99 DETAILS AND DETAILING OF CONCRETE REINFORCEMENT
4. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) STEEL CONSTRUCTION MANUAL, 15TH EDITION
5. AMERICAN IRON AND STEEL INSTITUTE (AISI) S100-20 NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS
6. AMERICAN WELDING SOCIETY (AWS) D1.1/D1.1M:2015 STRUCTURAL WELDING CODE - STEEL

POST-INSTALLED ANCHORS

1. POST INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER OF RECORD PRIOR TO USING POST INSTALLED ANCHORS FOR MISSING OR MISPLACED ANCHORS.
2. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING WHEN DRILLING HOLES. HOLES SHALL BE DRILLED AND CLEANED PER THE MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACING INDICATED WITHIN THE LITERATURE.

REINFORCING STEEL - SPEC 03 20 00

1. LAP SPLICES OF DEFORMED BARS SHALL BE CLASS B, SEE REINFORCING SPLICE AND DEVELOPMENT TABLE FOR LENGTHS, UNLESS OTHERWISE NOTED.
2. ASTM A615 REINFORCING STEEL SHALL NOT BE WELDED.
3. WELDED REINFORCING SHALL BE ASTM A706 MATERIAL WITH WELDING COMPLETED IN ACCORDANCE WITH AWS D1.4.
4. LAP ALL WWR (WELDED WIRE REINFORCING) A MINIMUM DISTANCE OF ONE CROSS WIRE SPACING PLUS 2 INCHES.
5. ALL REINFORCING STEEL SHALL BE SUPPORTED ON STANDARD ACCESSORIES, HELD RIGIDLY AND ACCURATELY IN PLACE, AND PROTECTED AGAINST DISPLACEMENT BEFORE AND DURING PLACEMENT OF CONCRETE. SUPPORTING ACCESSORY LEGS THAT REST ON CONCRETE SURFACES THAT WILL BE EXPOSED IN THE FINISHED STRUCTURE SHALL BE FABRICATED OF STAINLESS STEEL.
6. DOWELS AND OTHER MISCELLANEOUS STEEL EMBEDDED ITEMS SHALL BE LOCATED AND HELD IN SPECIFIED POSITION PRIOR TO PLACEMENT OF CONCRETE AND SHALL NOT BE PUSHED INTO CONCRETE FOLLOWING CONCRETE POUR.

CAST-IN-PLACE CONCRETE - SPEC 03 30 00

1. A CONCRETE MIX DESIGN FOR EACH UNIQUE COMBINATION OF STRENGTH, APPLICATION, COARSE AGGREGATE GRADATION, AND WATER CEMENT RATIO SPECIFIED SHALL BE PREPARED BY THE SUPPLIER OR AN INDEPENDENT TESTING LABORATORY AND BE SUBMITTED FOR REVIEW PRIOR TO CASTING ANY CONCRETE.
2. ALL FORMWORK SHALL BE DESIGNED, ERECTED, SUPPORTED, BRACED AND MAINTAINED ACCORDING TO ACI 347, "RECOMMENDED STANDARD PRACTICE FOR CONCRETE FORMWORK".
3. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, CONSTRUCTION, AND SAFETY OF ALL FORMWORK.
4. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" WHERE NOT SPECIFICALLY SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS.
5. UNLESS OTHERWISE NOTED, TOLERANCES FOR CONCRETE FORMWORK SHALL CONFORM TO ACI STANDARD 117, "STANDARD TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS". TOLERANCES IN PLACING REINFORCEMENT SHALL BE:
   A. +/- 3/8 INCH FOR MEMBERS WITH DEPTH </= 10 INCHES
   B. +/- 1/2 INCH FOR MEMBERS WITH DEPTH > 10 INCHES
6. DO NOT USE ADMIXTURES CONTAINING CALCIUM CHLORIDE.
7. ALL WATER TO ACHIEVE CONCRETE BATCHING MUST BE ADDED DURING THE BATCH AT THE PLANT. THE ADDITION OF WATER TO THE A BATCH ON SITE WILL NOT BE PERMITTED.
8. CONCRETE CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF ACI 301 "STANDARD SPECIFICATIONS FOR STRUCTURAL CONCRETE" AND ACI 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE." CONFORM TO THE REQUIREMENTS OF ACI 305 "HOT WEATHER CONCRETING" OR ACI 306 "COLD WEATHER CONCRETING" WHEN WEATHER CONDITIONS DICTATE.
9. ALL FOOTINGS, PIERS, AND FOUNDATIONS SHALL BE CENTERED, UNLESS OTHERWISE NOTED.
10. ALL EMBEDDED ELEMENTS, INCLUDING BUT NOT LIMITED TO REINFORCING DOWELS, WATERSTOPS, EMBEDMENT PLATES, AND ANCHOR BOLTS, MUST BE HELD RIGIDLY AND ACCURATELY IN PLACE, AND PROTECTED AGAINST DISPLACEMENT BEFORE AND DURING PLACEMENT OF CONCRETE. WET SETTING OF EMBEDDED ELEMENTS WILL NOT BE PERMITTED.

FOUNDATIONS

1. FOUNDATION SYSTEMS ARE DESIGNED PER THE PROJECT GEOTECHNICAL REPORT (TERRACON, PROJECT NUMBER 61255278) AND FOLLOW THE RECOMMENDATIONS SPECIFIED THEREIN.
2. FOOTINGS HAVE BEEN DESIGNED FOR THE ALLOWABLE SOIL BEARING PRESSURE INDICATED WITHIN THE DESIGN CRITERIA AND LOADS TABLE AND SHALL BE FIELD VERIFIED.
3. PROJECT GEOTECHNICAL ENGINEER SHALL INSPECT ALL SUBGRADES AND PREPARED SOIL BEARING SURFACES PRIOR TO PLACEMENT OF FOUNDATIONS.
4. FOUNDATIONS, WHERE PRESENT, SHALL BEAR ON EITHER COMPETENT NATIVE SOIL OR COMPACTED STRUCTURAL FILL.
5. PROTECT ALL FOUNDATIONS FROM THE ACTION OF WATER AND FREEZING.

STRUCTURAL STEEL - SPEC 05 12 00

1. STRUCTURAL STEEL, INCLUDING ANCHOR RODS/BOLTS AND BASE PLATES, SHALL NOT BE FIELD MODIFIED WITHOUT APPROVAL OF THE ENGINEER OF RECORD.
2. FRAMING CONNECTIONS NOT DETAILED, OR CONNECTIONS THAT ARE MODIFIED FROM THOSE DETAILED, SHALL BE DESIGNED BY THE FABRICATOR FOR THE END REACTION SHOWN ON THE PLAN (## K). FABRICATOR MAY SELECT AISC SIMPLE SHEAR CONNECTION THAT MEETS DESIGN REQUIREMENTS AND ERECTOR PREFERENCE. IF NO REACTION IS PROVIDED, DESIGN FOR ½ THE BEAM MAXIMUM UNIFORM LOAD PER AISC MANUAL FOR STEEL CONSTRUCTION.
3. MEMBERS NOTED AS 'CONTINUOUS' SHALL BE FULLY WELDED AT ALL BUTT SPLICES OR CONNECTIONS SHALL BE DETAILED TO PROVIDE CONTINUITY.
4. BEAM AND COLUMNS SHALL BE ERECTED TRUE AND PLUMB, PROVIDE TEMPORARY BRACING.
5. BEARING PLATES FOR STEEL BEAMS AND COLUMNS SHALL BE DRY PACKED WITH GROUT AS SPECIFIED OR REQUIRED.
6. NO FIELD WELDS ARE TO BE MADE UNTIL THE MEMBERS ARE PROPERLY ALIGNED. FIELD WELDS ARE TO BE MADE BY COMPETENT WELDERS USING PROPER ELECTRODES AND AMPERAGE.
7. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AWS D1.1 BY CERTIFIED WELDERS WITH CURRENT EXPERIENCE IN TYPE OF WELD SHOWN ON THE DRAWINGS.
8. DO NOT PAINT STEEL TO BE FIREPROOFED, FIELD WELDED, EMBEDDED IN CONCRETE, OR SPECIALLY PREPARED.
9. SHOP PRIME ALL STRUCTURAL STEEL WITH FABRICATOR'S STANDARD COLOR, UNLESS NOTED OTHERWISE, PER AISC 360 SECTION M3 AND AISC 303 SECTION 6.5. PRIMER SHALL BE COMPATIBLE WITH TOP COAT AND FINISH, FIELD TOUCH-UP AS NECESSARY. COORDINATE TOP COAT AND FINISH WITH ARCHITECTURAL DRAWINGS, UNLESS OTHERWISE NOTED.
10. LIFE SAFETY COMPONENTS AND LIFTING DEVICES (I.E. GUARD RAILS, STAIRS, MONORAIL, ETC) SHALL RECEIVE A SAFETY YELLOW TOP COAT.
11. NUMBER ADJACENT TO BEAM SECTION, (##), INDICATES TOTAL NUMBER OF ¾"X4" LONG HEADED STUDS TO BE EQUALLY SPACED ALONG THE LENGTH OF THE BEAM. MULTIPLE NUMBERS ADJACENT TO GIRDER SECTION, (##,##,##), INDICATES NUMBER STUDS TO BE EQUALLY SPACED ALONG SEGMENTS OF THE GIRDER. STUDS ARE TO BE AUTOMATICALLY WELDED TO THE BEAMS THROUGH THE FLOOR DECK.
12. TOP FLANGES OF BEAMS AND GIRDERS MUST BE FREE OF PAINT, WATER, DIRT, RUST AND ANY OTHER MATERIALS WHICH INTERFERE WITH THE WELDING OPERATION OF HEADED STUDS.
13. COLUMN CAP PLATES SHALL BE 3/4 INCH THICK, UNLESS OTHERWISE NOTED.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D. EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
STRUCTURAL GENERAL NOTES

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	HES
CHECKED BY:	JAP
APPROVED BY:	KDE

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: **GEN**

SHEET NO: **S001**

4/16/2026 2:40:17 PM

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_S_v26.rvt

MATERIAL STRENGTHS [1]

CONCRETE		
	28 DAY COMPRESSIVE STRENGTH	f'c
	STRUCTURAL CONCRETE	4500 PSI
	GROUT (NON SHRINK / NON METALLIC)	5000 PSI
REINFORCING STEEL		
	REINFORCING BARS	ASTM A615, GRADE 60, DEFORMED
	REINFORCING BARS (WELDABLE)	ASTM A706, GRADE 60, DEFORMED
	WELDED WIRE REINFORCING	ASTM A185
STRUCTURAL STEEL		
STRUCTURAL MEMBERS	WIDE FLANGE (W) & TEE (WT)	ASTM A992, Fy=50 KSI
	CHANNEL (C & MC) & ANGLE (L)	ASTM A36, Fy=36 KSI
	STRUCTURAL BARS & PLATES	ASTM A36, Fy=36 KSI
	HOLLOW STRUCTURAL SECTIONS - RECT/SQ (HSS)	ASTM A500, GRADE C, Fy=50 KSI
	STRUCTURAL PIPE (SCHED 40 UNO)	ASTM A53, GRADE B, Fy=35 KSI
FASTENERS	HIGH STRENGTH BOLTS	ASTM A325-N
	ANCHOR RODS	ASTM F1554, GRADE 36
	THREADED RODS	ASTM A36
	COMMON BOLTS	ASTM A307
	SHEAR STUD CONNECTORS	ASTM A108
WELDS	WELD ELECTRODES	E70XX
POST INSTALLED ANCHORS		
ADHESIVE ANCHORS	HILTI HIT-HY200	ANCHORAGE TO CONCRETE
EXPANSION ANCHORS	HILTI KWIK BOLT 3	ANCHORAGE TO CONCRETE
SCREW ANCHORS	HILTI KWIK HUS-EZ	ANCHORAGE TO CONCRETE
CONCRETE SCREWS	HILTI KWIK CON II	ANCHORAGE TO CONCRETE & MASONRY
ADHESIVE ANCHORS	HILTI HIT-HY270	ANCHORAGE TO MASONRY
POWER ACTUATED FASTENERS	HILTI X-U	ANCHORAGE TO CONCRETE, MASONRY, & STEEL
	(OR APPROVED EQUALS)	

1. SEE GENERAL NOTES & SPECS FOR ADDITIONAL REQUIREMENTS

CAST IN PLACE CONCRETE (NON-PRESTRESSED) COVER ACI 350 - ENVIRONMENTAL STRUCTURES

UNLESS NOTED OTHERWISE ON DRAWINGS	COVER (in)
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3
EXPOSED TO EARTH, LIQUID, WEATHER, OR BEARING ON WORK MAT OR SLABS SUPPORT EARTH COVER	
SLABS, JOISTS:	2
BEAMS, COLUMNS:	
STIRRUPS, SPIRALS, AND TIES	2
PRIMARY REINFORCEMENT	2 1/2
WALLS:	2
FOOTINGS, BASE SLABS:	
FORMED SURFACES	2
TOP OF FOOTINGS AND BASE SLABS	2
CONDITIONS NOT COVERED ABOVE	
SLAB, JOISTS:	
No. 11 AND SMALLER	3/4
No. 14 AND No. 18 BARS	1 1/2
BEAMS, COLUMNS:	
STIRRUPS, SPIRALS, AND TIES	1 1/2
PRIMARY REINFORCEMENT	2
WALLS:	
No. 11 AND SMALLER	3/4
No. 14 AND No. 18 BARS	1 1/2
SLAB ON GRADE / SLAB ON METAL DECK	CENTERED

DESIGN CRITERIA AND LOADS (IN ADDITION TO THOSE INDICATED ON PLANS & DETAILS)

OCCUPANCY	**BUILDING RISK CATEGORY**		**III**
DEAD LOADS	**(SUPERIMPOSED)**		
	FUTURE ROOF DEAD		5 PSF
LIVE LOADS			
	MAINTENANCE CATWALK		50 PSF
	STAIRS		100 PSF
RAIN LOADS	**IBC CHAP 16, SECTION 1603.1.9**		
	RAIN INTENSITY (15-MIN)		4.36 INCH/HR
	RAIN INTENSITY (24-HR)		1.82 INCH/HR
SNOW LOAD	**ASCE 7-22, CHAP 7**		
EXTERIOR PLATFORMS	GROUND SNOW LOAD	Pg	44 PSF
	SNOW EXPOSURE, FULLY EXPOSED	Ce	0.90
	THERMAL FACTOR	Ct	1.20
	FLAT ROOF SNOW LOAD	Pf	40 PSF
	SLOPED ROOF FACTOR	Cs	1.0
WIND DESIGN	**(STRENGTH LEVEL, UNO)**		
MAIN WIND FORCE RESISTING SYSTEM	BASIC WIND SPEED	V	109 MPH
	EXPOSURE CATEGORY		C
	BUILDING TYPE		OPEN
	INTERNAL PRESSURE COEFFICIENT	GCpi	0.00
COMPONENTS & CLADDING	FOR EACH PRODUCT SHALL BE CALCULATED BY EACH PRODUCT VENDOR USING THE COEFFICIENTS AND PARAMETERS STATED HEREIN		
SEISMIC DESIGN	**ASCE 7-22**		
	SEISMIC DESIGN CATEGORY		D
	SEISMIC FORCE RESISTING SYSTEM		CONCRETE SHEAR WALL
	IMPORTANCE FACTOR	Ie	1.25
	SITE CLASS		D
	SPECTRAL RESPONSE ACCELERATION	Ss	0.77g
		S1	0.25g
	SPECTRAL DESIGN RESPONSE COEFFICIENT	Sds	0.67g
		Sd1	0.43g
FOUNDATIONS			
	NET ALLOWABLE BEARING PRESSURE		2000 PSF

REINFORCING STEEL LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE

	MINIMUM LAP SPLICE LENGTH ("Ls")		MINIMUM DEVELOPMENT LENGTH ("Ld")	
BAR SIZE	TOP BARS [1]	OTHER BARS	TOP BARS [1]	OTHER BARS
#3	2'-0"	1'-7"	1'-7"	1'-3"
#4	2'-8"	2'-1"	2'-1"	1'-7"
#5	3'-4"	2'-7"	2'-7"	2'-0"
#6	4'-0"	3'-1"	3'-1"	2'-5"
#7	5'-10"	4'-6"	4'-6"	3'-6"
#8	6'-8"	5'-2"	5'-2"	3'-11"
#9	7'-7"	5'-10"	5'-10"	4'-6"

1. HORIZONTAL BARS WITH MORE THAN 12" DEPTH OF CONCRETE CAST BELOW THEM

REQUIRED SPECIAL INSPECTION OF SOILS [1,2]

VERIFICATION & INSPECTION	CONTINUOUS	PERIODIC
VERIFY MATERIAL BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE DESIGN BEARING CAPACITY		X
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL		X
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS		X
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	
PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY		X

1. ALL SPECIAL INSPECTION IN ACCORDANCE WITH CURRENT IBC

2. SEE GENERAL NOTES & SPECS FOR ADDITIONAL REQUIREMENTS

REQUIRED SPECIAL INSPECTION OF CONCRETE CONSTRUCTION [1,2]

VERIFICATION & INSPECTION	CONTINUOUS	PERIODIC
INSPECTION OF REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT		X
REINFORCING BAR WELDING:		
a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A 706		X
b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND		X
c. INSPECT ALL OTHER WELDS	X	
INSPECTION OF ANCHORS CAST INTO CONCRETE		X
INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS		X
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS	X	
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED ABOVE		X
VERIFYING USE OF REQUIRED DESIGN MIX		X
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	
INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES		X
INSPECTION OF PRESTRESSED CONCRETE FOR:		
a. APPLICATION OF PRESTRESSING FORCED; AND	X	
b. GROUTING OF BONDED PRESTRESSING TENDONS	X	
INSPECT ERECTION OF PRECAST CONCRETE MEMBERS		X
VERIFICATION IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS		X
INSPECTION OF FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS PRIOR TO CONCRETE POUR		X

1. ALL SPECIAL INSPECTION IN ACCORDANCE WITH CURRENT IBC AND ACI STANDARDS

2. SEE GENERAL NOTES & SPECS FOR ADDITIONAL REQUIREMENTS

REQUIRED SPECIAL INSPECTION OF STEEL CONSTRUCTION [1,2]

VERIFICATION & INSPECTION	CONTINUOUS	PERIODIC
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS:		
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS		X
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED		X
2. INSPECTION OF HIGH-STRENGTH BOLTING:		
a. SNUG-TIGHT JOINTS.		X
b. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION		n/a
c. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITHOUT MATCHMARKING OR CALIBRATED WRENCH METHODS OF INSTALLATION	n/a	
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:		
a. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360.		X
b. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS		X
c. MANUFACTURER'S CERTIFIED TEST REPORTS		X
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:		
a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.		X
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED		X
5. INSPECTION OF WELDING:		
a. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK		
1) COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS	X	
2) MULTIPASS FILLET WELDS	X	
3) SINGLE-PASS FILLET WELDS > 5/16"	X	
4) PLUG AND SLOT WELDS	X	
5) SINGLE-PASS FILLET WELDS OF 5/16" AND LESS		X
6) FLOOR AND ROOF DECK WELDS		X
b. REINFORCING STEEL:		
1) VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706		X
2) REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES	X	
3) SHEAR REINFORCEMENT	X	
4) OTHER REINFORCING STEEL		X
4. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE:		
a. DETAILS SUCH AS BRACING AND STIFFENING		n/a
b. MEMBER LOCATIONS		n/a
c. APPLICATION OF JOINT DETAILS AT EACH CONNECTION		n/a

1. ALL SPECIAL INSPECTION IN ACCORDANCE WITH CURRENT IBC AND AISC REQUIREMENTS

2. SEE GENERAL NOTES & SPECS FOR ADDITIONAL REQUIREMENTS

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D. EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

PROJECT TITLE:

SHEET TITLE: **STRUCTURAL DESIGN TABLES**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: **GEN**

SHEET NO: **S002**

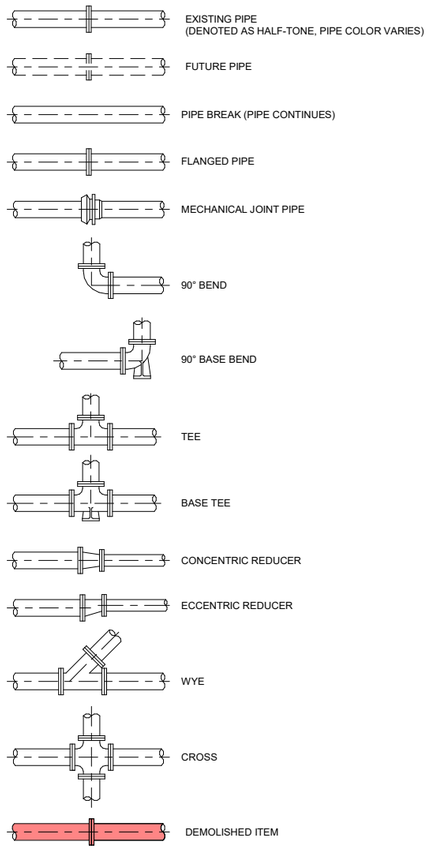
4/16/2026 2:40:17 PM

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SD_OXD_v28.rvt

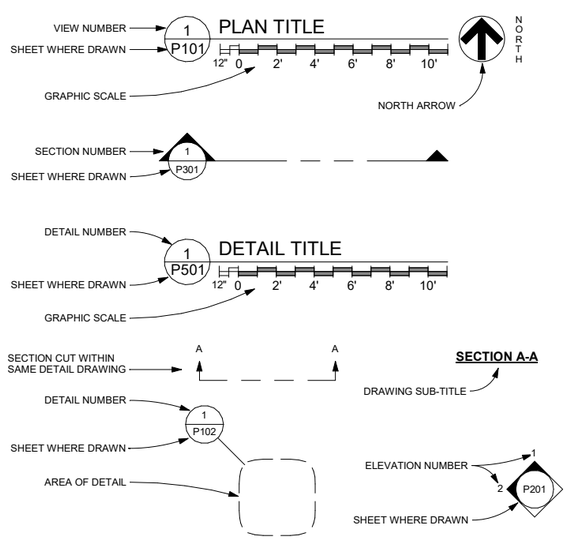
GENERAL NOTES

1. ALL PROCESS ITEMS IDENTIFIED ON DRAWINGS SHALL BE NEW AND UNUSED FOR THE PROJECT UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL NOTE THAT ADDITIONAL CONSTRUCTION NOTES MAY BE INCLUDED ON INDIVIDUAL DRAWINGS.
3. AE2S PROCESS DRAWINGS ARE INTENDED TO BE REPRODUCED IN COLOR TO ASSIST IN IDENTIFYING PROCESS PIPING AND SELECT ITEMS. AE2S ASSUMES NO LIABILITY FOR CONTRACTORS CHOOSING TO REPRODUCE THESE DRAWINGS IN BLACK AND WHITE OR AT A SCALE WHICH REDUCES LEGIBILITY.
4. DIMENSIONS AND ELEVATIONS SHOWN ON DRAWINGS ARE FOR BIDDING PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
5. INFORMATION REGARDING THE EXISTING CONDITIONS WAS OBTAINED FROM SURVEY DATA AND PRELIMINARY FIELD INVESTIGATIONS. ALL EXISTING AND PROPOSED CONDITIONS SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO ANY CONSTRUCTION.
6. CONTRACTOR SHALL PROTECT ADJACENT MATERIALS AND EQUIPMENT (NOT SCHEDULED FOR REMOVAL) FROM DAMAGE THROUGHOUT THE CONSTRUCTION PHASE OF THE PROJECT. ALL DAMAGED ITEMS SHALL BE REPAIRED OR REPLACED WITH NO ADDITIONAL COST TO THE OWNER.
7. ENGINEER AND/OR OWNER RESERVES THE RIGHT TO INSTRUCT CONTRACTOR TO SALVAGE SELECTED DEMOLITION ITEMS WHICH THE OWNER WILL RETAIN ONCE REMOVED.
8. ACCESS TO EXISTING PROJECT AREAS WHERE WORK IS TO BE PERFORMED MAY BE LIMITED. CONTRACTOR IS RESPONSIBLE TO ASSESS ACCESSIBILITY BEFORE PURCHASING EQUIPMENT AND PROCESS COMPONENTS TO ASSURE ABILITY TO INSTALL.
9. COORDINATE ALL ELECTRICAL WORK WITH ELECTRICAL AND MECHANICAL CONTRACTORS.
10. NOT ALL EQUIPMENT, PIPING, ACTUATORS, CONDUITS, PLUMBING, ETC. IS SHOWN. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION (LOCATIONS), REMOVAL, MODIFICATION, RELOCATION, RE-INSTALLATION, ETC. OF ALL MISCELLANEOUS EQUIPMENT PIPING, CONDUIT, PLUMBING, ETC. REQUIRED TO ACCOMMODATE THE INSTALLATION OF IMPROVEMENTS.
11. NOT ALL PIPE HANGERS AND SUPPORTS ARE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION (LOCATIONS), REMOVAL, MODIFICATIONS, RELOCATION, RE-INSTALLATION, ETC. OF ALL MISCELLANEOUS EQUIPMENT PIPING, CONDUIT, PLUMBING, ETC. REQUIRED TO ACCOMMODATE THE INSTALLATION OF IMPROVEMENTS.
12. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY ADDITIONAL COSTS WHICH MAY RESULT IN UNAUTHORIZED DEVIATIONS FROM THE CONTRACT DOCUMENTS.
13. ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCES SHALL BE ADHERED TO THROUGHOUT THE CONSTRUCTION PROJECT.
14. STANDARD DETAILS ARE INTENDED TO SHOW GENERAL DESIGN CONCEPTS. REFER TO THE STRUCTURAL DRAWINGS FOR DIMENSIONS AND SIZES.
15. SIZE OF FITTINGS AND VALVES SHALL CORRESPOND TO THE SIZE OF ADJACENT PIPING. JOINTS AND FITTING MATERIAL SHALL BE AS SHOWN ON ADJACENT PIPING.
16. ALTHOUGH PIPING, FITTINGS AND VALVES MAY BE SHOWN WITH FLANGED CONNECTIONS ON THE DRAWINGS, THE USE OF RIGID GROOVED TYPE PIPING SYSTEMS IS ALLOWED. CONTRACTOR SHALL PROVIDE GROOVED x FLANGED ADAPTERS WHEN MATING GROOVED TYPE PIPING SYSTEMS TO FLANGED COMPONENTS.
17. PROVIDE PROPER PLUGS, CAPS, BLIND FLANGES, AND RESTRAINTS WHEN ANY PIPING IS TERMINATED. VERIFY SIZE WITH ADJACENT PIPING AND FITTINGS.
18. CONTRACTOR SHALL PROVIDE ALL TRANSITION FITTINGS AND APPURTENANCES REQUIRED FOR TRANSITIONS BETWEEN DIFFERENT PIPE MATERIALS AND JOINT TYPES.
19. ALL SUBMERGED ANCHOR BOLTS, NUTS, FASTENERS, ETC. SHALL BE 316L STAINLESS STEEL UNLESS OTHERWISE NOTED.
20. ALL PIPING BENEATH FLOOR SLABS SHALL BE CONCRETE ENCASED.
21. THE USE OF UNI-FLANGES SHALL ONLY BE ALLOWED WITH PRIOR APPROVAL OF ENGINEER.
22. THE PROCESS DRAWINGS INDICATE REQUIRED PIPE SIZES, ELEVATIONS, AND THE EXTENT AND GENERAL ARRANGEMENT FOR PROCESS PIPING AND EQUIPMENT. PRIOR TO THE FABRICATION OR INSTALLATION OF ANY PIPING OR EQUIPMENT, THE CONTRACTOR SHALL CONSULT ALL DRAWINGS AND CONSTRUCTION TRADES TO ACQUAINT SELF WITH THE MATERIALS, FINISHES, AND LOCATIONS OF EXISTING AND NEW CEILINGS, STRUCTURAL MEMBERS, PIPES, DUCTS, LIGHTING FIXTURES, CONDUITS, ETC. WHICH MAY AFFECT THE INSTALLATION. COORDINATE THE WORK WITH OTHER TRADES AND MAKE MODIFICATIONS IN LAYOUT TO AVOID CONFLICT WITH THE WORK OF OTHER TRADES.
23. VERIFY FINAL VALVE OPERATOR/ACTUATOR ORIENTATION WITH ENGINEER PRIOR TO INSTALLATION.
24. FLOORS, WALLS, CEILINGS, ROOFS, STAIRWAYS, DOORS, AND WINDOWS ARE SHOWN FOR REFERENCE ONLY. REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR SPECIFICS, AS APPLICABLE.
25. REFER TO CIVIL, ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND INSTRUMENTATION & CONTROL DRAWINGS FOR ADDITIONAL WORK TO BE PERFORMED AND COORDINATION INFORMATION, AS APPLICABLE.
26. NOT ALL PIPING FLOOR AND WALL PENETRATIONS ARE SHOWN. CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE PROPER PENETRATION INCLUDING CONCRETE CORING, FLOOR SLEEVES, LINK-TYPE SEALS, CAULKING, FIRESTOPPING, AND GROUTING.

PROCESS PIPING LEGEND



PLAN, SECTION, AND DETAIL CONVENTIONS



CHEMICAL PIPING COLOR LEGEND

(LEGEND MAY CONTAIN PIPE SYSTEMS NOT USED IN THIS PROJECT)

- ALUM PRIMARY COAGULANT (ALUM)
- AMMONIA (AMM)
- CARBON DIOXIDE GAS (CO2G)
- CARBON SLURRY (CAR)
- CAUSTIC (CAU)
- CHLORINE (CL)
- CITRIC ACID (CA)
- COAGULANT (COAG)
- COPPER SULFATE (CSS)
- FERRIC CHLORIDE (FECL)
- FERRIC SULFATE (FER)
- FLUORIDE (FLUO)
- HIGH PURITY OXYGEN (HPO)
- HMO (HMO)
- LIME SLURRY (LIM)
- LIME TRANSFER (LT)
- MAGNESIUM HYDROXIDE (MGOH)
- METHANOL (MEOH)
- OZONE (OZ)
- PERMANGANATE (PERM)
- PHOSPHATE (PHOS)
- POLYMERS (POLY)
- SODA ASH SLURRY (SAS)
- SODA ASH TRANSFER (SAT)
- SODIUM HYDROXIDE (NAOH)
- SODIUM HYPOCHLORITE (HYPO)
- SULFUR DIOXIDE (SO2)
- SULFURIC ACID (SULA)
- SUPPLEMENTAL CARBON (SPC)

PIPE ABBREVIATIONS LIST

(SEE SPECIFICATIONS FOR PIPE SCHEDULE RATINGS)

CPVC = CHLORINATED POLYVINYL CHLORIDE
DI = DUCTILE IRON
FL = FLANGED
GRV = GROOVED
MJ = MECHANICAL JOINT
PVC = POLYVINYL CHLORIDE
SS = STAINLESS STEEL
WLD = WELDED

DRAWING SYMBOLS LEGEND

EL 898.75' / ℄ PIPE	ELEVATION & LOCATION IN SECTION VIEW CENTERLINE ELEVATION
EL 884.50 / FLOOR	ELEVATION & LOCATION IN SECTION VIEW FLOOR, WALL, OR SURFACE ELEVATION
EL 880.00' / FLOOR	EXISTING ELEVATION & LOCATION IN SECTION VIEW FLOOR, WALL, OR SURFACE ELEVATION
EL 875.00' / FFE	EXISTING FLOOR SPOT ELEVATION (CONTRACTOR TO VERIFY)
EL 870.00' / FFE	FLOOR SPOT ELEVATION
	BREAKLINE (OBJECT CONTINUES, DRAWING ENDS)
1	IMPROVEMENT NOTES
1	CONSTRUCTION NOTES - IDENTIFICATION TAG WILL BE PLACED AT THE NEAREST POSSIBLE LOCATION TO THE WORK IT IS DESCRIBING
1	EXISTING NOTES
1	DEMOLITION NOTES
1	REVISION NOTES
	DENOTES FLOW DIRECTION
XXX-XXX-XXX	IDENTIFICATION TAG (SEE I&C DRAWINGS)

PROCESS PIPING COLOR LEGEND

(LEGEND MAY CONTAIN PIPE SYSTEMS NOT USED IN THIS PROJECT)

- AIR HIGH PRESSURE (AHP)
- AIR LOW PRESSURE (ALP)
- AIR SCOUR (AS)
- BACKWASH (BW)
- BIOGAS (BG)
- CENTRATE (CENT)
- CLARIFIER EFFLUENT (CLE)
- COARSE SCREENINGS (CSCR)
- DECANT (DCT)
- DECHLORINATION (DCHL)
- DIGESTED SLUDGE (DSL)
- DISINFECTION EFFLUENT (DIW)
- DRAIN (DRN)
- DRUM OR DISC FILTER EFFLUENT (DFE)
- FATS, OILS, GREASE (FOG)
- FILTERED WATER (FLW)
- FILTRATE (FLT)
- FINE SCREENINGS (FSCR)
- FIRE MAIN (FMAIN)
- GENERAL RECYCLE (RCY)
- GENERAL SCUM (SCUM)
- GRIT (GRT)
- HEADWORKS EFFLUENT (HWE)
- HEAVY SOLIDS & INERTS (HVS)
- INTERNAL MIXED LIQUOR RECYCLE (IMLR)
- LIME STABILIZED SLUDGE (LSSL)
- MBR FILTRATE (MBRFLT)
- MBR PERMEATE (PRM)
- MBR RETENTATE (RET)
- MIXED LIQUOR (ML)
- NATURAL GAS (NGL)
- NON POTABLE WATER (NPW)
- OVERFLOW (OFLW)
- POTABLE WATER (PW)
- PRESSATE (PRS)
- PRIMARY CLARIFIER EFFLUENT (PCE)
- PRIMARY CLARIFIER SLUDGE (PSL)
- PRIMARY SCUM (PSC)
- PROCESS AIR (PA)
- PROCESS WATER RECYCLE (PRW)
- RESCREENED RETURN ACTIVATED SLUDGE (SRAS)
- RETURN ACTIVATED SLUDGE (RAS)
- RETURN ACTIVATED SLUDGE FERMENTATION (FRAS)
- SAMPLE (SMPL)
- SCREENINGS (SCR)
- SECONDARY CLARIFIER EFFLUENT (SCE)
- SECONDARY CLARIFIER SLUDGE (SSL)
- SECONDARY SCUM (SSC)
- SEWAGE (SEW)
- SIDESTREAM RETURN ACTIVATED SLUDGE (SSR)
- SLUDGE (SL)
- THICKENED WASTE ACTIVATED SLUDGE (TWAS)
- ULTRAVIOLET DISINFECTION EFFLUENT (UVE)
- VENT (VNT)
- VOLATILE FATTY ACIDS (VFA)
- WASTE ACTIVATED SLUDGE (WAS)

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS SYMBOLS AND ABBREVIATIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JC
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **GEN**

SHEET NO: **P001**

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PUMP LEGEND

MARK	DESCRIPTION
	GENERIC
	SUBMERSIBLE
	SLUDGE DIAPHRAGM
	ROTARY LOBE POSITIVE DISPLACEMENT PUMP
MP	CHEMICAL FEED - METERING PUMP
P	CHEMICAL FEED - PERISTALTIC PUMP
	PROGRESSIVE CAVITY
VT	VERTICAL TURBINE - IN BASIN
VT	VERTICAL TURBINE - IN CAN
VT	VERTICAL TURBINE - IN BASIN (TOP)
VT	VERTICAL TURBINE - IN CAN (TOP
WP M	SUBMERSIBLE WELL PUMP

BLOWER LEGEND

MARK	DESCRIPTION
	POSITIVE DISPLACEMENT BLOWER
	BLOWER (GENERIC)

EQUIPMENT LEGEND

MARK	DESCRIPTION
XXXVAC CP-XXX M	MOTOR - PUMPS / BLOWERS
	AERATOR
	MIXER
	POLYMER INLINE MIXER
	CALIBRATION COLUMN / FLOW INDICATOR
PD	PULSATION DAMPENER
	AERATION DIFFUSERS
	JET MIXING HEADER
	EJECTOR
	EDUCTOR
	CHEMICAL INJECTOR
	CHEMICAL STORAGE TANK
	CHEMICAL STORAGE TOTE
	CHEMICAL STORAGE DRUM
	DESSICANT DRYER
	FLOW STRAIGHTENING
	HYDRANT
	SEDIMENT TRAPPER FILTER
	STATIC MIXER
F	AIR FILTER
R	PRESSURE REGULATOR
	AIR DRYER
	PILOT NOZZLE
	FLAME ARRESTOR
	DRIP TRAP
	DAMPER
A	ALARM
S	STROBE
	INCLINED DRUM SCREEN

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS SCHEMATIC LEGEND

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SGR
CHECKED BY: KW
APPROVED BY: JC

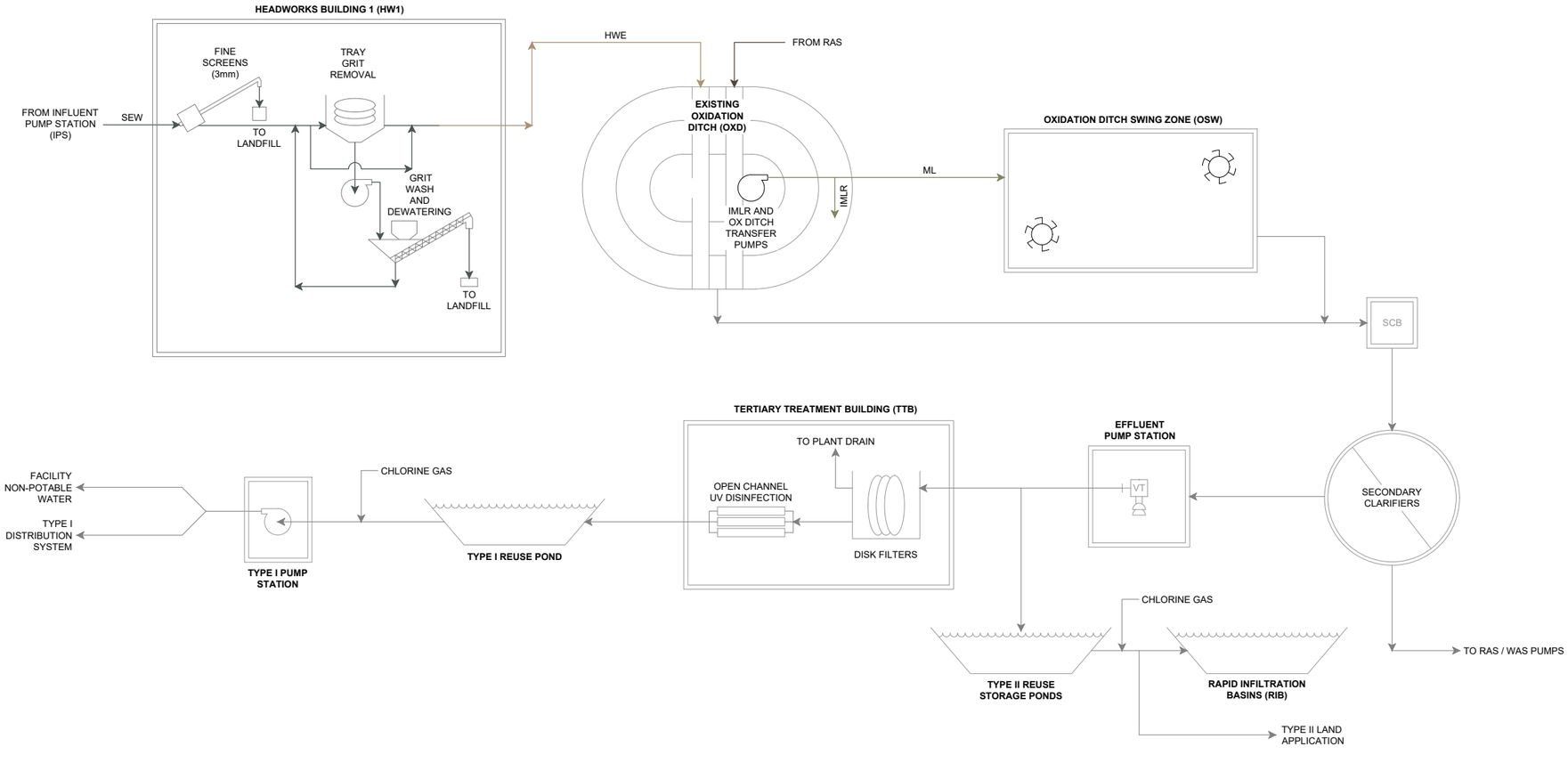
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**

SHEET NO: **P002**

Plotted By: GrantLindahl Date: Friday, April 17, 2026

File: \\ae2s.com\tetonvp\projects\EEagle Mountain\13139-2023-002\CAD\Engr\04-Process\Autocad\Plan Sheets\Process Flow Diagram_OXD.dwg



Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. THE NUMBER OF PROCESS UNITS INCLUDING TREATMENT TRAINS, EQUIPMENT, ETC. ARE NOT SHOWN. PROCESS FLOW DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS FLOW DIAGRAM

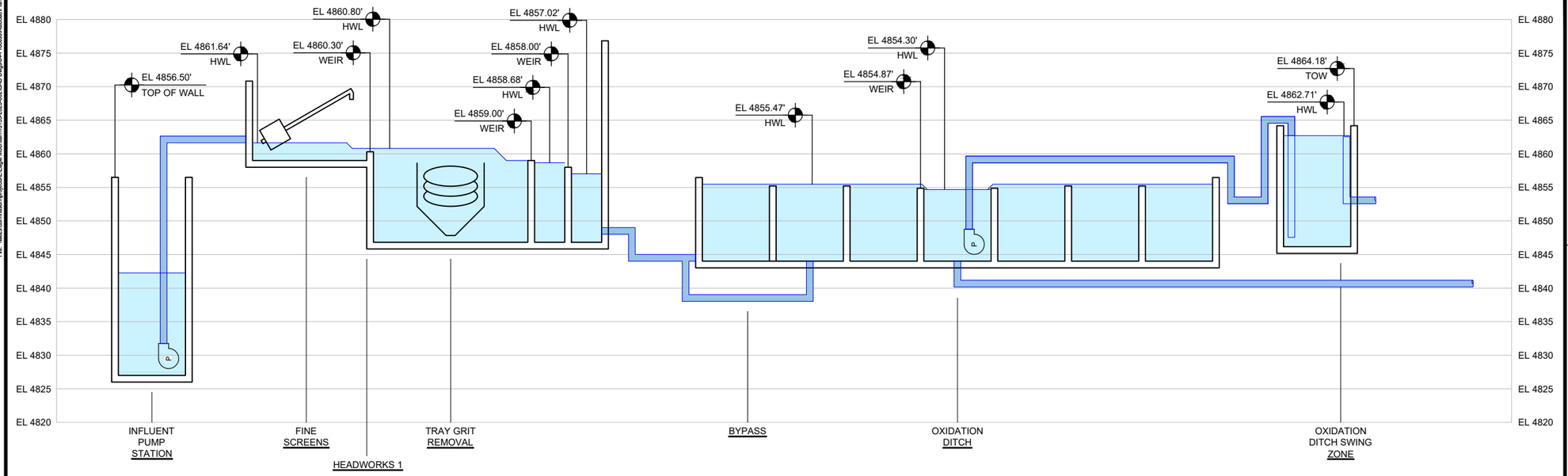
CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

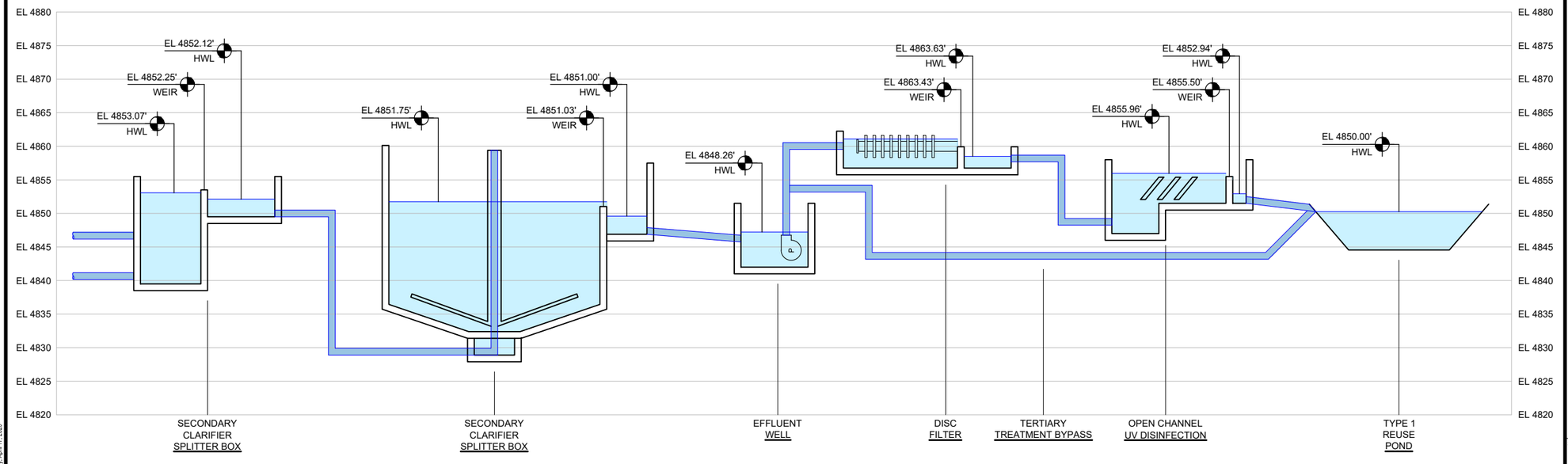
PREPARED BY: SGR
CHECKED BY: KW
APPROVED BY: JC

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **P003**

Plotted By: Grant Lindahl Date: Friday, April 17, 2026





GENERAL NOTES

1. WATER SURFACE ELEVATIONS ARE AT 4.8 MGD PHF
2. THE TERIARY TREATMENT FACILITY (TTF) IS RATED FOR 2.4 MGD, THUS FLOW WILL EITHER BE SPILT TO THE PONDS AND THE TTF SUCH THAT ONLY 2.4 MGD WILL BE PROCESSED AT THE TTF, OR BYPASS THE TTF WHEN FLOWS ARE HIGHER THAN 2.4 MGD.
3. HYDRAULIC PROFILE WILL BE FINALIZED WITH GEOTECHNICAL ANAYLSIS AND IS SUBJECT TO CHANGE.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR	DATE	SYM

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS HYDRAULIC PROFILE

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SGR
CHECKED BY: JDW
APPROVED BY: KW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **P004**

File: \\ae2s.com\esun\projects\EE\Eagle Mountain\13139-2023-002\CAD Dwgs\04-Process\Autocad\Plan Sheets\Process Hydraulic Profile_OXD.dwg
Plotted By: Grant Lindahl Date: Friday, April 17, 2026

PARAMETER	UNITS	VALUES		
LIQUIDS - INFLUENT FLOWS AND LOADS				
DESIGN FLOWS (PHASE 1)		**OVERALL**	**TRAIN 1: OXIDATION DITCH**	**TRAIN 2: MBR**
MINIMUM DAY	MGD	5.7	1.5	4.2
AVERAGE DAY	MGD	8	2.0	6.0
MAXIMUM MONTH	MGD	9.6	2.4	7.2
PEAK DAY	MGD	13.6	3.4	10.2
PEAK HOUR	MGD	21.1	4.8	16.3
pH	s.u.	6.5 - 8.0		
TEMPERATURE, MINIMUM	°C	10		
TEMPERATURE, AVERAGE	°C	19.3		
TEMPERATURE, MAXIMUM	°C	24.7		
DESIGN CONCENTRATIONS (PHASE 1)		**AT AVERAGE DAY**	**AT MAXIMUM MONTH**	**AT PEAK DAY**
BIOCHEMICAL OXYGEN DEMAND	mg/L	270	314	356
TOTAL SUSPENDED SOLIDS	mg/L	280	339	276
TOTAL KJELDAHL NITROGEN	mg/L as N	56	59	53
TOTAL AMMONIA	mg/L as N	38	40	37
TOTAL PHOSPHORUS	mg/L as P	13	12	14
DESIGN LOADS - OXIDATION DITCH (PHASE 1)		**AT AVERAGE DAY**	**AT MAXIMUM MONTH**	**AT PEAK DAY**
AT FLOW	MGD	2.0	2.4	3.4
BIOCHEMICAL OXYGEN DEMAND	lb/d	4,504	6,285	10,095
TOTAL SUSPENDED SOLIDS	lb/d	4,670	6,785	7,826
TOTAL KJELDAHL NITROGEN	lb/d	934	1,181	1,503
TOTAL AMMONIA	lb/d	634	801	1,049
TOTAL PHOSPHORUS	lb/d	217	240	397
DESIGN LOADS - MBR (PHASE 1)		**AT AVERAGE DAY**	**AT MAXIMUM MONTH**	**AT PEAK DAY**
AT FLOW	MGD	6.0	7.2	10.2
BIOCHEMICAL OXYGEN DEMAND	lb/d	13,511	18,855	30,284
TOTAL SUSPENDED SOLIDS	lb/d	14,011	20,356	23,479
TOTAL KJELDAHL NITROGEN	lb/d	2,802	3,543	4,509
TOTAL AMMONIA	lb/d	1,902	2,402	3,148
TOTAL PHOSPHORUS	lb/d	651	721	1,191
LIQUIDS - EFFLUENT WATER QUALITY - OXIDATION DITCH				
pH (RANGE)	S.U.	6 - 9		
BIOCHEMICAL OXYGEN DEMAND	mg/L	< 10		
TURBIDITY	NTU	2.0		
TOTAL INORGANIC NITROGEN	mg/L as N	< 10		
E. coli	No./100 mL	ND		

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

SHEET TITLE:
PROCESS BASIS OF DESIGN - FLOWS AND LOADS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**

SHEET NO: **P005**

Advanced Engineering and Environmental Services, LLC www.ae2s.com

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Plotted By: Grant Lindahl Date: Friday, April 17, 2026

PARAMETER	UNITS	VALUE
INFLUENT PUMP STATION (IPS) TO OXIDATION DITCH		
TOTAL CAPACITY	GPM	3,472
	MGD	5.0
FIRM CAPACITY	GPM	1,736
	MGD	2.5
INFLUENT PUMPS - EXISTING		
NUMBER	CT	3
TYPE	--	SUBMERSIBLE NON-CLOG CENTRIFUGAL
DESIGN FLOW, EA.	GPM	1,736
DESIGN HEAD, EA.	FT	26
MOTOR	HP	40
MOTOR SPEED CONTROL	--	VARIABLE FREQUENCY DRIVE
HEADWORKS (HW1, EXISTING)		
SCREENING		
TYPE	--	IN-CHANNEL ROTARY DRUM
OPENING SIZE	mm / in.	3 mm / 0.12 in.
MANUFACTURER	--	HUBER
MOTOR	HP	2
MODEL	--	ROTAMAT RO2
NUMBER	CT	2 EXISTING, 1 FUTURE, 3 TOTAL
CAPACITY (EACH)	GPM	3750
GRIT CHAMBER		
NUMBER	CT	1
TYPE	--	STACKED-TRAY
CAPACITY (ADF)	MGD	6
CAPACITY (PHF)	MGD	12
GRIT PUMP		
NUMBER	CT	1
PUMP TYPE	--	TORUS RECESSED IMPELLER VORTEX PUMP
DESIGN FLOW, EA.	GPM	250
DESIGN HEAD, EA.	FT	15
MOTOR	HP	10
MOTOR SPEED CONTROL	--	VARIABLE FREQUENCY DRIVE
GRIT CLASSIFIER/WASHER		
NUMBER	CT	1
CAPACITY	LBS/HR	1,500
GRIT STRIPPER	HP	0.75
GRIT SCREW	HP	1.50
ODOR CONTROL UNIT		
NUMBER	CT	1
TYPE	--	GRANULAR ACTIVATED CARBON
BLOWER CAPACITY	SCFM	288
BLOWER MOTOR	HP	3
OXIDATION DITCH (OXD, EXISTING)		
OXIDATION DITCH - BASIN		
TYPE	--	ORBAL ™
CONFIGURATION	--	SND / SWING / AEROBIC
AERATION TYPE	--	SURFACE AIR ROTOR
MIXING TYPE	--	MECHANICAL
FLOW CAPACITY	MGD	2.0
HYDRAULIC RETENTION TIME (MINIMUM)	HRS	24
SOLIDS RETENTION TIME (MINIMUM)	DAYS	18
MIXED LIQUOR SUSPENDED SOLIDS		
OUTER RING	mg/L	4,200
MIDDLE RING	mg/L	4,100
INNER RING	mg/L	4,000
LOADING CAPACITY		
BIOCHEMICAL OXYGEN DEMAND	LB/D	7405.0
TOTAL KJELDAHL NITROGEN	LB/D	800.0
TOTAL SUSPENDED SOLIDS	LB/D	4203.0
TOTAL PHOSPHORUS	LB/D	NA
VOLUME	MG	1,700,000
TOP OF WALL	FT	13.4
TYPICAL SWD (@ ADF)	FT	11.9
OXIDATION DITCH - AERATION		
TYPE	--	SURFACE AERATOR
OUTER RING AERATORS	CT	3
DISKS PER AERATORS	NUMBER	36
HORSEPOWER (EACH)	HP	30
MIDDLE RING AERATORS	CT	4
DISKS PER AERATORS	NUMBER	36
HORSEPOWER (EACH)	HP	--
INNER RING AERATORS	CT	4
DISKS PER AERATORS	NUMBER	36
HORSEPOWER (EACH)	HP	60
OXIDATION DITCH INTERNAL MIXED LIQUOR RECYCLE AND SWING ZONE TRANSFER(IRSW) SYSTEM		
FIRM CAPACITY FLOW	GPM	10,000
IMLR DESIGN FLOW	GPM	6,666
OXIDATION DITCH SWING ZONE TRANSFER DESIGN FLOW	GPM	3,333

OXIDATION DITCH INTERNAL MIXED LIQUOR RECYCLE AND SWING ZONE TRANSFER(IRSW) SYSTEM PUMPS		
NUMBER	CT	2 DUTY + 1 STANDBY (3 TOTAL)
PUMP TYPE	--	VERTICAL TURBINE SOLIDS HANDLING PUMPS
DESIGN FLOW, EA.	GPM	5,250
DESIGN HEAD, EA.	FT	12
MOTOR	HP	50
MOTOR SPEED CONTROL	--	VARIABLE FREQUENCY DRIVE
OXIDATION DITCH SWING ZONE (OSW, EXISTING TANK)		
DIMENSIONS	FT	50 W x 50 L
TYPICAL SWD	FT	16.0
CAPACITY	GAL	300,000
TOP OF WALL	FT	4,864.18
TYPICAL WSE	FT	4,861.18
MIXING & AERATION (AER)		
TYPE	--	TRITON 2.0 AERATORS
NUMBER OF AERATORS	CT	1 DUTY + 1 STANDBY (2 TOTAL)
MIXERS PER AERATORS	CT	1
MIXER HORSEPOWER	HP	40
BLOWERS PER AERATORS	CT	1
BLOWER HORSEPOWER	HP	7.5
SECONDARY CLARIFIERS (SC, EXISTING)		
CLARIFIER UNITS		
NUMBER	CT	2 DUTY + 1 STANDBY (3 TOTAL)
TYPE	--	CIRCULAR, CENTER FEED
DIAMETER	FT	60
TYPICAL SWD (@ ADF)	FT	14.7
OPERATIONAL PARAMETERS		
SURFACE OVERFLOW RATE (@ ADF)	GPM/SF	400
SURFACE OVERFLOW RATE (@ PHF)	GPM/SF	600
WEIR OVERFLOW RATE (@ADF)	GPD/FT	6,366
WEIR OVERFLOW RATE (@MMF)	GPD/FT	5,305
SOLIDS LOADING RATE (@ ADF)	LB/SF/D	25
RAS/WAS PUMPS		
TYPE	--	RECESSED IMPELLER, CENTRIFUGAL NON-CLOG
NUMBER OF PUMPS	CT	3 EXISTING, 3 TOTAL
DESIGN FLOW, EA.	GPM	1,250
DESIGN HEAD, EA.	FT	29
MOTOR	HP	15
GEAR REDUCER	--	BELT/CHAIN/PULLEY
SOLIDS BUILDING 1 (SB1, EXISTING)		
THICKENING		
TYPE	--	ROTARY DRUM THICKENER
NUMBER OF UNITS	CT	1 DUTY
HYDROCYCLONE SLUDGE DENSIFICATION		
TYPE	--	HYDROCYCLONE
NUMBER OF UNITS	CT	2
UNDERFLOW	%	20-30
CONE DIAMETER	IN.	3
CAPACITY, HYDRAULIC, EA.	GPM	44
DEWATERING		
TYPE	--	FAN PRESS
NUMBER OF UNITS	CT	1 DUTY, 1 STANDBY
CAPACITY, HYDRAULIC	GPM	167
CAPACITY, SOLIDS	LB/HR	1,254
OPERATION HOURS	HRS/DAY	8
DESIGN PERCENT SOLIDS	%	2
POLYMER (EXISTING)		
CHEMICAL NAME	--	PRAESTOL K279 FLX
PURPOSE	--	COAGULATION - SOLIDS DEWATERING
STORAGE		
TYPE	--	TOTE
NUMBER	CT	2
CAPACITY, EA	GAL	275
CAPACITY, TOTAL	GAL	550
DOSING		
FEED LOCATION	--	FAN PRESS INFLUENT
DOSING PUMPS		
TYPE	--	PERISTALTIC
EFFLUENT PUMP STATION (EPS, EXISTING)		
EFFLUENT PUMPS		
NUMBER OF UNITS	CT	3
TYPE	--	VERTICAL TURBINE
DESIGN FLOW, EA.	GPM	1,666
POWER	HP	15

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS BASIS OF DESIGN - EQUIPMENT

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **P006**

File: \\ae2s.com\esun\projects\EE\Eagle Mountain\13139-2023-002\CAD Dwgs\04-Process\Autocad\Plan Sheets\Process Basis of Design_OXD.dwg
Plotted By: Grant Lindahl Date: Friday, April 17, 2026

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SID_M_v26.rvt

GENERAL MECHANICAL NOTES - NEW CONSTRUCTION

1. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATION OF ALL DUCTWORK, CEILING DEVICES, GRILLES, REGISTERS, AND DIFFUSERS WITH THE REFLECTED CEILING PLAN AND BUILDING STRUCTURE BEFORE BEGINNING WORK.
2. DUCT DIMENSIONS PROVIDED ARE INSIDE SHEET METAL DIMENSIONS.
3. THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND MAY NOT SHOW EVERY REQUIRED OFFSET, FITTING, ETC. DO NOT SCALE THE DRAWINGS FOR DIMENSIONS. ALL DIMENSIONS SHOULD BE TAKEN FROM THE ARCHITECTURAL DRAWINGS, CERTIFIED EQUIPMENT DRAWINGS, AND THE STRUCTURE ITSELF. BEFORE FABRICATING ANY WORK, VERIFY ALL SPACE REQUIREMENTS IN COORDINATION WITH OTHER TRADES, AND INSTALL SYSTEMS WITHIN THE AVAILABLE SPACE. ANY NECESSARY ADJUSTMENTS OR CHANGES SHOULD BE MADE WITHOUT EXTRA CHARGES TO THE POUDRE SCHOOL DISTRICT.
4. THE OWNER AND ENGINEER ARE NOT RESPONSIBLE FOR THE CONTRACTOR'S SAFETY PRECAUTIONS, NOR FOR THE MEANS, METHODS, TECHNIQUES, CONSTRUCTION SEQUENCES, OR PROCEDURES THE CONTRACTOR USES TO PERFORM THE WORK.
5. ALL WORK MUST BE INSTALLED IN ACCORDANCE WITH APPLICABLE STATE CODES, LOCAL CODES, AND THE OWNER'S STANDARDS AS INDICATED IN THE CONSTRUCTION DOCUMENTS.
6. ALL EXTERIOR WALL AND ROOF PENETRATIONS MUST BE SEALED TO BE WATERTIGHT.
7. ALL MECHANICAL WORK UNDER THIS CONTRACT IS TO BE COMPLETED WITHIN FIVE (5) FEET OUTSIDE THE BUILDING.
8. ALL NEW EQUIPMENT MUST BE PROVIDED WITH UNIT TAGS THAT MATCH THOSE SPECIFIED IN THE CONTRACT DOCUMENTS.

MECHANICAL AIR DEVICES & EQUIPMENT LEGEND

- DUCTWORK (NEW, EXIST., DEMO.) INSIDE CLEAR DUCT SIZE: FIRST NUMBER INDICATED IS SIDE OF DUCT SHOWN (22"x12" / 22"x8")
- DUCT BREAK
- DUCT END CAP
- RISE IN DUCTWORK (UP)
- FALL IN DUCTWORK (DN)
- RECTANGULAR ELBOW UP (SUPPLY, RETURN, EXHAUST)
- RECTANGULAR ELBOW DOWN (SUPPLY, RETURN, EXHAUST)
- ROUND ELBOW UP (SUPPLY, RETURN, EXHAUST)
- ROUND ELBOW DOWN (SUPPLY, RETURN, EXHAUST)
- RECTANGLE TO RECTANGLE TRANSITION (CONCENTRIC / ECCENTRIC)
- ROUND TO RECTANGLE TRANSITION (CONCENTRIC / ECCENTRIC)
- RECTANGLE TO ROUND TRANSITION (CONCENTRIC / ECCENTRIC)
- FIRE DAMPER (FD)
- SMOKE DAMPER (SD)
- FIRE/SMOKE DAMPER (F/SD)
- BACKDRAFT DAMPER (BDD)
- MANUAL VOLUME DAMPER
- HIGH EFFICIENCY TAKE-OFF W/ MANUAL VOLUME DAMPER
- ACCESS DOOR (AD)
- MOTORIZED DAMPER (MD)
- SUPPLY AIRFLOW
- RETURN or EXHAUST AIRFLOW
- FLEXIBLE DUCTWORK

DUCTWORK & ACCESSORIES LEGEND

- EQUIPMENT (NEW, EXISTING, DEMO.)
- SUPPLY AIR DEVICE (NEW, EXISTING, DEMO.)
- RETURN AIR DEVICE (NEW, EXISTING, DEMO.)
- EXHAUST AIR DEVICE (NEW, EXISTING, DEMO.)
- LINEAR AIR DEVICE
- SIDEWALL DEVICE
- T-STAT (T)
- SENSOR (S)
- DIFFUSER / GRILLE TAG (DEVICE NUMBER (SEE SCHEDULE) / S-1 / 200 CFM / DEVICE CFM)
- EQUIPMENT TAG (EQUIP. TYPE (ABV) & NUMBER (SEE SCHEDULE) / VAV-1)

HVAC PIPING COLOR LEGEND

(LEGEND MAY CONTAIN PIPE SYSTEMS NOT USED IN THIS PROJECT)

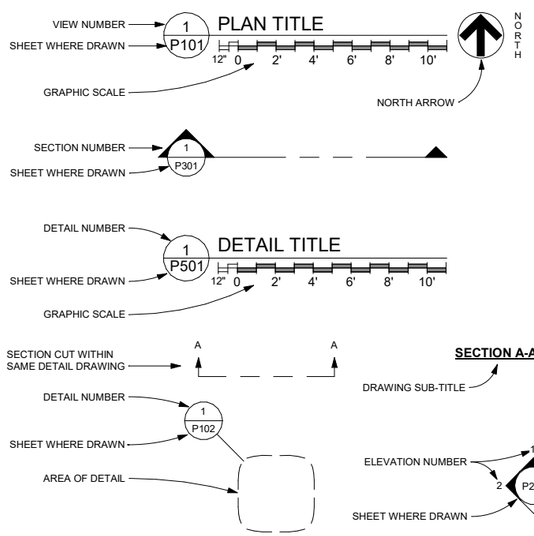
- LOW PRESSURE STEAM (STM)
- MEDIUM PRESSURE STEAM (MPS)
- HIGH PRESSURE STEAM (HPS)
- CONDENSATE (COND)
- HOT WATER RECIRCULATION (HWRC)
- HOT WATER RETURN (HWR)
- HOT WATER SUPPLY (HWS)
- CHILLED WATER SUPPLY (CWS)
- BLOWDOWN (BD)
- BOILER FEED WATER (BFW)
- DUAL TEMPERATURE WATER SUPPLY (DTWS)
- DUAL TEMPERATURE EATER RETURN (DTWR)
- FUEL OIL SUPPLY (FOS)
- FUEL OIL RETURN (FOR)
- FUEL OIL VENT (FOV)
- NATURAL GAS (G)
- REFRIGERANT LIQUID (RL)
- REFRIGERANT SUCTION (RS)

VENTILATION COLOR LEGEND

(LEGEND MAY CONTAIN DUCT SYSTEMS NOT USED IN THIS PROJECT)

- COMBUSTION AIR (CA)
- EXHAUST AIR (EA)
- FLUE (FLUE)
- GREASE EXHAUST (GE)
- RELIEF AIR (LA)
- MIXED AIR (MA)
- OUTSIDE AIR (OA)
- RETURN AIR (RA)
- SUPPLY AIR (SA)
- TRANSFER AIR (TA)

PLAN, SECTION, AND DETAIL CONVENTIONS



DRAWING SYMBOLS LEGEND

- EL 898.75' / ℄ PIPE — ELEVATION & LOCATION IN SECTION VIEW, CENTERLINE ELEVATION
- EL 884.50 / FLOOR — ELEVATION & LOCATION IN SECTION VIEW, FLOOR, WALL, OR SURFACE ELEVATION
- EL 880.00' / FLOOR — EXISTING ELEVATION & LOCATION IN SECTION VIEW, FLOOR, WALL, OR SURFACE ELEVATION
- EL 875.00' / FFE — EXISTING FLOOR SPOT ELEVATION (CONTRACTOR TO VERIFY)
- EL 870.00' / FFE — FLOOR SPOT ELEVATION
- BREAKLINE (OBJECT CONTINUES, DRAWING ENDS)
- 1 — IMPROVEMENT NOTES
- 1 — CONSTRUCTION NOTES - IDENTIFICATION TAG WILL BE PLACED AT THE NEAREST POSSIBLE LOCATION TO THE WORK IT IS DESCRIBING
- 1 — EXISTING NOTES
- 1 — DEMOLITION NOTES
- 1 — REVISION NOTES
- DENOTES FLOW DIRECTION
- XXX-XXX-XXX — IDENTIFICATION TAG (SEE I&C DRAWINGS)

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 6933923-2202
SAMUEL J. FANKHAUSER
4/17/26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTP EXPANSION
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
MECHANICAL SYMBOLS AND ABBREVIATIONS - HVAC

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	RMD
CHECKED BY:	CJB
APPROVED BY:	SJF

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **GEN**

SHEET NO: **M001**

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ELECTRICAL ABBREVIATIONS

A	AMPERES
AC	ABOVE COUNTER (VERIFY HEIGHT)
ACK	ACKNOWLEDGE
AE	ANALYZER ELEMENT
AER	AERATOR
AI	ANALOG INPUT
AIT	ANALYZER INDICATION TRANSMITTER
A.F.F.	ABOVE FINISHED FLOOR
AM	AMMETER
ANN	ANNUNCIATOR
AO	ANALOG OUTPUT
ASMP	AUTOSAMPLER
AWG	AMERICAN WIRE GAGE
BKR	BREAKER
BLDG	BUILDING
BLW	BLOWER
CKT	CIRCUIT
℄	CENTER LINE
CONTR	CONTRACTOR
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CS	CONTROL STATION
CT	CURRENT TRANSFORMER
DE	DUAL ELEMENT
DI	DIGITAL INPUT
DISC	DISCONNECT
DO	DIGITAL OUTPUT
DP	DAMP PROOF
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
EXP	EXPLOSION PROOF
EQUIP	EQUIPMENT
F&I	FURNISH AND INSTALL
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FIT	FLOW INDICATING TRANSMITTER
FS	FLOW SWITCH
FU	FUSE OR FUSIBLE
GC	GENERAL CONTRACTOR
GDE	GAS DETECT ELEMENT
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GRS	GALVANIZED RIGID STEEL CONDUIT
HD	HEAVY DUTY
HH	HANDHOLE
H/R	HAND/REMOTE
HOA	HAND-OFF-AUTO
HOL	HAND-OFF-LOCAL
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HS	HAND SWITCH
HTR	HEATER
HZ	HERTZ (CYCLES / SECOND)
IMC	INTERMEDIATE METAL CONDUIT
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERES
KVAR	KILOVOLT-AMPERES REACTIVE
KW	KILOWATTS
LIT	LEVEL INDICATING TRANSMITTER
LMF	LIQUID-TIGHT METALLIC CORE FLEXIBLE CONDUIT
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
M	MOTOR STARTER OPERATING COIL
MAX	MAXIMUM
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MECH	MECHANICAL
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINUTE OR MINIMUM
MTD	MOUNTED
MXR	MIXER
NF	NON-FUSED
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTC	NOT CONNECTED
OL(S)	OVERLOAD RELAY CONTACT(S)
PF	POWER FACTOR
PIT	PRESSURE INDICATING TRANSMITTER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
PTT	PUSH TO TEST
PVC	POLYVINYLCHLORIDE CONDUIT
REQ'D	REQUIRED
RS	RIGID STEEL CONDUIT
RTD	RESISTANCE TEMPERATURE DETECTOR
RTM	RUNNING TIME METER
RTR	REMOTE TEST / RESET
SCP	SUPERVISORY CONTROL PANEL
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SE	SERVICE ENTRANCE
SEC	SECOND OR SECONDARY
SIG	SIGNAL
SMP	SAMPLE PUMP
SOL Vv	SOLENOID VALVE
SP	SINGLE POLE
SPECS	SPECIFICATIONS
SSNR	"SOFT START" NON-REVERSING SWITCH
SSR SW	"SOFT START" REVERSING SWITCH
SUSE	SUITABLE FOR USE AS SERVICE ENTRANCE
TD	TIME DELAY
TEMP	TEMPERATURE
TIT	TEMPERATURE INDICATING TRANSMITTER
TS	MOTOR THERMAL SWITCH
TSTAT	THERMOSTAT
UH	UNIT HEATER
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLTMETER
VS	VOLTMETER SWITCH
Vv	VALVE
W	WATTS OR WIRE
W/	WITH
WW	WIREWAY
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZC	POSITION CONTROLLER
ZI	POSITION INDICATOR
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPENED

ONE-LINE DIAGRAM AND SCHEMATIC SYMBOLS

- PRESS TO TEST LAMP (LETTER DENOTES COLOR)
- RUN / OFF / AUTO SELECTOR SWITCH
- CIRCUIT BREAKER
- MAGNETIC TRIP
- THERMAL TRIP
- RTM RUNNING TIME METER
- CONTACT (N.C., N.O.)
- 52 M OPERATING COIL (LETTER OR NUMBER DENOTES DEVICE)
- 30A FUSE (NUMBER DENOTES RATING)
- DISCONNECT SWITCH
- DE-ENERGIZED TIMER CONTROL (N.C., N.O.)
- ENERGIZED TIMER CONTROL (N.C., N.O.)
- FLOW SWITCH (N.C., N.O.)
- LIMIT SWITCH (N.C., N.O.)
- LIQUID LEVEL SWITCH (N.C., N.O.)
- PRESSURE SWITCH (N.C., N.O.)
- TEMPERATURE SWITCH (N.C., N.O.)
- TORQUE SWITCH (N.C., N.O.)
- PUSHBUTTON CONTACT (OFF, ON)
- DOUBLE CIRCUIT PUSHBUTTON SWITCH
- SURGE CAPACITOR
- POWER FACTOR CAPACITOR WITH FUSING AND INDICATING LIGHTS
- FUSED DISCONNECT SWITCH
- LINE REACTOR
- DRAW-OUT CIRCUIT BREAKER
- GROUND CONNECTION
- CHASSIS CONNECTION
- R P.T.T. INDICATING LIGHT (LETTER DENOTES COLOR) (P.T.T. = PUSH TO TEST)
- CONTROL OR POTENTIAL TRANSFORMER
- THERMAL OVERLOAD TRIP UNITS
- DEVICE MOUNTED IN MOTOR CONTROL CENTER (MCC)
- DEVICE MOUNTED IN FIELD
- GROUND ROD
- LIGHTNING ARRESTOR
- VS CONTROL OR INSTRUMENT SWITCH (LETTERS DENOTES FUNCTION)
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER (DRAW OUT TYPE WITH PRIMARY FUSES)
- CS CONTROL STATION
- AM INSTRUMENT (LETTER DENOTES TYPE)
- 20 MOTOR (NUMBER DENOTES HP)
- 20 TS MOTOR (NUMBER DENOTES HP) (TS = THERMAL SWITCH)
- 20 SENSOR MOTOR (NUMBER DENOTES HP) (SENSOR = SEAL FAIL)
- MOTOR CIRCUIT PROTECTOR (MCP)
- MOLDED CASE CIRCUIT BREAKER
- GENERATOR
- GROUND / NEUTRAL
- HEATER

CIRCUIT LEGEND

NUMBER OF CABLES - QUANTITY OF CONDUCTORS PER CABLE - CONDUCTOR SIZE OR TYPE - CONDUIT SIZE & TYPE

2 - 1/C - #12 - 3/4"

LINETYPE LEGEND

- NEW EQUIPMENT
- EXISTING EQUIPMENT
- FUTURE EQUIPMENT

DEVICE SYMBOLS

- E/1 E/1 WALL MOUNTED / CEILING EXIT LIGHT (LETTER & NUMBER SIMILAR TO HID OR INCANDESCENT FIXTURE, SHADING DENOTE FACE(S) AND ARROW(S) IF REQUIRED)
- A/1 d A/1 WALL / CEILING MOUNTED FLUORESCENT / INDUCTION / LED FIXTURE (CAPITAL LETTER DENOTES TYPE, NUMBER DENOTES CIRCUIT, SMALL LETTER DENOTES SWITCH LEG)
- A/1 d / A/1 d WALL MOUNTED / CEILING / HUNG LINEAR FIXTURES (LETTERS & NUMBERS SIMILAR TO FIXTURES ABOVE)
- NL HALF SOLID FIXTURE INDICATES FIXTURE IS ON AN EMERGENCY CIRCUIT (NL = UNSWITCHED LIGHTING CIRCUIT)
- GFI WP 24" NUMBER DENOTES DUPLEX CONVENIENCE OUTLET (CIRCUIT & INCHES DENOTE MOUNTING HEIGHT IF OTHER THAN NORMAL, LETTERS SPECIFY OTHER CONDITIONS ie: WP, DP, OR GFI)
- GFCI RECEPTACLE
- ABOVE COUNTER RECEPTACLE
- FLOOR MOUNTED RECEPTACLE
- DOUBLE DUPLEX RECEPTACLE
- RTR REMOTE TEST / RESET (RTR)
- BELOW-GRADE HANDHOLE / PULLBOX (SEE TYPICAL DETAIL)
- SPECIAL PURPOSE RECEPTACLE
- J J JUNCTION BOX-CEILING / WALL MOUNTED
- T MECHANICAL THERMOSTAT
- PS PHOTO SENSOR
- 3 a SWITCH (NO MARKING IS SINGLE POLE, 2 IS DOUBLE POLE, 3 IS 3-WAY, 4 IS 4-WAY)
- ELECTRICAL CONNECTION (NON DRAFTED / MODELED ELEMENT)
- MOTOR
- CIRCUITRY (EXPOSED, SURFACE MOUNTED)
- CIRCUITRY (BELOW GRADE OR FLOOR)
- CIRCUITRY (CONCEALED IN STRUCTURE)
- GROUND
- H PUSHBUTTON CONTROL STATION
- DISCONNECT SWITCH
- ACROSS THE LINE STARTER
- C LIGHTING CONTACTOR (SEE RESPECTIVE PLAN NOTE)
- PAD MOUNT FEEDPOINT (SEE TYPICAL DETAIL)

GENERAL NOTES

1. AE2S ELECTRICAL DRAWINGS ARE INTENDED TO BE REPRODUCED IN COLOR. AE2S ASSUMES NO LIABILITY FOR CONTRACTORS CHOOSING TO REPRODUCE THESE DRAWINGS IN BLACK AND WHITE OR AT A SCALE WHICH REDUCES LEGIBILITY.
2. PLANT MUST REMAIN IN VIRTUALLY CONTINUOUS OPERATION DURING CONSTRUCTION. COORDINATE SEQUENCING, SWITCHOVERS, AND SHORT DOWNTIME PERIODS WITH LOCAL UTILITY COMPANY, THE OWNER, AND THE ENGINEER DURING CONSTRUCTION.
3. COORDINATE THE INSTALLATION OF ALL BELOW-GRADE AND CAST-IN-PLACE CIRCUITRY WITH OTHER TRADES.
4. CONTRACTOR SHALL RETURN ALL DISTURBED SURFACES AND SOILS TO ORIGINAL OR PRE-CONSTRUCTION CONDITION UNLESS SPECIFICALLY INDICATED OTHERWISE.
5. CONTRACTOR SHALL LOCATE OR SHALL HAVE THE SERVING UTILITIES LOCATE ALL UNDERGROUND CABLE, CONDUITS, PIPING, UTILITIES, ETC., PRIOR TO COMMENCING CONSTRUCTION (UNDERGROUND EXCAVATION). CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES DUE TO CONSTRUCTION ACTIVITIES.
6. EXISTING AND / OR NEW UNDERGROUND CONDUITS, DUCTBANK, AND OTHER CIRCUITRY SHOWN ON THE PLANS ARE INTENDED TO BE DIAGRAMMATIC IN NATURE. CONTRACTOR IS RESPONSIBLE FOR FIELD CONFIRMING ALL CIRCUITRY AND ROUTING.
7. CORE DRILL EXISTING STRUCTURES AS REQUIRED FOR NEW CONDUIT INSTALLATIONS. PATCH AROUND PENETRATIONS WITH NON-SHRINK GROUT AND PAINT TO MATCH SURROUNDING SURFACES WHERE APPLICABLE.
8. PLUG ALL UNUSED OPENINGS IN PANELS / EQUIPMENT LEFT BY REMOVALS. CUT OFF ALL ABANDONED CONDUITS FLUSH WITH SURFACES AND FILL WITH NON-SHRINK GROUT.
9. REFER TO EXISTING ELECTRICAL DRAWINGS FOR SITE PLAN DETAILS / CIRCUITRY.
10. SCHEDULE 80 PVC CONDUIT IS ALLOWED UNDERGROUND FOR NON-VFD AND NON-SIGNAL CIRCUITS. TRANSITION TO RIGID STEEL CONDUIT BEFORE EXPOSING ABOVE GRADE.
11. FIELD CONFIRM CONDUIT ROUTING. DO NOT ROUTE CONDUIT ON BUILDING EXTERIOR UNLESS NOTED OTHERWISE.
12. ALL CABLE CONNECTIONS SHALL BE TORQUED ACCORDING TO MANUFACTURER REQUIREMENTS, UL STANDARD 486A-B, AND NEC ANNEX I AS APPLICABLE. ADDITIONALLY, CONTRACTOR SHALL MARK EACH PROPERLY TORQUED BOLT / LOCKWASHER / NUT ASSEMBLY WITH A PERMANENT PAINT STRIPE OVER BOTH THE BOLT / LOCKWASHER / NUT ASSEMBLY AND THE LUG ASSEMBLY TO INDICATE ANY CHANGES IN THE POSITION OVER TIME.
13. SEE STRUCTURAL, MECHANICAL, AND PROCESS DRAWINGS FOR EXACT EQUIPMENT, PIPING, AND BUILDING LAYOUTS.
14. ALL CONDUCTORS ARE TO BE COPPER.
15. PROVIDE AS-BUILT DRAWINGS. DRAWINGS SHALL BE NEAT AND LEGIBLE.
16. COORDINATE ELECTRICAL WORK WITH OTHER TRADES.
17. PROVIDE PANEL SCHEDULES FOR ALL NEW AND / OR MODIFIED PANELS. SCHEDULES SHALL BE TYPED.
18. ANY ELECTRICAL BOX THAT BECOMES ABANDONED DURING THE COURSE OF THE PROJECT SHALL HAVE A BLANK COVERPLATE.
19. ALL LIGHTING AND RECEPTACLE CIRCUITRY CONDUCTOR QUANTITY AND CONDUIT IS THE RESPONSIBILITY OF THE CONTRACTOR. LIGHTING CIRCUITRY IS TO BE A MINIMUM OF #12AWG COPPER IN 3/4" CONDUIT, QUANTITY AS REQUIRED.
20. WHERE OTHER ELECTRICAL DEVICES ARE LOCATED ADJACENT TO LIGHT SWITCHES, MOUNT ALL DEVICES AT THE SAME CENTER LINE ELEVATION. WHERE ELECTRICAL DEVICES ARE NOT LOCATED ADJACENT TO LIGHT SWITCHES, MOUNT DEVICES AT 48" A.F.F. UNLESS NOTED OTHERWISE.
21. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS IN FIELD PRIOR TO COMMENCEMENT OF WORK.
22. FINAL CONNECTIONS TO EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
23. ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A PULLWIRE OR EQUAL AND SHALL BE IDENTIFIED AT ALL JUNCTION, PULL, AND TERMINATION POINTS USING PERMANENT METALLIC TAGS. TAG SHALL INDICATE INTENDED USE OF CONDUIT, ORIGINATION, AND TERMINATION POINTS OF EACH INDIVIDUAL CONDUIT.
24. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER RESERVES THE RIGHT TO APPROVE METHODS AND MATERIALS NOT REFLECTED HEREIN.
25. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN THEIR BID THE COSTS REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS.
26. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ENGINEER.
27. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE, AND NATIONAL CODES AND ORDINANCES.
28. VERIFY THAT EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
29. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
30. SYSTEMS SHALL BE COMPLETE, OPERABLE, AND READY FOR CONTINUOUS OPERATION. LIGHTS, SWITCHES, RECEPTACLES, MOTORS, ETC., SHALL BE CONNECTED AND OPERABLE.
31. ALL CONDUIT IS TO BE RIGID STEEL WITH CAST 'FS' STYLE BOXES. MAKE FINAL EQUIPMENT CONNECTIONS USING LIQUID-TIGHT METALLIC FLEX.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR	DATE	SYM

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
ELECTRICAL SYMBOLS AND ABBREVIATIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN
SHEET NO: E001

Plotted By: Ian Smith Date: Thursday, April 16, 2026

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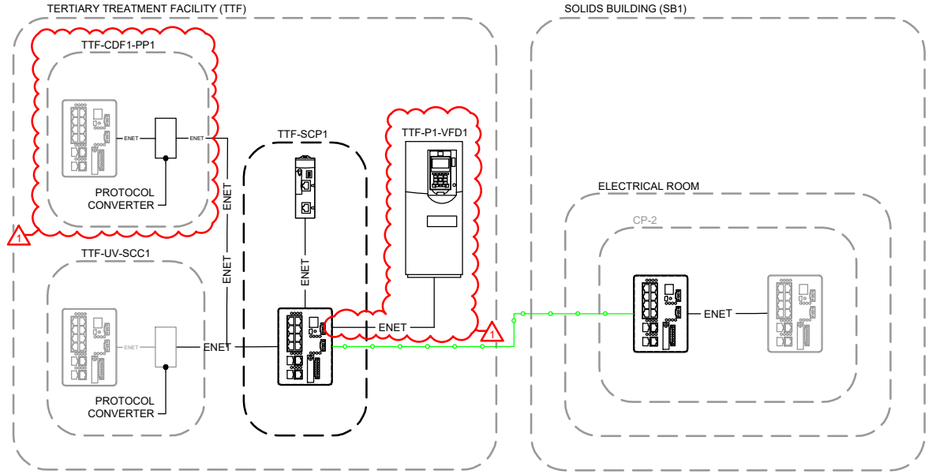
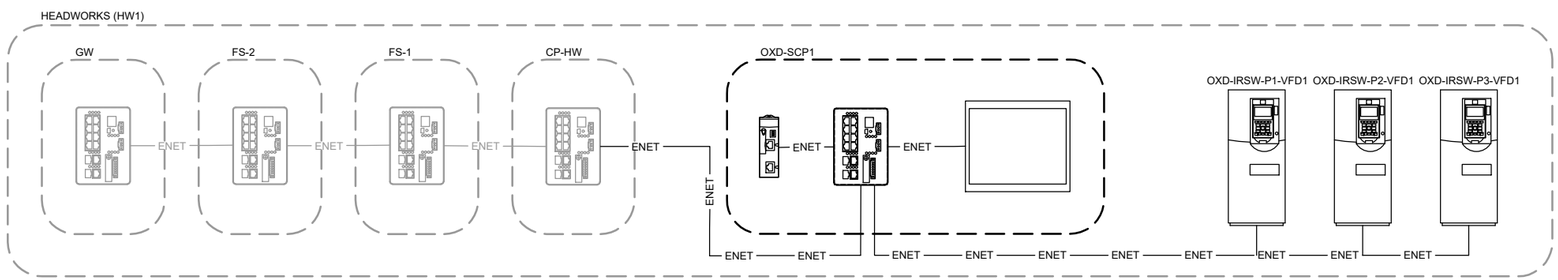


1 E002 TERTIARY TREATMENT FACILITY NETWORK DIAGRAM



2 E002 OXIDATION DITCH NETWORK DIAGRAM

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	
1	04-28-26	ADDENDUM #1

CJS APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
NETWORK DIAGRAMS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN
SHEET NO: E002

Plotted By: Cole Twelt Date: Tuesday, April 28, 2026

File: W:\E\Eagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Hazardous Area Class Schedule.dwg

HAZARDOUS AREA CLASSIFICATION SUMMARY

BUILDING	BUILDING AREA	HAZARDOUS AREA CLASSIFICATION			VENTILATION RATE	CODE REFERENCE				FIRE PROTECTION MEASURES	EXTENT OF CLASSIFIED AREA & ADDITIONAL NOTES
		CLASS	DIVISION	GROUP		STANDARD	TABLE	ROW	LINE		
Headworks Building #1 (HW1)	Electrical Room	UNCLASSIFIED			NR	NFPA 820	-	-	-	-	-
	Grit Washer and Screening Room	1	1	D	Less than 12 ACPH		5.2.2	2	a	H,FE,FAS,CGD	-
							6.2.2(a)	1	-		
							6.2.2(a)	2	-		
Oxidation Ditch (OXD)	Basin	1	2	D	NR	NFPA 820	5.2.2	7	c	H	Interior of the tank from the minimum operating water surface to the top of the tank wall; envelope 0.46 m (18 in.) above the top of the tank and extending 0.46 m (18 in.) beyond the exterior wall; envelope 0.46 m (18 in.) above grade extending 3 m (10 ft) horizontally from the exterior tank walls.
Oxidation Swing Zone (OSW)	Basin	1	2	D	NR	NFPA 820	5.2.2	7	c	H	Interior of the tank from the minimum operating water surface to the top of the tank wall; envelope 0.46 m (18 in.) above the top of the tank and extending 0.46 m (18 in.) beyond the exterior wall; envelope 0.46 m (18 in.) above grade extending 3 m (10 ft) horizontally from the exterior tank walls.
Solids Building (SB1)	Electrical Room	UNCLASSIFIED			NR	NFPA 820	-	-	-	-	-
	Screw Compactor and Sludge Storage Room	1	2	D	Less than 6 ACPH		6.2.2(a)	12	b	H,FE,FAS	-
							6.2.2(a)	13	b		-
Tertiary Treatment Facility (TTF)	Main Process Area	UNCLASSIFIED			NR	NFPA 820	5.2.2	26		H	-

NOTES:
- CGD: COMBUSTIBLE GAS DETECTION
- FE: FIRE EXTINGUISHER
- H: HYDRANT PROTECTION
- FAS: FIRE ALARM SYSTEM
- NR: THE NR DESIGNATION IN THE VENTILATION COLUMN INDICATES THAT NO VENTILATION REQUIREMENTS ARE ESTABLISHED FOR THE SPACE, AND THEREFORE NFPA 820 TABLE 9.1.1.1.1 ALSO HAS NO REQUIREMENTS.
- ACPH: AIR CHANGES PER HOUR
- C1 D1 AREAS: COMPLY WITH NEC ARTICLE 501. USE CONDUIT AND MOUNTING HARDWARE AS NOTED ON THE DRAWINGS. FURNISH AND INSTALL SEAL OFFS ON PENETRATIONS IN AND OUT OF SPACE PER NEC ARTICLES 500 THROUGH 504.
- C1 D2 AREAS: COMPLY WITH NEC ARTICLE 501. USE CONDUIT AND MOUNTING HARDWARE AS NOTED ON THE DRAWINGS. FURNISH AND INSTALL SEAL OFFS ON PENETRATIONS IN AND OUT OF SPACE PER NEC ARTICLES 500 THROUGH 504.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. WIRING METHODS ACROSS THE ENTIRE PROJECT SHALL ADHERE TO NATIONAL ELECTRIC CODE (NEC) ARTICLE 500 AS REQUIRED.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
HAZARDOUS AREA CLASSIFICATION SCHEDULE

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO.: **E003**

Plotted By: Ian Smith Date: Thursday, April 16, 2026

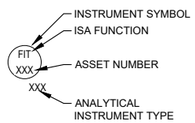
File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\07-I&C\Plan Sheets\Oxidation Ditch CAD Files\EMWWTF_IC_P&ID - GEN.dwg

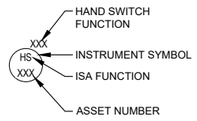
IDENTIFICATION LETTERS

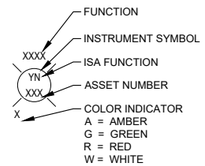
	FIRST LETTER		SUCCEEDING LETTERS		
LETTER	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	INPUT / OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		AUTO
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	COMMUNICATION			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FAULT
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOTOR	MOMENTARY			MIDDLE INTERMEDIATE
N	SECURITY		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY OR EVENT	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		RUN/REMOTE
S	SPEED, FREQUENCY	SAFETY		SWITCH/STATUS	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X-AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z-AXIS		DRIVER, ACTUATOR	

GENERAL INSTRUMENT OR FUNCTION SYMBOLS LEGEND

	FIELD MOUNTED	PRIMARY LOCATION (ACCESSIBLE)	PRIMARY LOCATION (INACCESSIBLE)	AUXILIARY LOCATION (ACCESSIBLE)	AUXILIARY LOCATION (INACCESSIBLE)
DISCRETE INSTRUMENTS	XX / -	XX / -	XX / -	XX / -	XX / -
SHARED CONTROL/ DISPLAY ELEMENTS	XX / -	XX / -	XX / -	XX / -	XX / -
COMPUTER FUNCTIONS	XX / -	XX / -	XX / -	XX / -	XX / -
PLC	XX / -	XX / -	XX / -	XX / -	XX / -







PROCESS EQUIPMENT LINETYPE / COLOR LEGEND

EXISTING	PROPOSED	FUTURE	DESCRIPTION
			PROCESS PIPING / FLOW
			CHEMICAL PIPING
			PIPE FITTING
			EQUIPMENT
			VALVES
			SENSORS
			INSTRUMENT
			PLANT AIR

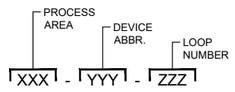
POWER AND COMMUNICATION CABLE LINETYPE / COLOR LEGEND

EXISTING	PROPOSED	FUTURE	DESCRIPTION
			SIGNAL - ELECTRIC
24VDC	24VDC	24VDC	24VDC POWER
120VAC	120VAC	120VAC	120VAC POWER
208VAC	208VAC	208VAC	208VAC POWER
240VAC	240VAC	240VAC	240VAC POWER
480VAC	480VAC	480VAC	480VAC POWER
			SCADA NETWORK (FIBER)
E/IP	E/IP	E/IP	SCADA NETWORK (ETHERNET/IP)
M/TCP	M/TCP	M/TCP	SCADA NETWORK (MODBUS/TCP)
DNET	DNET	DNET	SCADA NETWORK (DEVICENET)

GENERAL NOTES

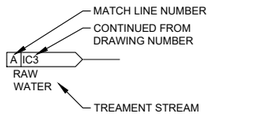
1. THE SYMBOLIZATION AND NOMENCLATURE USED ON THESE P&ID DRAWINGS ARE BASED ON ISA STANDARDS AND INDUSTRY CONVENTIONS. SOME MODIFICATIONS AND ADDITIONS HAVE BEEN MADE FOR CLARIFICATIONS AND OMISSIONS IN STANDARDS.
2. THE SYMBOLIZATION AND NOMENCLATURE SHOWN HERE APPLIES TO P&ID DRAWINGS ONLY. ADDITIONAL LEGENDS MAY BE USED ON OTHER DRAWINGS.
3. SOME SYMBOLS MAY NOT BE SHOWN ON THIS LEGEND. NOT ALL SYMBOLS SHOWN MAY NECESSARILY BE USED ON THESE DRAWINGS.

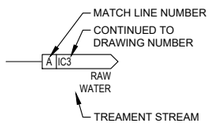
EQUIPMENT DESIGNATOR



XXX-YYY-ZZZ SAMPLE EQUIPMENT TAG

DRAWING CONTINUATION DESIGNATOR





Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
P&ID SYMBOLS AND ABBREVIATIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TRK
CHECKED BY: JC
APPROVED BY: KCW / CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**
SHEET NO: **IC001**

Plotted By: Ian Smith Date: Friday, April 17, 2026

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\07-IdCPlan Sheets\Oxidation Ditch CAD Files\EMWWTF_IC_P&ID - GEN.dwg

ANNOTATION LEGEND

MARK	DESCRIPTION
XXX-XXX	EQUIPMENT TAG
A SHEET# TO/FROM DESCRIPTION	ON/OFF PAGE CONNECTORS 1-WAY
ICXXX A TO/FROM DESCRIPTION	ON/OFF PAGE CONNECTORS 2-WAY
	BREAK
	PROCESS FLOW DIRECTION ARROW
	HART TOTALIZER
IS	ANALOG INPUT / INTRINSICALLY SAFE ANALOG INPUT
	ANALOG OUTPUT
IS	DIGITAL INPUT / INTRINSICALLY SAFE DIGITAL INPUT
	DIGITAL OUTPUT
PSR	PUMP SUPERVISORY RELAY
HIM	HARDWARE INTERFACE MODULE
HMI	HUMAN MACHINE INTERFACE
OIT	OPERATOR INTERFACE TERMINAL
I	INTERLOCK
	PIPE JUMP
LP	LEAK PROBE
	REDUCER / EXPANDER

VALVE/GATE LEGEND

MARK	DESCRIPTION
	AIR RELEASE
	AIR VACUUM VALVE
	GENERIC
	GATE
	BUTTERFLY
	PLUG
	PINCH
	BALL
	BALL V-NOTCH THROTTLING
	BALL - FLOAT
	KNIFE GATE
	MUD
	NEEDLE
	DIAPHRAGM
	GENERIC N.C.
	GATE N.C.
	BUTTERFLY N.C.
	PLUG N.C.
	PINCH N.C.
	BALL N.C.
	KNIFE GATE N.C.
	NEEDLE N.C.
	DIAPHRAGM N.C.
	DOUBLE BLOCK
	PLUG - 3-WAY
	3-WAY
	4-WAY
	CHECK
	SURGE ANTICIPATOR
	PRESSURE REDUCING
	PRESSURE SUSTAINING / FLOW CONTROL VALVE
	ANGLE
	RUPTURE DISK - PRESSURE
	REDUCED PRESSURE ZONE / BACKFLOW PREVENTER
	GATE (GENERIC)
	STOP PLATE
E	WEIR GATE (MANUAL AND ACTUATED)
E	SLUICE GATE (MANUAL AND ACTUATED)
	DIVERTER GATE
	STRAINER
	BASKET STRAINER
	CAP
	QUICK CONNECT/ADAPTER
	AUTO FEED VALVE
	FLEX CONNECTION
	AIR SEPARATOR
	OVERFLOW
	PIPE FLANGE
	UNION
D	TELESCOPING VALVE

VALVE ACTUATOR LEGEND

MARK	DESCRIPTION
	DIAPHRAGM
M	ROTARY MOTOR
E	ELECTRIC
E O/C	ELECTRIC - OPEN/CLOSE
E MOD	ELECTRIC - MODULATING
P	PNEUMATIC
S P O/C	PNEUMATIC - OPEN/CLOSE
I/P P	PNEUMATIC - MODULATING
H	HYDRAULIC
S	SOLENOID
	HAND
HW	HAND WHEEL
CW	CHAIN WHEEL
FS	FLOOR STAND
FB	FLOOR BOX
	WEIGHTED PRESSURE RELIEF

INSTRUMENT LEGEND

MARK	DESCRIPTION
	FLOW METER - MAGNETIC
	FLOW METER - TURBINE OR PROPELLER
	FLOW METER - POSITIVE DISPLACEMENT
	FLOW METER - CORIOLLIS
	FLOW METER - SONIC OR ULTRASONIC
	FLOW TUBE
	ORIFICE PLATE - GENERIC
	ORIFICE PLATE - CONCENTRIC
	OPEN CHANNEL WEIR PLATE
	OPEN CHANNEL FLUME
	THERMAL DISPERSION FLOW ELEMENT
FI	ROTAMETER
	ULTRASONIC LEVEL SENSOR
	RADAR LEVEL SENSOR
	DIAPHRAGM SEAL

PUMP LEGEND

MARK	DESCRIPTION
	GENERIC
	SUBMERSIBLE
	SLUDGE DIAPHRAGM
	ROTARY LOBE POSITIVE DISPLACEMENT PUMP
MP	CHEMICAL FEED - METERING PUMP
P	CHEMICAL FEED - PERISTALTIC PUMP
	PROGRESSIVE CAVITY
VT	VERTICAL TURBINE - IN BASIN
VT	VERTICAL TURBINE - IN CAN
VT	VERTICAL TURBINE - IN BASIN (TOP)
VT	VERTICAL TURBINE - IN CAN (TOP
WP M	SUBMERSIBLE WELL PUMP

BLOWER LEGEND

MARK	DESCRIPTION
	POSITIVE DISPLACEMENT BLOWER
	BLOWER (GENERIC)

EQUIPMENT LEGEND

MARK	DESCRIPTION
XXX/VAC GP-XXX M	MOTOR - PUMPS / BLOWERS
	AERATOR
	MIXER
	POLYMER INLINE MIXER
	CALIBRATION COLUMN / FLOW INDICATOR
PD	PULSATION DAMPENER
	AERATION DIFFUSERS
	JET MIXING HEADER
	EJECTOR
	EDUCTOR
	CHEMICAL INJECTOR
	CHEMICAL STORAGE TANK
	CHEMICAL STORAGE TOTE
	CHEMICAL STORAGE DRUM
	DESSICANT DRYER
	FLOW STRAIGHTENING
	HYDRANT
	SEDIMENT TRAPPER FILTER
	STATIC MIXER
F	AIR FILTER
R	PRESSURE REGULATOR
	AIR DRYER
	PILOT NOZZLE
	FLAME ARRESTOR
	DRIP TRAP
	DAMPER
A	ALARM
S	STROBE

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
P&ID SYMBOLS AND LEGEND

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TRK
CHECKED BY: JC
APPROVED BY: KCW / CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: GEN
SHEET NO: IC002

Plotted By: Ian Smith Date: Friday, April 17, 2026

MARK	DESCRIPTION
FACILITY DESIGNATOR	
BNR	BIOLOGICAL NUTRIENT REMOVAL BASINS
CFB	CHEMICAL FEED BUILDING
DLS	DRAIN LIFT STATION
HW1	HEADWORKS BUILDING 1 (EXISTING)
HW2	HEADWORKS BUILDING 2
IPS	INFLUENT PUMP STATION (EXISTING)
MTB	MEMBRANE TREATMENT BUILDING
OD1	ODOR CONTROL FACILITY NO. 1
OSW	OXIDATION SWING ZONE
OXD	OXIDATION DITCH
SCB	SECONDARY CLARIFIER SPLITTER BOX
SDB	SOLIDS DEWATERING BUILDING (EXISTING)
SHB	SOLIDS HANDLING BUILDING
SST	SLUDGE STORAGE TANK
SW	ITEMS IN THE YARD/SITEWORK
PROCESS EQUIPMENT	
BLW	BLOWER
CMP	COMPRESSOR
CS	COARSE SCREEN
DCNT	DECANTER
DU	DEWATERING UNIT
EAS	EFFLUENT AUTOMATIC SAMPLER
ED	EDUCTOR
FAN	FAN
FLT	FILTER
FS	FINE SCREEN
GCU	GRIT CYCLONE/CLASSIFIER UNIT
GRU	GRIT REMOVAL UNIT
HCH	ACCESS HATCH
IAS	INFLUENT AUTOMATIC SAMPLER
MXR	MIXER
P	PUMP
PBU	POLYMER BLENDING UNIT
SC	SCREW CONVEYOR
SIL	SILENCER
SP	SCREW PRESS
UV	ULTRAVIOLET DISINFECTION
WQS	WATER QUALITY STATION
PROCESS FLOW DESIGNATOR	
AHP	HIGH PRESSURE PROCESS AIR
AIR	AIR
ALP	LOW PRESSURE PROCESS AIR
AS	AIR SCOUR
CSE	COARSE SCREEN EFFLUENT
CSI	COARSE SCREEN INFLUENT
DRN	PROCESS DRAIN
EFF	EFFLUENT
EFW	EFFLUENT WATER SYSTEM
FSE	FINE SCREEN EFFLUENT
FSI	FINE SCREEN INFLUENT
HWE	HEADWORKS EFFLUENT
INF	INFLUENT
ML	MIXED LIQUOR
SC	SCUM
SPP	SCUM PIT PUMP
TWAS	THICKENED WASTE ACTIVATED SLUDGE
UVE	UV DISINFECTION EFFLUENT
UVI	UV DISINFECTION INFLUENT
WAS	WASTE ACTIVATED SLUDGE
WST	WASTE

MARK	DESCRIPTION
CHEMICAL EQUIPMENT	
CAL	CALIBRATION COLUMN
CFP	CHEMICAL FEED PUMP
CHMP	CHEMICAL METERING PUMP
CM	CHEMICAL MIXER
CTP	CHEMICAL TRANSFER PUMP
FP	CHEMICAL FEED PANEL
INJ	CHEMICAL INJECTOR
ROT	ROTAMETER
PROCESS AREA	
AER	PROCESS BASIN AEROBIC ZONE
ALK	ALKALINITY (CHEMICAL)
ALUM	ALUM (CHEMICAL)
AN	PROCESS BASIN ANAEROBIC ZONE
AX	PROCESS BASIN ANOXIC ZONE
CA	CITRIC ACID (CHEMICAL)
CAR	CARBON (CHEMICAL)
CAT	CONTROL AIR RECEIVER TANK
DW	DEWATERING
DX	DEOXYGENATION
EFF	EFFLUENT
GRT	GRIT
HWE	HEADWORKS EFFLUENT
HYDRO	HYDRO (PRESSURIZED WATER/AIR SYS)
HYPO	SODIUM HYPOCHLORITE (CHEMICAL)
IMLR	INTERNAL MIXED LIQUOR RECYCLE
INF	INFLUENT
IRSW	INTERNAL RECYCLE AND SWING
MBT	MEMBRANE TANK
MDT	MEMBRANE DISTRIBUTION CHANNEL
MFS	MEMBRANE FILTRATION SYSTEM
MTH	MEMBRANE THICKENING
NPW	NONPOTABLE PLANT WATER
ODR	ODOR CONTROL
OSWT	OXIDATION SWING ZONE TRANSFER
PB	PROCESS BASIN
POL	POLYMER (CHEMICAL)
PRM	PERMEATE
PWR	POWER
RAS	RETURN ACTIVATED SLUDGE
SBS	SODIUM BISULFITE (CHEMICAL)
SCM	SCUM
SCR	SCREENS
SEW	SEWAGE
SL	SLUDGE
SWG	PROCESS BASIN SWING ZONE
TAT	TEST AIR RECEIVER TANK
UV	ULTRAVIOLET DISINFECTION
WAS	WASTE ACTIVATED SLUDGE
PLUMBING	
DR	DRAIN (GENERIC)
EEWS	EMERGENCY EYEWASH/SHOWER
FD	FLOOR DRAIN

MARK	DESCRIPTION
GATES	
MAG	MOTORIZED ACTUATED GATE
SG	SLIDE GATE
SLCG	SLUICE GATE
SP	STOP PLATE
SWG	SWING GATE
W	WEIR
WG	WEIR GATE
VALVES	
3WV	3-WAY
4WV	4-WAY
AFCV	AUTOMATIC FLOW CONTROL
AGV	ANGLE
ARV	AIR RELEASE
ASV	AUTO SWITCHOVER
AVV	AIR VACUUM VALVE
BCV	BALL CHECK
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY
BLV	BALL
BPV	BACK PRESSURE
BV	BALL
CPV	CORPORATION
CV	CHECK
DBV	DUCK BILL
DCV	DOUBLE-LEAF CHECK
DV	DIAPHRAGM
DVV	DIVERTER
ESV	EMERGENCY SHUTOFF
EVA	ELECTRIC VALVE ACTUATOR
FCV	FLOW CONTROL
FPV	FLAP
FRV	FLOW REGULATING
FTV	FOOT
GBV	GLOBE
GCV	GLOBE CHECK
GKV	GAUGE COCK
GV	GATE
HBV	HOSE BIBB
ICV	INTERNAL CHECK
KGV	KNIFE GATE
MDV	MUD
NDV	NEEDLE
PCV	SPRING CHECK
PIV	PINCH
PLV	PRESSURE RELIEF
PNV	PINCH
POV	PNEUMATIC SOLENOID
PRV	PRESSURE REGULATING
PSV	PRESSURE SUSTAINING
PV	PLUG
RCV	RUBBER FLAPPER CHECK
RPZ	REDUCED PRESSURE ZONE
RTV	ROTARY
SCV	SWING CHECK
SLV	STOP LOG
SPV	SLIDE PLATE
STV	SAMPLE TAP
SV	SOLENOID
TBV	TRUE UNION BALL
TCV	STOP CHECK
TLV	TELESCOPING
VRG	VACUUM REGULATOR
VVP	V-PORT BALL
WCV	WEIGHTED CHECK
WGV	WEDGE
WPV	WEIGHTED PRESSURE RELIEF

MARK	DESCRIPTION
CONTROL ENCLOSURES	
CP	CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
JBOX	JUNCTION BOX
LCS	LOCAL CONTROL STATION
MCP	MASTER CONTROL PANEL
SCP	SUPERVISORY CONTROL PANEL
TFCP	TRUCK FILL CONTROL PANEL
ELECTRICAL EQUIPMENT	
AS	AUTOMATIC SWITCHOVER
ATS	AUTOMATIC TRANSFER SWITCH
CS	CONTROL STATION
CTCAB	CURRENT TRANSFORMER CABINET
DISC	DISCONNECT
ES	EMERGENCY STOP
ESC	EMERGENCY SHUTOFF CONTROLLER
FVNR	FULL VOLTAGE NON-REVERSING STARTER
HCS	HYDRAULIC CONTOL SYSTEM
HCU	HARMONIC CORRECTION UNIT
HIM	HUMAN INTERFACE MODULE
HP	HIGH PANELBOARD (277/480VAC)
INV	INVERTER
LP	LOW PANELBOARD (120/208VAC)
M	MOTOR
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
NWP	NETWORK PANEL
PDC	POWER DISTRIBUTION CENTER
PM	POWER MONITOR
RCP	REMOTE CONTROL PANEL
SPD	SURGE PROTECTION DEVICE
STR	STARTER
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
UCP	USER CONTROL PANEL
UPS	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE
XFMR	TRANSFORMER
HAND SWITCH ABBREVIATIONS	
STR	START
0-100%	POTENTIOMETER CONTROL
E-STOP	EMERGENCY STOP
FOR	FORWARD OFF REVERSE
HOA	HAND OFF AUTO
HOO	HAND ON/OFF
HOR	HAND OFF REMOTE
HORN	ALARM HORN
JOR	JOG OFF REMOTE
L/R	LOCAL REMOTE
LOR	LOCAL OFF REMOTE
LSR	LOCAL STOP REMOTE
MA	MANUAL AUTO
MR	MANUAL REMOTE
O/C	OPEN CLOSE
OCA	OPEN CLOSE AUTO
OCR	OPEN CLOSE REMOTE
OSC	OPEN STOP CLOSE
POT	POTENTIOMETER
RST	RESET
SC	SPEED CONTROL
SIL	HORN SILENCE
SS	START STOP
STP	STOP
TOA	TEST OFF/AUTO
WDA	WET DRY AUTO

MARK	DESCRIPTION
INSTRUMENTATION	
AE	ANALYTICAL ELEMENT
AI	ALAYSIS INDICATOR
AIT	ANALYTICAL INDICATING TRANSMITTER
ASH	ANALYSIS SWITCH HIGH
ASL	ANALYSIS SWITCH LOW
AT	ANALYSIS TRANSMITTER
DO	DISSOLVED OXYGEN
DS	DOOR (INTRUSION) SWITCH
EN	VOLTAGE ON
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FLS	FLOOD SWITCH
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
FT	FLOW TRANSMITTER
GDE	GAS DETECTOR ELEMENT
GDT	GAS DETECTOR TRANSMITTER
JI	POWER INDICATOR
JN	POWER ON
LE	LEVEL ELEMENT
LI	LEVEL INDICATOR
LIT	LEVEL INDICATING TRANSMITTER
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LT	LEVEL TRANSMITTER/TRANSDUCER
MA	MOTOR FAIL
MC	MOTOR CONTROL
MN	MOTOR ON
MS	MOTION SENSOR
MSH	MOTOR SEAL FAIL
OP	ORIFICE PLATE
ORP	OXYGEN REDUCTION POTENTIAL
PDI	PRESSURE DIFFERENTIAL INDICATION
PDS	PRESSURE DIFFERENTIAL SWITCH
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH
PDSL	PRESSURE DIFFERENTIAL SWITCH LOW
PE	PRESSURE ELEMENT
PFR	POWER FAIL RELAY
PH	PH (POTENTIAL OF HYDROGEN)
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH HIGH
PT	PRESSURE TRANSMITTER
SC	SPEED CONTROLLER
SCL	SCALE
SI	SPEED INDICATOR
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TIT	TEMPERATURE INDICATING TRANSMITTER
TOD	TROUGH OVERLOAD DOOR
TSH	TEMPERATURE SWITCH HIGH
TSL	TEMPERATURE SWITCH LOW
TSS	TOTAL SUSPENDED SOLIDS
TT	TEMPERATURE TRANSMITTER
WE	WEIGHT ELEMENT
WI	WEIGHT INDICATOR
WIT	WEIGHT INDICATING TRANSMITTER
WT	WEIGHT TRANSMITTER
YA	INDICATION ALARM
YC	STATE RESET
YL	INDICATION LIGHT
YN	STATE ON
ZB	POSITION OPEN COMMAND
ZC	POSITION CLOSED
ZD	POSITION CLOSED COMMAND
ZI	POSITION INDICATION
ZIC	POSITION INDICATION CLOSED
ZIO	POSITION INDICATION OPEN
ZO	POSITION OPEN
ZS	POSITION SWITCH
ZSC	POSITION SWITCH OPEN
ZSO	POSITION SWITCH CLOSED POSITION SWITCH ROTATION

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

APPR	DATE	SYM

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

PROJECT TITLE:

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

P&ID TAGGING ABBREVIATIONS

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TRK
CHECKED BY: JC
APPROVED BY: KCW / CJS

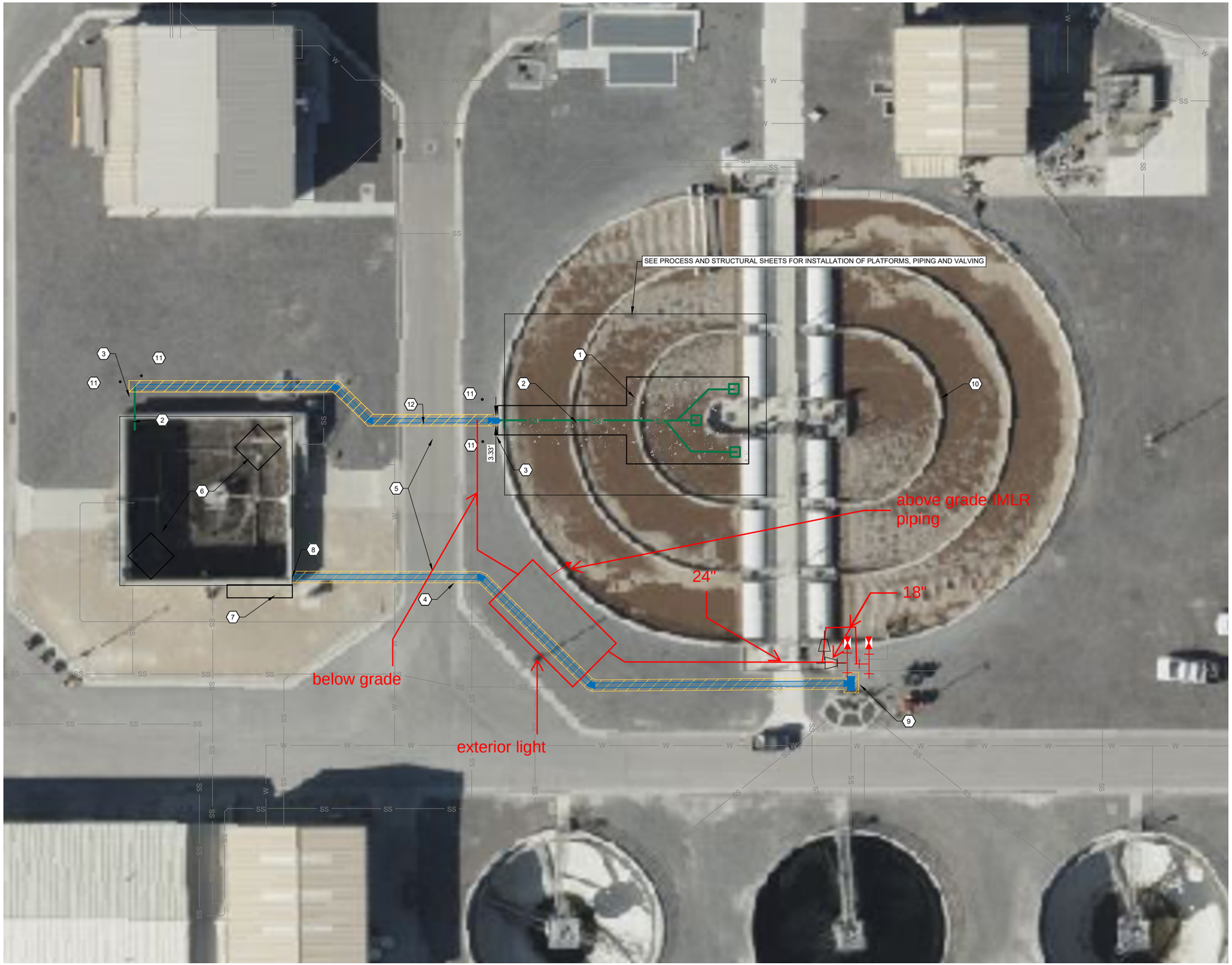
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **GEN**

SHEET NO: **IC003**

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\07-I&C\Plan Sheets\Oxidation Ditch CAD Files\EMWWTF_IC_PID - GEN.dwg

Plotted By: Ian Smith Date: Friday, April 17, 2026



Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE		APPR

NORTH

0 15
Scale in Feet

GENERAL NOTES

1. EXISTING UTILITIES LOCATIONS ARE APPROXIMATE. FIELD VERIFY POTENTIAL CONFLICTS.
2.

CONSTRUCTION NOTES

1. INSTALL TRANSFER PUMP PLATFORM WITH SUBMERSIBLE PUMPS. SEE PROCESS AND STRUCTURAL SHEETS.
2. NEW 16" PROCESS PIPE. SEE PROCESS SHEETS FOR YARD PIPING COORDINATION.
3. BEGIN TRANSFER YARD PIPE TO OSW AT STATION 0+00. SEE SHEET C101 FOR PLAN AND PROFILE. SEE PROCESS SHEETS FOR CONTINUATION COORDINATION.
4. 18" DI PIPE. SEE CIVIL DETAILS FOR TRENCH AND BACKFILL. 42" TRENCH REQUIRED, EXTENTS OUTLINED BY YELLOW HATCH.
5. RESTORE ASPHALT AND CURB. SEE CIVIL DETAILS.
6. INSTALL TRITON MIXER/AERATORS
7. INSTALL CONCRETE PLATFORM. SEE STRUCTURAL OSW SHEETS FOR DETAILS.
8. BEGIN EFFLUENT TO SCB YARD PIPE AT STA 0+00. SEE C101 FOR PLAN AND PROFILE. SEE PROCESS FOR PENETRATION DETAIL.
9. LOCATE EXISTING 24" DRAIN LINE AND CONNECT WITH 24" X 18" TEE.
10. NOT USED
11. INSTALL BOLLARD ACCORDING TO DETAIL.
12. 16" DI PIPE. SEE CIVIL DETAILS FOR TRENCH AND BACKFILL. 40" TRENCH REQUIRED, EXTENTS OUTLINED BY YELLOW HATCH.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OXIDATION DITCH UPGRADES SITE PLAN

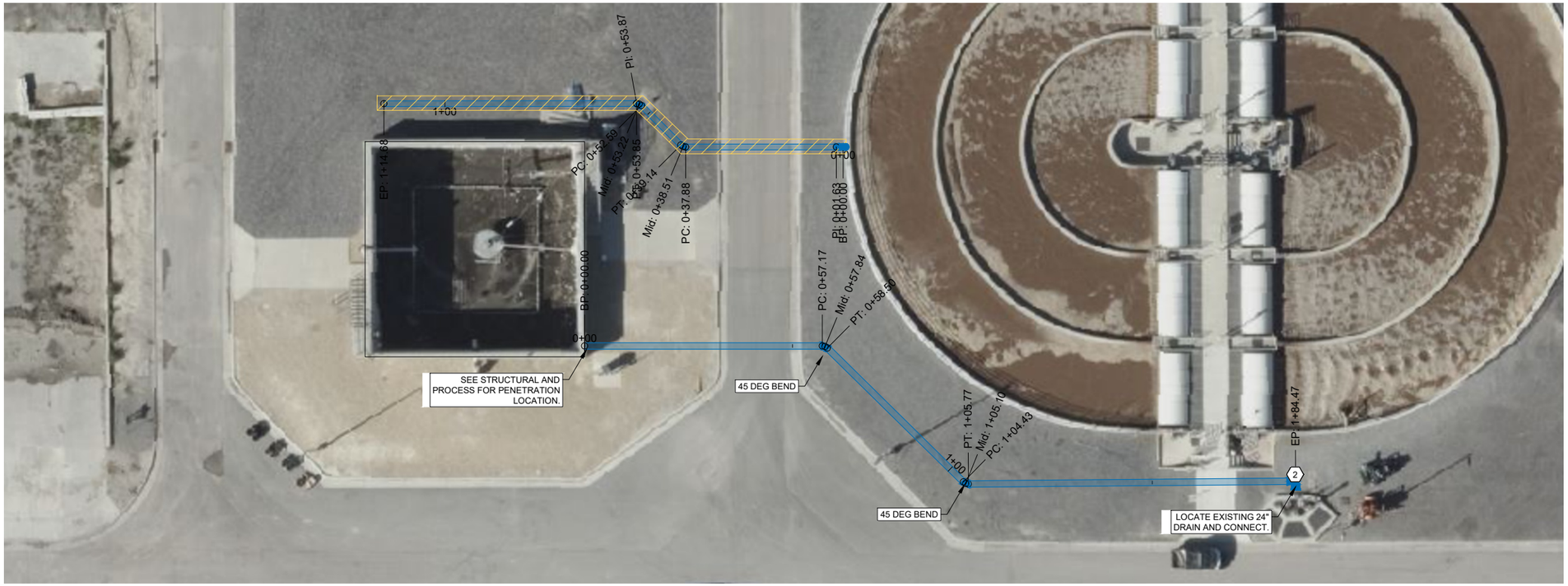
CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

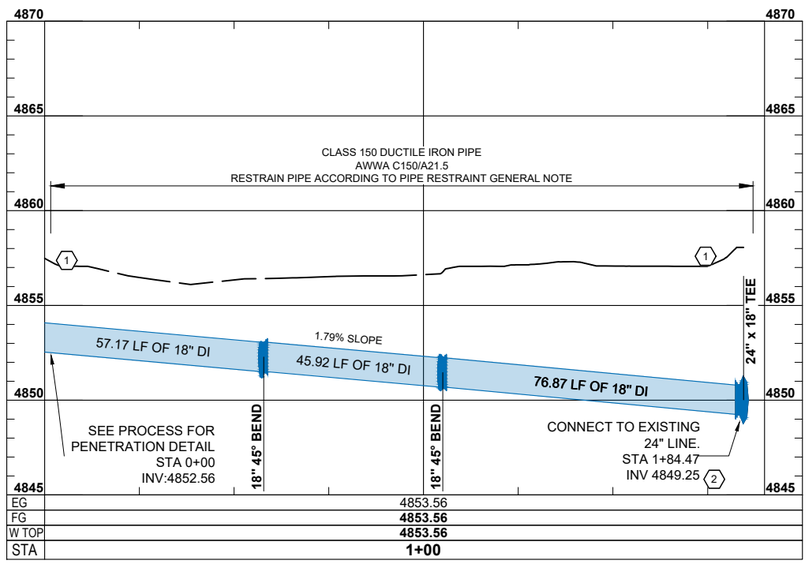
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A
SHEET DESIGNATOR: SW
SHEET NO: C100

File: W:\EE\Eagle Mountain\13139-2023-002\CAD Dwgs\01-Civil\Plan Sheets\OXIDATION DITCH SITE PLAN.dwg
Plotted By: Russell Sprague Date: Friday, April 17, 2026

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\01.Civil\Plan Sheets\Ox Ditch Pipe.dwg

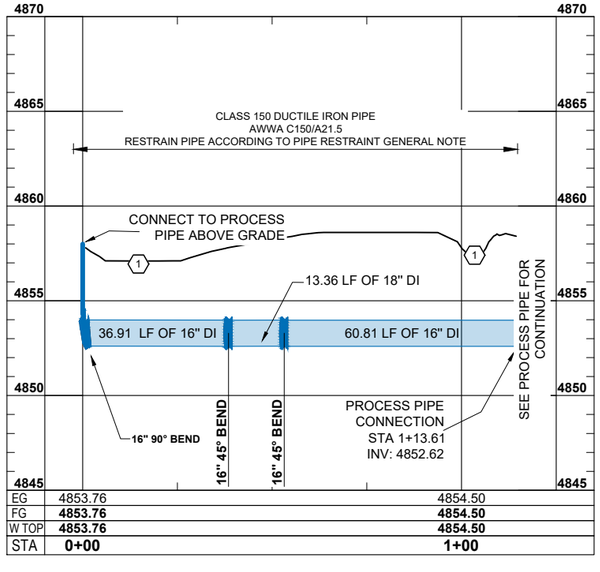


Effluent to SCB ~ STA 0+00 TO 1+90.00



HORIZONTAL SCALE 1:20
VERTICAL SCALE 1:5

Influent to OSW ~ STA -0+10 TO 1+25.00



HORIZONTAL SCALE 1:20
VERTICAL SCALE 1:5

Plotted By: Russell Sprague Date: Friday, April 17, 2026

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE		APPR

NORTH

0 15
Scale in Feet

CONSTRUCTION NOTES

1. VERIFY EXISTING GRADE AND MAINTAIN 3 FEET MINIMUM BURY DEPTH. NOTIFY ENGINEER OF DISCREPANCIES.
2. VERIFY INVERT OF EXISTING 24 INCH DRAIN LINE.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OXIDATION DITCH YARD PIPE PLAN & PROFILE

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: ####

SHEET DESIGNATOR: **SW**
SHEET NO: **C101**

File: W:\EE\Eagle Mountain\13139-2023-002\CAD Dwgs\01-Civil\Plan Sheets\OXIDATION DITCH SITE PLAN.dwg

AES

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
	SYM	DATE	APPR

NORTH

0 15
Scale in Feet

GENERAL NOTES

1. EXISTING UTILITIES LOCATIONS ARE APPROXIMATE. FIELD VERIFY POTENTIAL CONFLICTS.
2.

CONSTRUCTION NOTES

1. INSTALL 60" PRECAST MANHOLE WITH MODULATING VALVE AND ELECTRIC ACTUATOR. SEE C701 FOR DETAIL.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

SHEET TITLE:
OXIDATION DITCH SITE PLAN - TTF VALVE

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: EL
CHECKED BY: RS
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SW**

SHEET NO: **C102**

Advanced Engineering and Environmental Services, LLC www.ae2s.com

Plotted By: Russell Sprague Date: Friday, April 17, 2026

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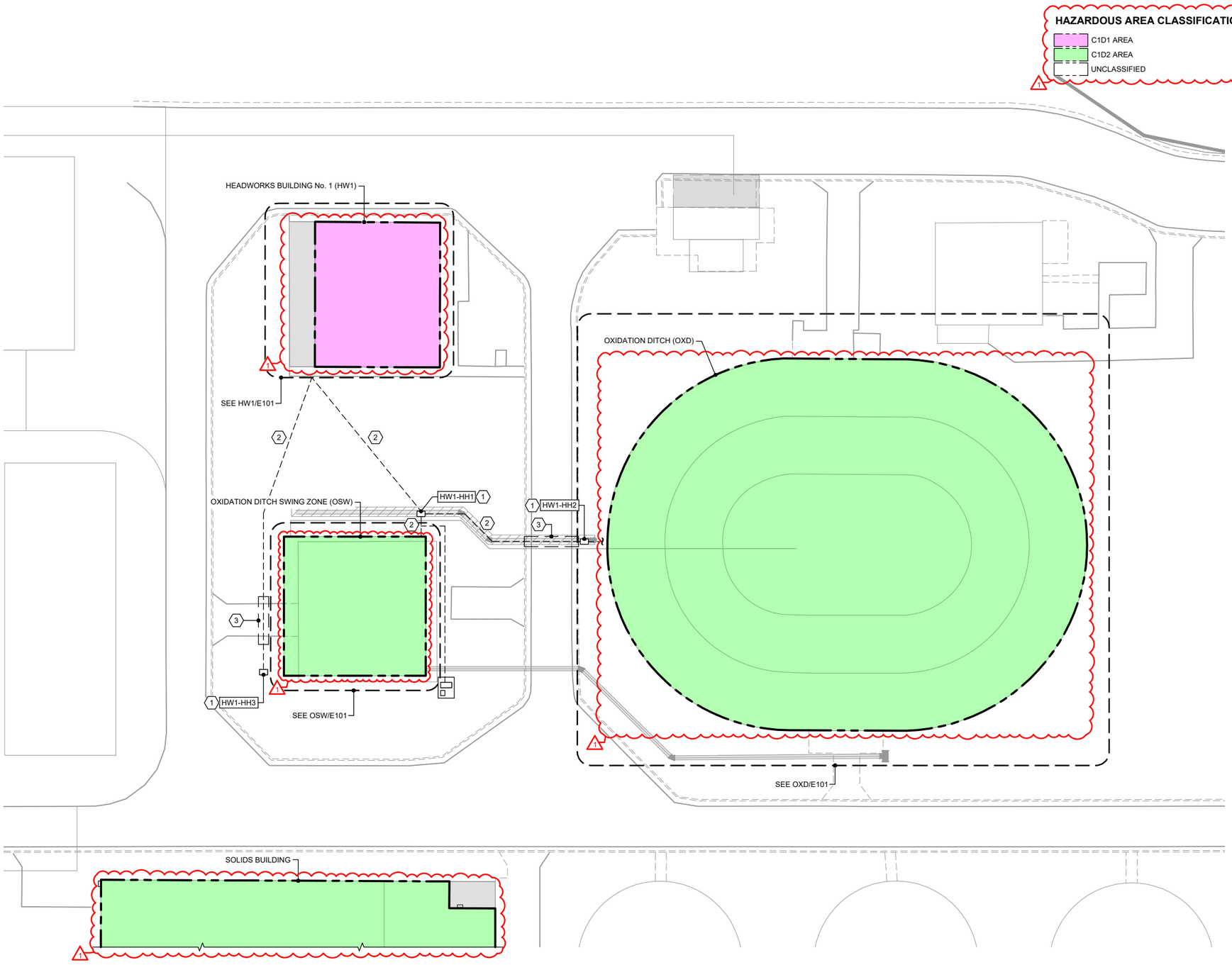

1 E001 OVERALL OXIDATION DITCH ELECTRICAL SITE PLAN

20' 0 20' 40'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR
1	04-28-26	CJS

ADDENDUM #1

GENERAL NOTES

1. SEE GEN/E003 FOR PROCESS AREA HAZARD CLASSIFICATION RATINGS.

CONSTRUCTION NOTES

1. PROVIDE 24"x 36" X 36"D FIBERGLASS HANDHOLE PULLBOX FOR ROUTING OF POWER AND CONTROL CIRCUITRY TO OXD AND OSW. SEE DETAILS.
2. MULTIPLE CONDUITS ROUTED IN A COMMON TRENCH. ROUTE CONDUIT ALONG PROCESS PIPE (AS APPLICABLE) IN COMMON TRENCH 24" BELOW GRADE AND OFFSET CONDUITS 1' FROM EDGE OF PIPE. CONTRACTOR TO CONFIRM FINAL ROUTE BASED ON ACTUAL FIELD CONDITIONS. SEE HW1 ONE-LINES, P&IDS, AND CABLE AND CONDUIT SCHEDULE FOR DETAILS.
3. ROUTE CONDUIT IN COMMON TRENCH WITH PROCESS PIPING. CONDUIT UNDER ROADWAY SHALL BE PVC COATED RIGID STEEL.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OVERALL OXIDATION DITCH ELECTRICAL SITE PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: SW
SHEET NO: E001

Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

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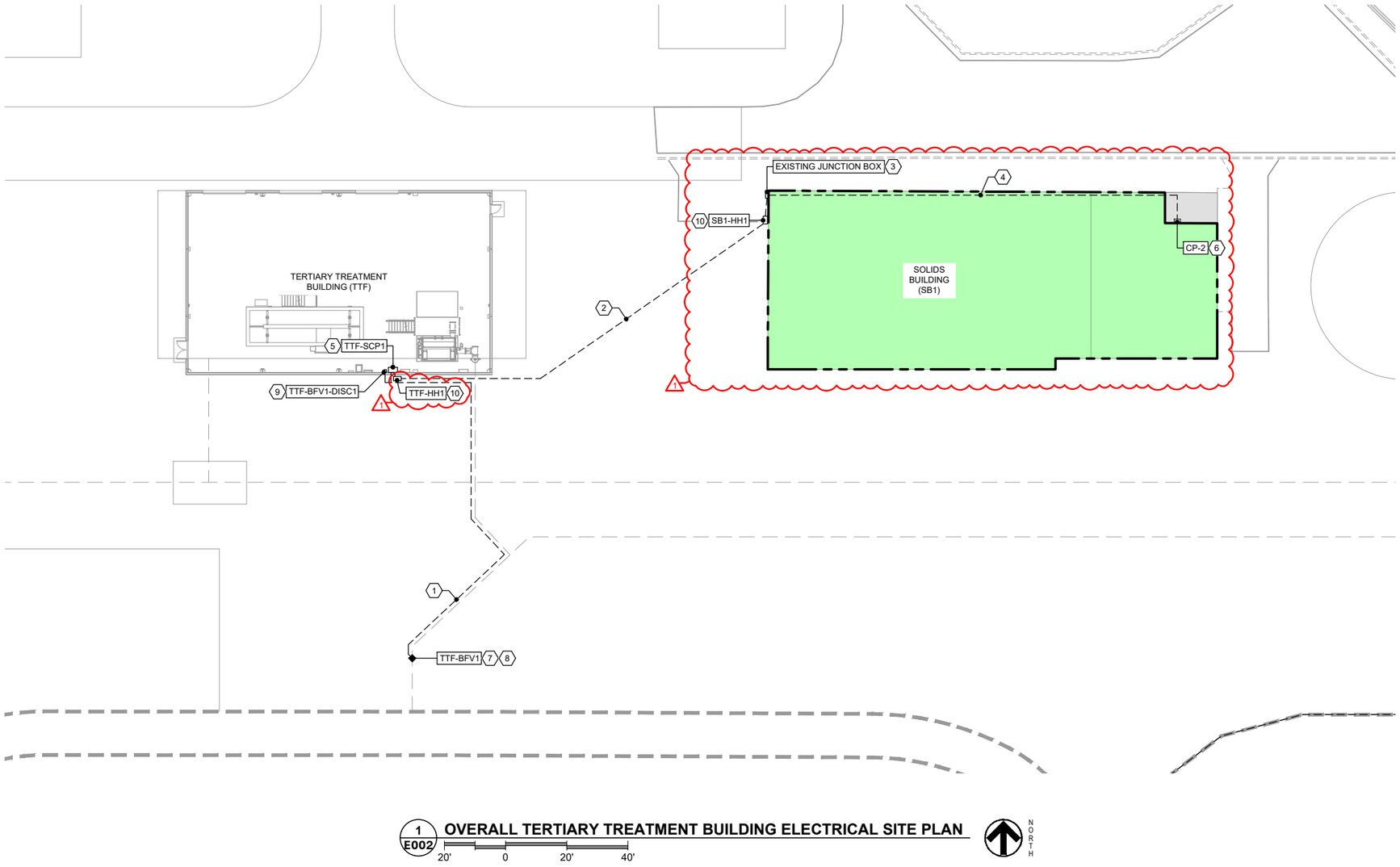


1 E002 **OVERALL TERTIARY TREATMENT BUILDING ELECTRICAL SITE PLAN**

20' 0 20' 40'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	
1	04-28-26	ADDENDUM #1

CJS APPR

GENERAL NOTES

1. SEE GEN/E003 FOR PROCESS AREA HAZARD CLASSIFICATION RATINGS.

CONSTRUCTION NOTES

1. ROUTE CONDUIT ALONG PROCESS PIPE IN COMMON TRENCH 24" BELOW GRADE AND OFFSET CONDUITS 1' FROM EDGE OF PIPE. CONTRACTOR TO CONFIRM FINAL ROUTE BASED ON ACTUAL FIELD CONDITIONS.
2. ROUTE FIBER IN CONDUIT FROM TTF-SCP1 TO EXISTING JUNCTION BOX 24" BELOW GRADE. CONTRACTOR TO CONFIRM FINAL ROUTE BASED ON ACTUAL FIELD CONDITIONS.
3. NEW FIBER SHALL PASS THROUGH THE EXISTING JUNCTION BOX AS A SINGLE CABLE WITHOUT BEING SPLICED OR TERMINATED.
4. ROUTE FIBER IN CONDUIT FROM EXISTING JUNCTION BOX TO CP-2 ALONG INTERIOR WALL. CONTRACTOR TO CONFIRM FINAL ROUTE BASED ON ACTUAL FIELD CONDITIONS.
5. SEE TTF/E101 FOR TTF-SCP1 REQUIREMENTS.
6. SEE SB/E101 FOR CP-2 MODIFICATIONS.
7. PROVIDE A WARNING LABEL ON THE ELECTRIC VALVE OPERATOR GIVING THE LOCATION OF THE DISCONNECTING MEANS, PER NEC 430.102(A).
8. ELECTRICALLY ACTUATED VALVE SHALL BE PROVIDED BY THE CONTRACTOR. REFER TO PROCESS DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. CONTRACTOR SHALL PROVIDE 30A/3P ROTARY DISCONNECT FOR ASSOCIATED ELECTRIC VALVE ACTUATOR. ROTARY DISCONNECT SHALL BE A SQUARE D MD SERIES OR EQUAL.
10. PROVIDE 24"X 36" X 36"D FIBERGLASS HANDHOLE PULLBOX FOR ROUTING OF FIBER OPTIC CABLE. SEE DETAILS FOR ADDITIONAL INFORMATION.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OVERALL TERTIARY TREATMENT BUILDING ELECTRICAL SITE PLAN

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

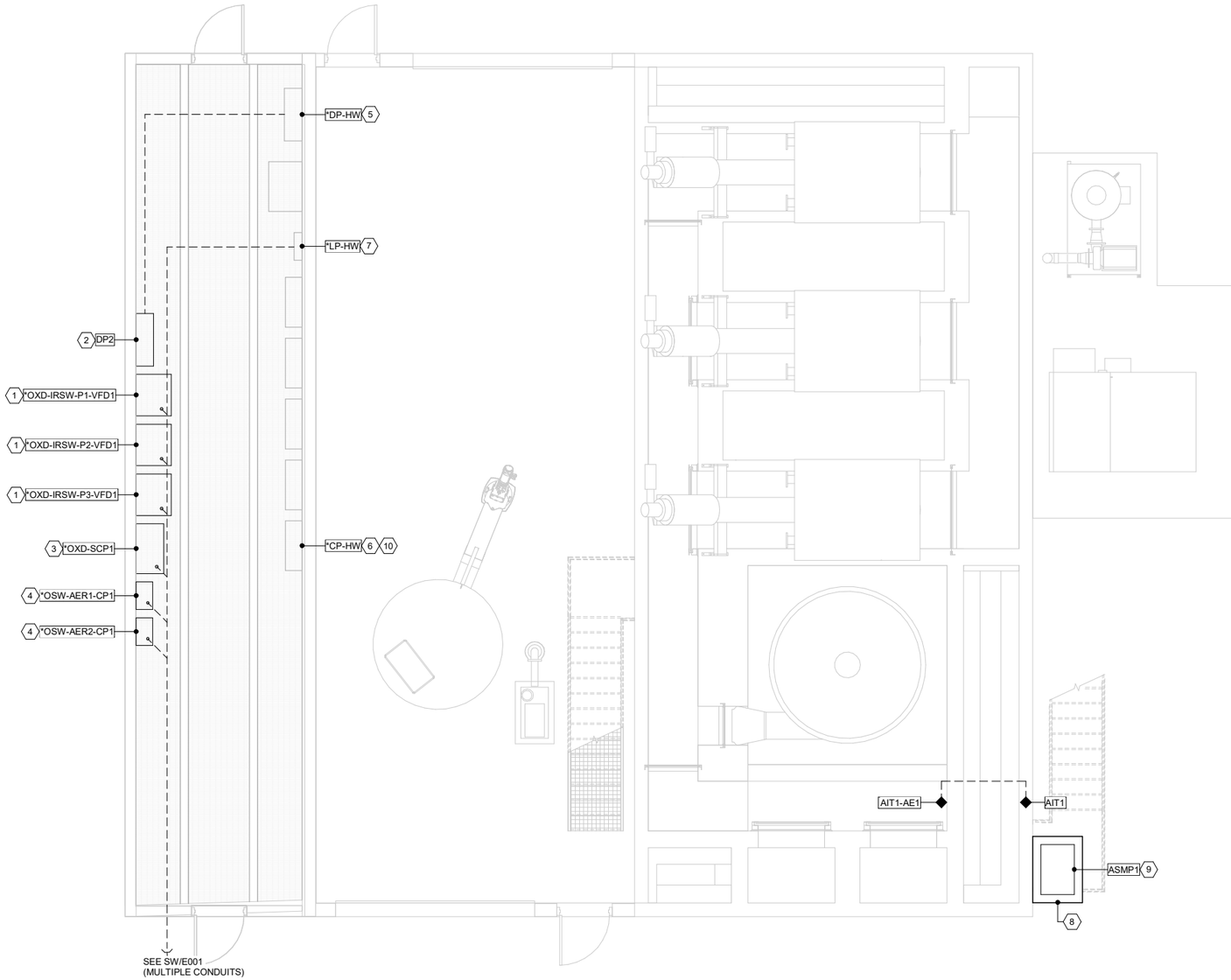
PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SW**
SHEET NO: **E002**

Plotted By: Cole Twelt Date: Wednesday, May 6, 2026

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_HW1_E_v26.rvt



1 / E101 **MAIN LEVEL - PROCESS ELECTRICAL PLAN**

NORTH

12" 0 2' 4' 6' 8' 10'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "HW1-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).
2. REFER TO THE INSTRUMENTATION SCHEDULE FOR DETAILS REGARDING ALL INSTRUMENTATION.

CONSTRUCTION NOTES

1. STANDALONE ENCLOSED VFD ENCLOSURE SHALL BE PROVIDED BY THE CONTRACTOR. WALL MOUNTED WITH TOP AT 72" A.F.F. SEE ONE-LINE DIAGRAM FOR MORE INFORMATION.
2. PANELBOARD SHALL BE PROVIDED BY THE CONTRACTOR. WALL MOUNTED WITH TOP AT 72" A.F.F. SEE ONE-LINE DIAGRAM FOR MORE INFORMATION.
3. SUPERVISORY CONTROL PANEL (40 63 13) PROVIDED BY CONTRACTOR. SEE P&IDS, I/O SCHEDULE AND NETWORK DIAGRAMS FOR ADDITIONAL DETAILS.
4. STANDALONE TRITON CONTROL PANEL PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR. CONTRACTOR TO MOUNT ON WALL WITH TOP AT 72" A.F.F. SEE ONE-LINE DIAGRAM FOR MORE INFORMATION. HARDWARE SYSTEM INTEGRATOR SHALL MODIFY CONTROL PANEL TO REMOVE ON/OFF SWITCH FOR EACH MOTOR, REPLACE WITH AN HOA SWITCH FOR EACH MOTOR, AND ADD CONTACTS FOR INTERLOCKING WITH THE LOCAL CONTROL STATION AND THE DESIGNATED I/O WITHIN THE SUPERVISORY CONTROL PANEL. REWIRE THE HOA SWITCHES SO THAT IN HAND THE MOTOR RUNS, IN OFF THE MOTOR IS OFF, AND IN AUTO THE MOTOR IS CONTROLLED FROM THE PLC. SEE THE CABLE AND CONDUIT SCHEDULE AND I/O SCHEDULE FOR MORE INFORMATION.
5. EXISTING DISTRIBUTION PANEL TO BE MODIFIED FOR NEW BREAKER. SEE DP-HW ONELINE DIAGRAM FOR ADDITIONAL INFORMATION..
6. CONTROL PANEL OXD-SCP1 SHALL BE CONNECTED TO EXISTING CONTROL PANEL CP-HW NETWORK SWITCH VIA CABLE AND CONDUIT SCHEDULE. REFER TO THE NETWORK DIAGRAM FOR ADDITIONAL INFORMATION.
7. PROVIDE (2) - 20A/1P SPARE BREAKERS MATCHING EXISTING LIGHTING PANELBOARD RATINGS. ONE BREAKER TO FEED OXD-SCP1 AND ONE TO FEED THE HEADWORKS AUTOSAMPLER.
8. 4" HOUSEKEEPING PAD WITH 3/4" CHAMFERED EDGES PROVIDED BY THE CONTRACTOR.
9. AUTOSAMPLER SHALL BE PROVIDED BY THE CONTRACTOR. INSTALL OUTSIDE BELOW EXISTING STAIR PLATFORM. RECEPTACLE FOR CORD AND PLUG SHALL BE OUTDOOR RATED AND PROVIDE PROTECTION FROM ELEMENTS WHILE IN USE.
10. EXISTING CONTROL PANEL CP-HW SHALL HAVE THE FOLLOWING I/O INTEGRATED TO THE EXISTING PLC WITHIN BY THE HARDWARE SYSTEM INTEGRATOR. INTRINSICALLY SAFE BARRIERS SHALL BE UTILIZED AS REQUIRED.

ANALOG INPUT:
1. HW1-AIT1.AI1; HW1 EFFLUENT pH
ANALOG OUTPUT:
1. HW1-ASMP1.FC; HW1 AUTOSAMPLER FLOW PACE
DIGITAL INPUT:
1. HW1-ASMP1.YA; HW1 AUTOSAMPLER GENERAL ALARM

PROJECT TITLE:
EAGLE MOUNTAIN WWTP OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
MAIN LEVEL - PROCESS ELECTRICAL PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: JGW
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: N/A

SHEET DESIGNATOR: **HW1**

SHEET NO: **E101**

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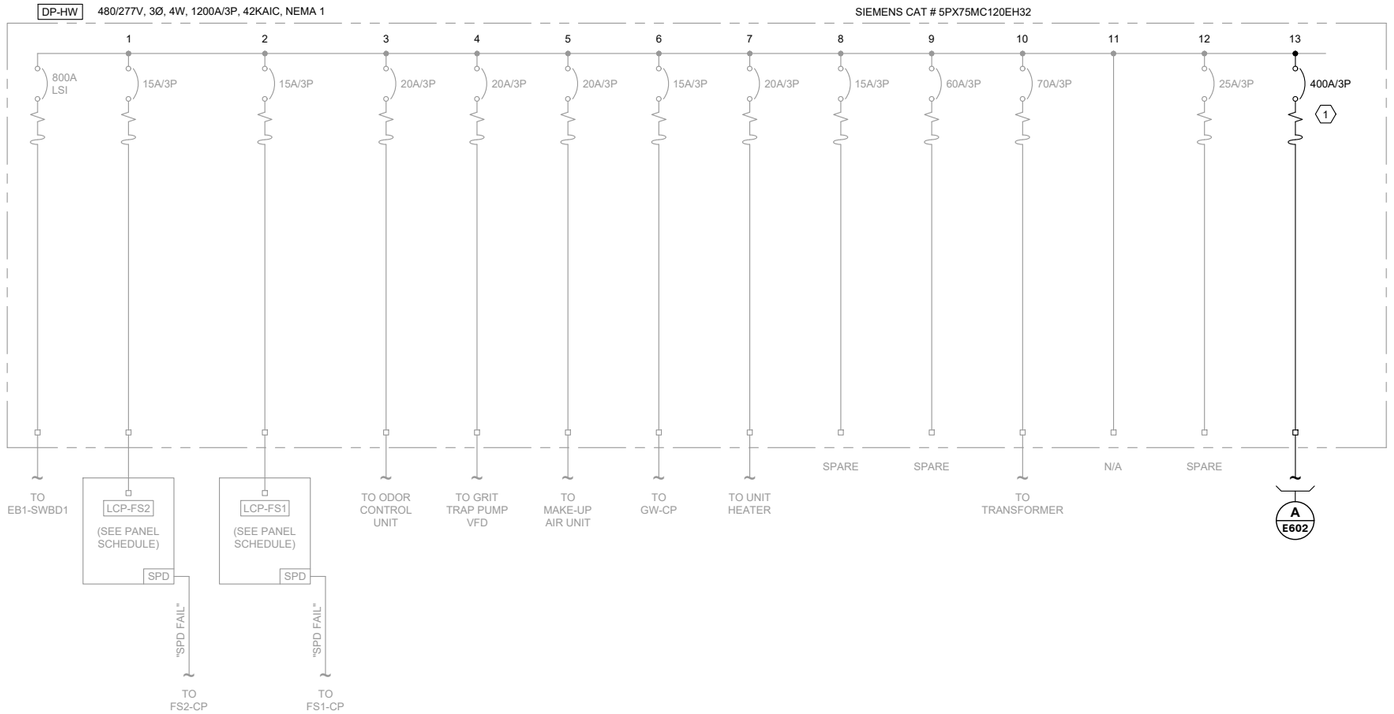
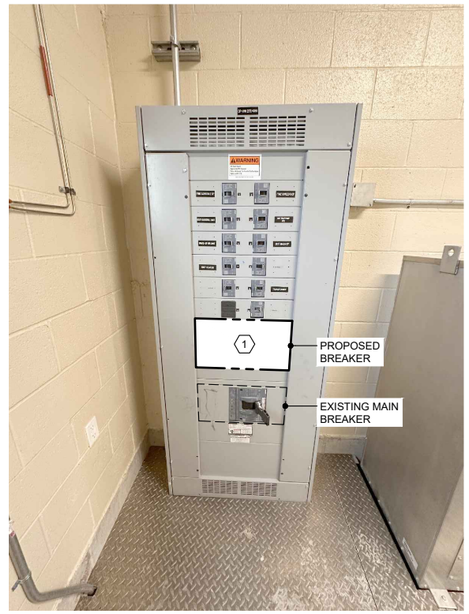


1 E601 **DP-HW ONE-LINE DIAGRAM**



2 E601 **DP-HW MODIFICATION IMAGE**

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

CONSTRUCTION NOTES

1. CONTRACTOR TO PROVIDE NEW BREAKER MATCHING EXISTING PANELBOARD RATINGS IN SPARE SPACE.

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

DP-HW ONE-LINE DIAGRAM

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **HW1**

SHEET NO: **E601**

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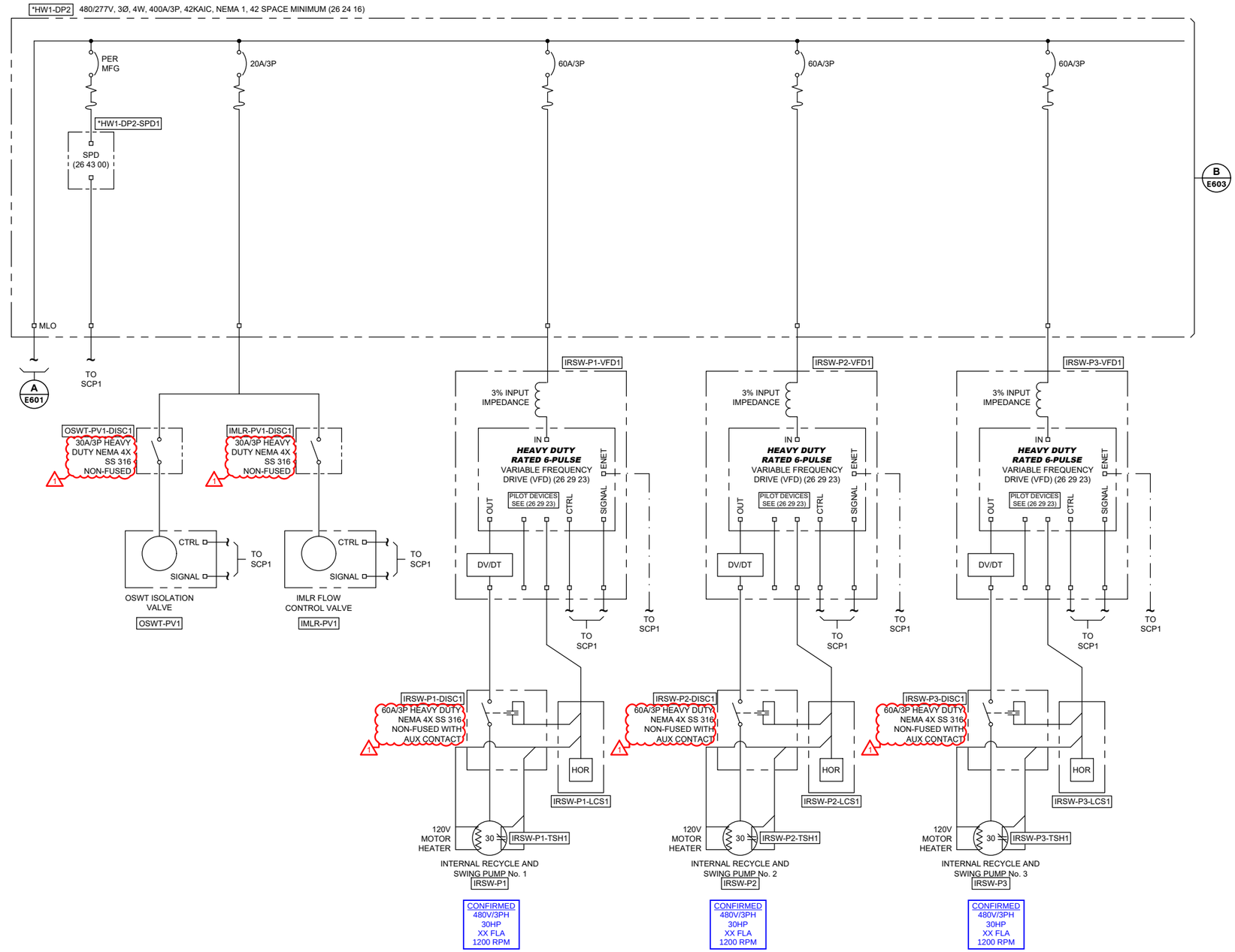
Plotted By: Ian Smith Date: Thursday, April 16, 2026



1 E602 HW1-DP2 ONE-LINE DIAGRAM

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE		APPR
1	04-28-26	ADDENDUM #1	CJS

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **HW1-DP2 ONE-LINE DIAGRAM**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **HW1**
SHEET NO: **E602**

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Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

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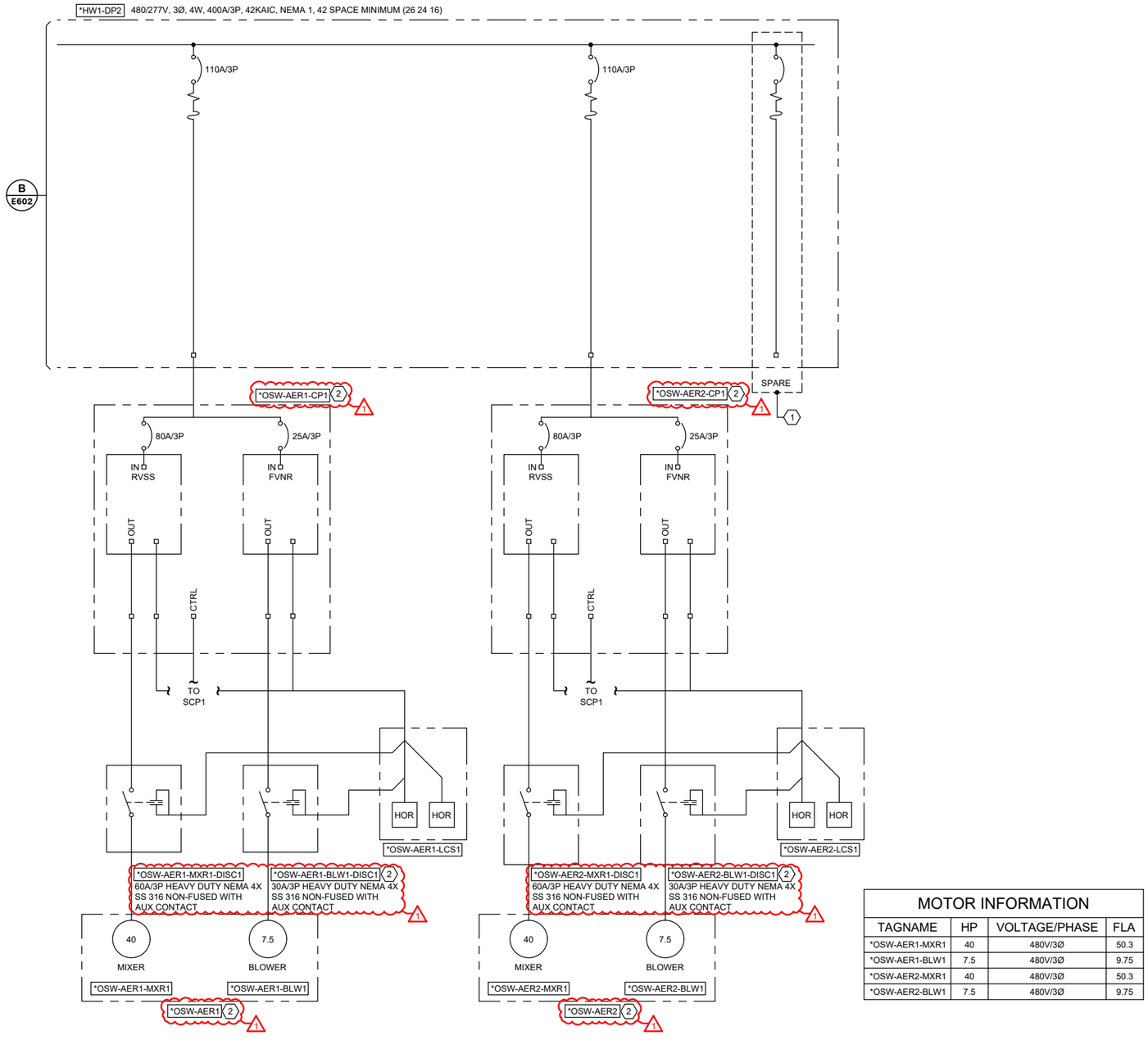


MOTOR INFORMATION			
TAGNAME	HP	VOLTAGE/PHASE	FLA
*OSW-AER1-MXR1	40	480V/3Ø	50.3
*OSW-AER1-BLW1	7.5	480V/3Ø	9.75
*OSW-AER2-MXR1	40	480V/3Ø	50.3
*OSW-AER2-BLW1	7.5	480V/3Ø	9.75

1 E603 HW1-DP2 ONE-LINE DIAGRAM

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR
1	04-28-26	CJS
	ADDENDUM #1	

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

CONSTRUCTION NOTES

1. PROVIDE TWO (2) SPARE 30A/3P CIRCUIT BREAKERS AND ALL REMAINING SPACES SHALL BE SPARE 20A/3P CIRCUIT BREAKERS.
2. EQUIPMENT IS EXISTING AND TO BE INSTALLED/REPURPOSED FOR USE AS NOTED. REFER TO SITE PLANS AND MODIFICATION SHEETS FOR ADDITIONAL INFORMATION.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
HW1-DP2 ONE-LINE DIAGRAM

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

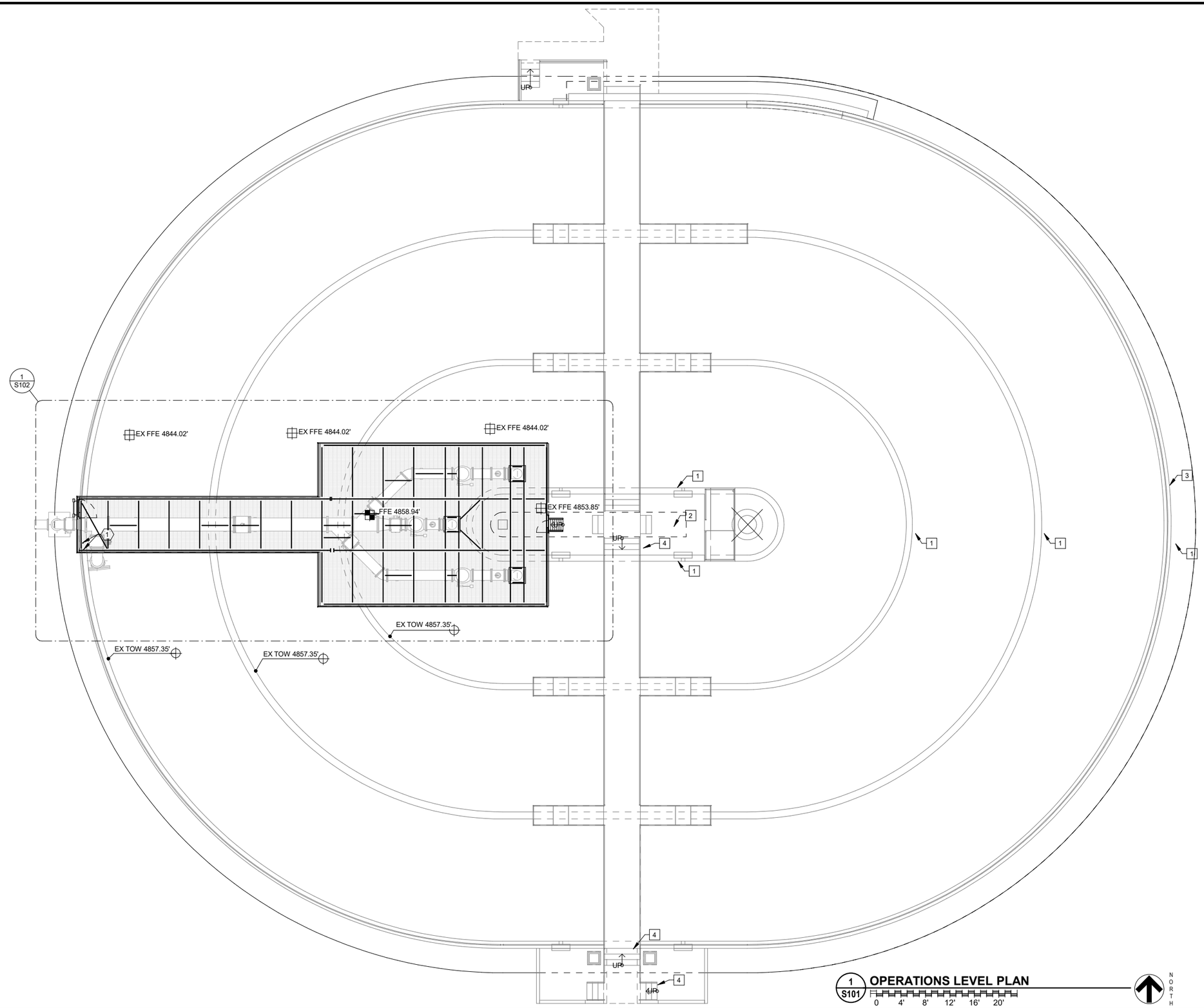
PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **HW1**
SHEET NO: **E603**

Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_S_v26.rvt



1 S101 **OPERATIONS LEVEL PLAN**

0 4' 8' 12' 16' 20'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PLAN NOTES

1. PLATFORM FRAMING AND CONNECTIONS TO BE GALVANIZED STEEL
2. TOS = 4858.82' UNLESS NOTED OTHERWISE
3. COORDINATE PROCESS PIPE SUPPORTS TO CENTERED ON STEEL BEAMS
4. ● -INDICATE STEEL BEARING ON EXISTING CONCRETE WALL SEE DETAIL 4 / S501 -UNO

EXISTING NOTES

1. CONCRETE WALL
2. CONCRETE SLAB
3. GUARD RAIL
4. STAIR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **OPERATIONS LEVEL PLAN**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: **OXD**

SHEET NO: **S101**

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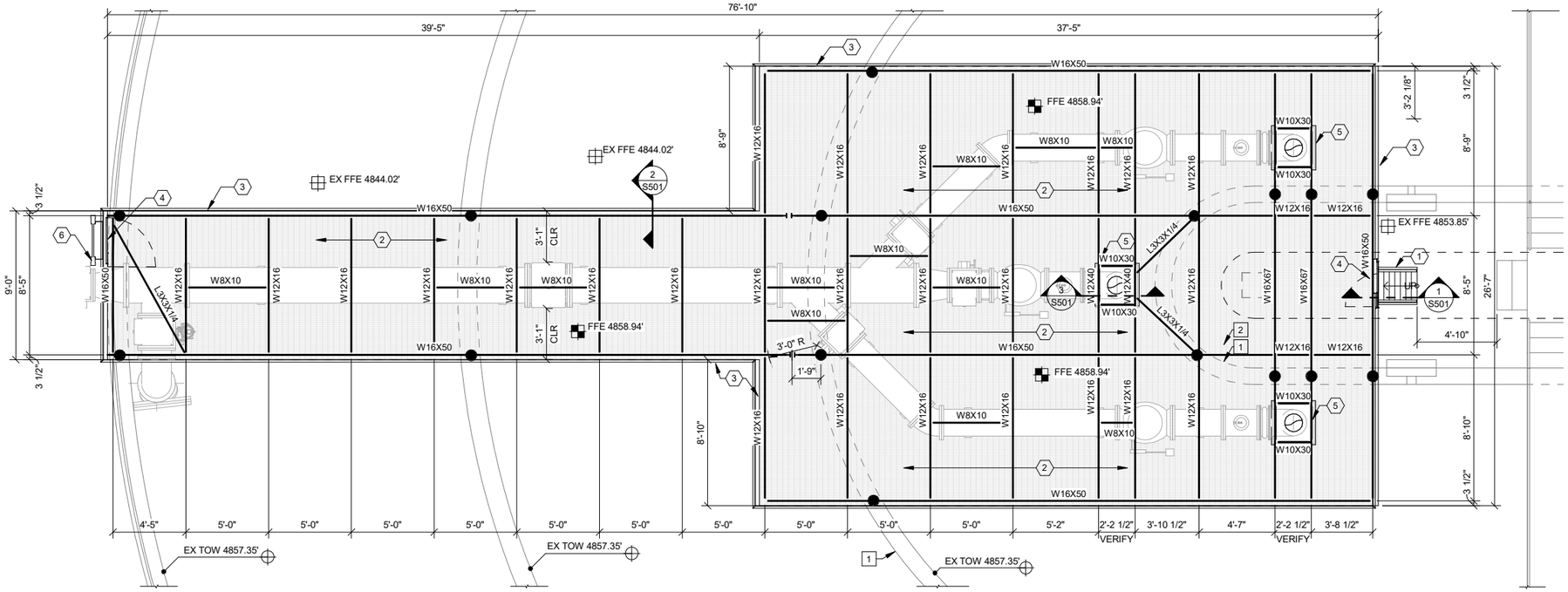
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_S_v26.rvt



1 S102 WEST PLATFORM PLAN

12" 0 2' 4' 6' 8' 10'

NORTH

PLAN NOTES

1. PLATFORM FRAMING AND CONNECTIONS TO BE GALVANIZED STEEL
2. TOS = 4858.82' UNLESS NOTED OTHERWISE
3. COORDINATE PROCESS PIPE SUPPORTS TO CENTERED ON STEEL BEAMS
4. ● -INDICATE STEEL BEARING ON EXISTING CONCRETE WALL SEE DETAIL 4 / S501 -UNO

EXISTING NOTES

1. CONCRETE WALL
2. CONCRETE SLAB
3. GUARD RAIL
4. STAIR

CONSTRUCTION NOTES

1. GALVANIZED SHIP LADDER WITH HANDRAILS -SEE SPEC
2. 1-1/2" DEEP X 3/16 BEARING BARS 19W4 GALVANIZED GRATING WITH SERRATE GRATING SURFACE
3. ALUMINUM (4) RAIL RAILING W/ TOE PLATE -SEE SPEC
4. FRP SELF CLOSING GATE AT LADDER
5. SHOP FABRICATED STEEL PUMP BASE SEE DETAIL 3 / S501
6. FIXED STEEL LADDER WITH WALK TROUGH HANDRAILS

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OPERATIONS LEVEL ENLARGED PLANS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: **OXD**

SHEET NO: **S102**

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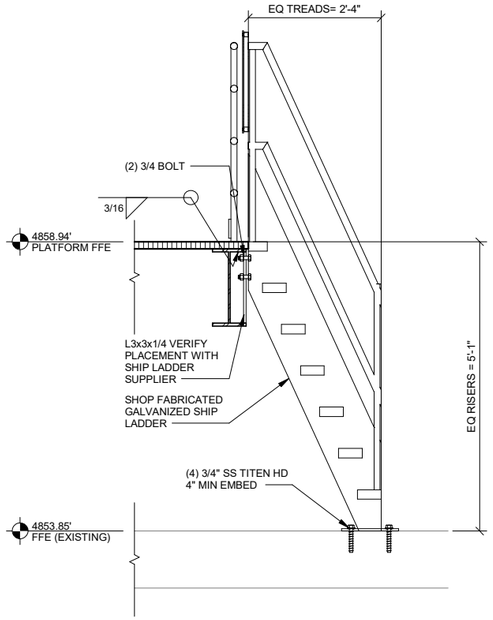
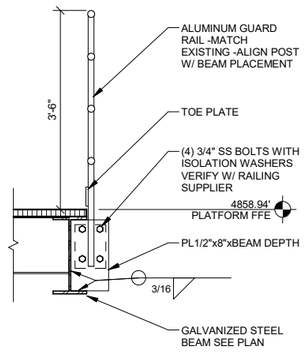


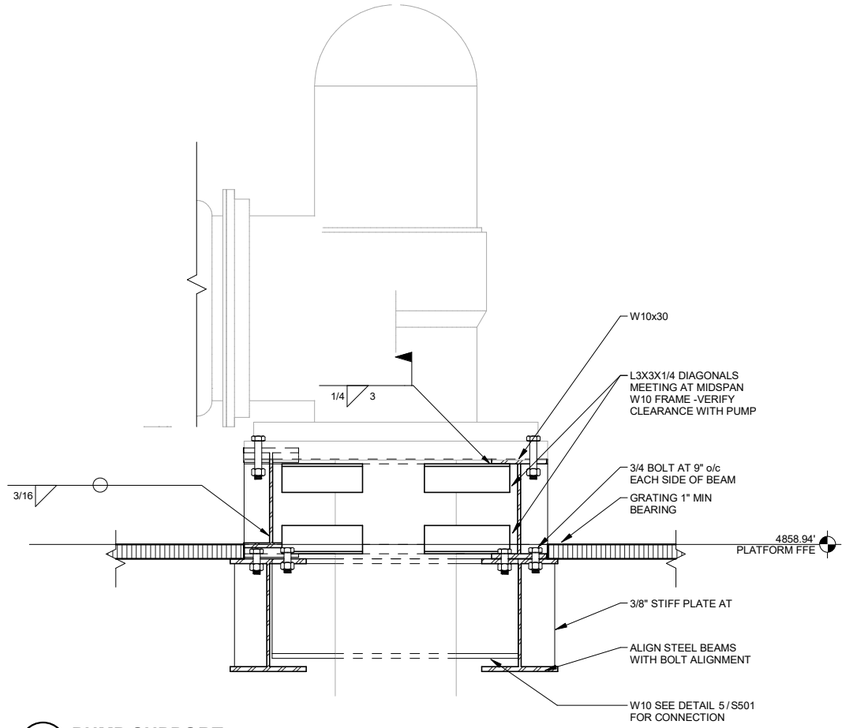
1 S501 SHIP LADDER SECTION

12" 6" 0 1' 2' 3'



2 S501 RAILING SECTION

12" 6" 0 1' 2' 3'



3 S501 PUMP SUPPORT

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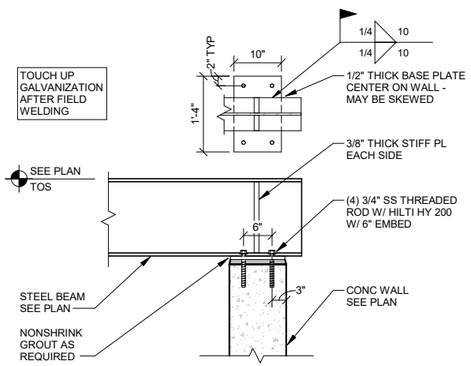
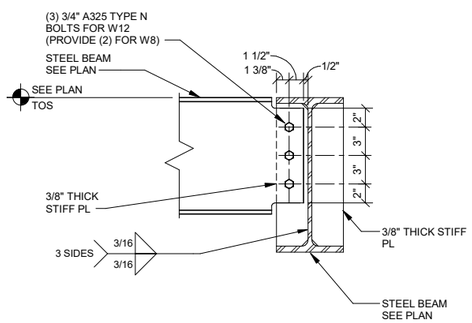


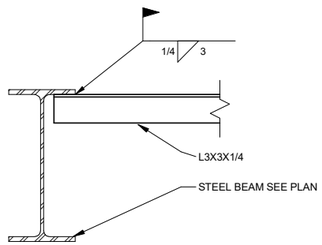
4 S501 STEEL BEAM STD CONNECTION DETAIL

NO SCALE



5 S501 STEEL BEAM CONNECTION DETAIL

NO SCALE



6 S501 BRACE DETAIL

NO SCALE

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Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
FRAMING SECTIONS

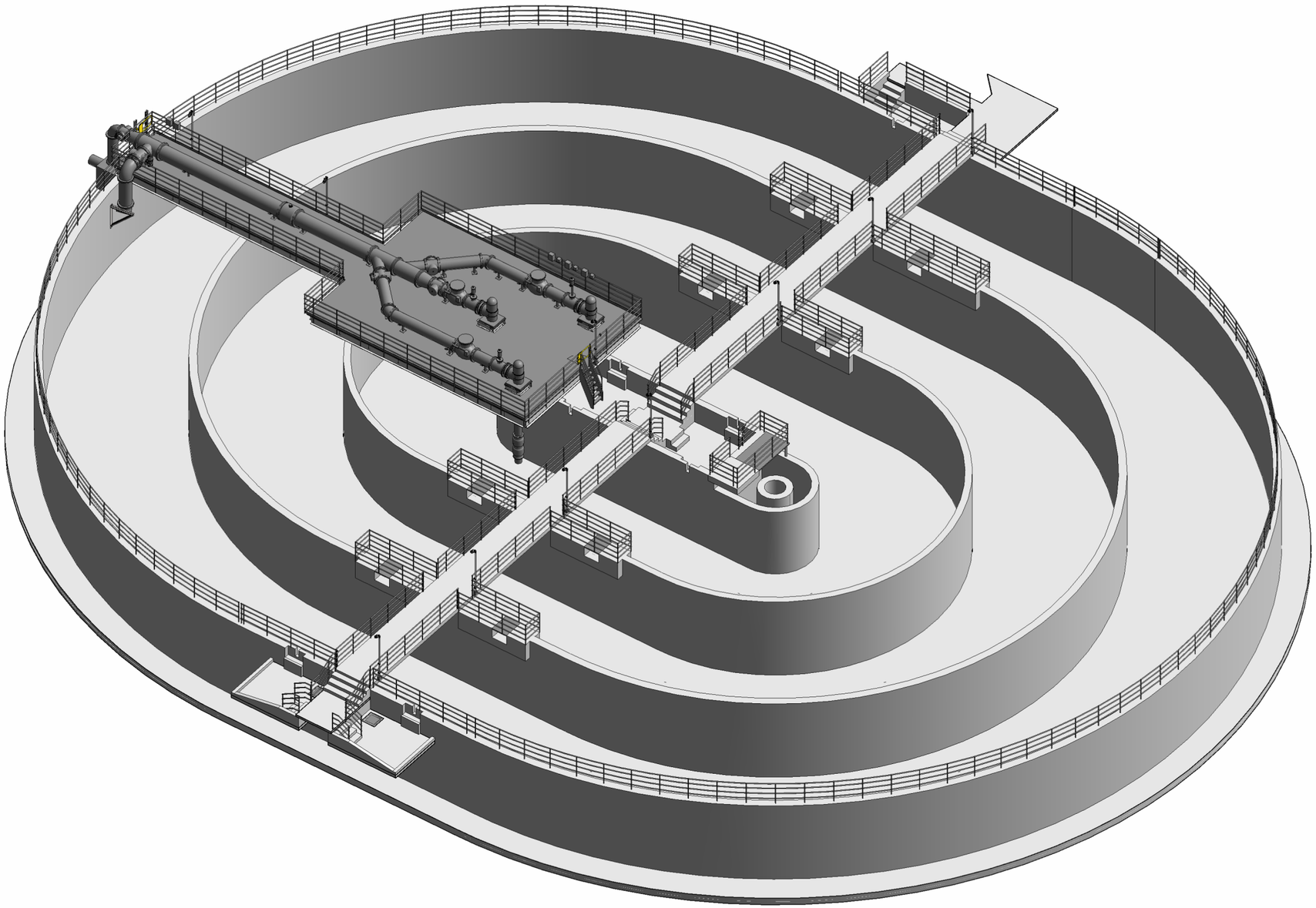
CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: OXD
SHEET NO: S501

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_S_v26.rvt



1 S901 **RENDERING**
NO SCALE

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
ISOMETRIC VIEW

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

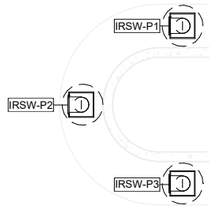
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO:

SHEET DESIGNATOR: **OXD**

SHEET NO: **S901**

4/16/2026 2:42:18 PM

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt



1 / P101 **SUBGRADE LEVEL - OVERALL PLAN**

0 4' 8' 12' 16' 20'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS

SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **SUBGRADE LEVEL - OVERALL PLAN**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JCC
APPROVED BY: KCW

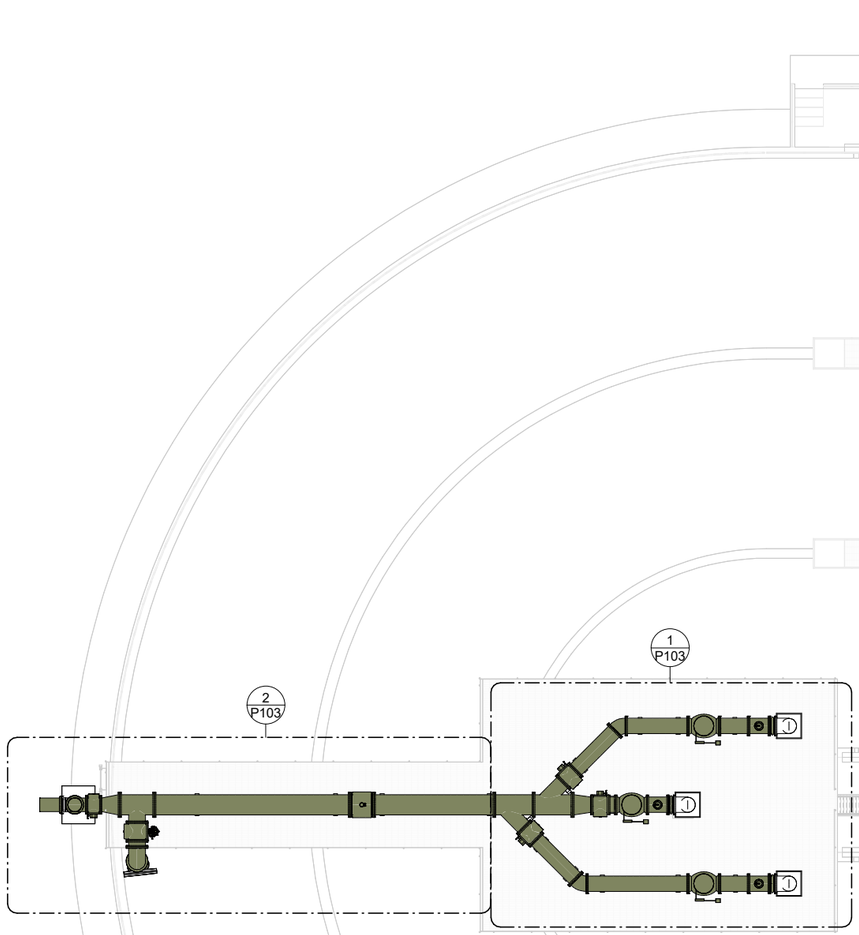
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OXD**

SHEET NO: **P101**

4/17/2026 4:42:27 PM

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt



CHANNEL 3

CHANNEL 2

CHANNEL 1

CHANNEL 1

CHANNEL 2

CHANNEL 3

1 P102 **MAIN LEVEL - OVERALL PLAN**

0 4' 8' 12' 16' 20'

NORTH

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

MAIN LEVEL - OVERALL PLAN

CLIENT:

EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JCC
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002	SHEET DESIGNATOR:	SHEET NO:
DATE: APRIL 2026	**OXD**	**P102**
ALT PROJECT NO: 00000-0000		

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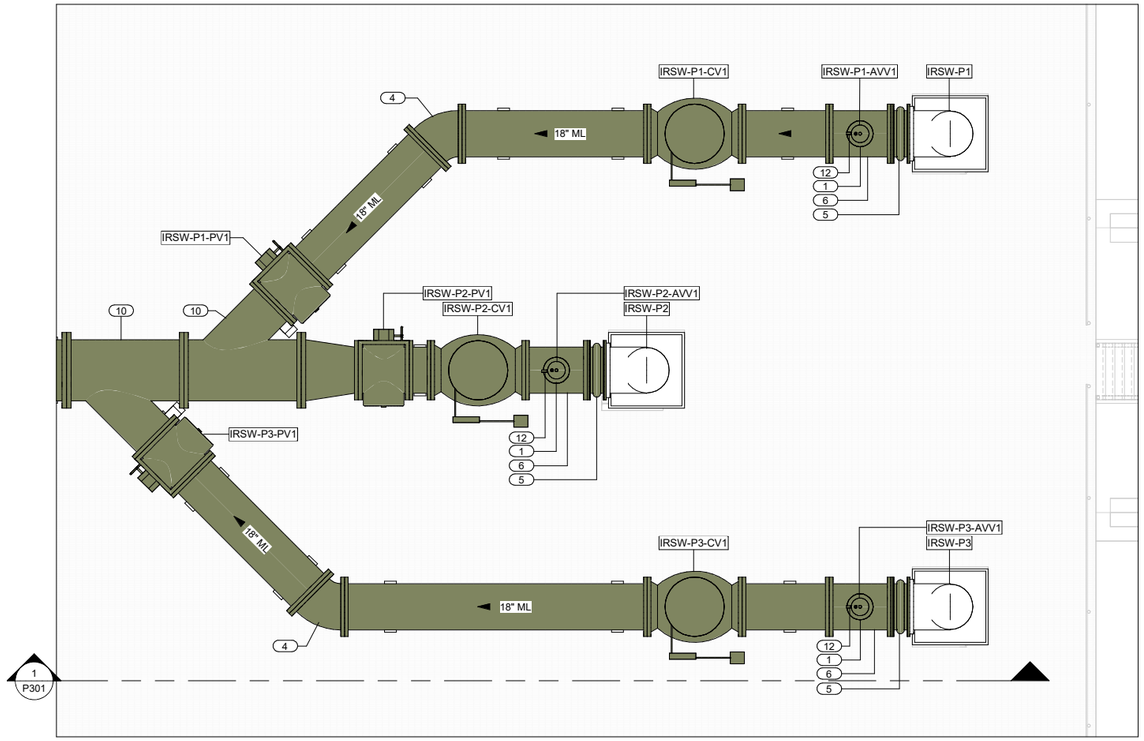
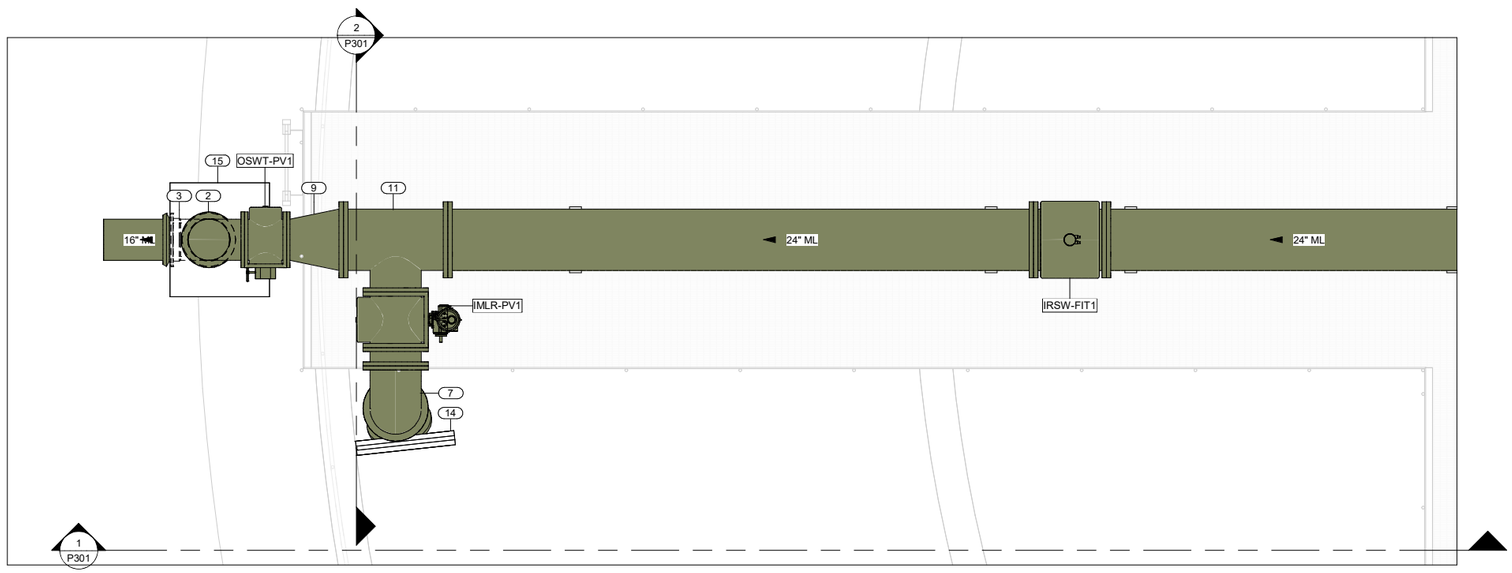
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt



1 P103 MAIN LEVEL - ENLARGED PLAN - TRANSFER PUMPS

12" 0 1' 2' 3' 4' 5' 6' 7'

NORTH



2 P103 MAIN LEVEL - ENLARGED PLAN - PUMP DISCHARGE

12" 0 1' 2' 3' 4' 5' 6' 7'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

#	PROCESS IMPROVEMENTS
1	6" x 2" DI COMPANION FLANGE
2	16" FL DI 90° BEND
3	16" MJ DI 90° BEND
4	18" FL DI 45° BEND
5	18" FL RUBBER EXPANSION JOINT
6	18" X 6" FL DI TEE
7	20" FL DI 90° BEND
9	24" x 16" FL DI CONCENTRIC REDUCER
10	24" x 18" FL DI LATERAL WYE
11	24" X 20" FL DI TEE
12	FLUID PRESSURE GAUGE – SEE PROCESS STANDARD DETAILS
14	PIPE / VALVE SUPPORT FROM WALL - SEE PROCESS STANDARD DETAILS
15	THRUST BLOCK

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
MAIN LEVEL - ENLARGED PLANS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JBB
APPROVED BY:	KCB

PROJECT NO: 13139-2023-002	SHEET DESIGNATOR:	SHEET NO:
DATE: APRIL 2026	**OXD**	**P103**
ALT PROJECT NO: 00000-0000		

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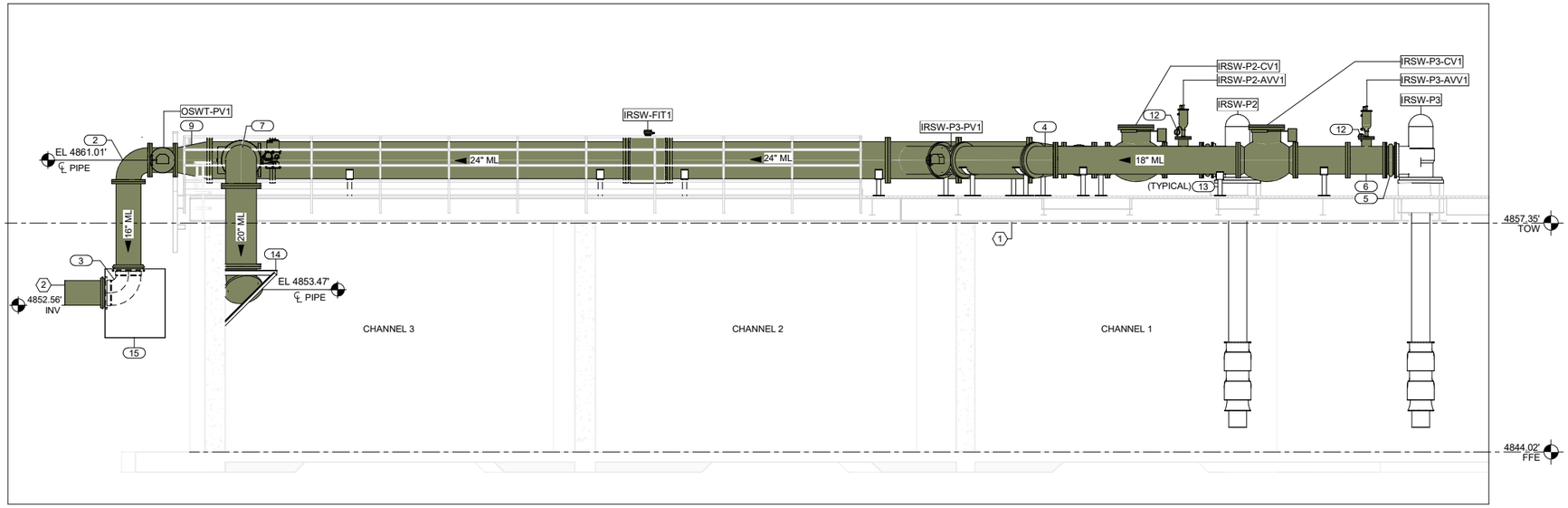
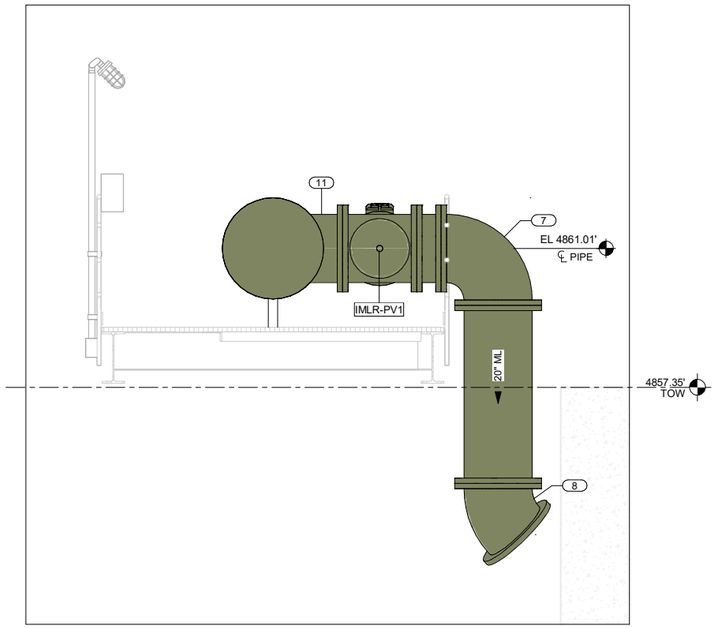
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt



1 P301 **SECTION - TRANSFER PUMPS - LOOKING NORTH**

12" 0 2' 4' 6' 8' 10'



2 P301 **SECTION - TRANSFER PUMPS - LOOKING EAST**

12" 0 1' 2' 3' 4' 5'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROCESS IMPROVEMENTS

#	
2	16" FL DI 90° BEND
3	16" MJ DI 90° BEND
4	18" FL DI 45° BEND
5	18" FL RUBBER EXPANSION JOINT
6	18" X 6" FL DI TEE
7	20" FL DI 90° BEND
8	20" FL DI 45° BEND
9	24" x 16" FL DI CONCENTRIC REDUCER
11	24" X 20" FL DI TEE
12	FLUID PRESSURE GAUGE – SEE PROCESS STANDARD DETAILS
13	ADJUSTABLE PIPE SUPPORT – TYPE 2 – SEE PROCESS STANDARD DETAILS
14	PIPE / VALVE SUPPORT FROM WALL - SEE PROCESS STANDARD DETAILS
15	THRUST BLOCK

CONSTRUCTION NOTES

1 PROVIDE PIPE SUPPORTS PER SECTION 40 27 05. PIPE SUPPORTS SHOWN ARE NOT COMPREHENSIVE AS PIPE SUPPORT DESIGN AND SUPPLY IS THE RESPONSIBILITY OF CONTRACTOR. THE BEAMS FOR THE PUMP PLATFORM MAY BE EXTENDED TO SUPPORT PROCESS PIPING IF NEEDED.

2 SEE CIVIL DRAWINGS FOR CONTINUATION OF YARD PIPING. SEE JOINT RESTRAINT DETAIL - PROCESS STANDARD DETAILS FOR BURIED 90° BEND.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
SECTIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JCC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OXD**

SHEET NO: **P301**

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Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt

#	MASTER PROCESS IMPROVEMENTS
1	6" x 2" DI COMPANION FLANGE
2	16" FL DI 90° BEND
3	16" MJ DI 90° BEND
4	18" FL DI 45° BEND
5	18" FL RUBBER EXPANSION JOINT
6	18" X 6" FL DI TEE
7	20" FL DI 90° BEND
8	20" FL DI 45° BEND
9	24" x 16" FL DI CONCENTRIC REDUCER
10	24" x 18" FL DI LATERAL WYE
11	24" X 20" FL DI TEE
12	FLUID PRESSURE GAUGE – SEE PROCESS STANDARD DETAILS
13	ADJUSTABLE PIPE SUPPORT – TYPE 2 – SEE PROCESS STANDARD DETAILS
14	PIPE / VALVE SUPPORT FROM WALL - SEE PROCESS STANDARD DETAILS
15	THRUST BLOCK

INSTRUMENT SCHEDULE

TAG #	DESCRIPTION	TYPE	SPECIFICATION	FURNISHED BY	REMARKS
IRSW-FIT1	IMLR + OSW TRANSFER FLOW METER	MAGNETIC FLOW METER	40 71 00	CONTRACTOR	

EQUIPMENT SCHEDULE

TAG #	DESCRIPTION	TYPE	SPECIFICATION	FURNISHED BY	REMARKS
IRSW-P1	OXIDATION DITCH EFFLUENT TRANSFER PUMP No. 1	VERTICAL TURBINE PUMP	43 23 31	CONTRACTOR	
IRSW-P2	OXIDATION DITCH EFFLUENT TRANSFER PUMP No. 2	VERTICAL TURBINE PUMP	43 23 31	CONTRACTOR	
IRSW-P3	OXIDATION DITCH EFFLUENT TRANSFER PUMP No. 3	VERTICAL TURBINE PUMP	43 23 31	CONTRACTOR	

VALVE SCHEDULE

TAG #	DESCRIPTION	VALVE SIZE	CONNECTION	TYPE	SPECIFICATION	OPERATOR	FURNISHED BY	REMARKS
IMLR-PV1	COMBINED EFFLUENT DISCHARGE MODULATING VALVE	20"	FLANGED	PLUG VALVE	40 27 20	ELECTRIC	CONTRACTOR	MODULATING
IRSW-P1-AVV1	EFFLUENT TRANSFER PUMP No. 1 AIR VACUUM VALVE	2"	THREADED	SEWAGE AIR RELEASE VALVE	40 27 20	N/A	CONTRACTOR	SEWAGE AIR / VACUUM RELEASE VALVE – SEE PROCESS STANDARD DETAILS
IRSW-P1-CV1	EFFLUENT TRANSFER PUMP No. 1 CHECK VALVE	18"	FLANGED	SWING CHECK VALVE	40 27 20	N/A	CONTRACTOR	
IRSW-P1-PV1	EFFLUENT TRANSFER PUMP No. 1 ISOLATION VALVE	18"	FLANGED	PLUG VALVE	40 27 20	HANDWHEEL	CONTRACTOR	
IRSW-P2-AVV1	EFFLUENT TRANSFER PUMP No. 2 AIR VACUUM VALVE	2"	THREADED	SEWAGE AIR RELEASE VALVE	40 27 20	N/A	CONTRACTOR	SEWAGE AIR / VACUUM RELEASE VALVE – SEE PROCESS STANDARD DETAILS
IRSW-P2-CV1	EFFLUENT TRANSFER PUMP No. 2 CHECK VALVE	18"	FLANGED	SWING CHECK VALVE	40 27 20	N/A	CONTRACTOR	
IRSW-P2-PV1	EFFLUENT TRANSFER PUMP No. 2 ISOLATION VALVE	18"	FLANGED	PLUG VALVE	40 27 20	HANDWHEEL	CONTRACTOR	
IRSW-P3-AVV1	EFFLUENT TRANSFER PUMP No. 3 AIR VACUUM VALVE	2"	THREADED	SEWAGE AIR RELEASE VALVE	40 27 20	N/A	CONTRACTOR	SEWAGE AIR / VACUUM RELEASE VALVE – SEE PROCESS STANDARD DETAILS
IRSW-P3-CV1	EFFLUENT TRANSFER PUMP No. 3 CHECK VALVE	18"	FLANGED	SWING CHECK VALVE	40 27 20	N/A	CONTRACTOR	
IRSW-P3-PV1	EFFLUENT TRANSFER PUMP No. 3 ISOLATION VALVE	18"	FLANGED	PLUG VALVE	40 27 20	HANDWHEEL	CONTRACTOR	
OSWT-PV1	COMBINED EFFLUENT DISCHARGE ISOLATION VALVE	16"	FLANGED	PLUG VALVE	40 27 20	ELECTRIC	CONTRACTOR	OPEN/CLOSE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS SCHEDULES

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OXD**

SHEET NO: **P601**

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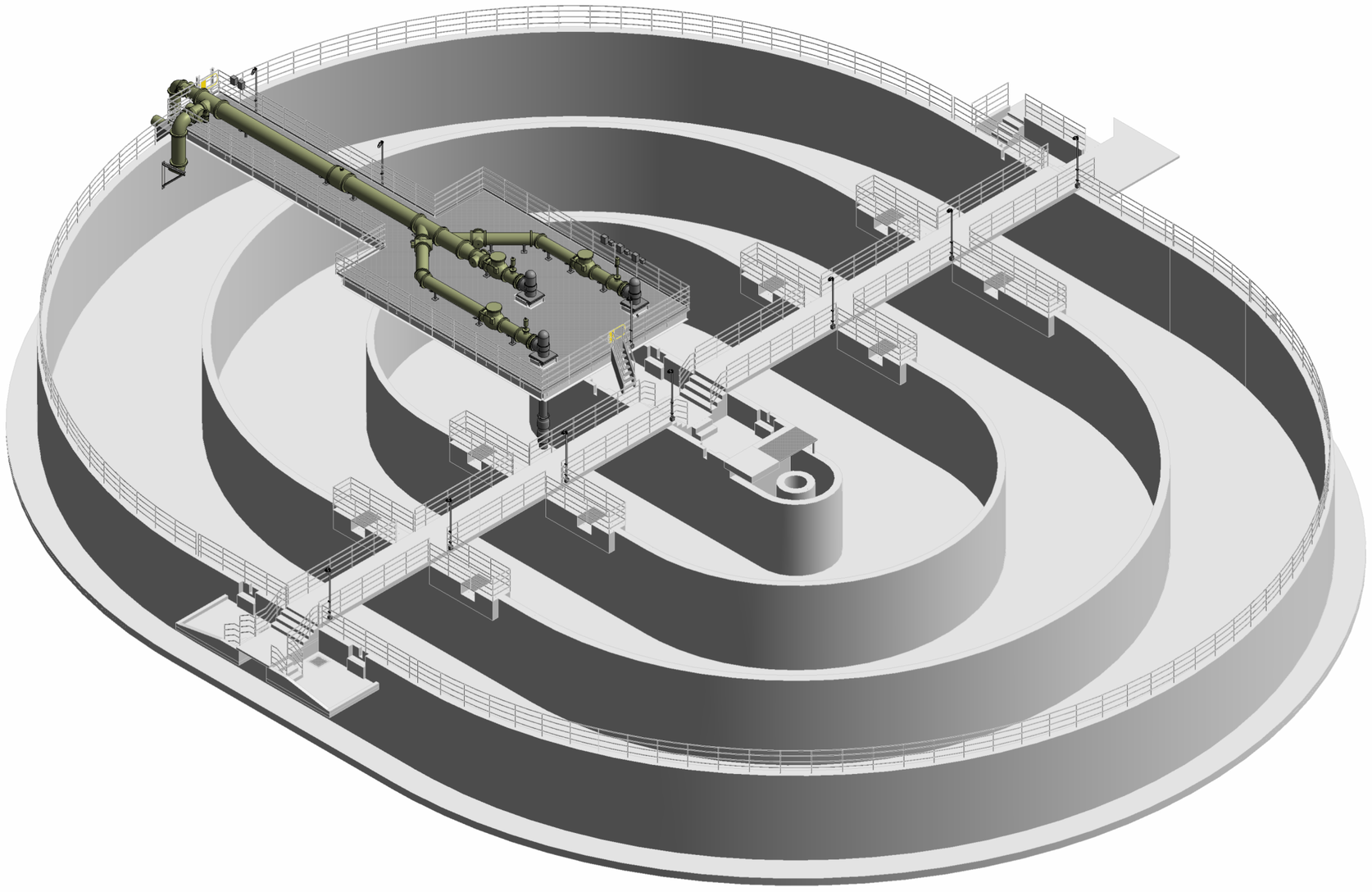
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OXD_P_V28.rvt



1 P901 **3D - ISO VIEW**
NO SCALE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
ISO VIEW

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JCC
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002	SHEET DESIGNATOR:	SHEET NO:
DATE: APRIL 2026	OXD	P901
ALT PROJECT NO: 00000-0000		

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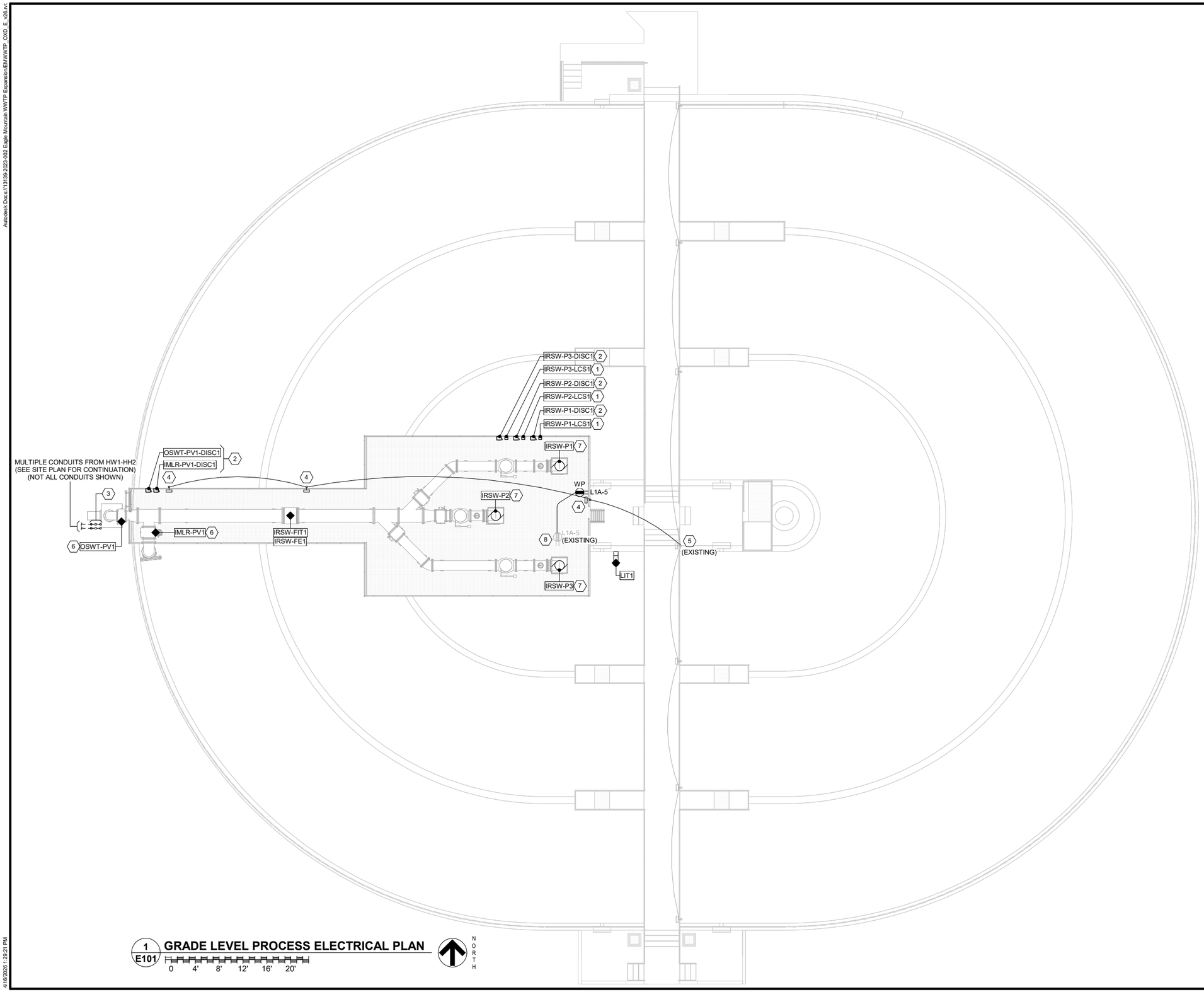

1 E101 **GRADE LEVEL PROCESS ELECTRICAL PLAN**

0 4' 8' 12' 16' 20'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).
2. REFER TO THE INSTRUMENTATION SCHEDULE FOR DETAILS REGARDING ALL INSTRUMENTATION.

CONSTRUCTION NOTES

1. CONTROL STATION / JUNCTION BOX (40 63 14) MOUNTED ON RAILING OR STRUT STAND AS SHOWN. CONTROL STATION / JUNCTION BOX MAY BE USED AS A MEANS TO COMBINE OR 'MARSHALL' WIRING BACK TO THE CONTROL PANELS AND/OR VFDS AS INDICATED IN THE CABLE AND CONDUIT SCHEDULE. SEE ONE-LINE DIAGRAMS, AND P&IDS FOR ADDITIONAL DETAILS.
2. LOCAL DISCONNECT SWITCH FOR PROCESS EQUIPMENT. SEE ONE-LINE DIAGRAMS AND VFD SCHEMATICS AS APPLICABLE FOR WIRING DETAILS.
3. TRANSITION FROM BELOW GRADE CONDUITS. CONDUITS SHALL BE CONTINUOUS IF ROUTED THROUGH RATED SPACE ENVELOPE.
4. PROVIDE NEW LED STANCHION MOUNTED LUMINAIRE FOR MOUNTING ON 1-1/2" CONDUIT, CLOSED GLASS REFRACTOR, WITH WIRE GUARD MATCHING EXISTING LIGHTING CIRCUIT VOLTAGE, FIXTURE STYLE AND COLOR. MOUNT 8' ABOVE WALKWAY. MODEL RAB HAZSLED42C-G/D10 OR EQUAL. SEE MOUNTING DETAIL ON E801.
5. INTERCEPT AND EXTEND EXISTING LIGHTING CIRCUIT TO NEW LIGHTS SHOWN WITH 3-1/C-#10-3/4".
6. ELECTRICALLY ACTUATED VALVE SHALL BE PROVIDED BY THE CONTRACTOR. REFER TO PROCESS DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. PUMP AND MOTOR SHALL BE PROVIDED BY THE CONTRACTOR. REFER TO PROCESS DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
8. DEMOLISH EXISTING RECEPTACLE AND REPLACE WITH NEW HANDBOX. INTERCEPT AND EXTEND REMAINING CIRCUIT TO NEW RECEPTACLE SHOWN WITH 3-1/C-# 10-3/4".

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
GRADE LEVEL PROCESS ELECTRICAL PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: N/A

SHEET DESIGNATOR: **OXD**

SHEET NO: **E101**

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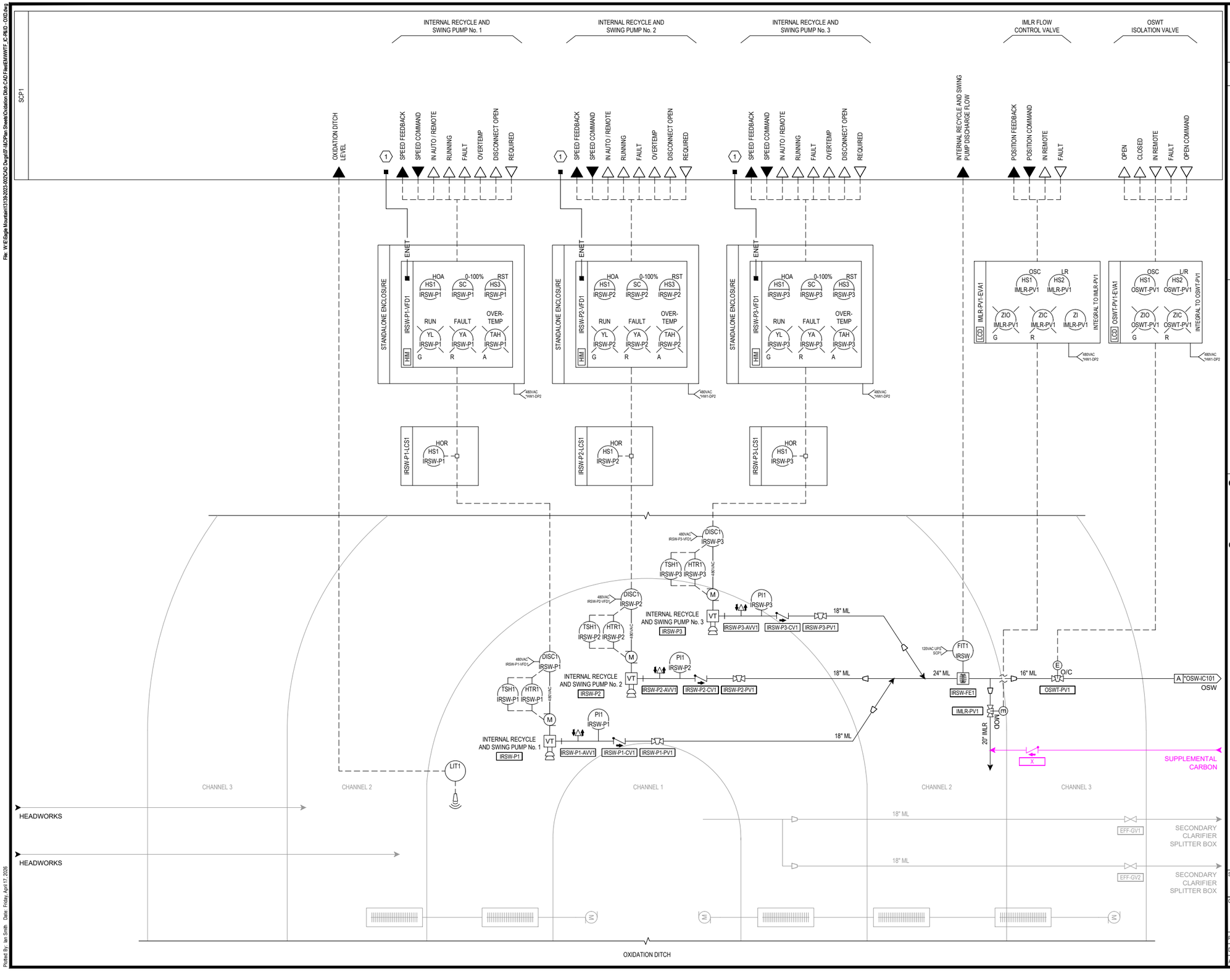


Plotted By: Ian Smith Date: Friday, April 17, 2026

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "OXD-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

CONSTRUCTION NOTES

(1) ADDITIONAL DATA SHALL BE COMMUNICATED BETWEEN EQUIPMENT AND THE SCADA CONTROL SYSTEM OVER THE ETHERNET NETWORK VIA THE MODBUS TCP/IP PROTOCOL.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
P&ID - OXIDATION DITCH - IMLR PUMP

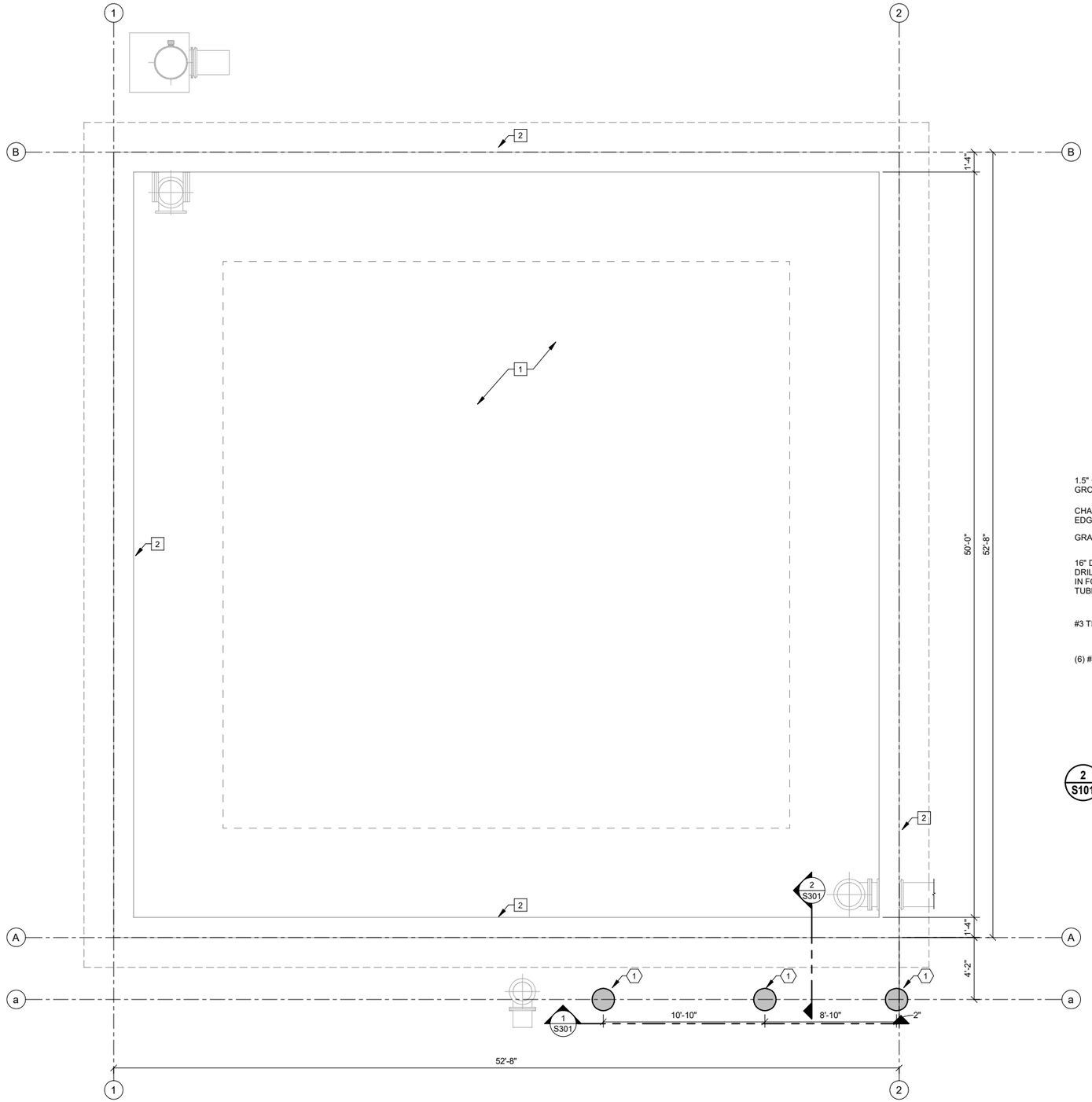
CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TRK
CHECKED BY: JC
APPROVED BY: KCS / CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

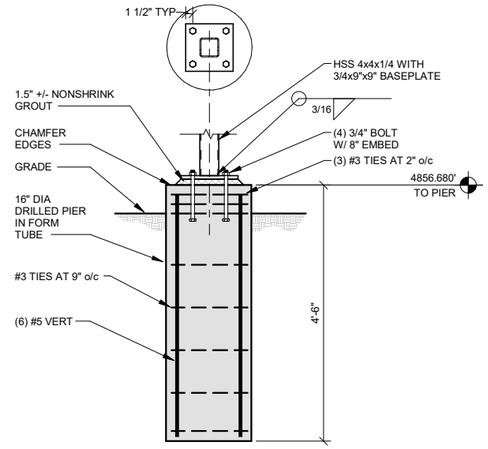
SHEET DESIGNATOR: **OXD**
SHEET NO: **IC101**

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_S_v26.rvt



1 **FOUNDATION PLAN** (S101)
12" 0 2' 4' 6' 8' 10'

NORTH



2 **TYPICAL PIER DETAIL** (S101)
12" 6" 0 1' 2' 3'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PLAN NOTES

1. PLATFORM FRAMING AND CONNECTIONS TO BE COATED PER SPEC 09 90 02
2. CONTRACTOR TO VERIFY FRAMING LAYOUT WITH PROCESS EQUIPMENT.

 # EXISTING NOTES

1. CONCRETE MAT SLAB
2. CONCRETE WALL

⬡ CONSTRUCTION NOTES

1. 18' DIAMETER DRILLED PIER SEE DETAIL 2 / S101

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **FOUNDATION PLAN**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT PROJECT NO:

SHEET DESIGNATOR: **OSW**

SHEET NO: **S101**

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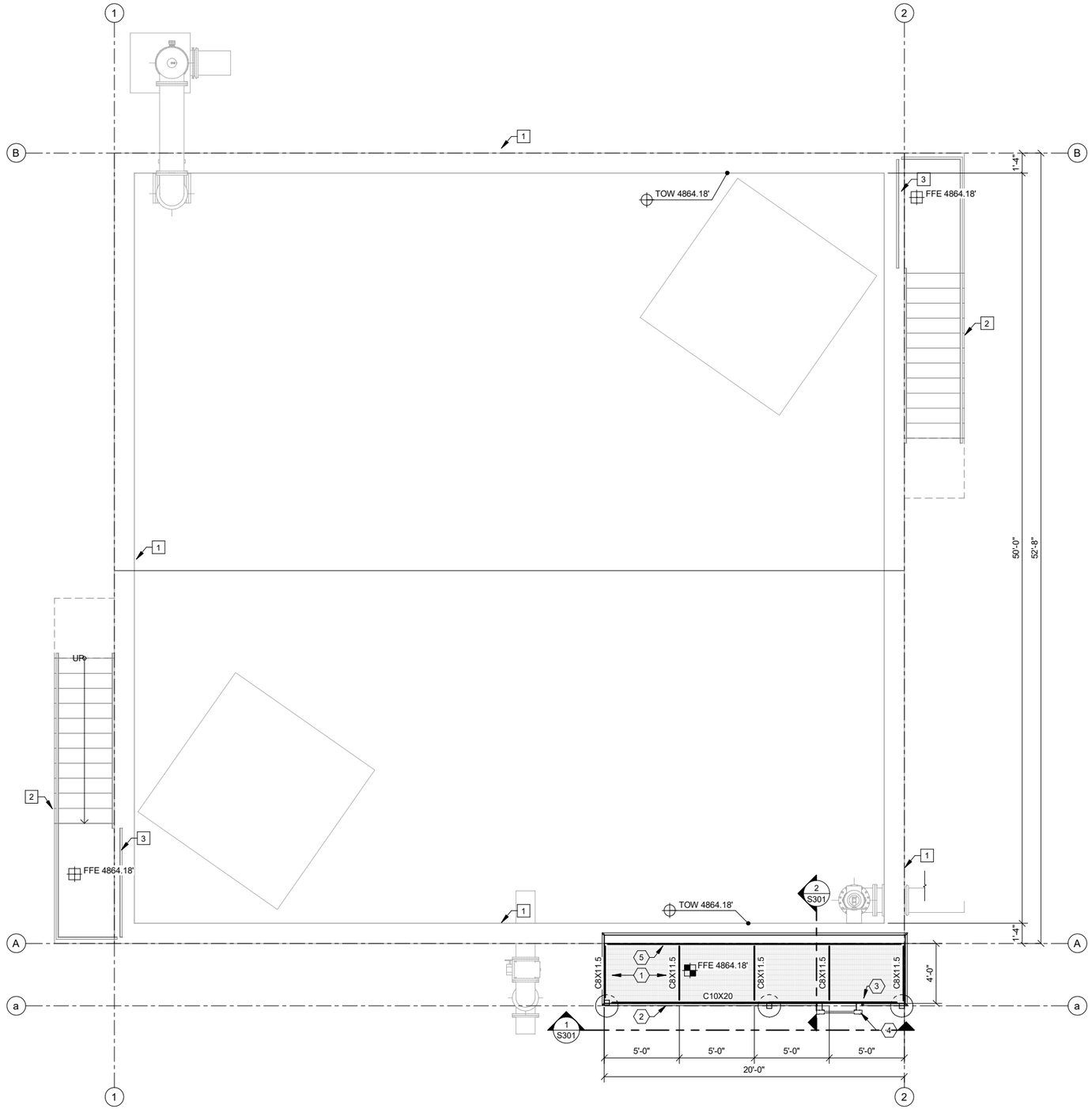
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_S_v26.rvt



1 S102 **OPERATIONS LEVEL PLAN**

12" 0 2' 4' 6' 8' 10'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PLAN NOTES

1. PLATFORM FRAMING AND CONNECTIONS TO BE GALVANIZED STEEL
2. TOS = 4864.01' -UNLESS NOTED OTHERWISE
3. CONTRACTOR TO VERIFY FRAMING LAYOUT WITH PROCESS EQUIPMENT.

[#] EXISTING NOTES

1. CONCRETE WALL
2. METAL STAIR AND LANDING
3. GUARD RAIL

(#) CONSTRUCTION NOTES

1. 1-1/2" DEEP X 3/16 BEARING BARS 19W4 GALVANIZED GRATING WITH SERRATE GRATING SURFACE
2. ALUMINUM (4) RAIL GUARDRAIL WITH KICK PLATE- MATCH EXISTING- PROVIDE ISOLATION MATERIAL BETWEEN ALUMINUM AND STEEL.
3. FRP SELF CLOSING GATE
4. FIXED STEEL LADDER WITH WALK TROUGH HANDRAILS
5. C8x11.5 FASTENED TO EXISTING CONCRETE WALL WITH 1/2" TITEN HD WITH 4" MIN EMBED FASTEN AT 48" o/c TOP AND BOTTOM- 1/2 SPACING BETWEEN TOP AND BOTTOM

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
OPERATION LEVEL PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	HES
CHECKED BY:	JAP
APPROVED BY:	KDE

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT PROJECT NO:

SHEET DESIGNATOR: **OSW**

SHEET NO: **S102**

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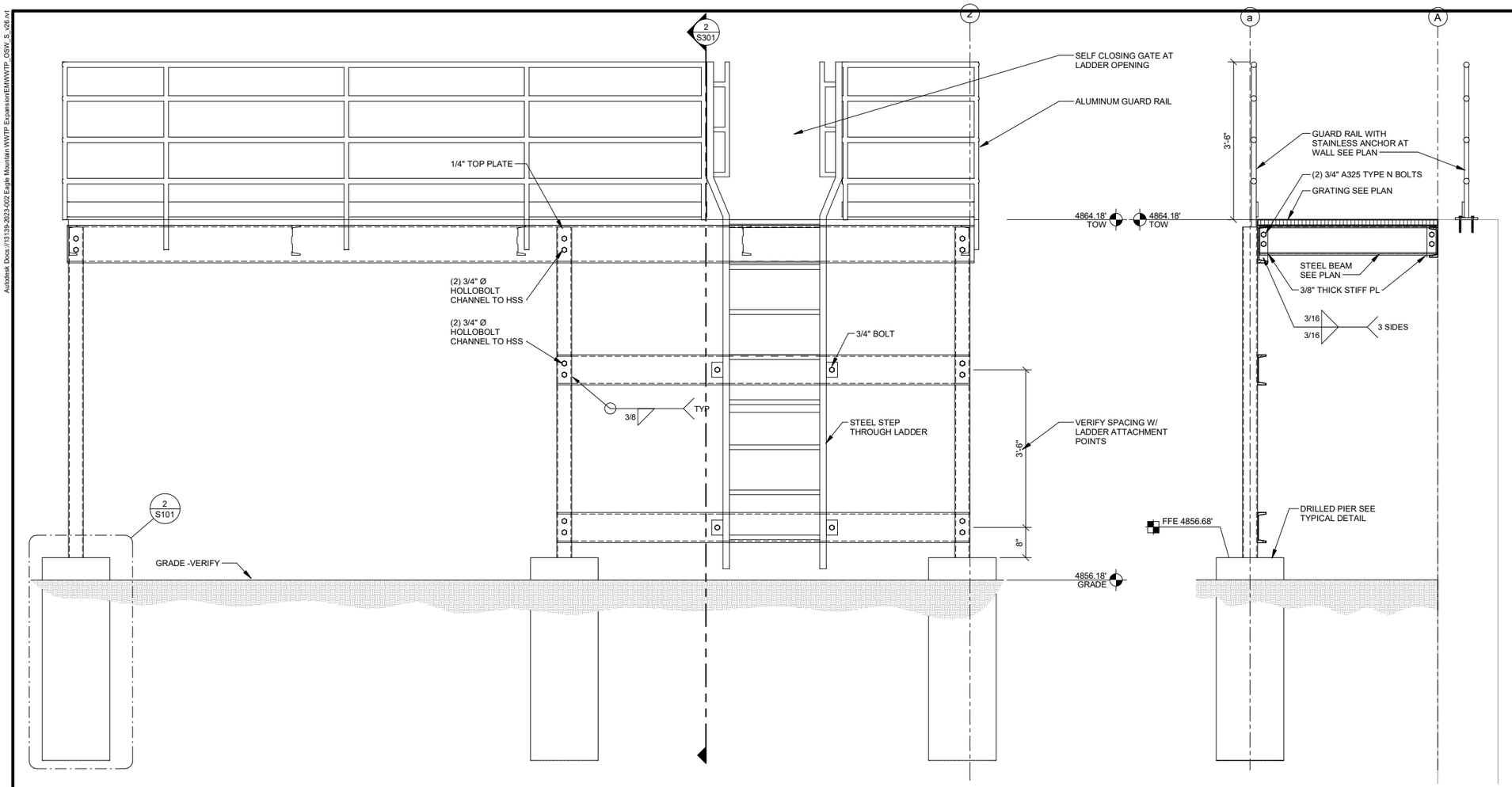

1 S301 **PLATFORM ELEVATION**

12" 6" 0 1' 2' 3'

2 S301 **PLATFORM SECTION**

12" 6" 0 1' 2' 3'

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 11338224-2202
KIRK D EHLKE
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
SECTIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: HES
CHECKED BY: JAP
APPROVED BY: KDE

PROJECT NO: 13139-2023-002
DATE: NOVEMBER 2025
ALT PROJECT NO:

SHEET DESIGNATOR: **OSW**

SHEET NO: **S301**

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_S_v26.rvt
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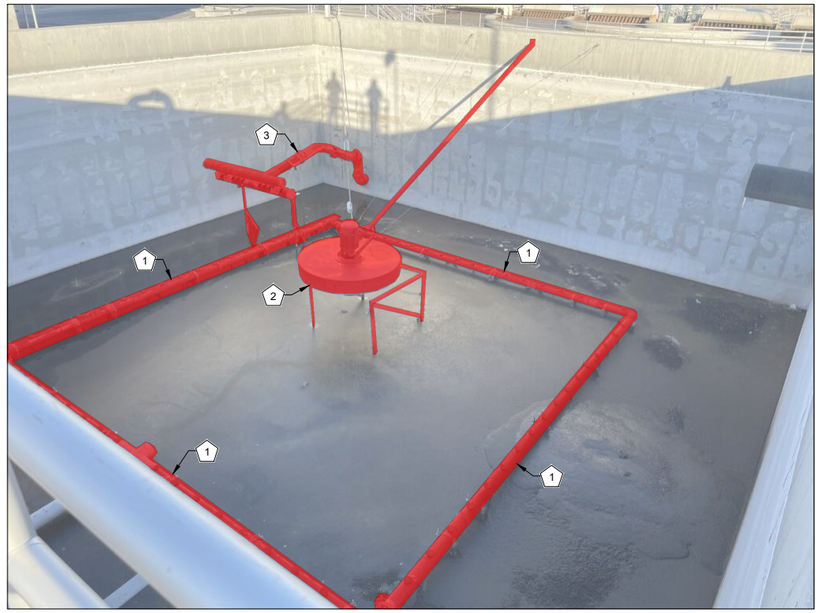
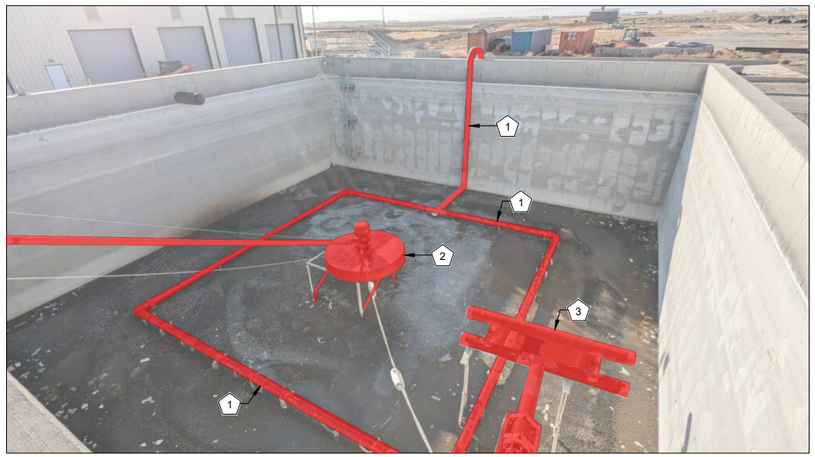


1 P100 **DEMOLITION - PROCESS**
NO SCALE



2 P100 **DEMOLITION - PROCESS**
NO SCALE

DEMOLITION NOTES

1. REMOVE AND DISPOSE BUBBLE DIFFUSER PIPING, NOZZLES, AND APPURTENANCES.
2. REMOVE AND DISPOSE SURFACE MIXER, SUPPORT STAND, AND APPURTENANCES.
3. REMOVE AND DISPOSE DECANT PIPING.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS	SYM	DATE	APPR
ISSUED FOR GMP (NOT FOR CONSTRUCTION)			

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS DEMOLITION - OSW

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **OSW**
SHEET NO: **P100**

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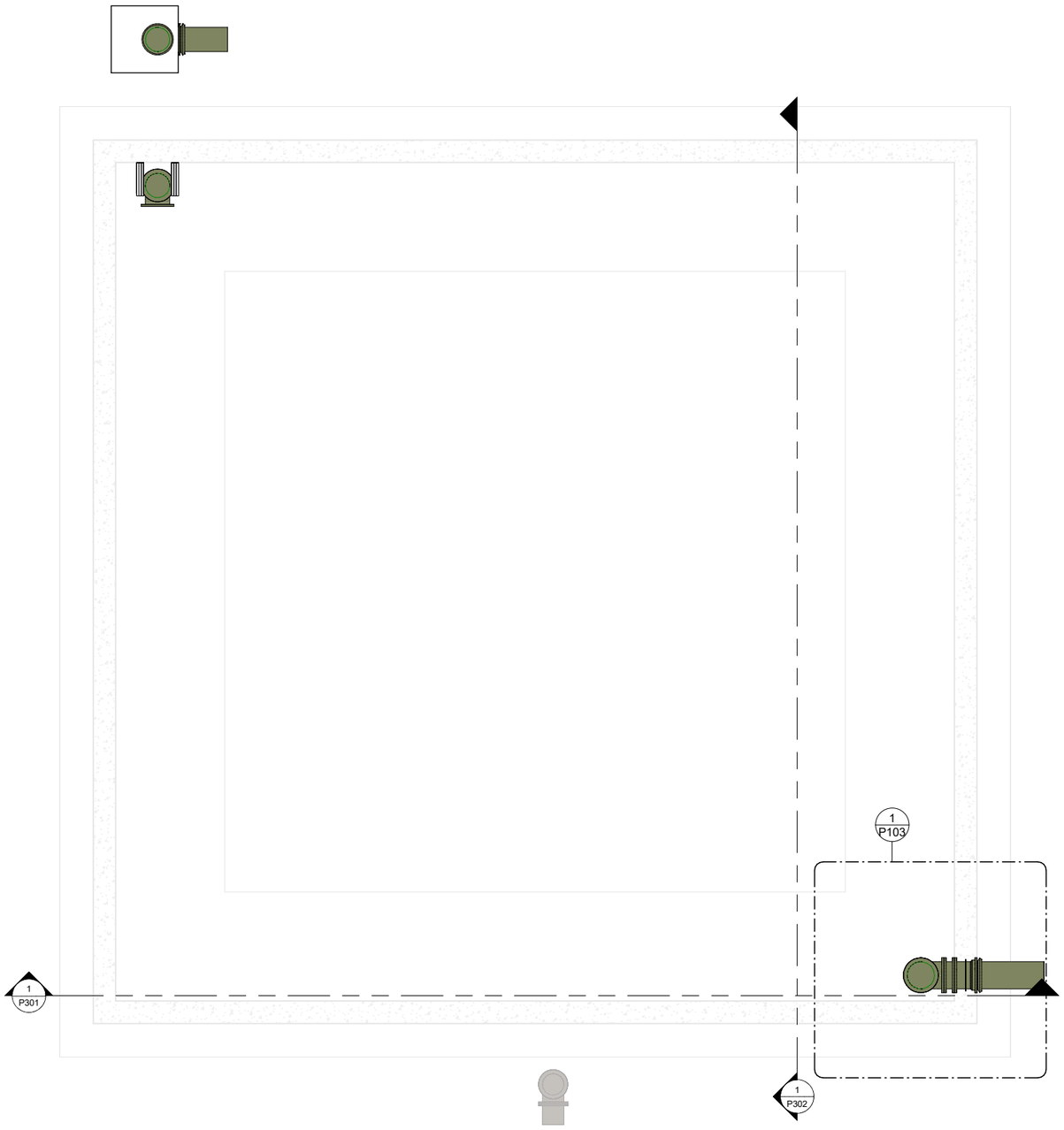
Plotted By: Grant Lindahl Date: Friday, April 17, 2026

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v26.rvt



1 P101 **SUBGRADE LEVEL - OVERALL PLAN**

12" 0 2' 4' 6' 8' 10'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
SUBGRADE LEVEL - OVERALL PLAN

CLIENT:
CITY OF EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JCC
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**

SHEET NO: **P101**

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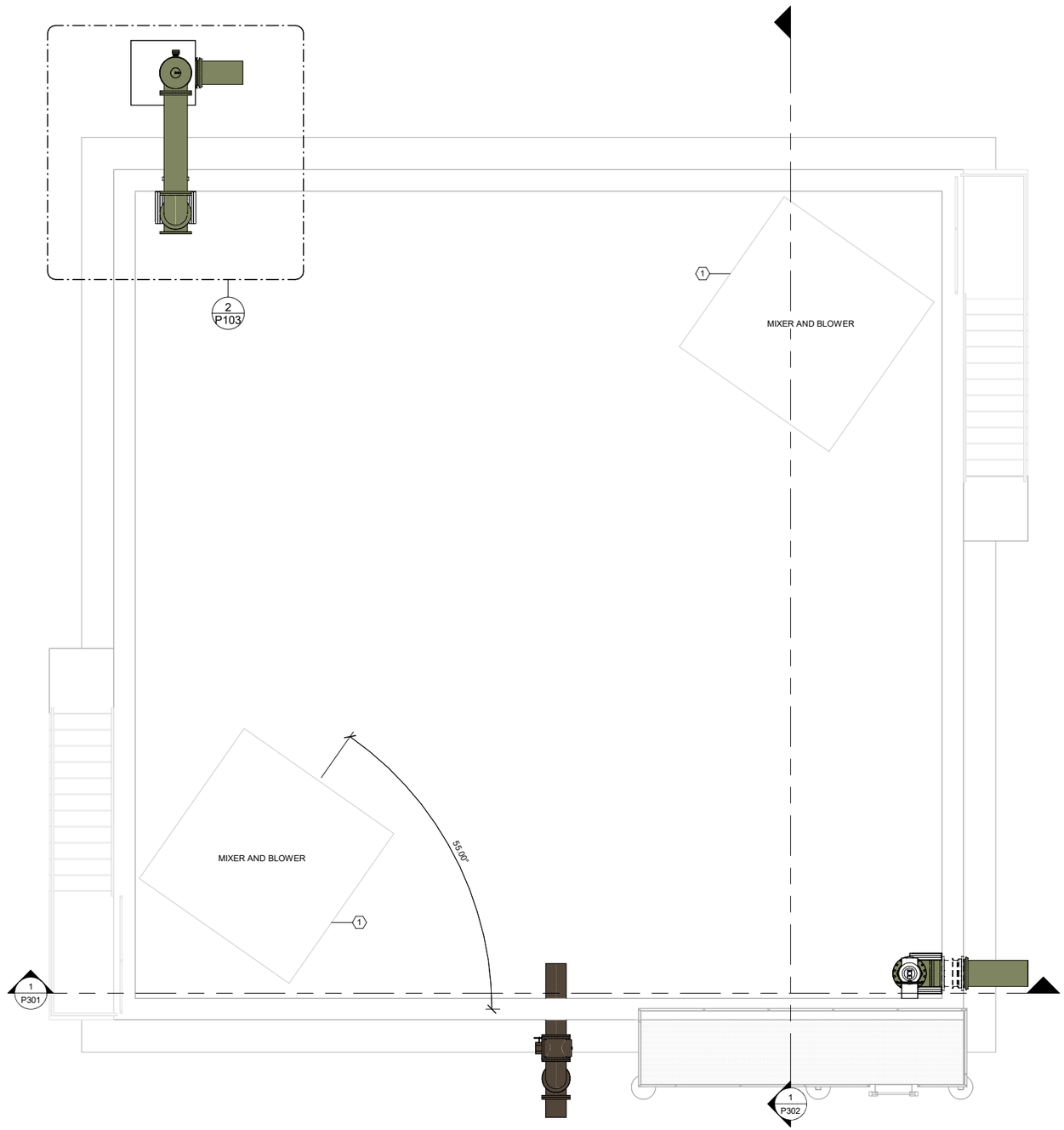
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v26.rvt



1 P102 **MAIN LEVEL - OVERALL PLAN**

12" 0 2' 4' 6' 8' 10'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).
2. ALL SUBMERGED OR IMMERSED PIPING, FITTINGS, PIPE SUPPORT SYSTEMS, AND APPURTENANCES BELOW THE TOP OF WALL ELEVATION BASINS WILL BE 316 SS OR COATED PER SECTION 09 90 02.

CONSTRUCTION NOTES

1 MIXER AND BLOWER EQUIPMENT IS EXISTING AND ONSITE. INSTALLATION WITH ANCHORAGE AND CABLES FOR SECURING EQUIPMENT BY CONTRACTOR PER MANUFACTURER RECOMMENDATIONS.

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **MAIN LEVEL - OVERALL PLAN**

CLIENT: **CITY OF EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JCC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**

SHEET NO: **P102**

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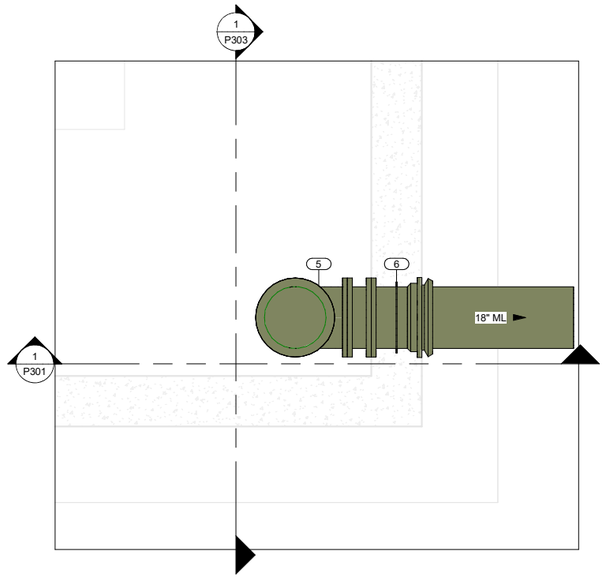
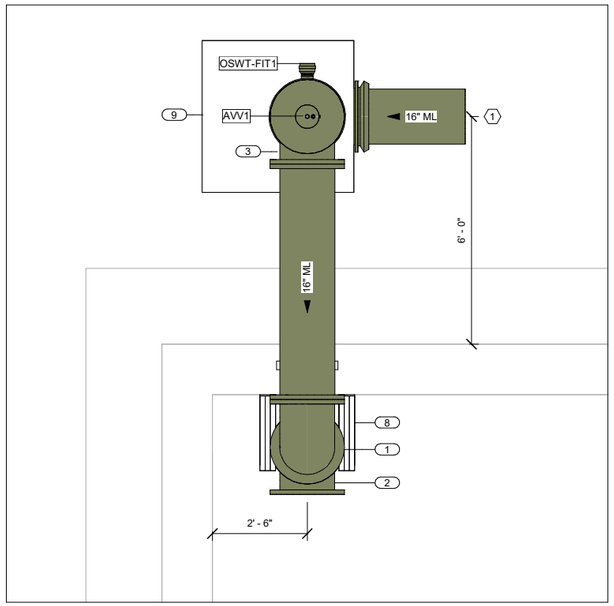
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v28.rvt



1 P103 **SUBGRADE LEVEL - ENLARGED PLAN - EFFLUENT PIPE**

12" 0 1' 2' 3' 4' 5'

NORTH



2 P103 **MAIN LEVEL - ENLARGED PLAN - INFLUENT PIPE**

12" 0 1' 2' 3' 4' 5'

NORTH

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

(#) PROCESS IMPROVEMENTS

1	16" FL DI 90° BEND
2	16" FL DI BASE BEND
3	16" FL DI TEE
5	18" FL DI 90° BEND
6	FL x MJ WALL PIPE - TYPE 1 - SEE PROCESS STANDARD DETAILS
8	VERTICAL PIPE SUPPORT - SEE PROCESS STANDARD DETAILS
9	JOINT RESTRAINT - SEE PROCESS STANDARD DETAILS

(#) CONSTRUCTION NOTES

1	SEE CIVIL FOR CONTINUATION OF YARD PIPING.

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

MAIN LEVEL - ENLARGED PLANS

CLIENT:
CITY OF EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**

SHEET NO: **P103**

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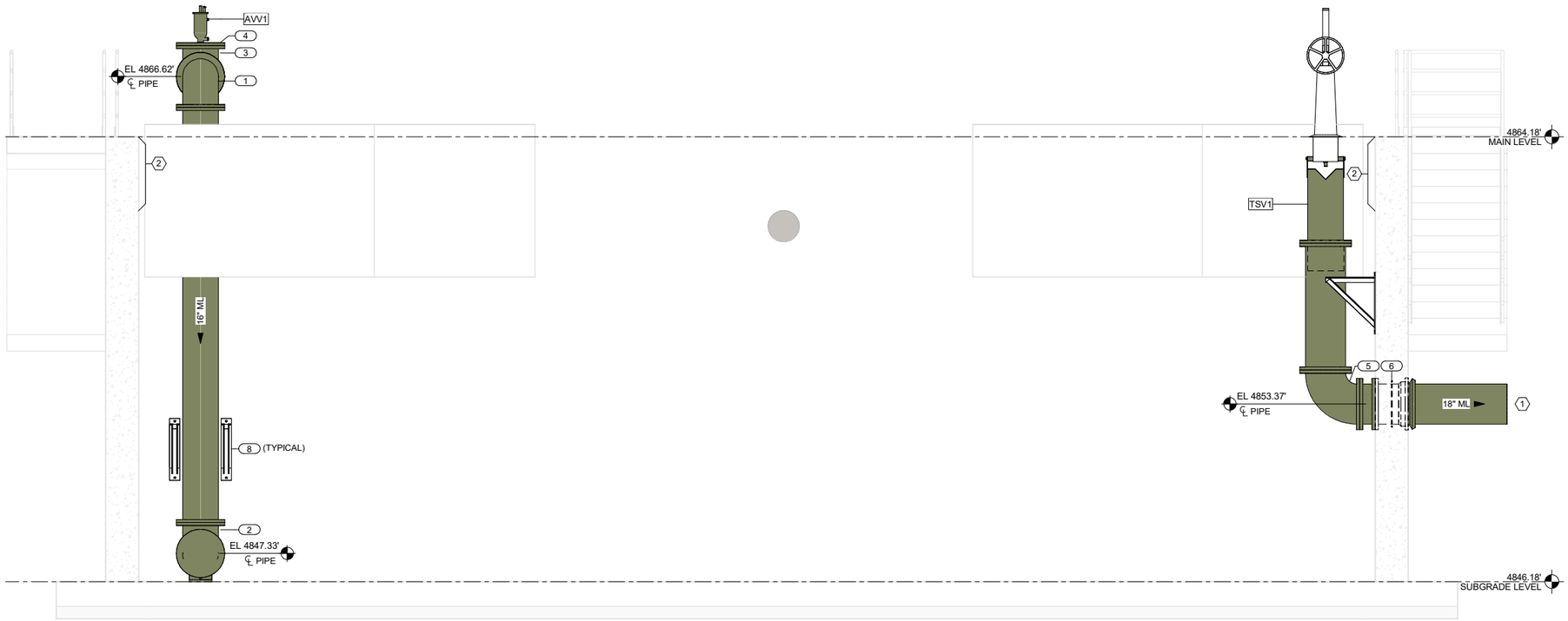
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v26.rvt



1 P301 **SECTION - LOOKING NORTH**

12" 0 1' 2' 3' 4' 5' 6' 7'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROCESS IMPROVEMENTS

#	
1	16" FL DI 90° BEND
2	16" FL DI BASE BEND
3	16" FL DI TEE
4	16" x 2" DI COMPANION FLANGE
5	18" FL DI 90° BEND
6	FL x MJ WALL PIPE - TYPE 1 - SEE PROCESS STANDARD DETAILS
8	VERTICAL PIPE SUPPORT - SEE PROCESS STANDARD DETAILS

CONSTRUCTION NOTES

#	
1	ELEVATION SHOWN IS BASED ON ASSUMED GRADE ELEVATION OF 4857.06'. FINISHED GRADE ELEVATION TO BE FIELD VERIFIED. TOP OF PIPE ELEVATION TO BE INSTALLED 3' BELOW GRADE. GROUT TO INVERT OF PIPE.
2	COAT CONCRETE BETWEEN TOP OF WALL AND ELEVATION 4861.18'.

REVISIONS

SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **SECTION - LOOKING NORTH**

CLIENT: **CITY OF EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JCC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**
SHEET NO: **P301**

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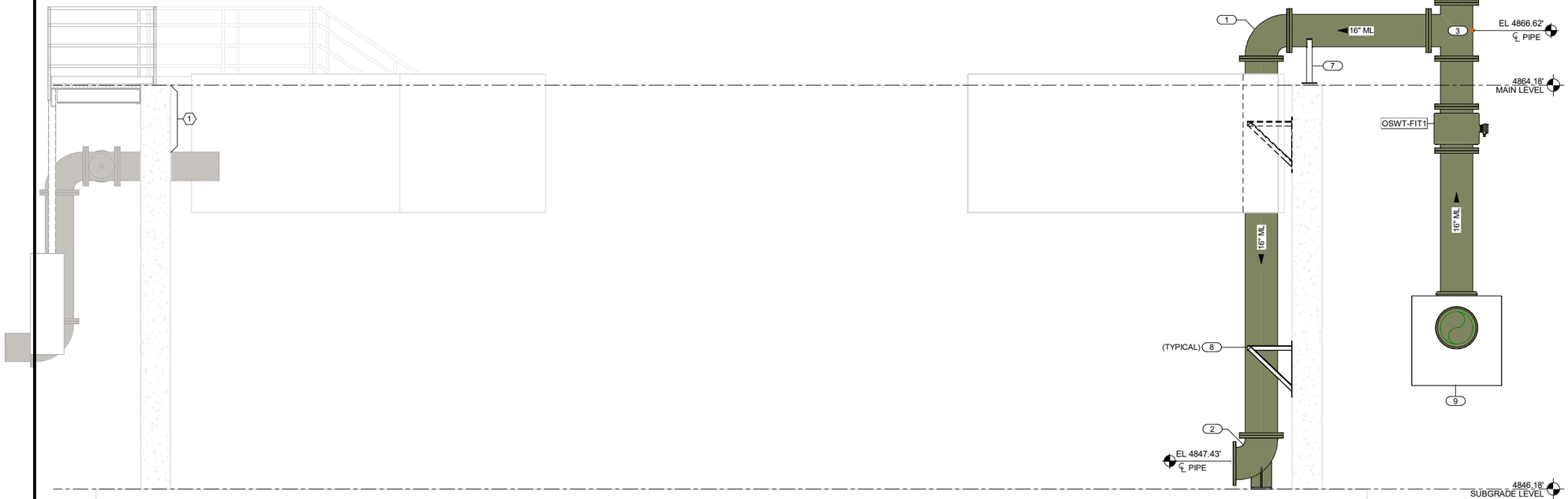
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v28.rvt



1 P302 SECTION - LOOKING WEST

12" 0 1' 2' 3' 4' 5' 6' 7'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS

SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

#	PROCESS IMPROVEMENTS
1	16" FL DI 90° BEND
2	16" FL DI BASE BEND
3	16" FL DI TEE
4	16" x 2" DI COMPANION FLANGE
7	ADJUSTABLE PIPE SUPPORT – TYPE 1 – SEE PROCESS STANDARD DETAILS
8	VERTICAL PIPE SUPPORT - SEE PROCESS STANDARD DETAILS
9	JOINT RESTRAINT - SEE PROCESS STANDARD DETAILS

#	CONSTRUCTION NOTES
1	COAT CONCRETE BETWEEN TOP OF WALL AND ELEVATION 4861.18'.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
SECTION - LOOKING WEST

CLIENT:
CITY OF EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: CA
APPROVED BY: RS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: OSW
SHEET NO: P302

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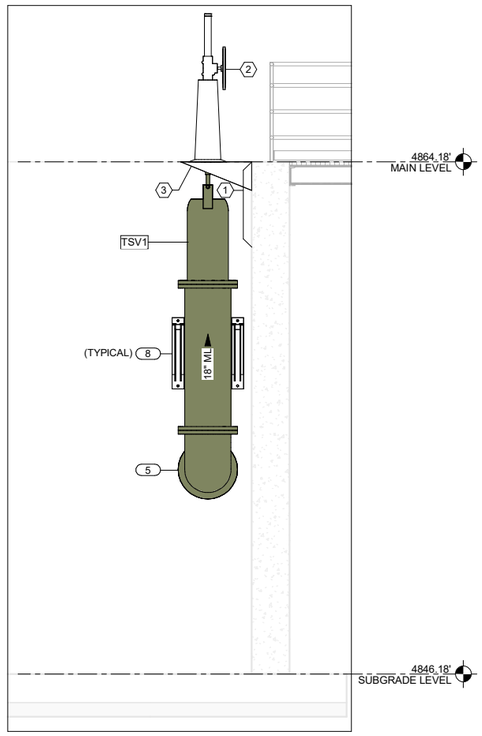
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v26.rvt



1 P303 **SECTION - WEIR BOX - LOOKING EAST**

12" 0 1' 2' 3' 4' 5' 6' 7'

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS

SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

(#) PROCESS IMPROVEMENTS

5 18" FL DI 90° BEND

6 FL x MJ WALL PIPE - TYPE 1 - SEE PROCESS STANDARD DETAILS

8 VERTICAL PIPE SUPPORT - SEE PROCESS STANDARD DETAILS

(#) CONSTRUCTION NOTES

1 COAT CONCRETE BETWEEN TOP OF WALL AND ELEVATION 4861.18'.

2 CONTRACTOR WILL COORDINATE WITH MANUFACTURER TO PROVIDE HANDWHEEL OFFSET TO TELESCOPING VALVE TO PROVIDE ACCESS TO HANDWHEEL INSIDE OF PLATFORM RAILING

3 CONTRACTOR WILL COORDINATE WITH MANUFACTURER TO PROVIDE FLOORSTAND BRACKET TO SUPPORT THE TELESCOPING VALVE.

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

SECTION - WEIR GATE

CLIENT:

CITY OF EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	SAS
CHECKED BY:	JBB
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**

SHEET NO: **P303**

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Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v28.rvt

#	MASTER PROCESS IMPROVEMENTS
1	16" FL DI 90° BEND
2	16" FL DI BASE BEND
3	16" FL DI TEE
4	16" x 2" DI COMPANION FLANGE
5	18" FL DI 90° BEND
6	FL x MJ WALL PIPE - TYPE 1 - SEE PROCESS STANDARD DETAILS
7	ADJUSTABLE PIPE SUPPORT – TYPE 1 – SEE PROCESS STANDARD DETAILS
8	VERTICAL PIPE SUPPORT - SEE PROCESS STANDARD DETAILS
9	JOINT RESTRAINT - SEE PROCESS STANDARD DETAILS

INSTRUMENT SCHEDULE

TAG #	DESCRIPTION	TYPE	SPECIFICATION	FURNISHED BY	REMARKS
OSWT-FIT1	OSW INFLUENT FLOW METER	MAGNETIC FLOW METER	40 71 00	CONTRACTOR	

VALVE SCHEDULE

TAG #	DESCRIPTION	VALVE SIZE	CONNECTION	TYPE	SPECIFICATION	OPERATOR	FURNISHED BY	REMARKS
AVV1	OSW INFLUENT COMBINATION AIR/VACUUM RELEASE VALVE	2"	THREADED	SEWAGE AIR RELEASE VALVE	40 27 20	N/A	CONTRACTOR	SEWAGE AIR / VACUUM RELEASE VALVE – SEE PROCESS STANDARD DETAILS
TSV1	OSW EFFLUENT TELESCOPING VALVE	18"	FLANGED	TELESCOPING VALVE	40 27 20	HANDWHEEL	CONTRACTOR	ACTUATOR EXTENSION AND FLOORSTAND BRACKET AS RECOMMENDED BY MANUFACTURER

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS

SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NAMES TO BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS SCHEDULES

CLIENT:
CITY OF EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**
SHEET NO: **P601**

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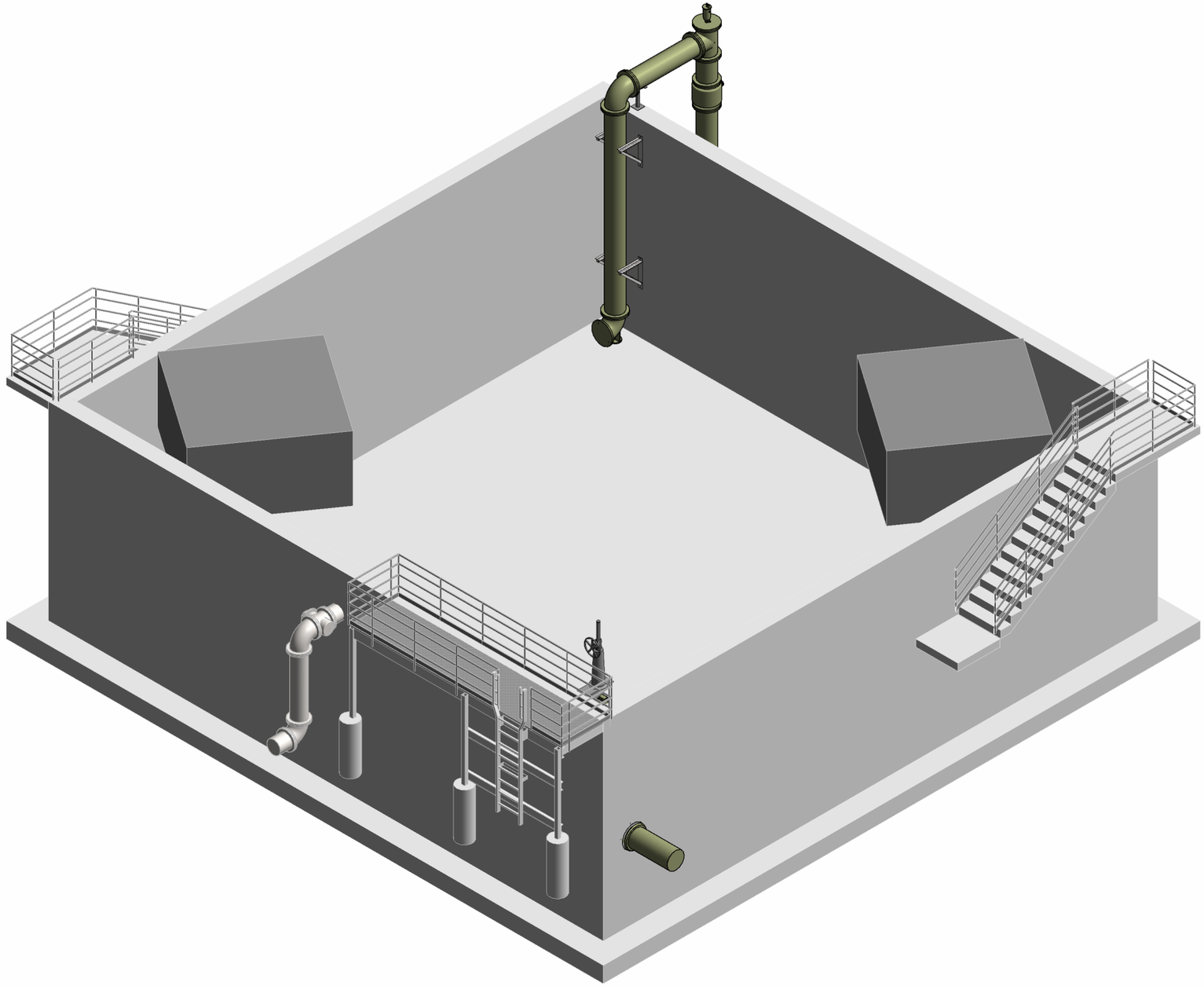
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_P_v28.rvt



1 P901 **3D - ISO VIEW**
NO SCALE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **ISO VIEW**

CLIENT: **CITY OF EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: SAS
CHECKED BY: JCC
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **OSW**

SHEET NO: **P901**

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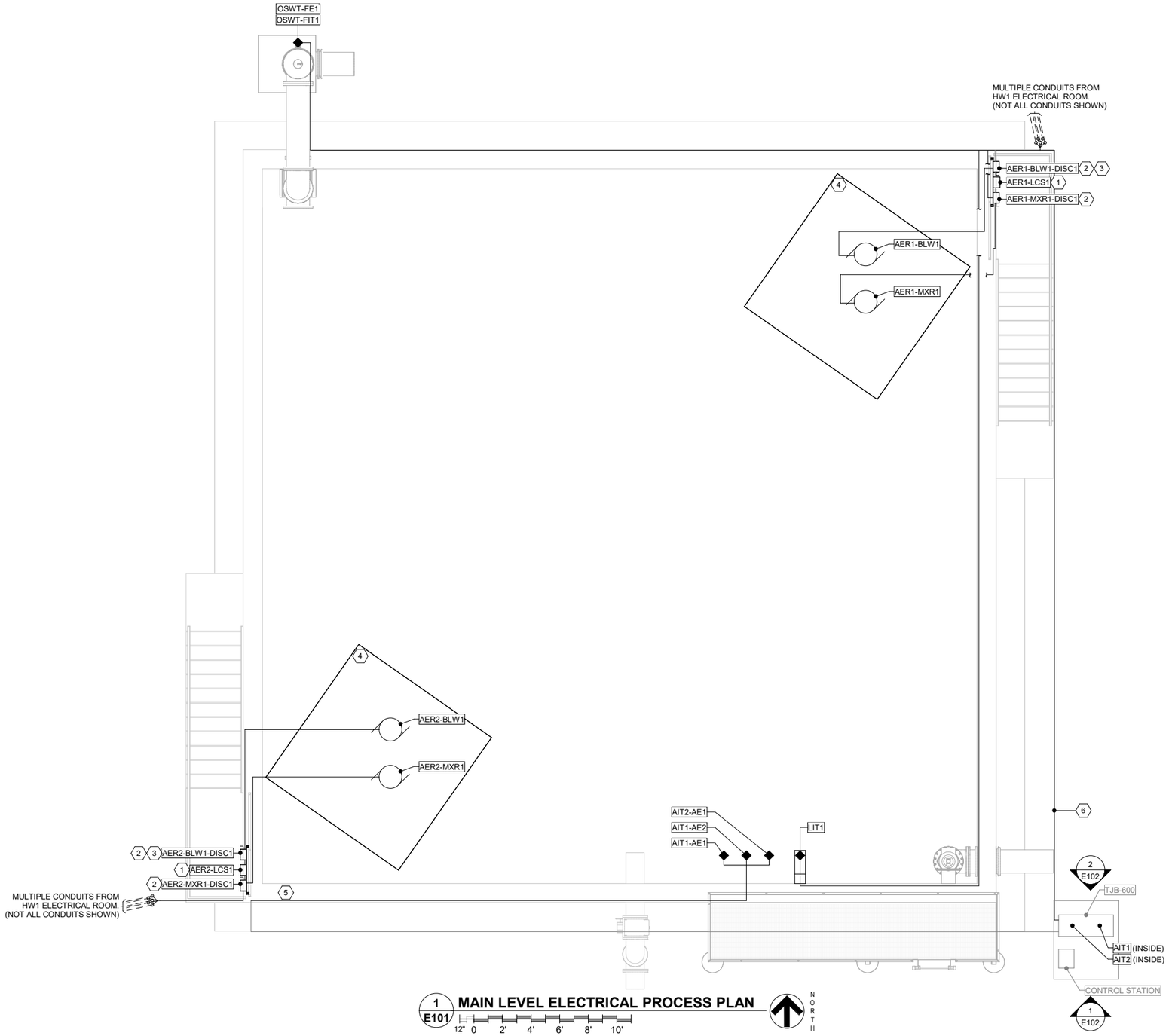
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_OSW_E_v26.rvt



1 E101 **MAIN LEVEL ELECTRICAL PROCESS PLAN**

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

GENERAL NOTES

1. ALL TAG NUMBERS AND SHEET CONTINUATION DESIGNATORS SHALL BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).
2. REFER TO THE INSTRUMENTATION SCHEDULE FOR DETAILS REGARDING ALL INSTRUMENTATION.

CONSTRUCTION NOTES

1. CONTROL STATION / JUNCTION BOX (40 63 14) MOUNTED ON RAILING OR STRUT STAND AS SHOWN. CONTROL STATION / JUNCTION BOX MAY BE USED AS A MEANS TO COMBINE OR 'MARSHALL' WIRING BACK TO THE CONTROL PANELS AS INDICATED IN THE CABLE AND CONDUIT SCHEDULE. SEE ONE-LINE DIAGRAMS, AND P&IDS FOR ADDITIONAL DETAILS.
2. LOCAL DISCONNECT SWITCH FOR PROCESS EQUIPMENT. SEE ONE-LINE DIAGRAMS FOR WIRING DETAILS.
3. RELOCATE DISCONNECT FROM REAR SIDE OF TJB-600 AND REUSE FOR AERATOR BLOWER MOTOR. SEE OSW E102 FOR FURTHER DIRECTIONS.
4. AERATOR PACKAGE WITH BLOWER AND MIXER MOTORS PROVIDED BY OWNER. CONTRACTOR TO REMOVE AND REPLACE EXISTING BLOWER AND MIXER MOTORS WITH C1D2 RATED EQUIVALENT VERSIONS. CONTRACTOR SHALL INSTALL AERATOR PACKAGE WITH NEW C1D2 RATED MOTORS IN OXIDATION DITCH SWING ZONE.
5. EXTEND EXISTING CONDUIT FROM THE SOUTHWEST CORNER OF BASIN TO THE ANALYTICAL ELEMENTS. ROUTE ANALYTICAL ELEMENTS CABLING THROUGH CONDUIT BACK TO TJB-600.
6. RUN NEW CONTROL CONDUIT FROM OXD-SCP1 TO TJB-600. ROUTE ANALYTICAL TRANSMITTER CABLING FROM TJB-600 BACK TO OXD-SCP1.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
MAIN LEVEL ELECTRICAL PROCESS PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: N/A

SHEET DESIGNATOR: **OSW**
SHEET NO: **E101**

4/16/2026 12:46:48 PM

1 E102 **TJB-600 CONTROL STATION AND DISCONNECTS**

2 E102 **TJB-600 MODIFICATIONS**

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

DEMOLITION LEGEND

ITEMS TO BE REMOVED

ITEMS TO BE REUSED

DEMOLITION NOTES

1. SALVAGE EXISTING 480VAC, 3 PHASE, 30A DISCONNECT. REMAINING CONDUITS SHALL BE SEALED WITH A REMOVABLE MECHANICAL PLUG AND HAVE CABLE REMOVED BACK TO SOURCE. RELOCATE DISCONNECT TO OXIDATION DITCH SWING ZONE PLATFORM AND REUSE AS THE DISCONNECT FOR AERATOR BLOWER MOTOR. SEE OSW/E101 FOR LOCATION.
2. DEMOLISH EXISTING HACH SC-100 TRANSMITTER. REMOVE CABLING BACK TO SOURCE.

CONSTRUCTION NOTES

1. INSTALL TWO NEW ANALYTICAL TRANSMITTERS ON BACKPLANE. CONNECT POWER AND SIGNAL CABLING FROM NEW ELEMENTS TO TRANSMITTERS. UTILIZE EXISTING POWER AND SIGNAL TERMINALS IN TJB-600 AS NEEDED. ROUTE TRANSMITTER CABLING FROM TJB-600 BACK TO OXD-SCP1 THROUGH NEW CONDUIT. SEE OSW / E101 FOR FURTHER DETAILS.

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

TJB-600 MODIFICATIONS

CLIENT:		
EAGLE MOUNTAIN CITY EAGLE MOUNTAIN CITY, UTAH	PREPARED BY: PGM	
	CHECKED BY: CJS	
	APPROVED BY: CJS	
PROJECT NO: 13139-2023-002	SHEET DESIGNATOR: **OSW**	SHEET NO: **E102**
DATE: APRIL 2026		
ALT. PROJECT NO: N/A		

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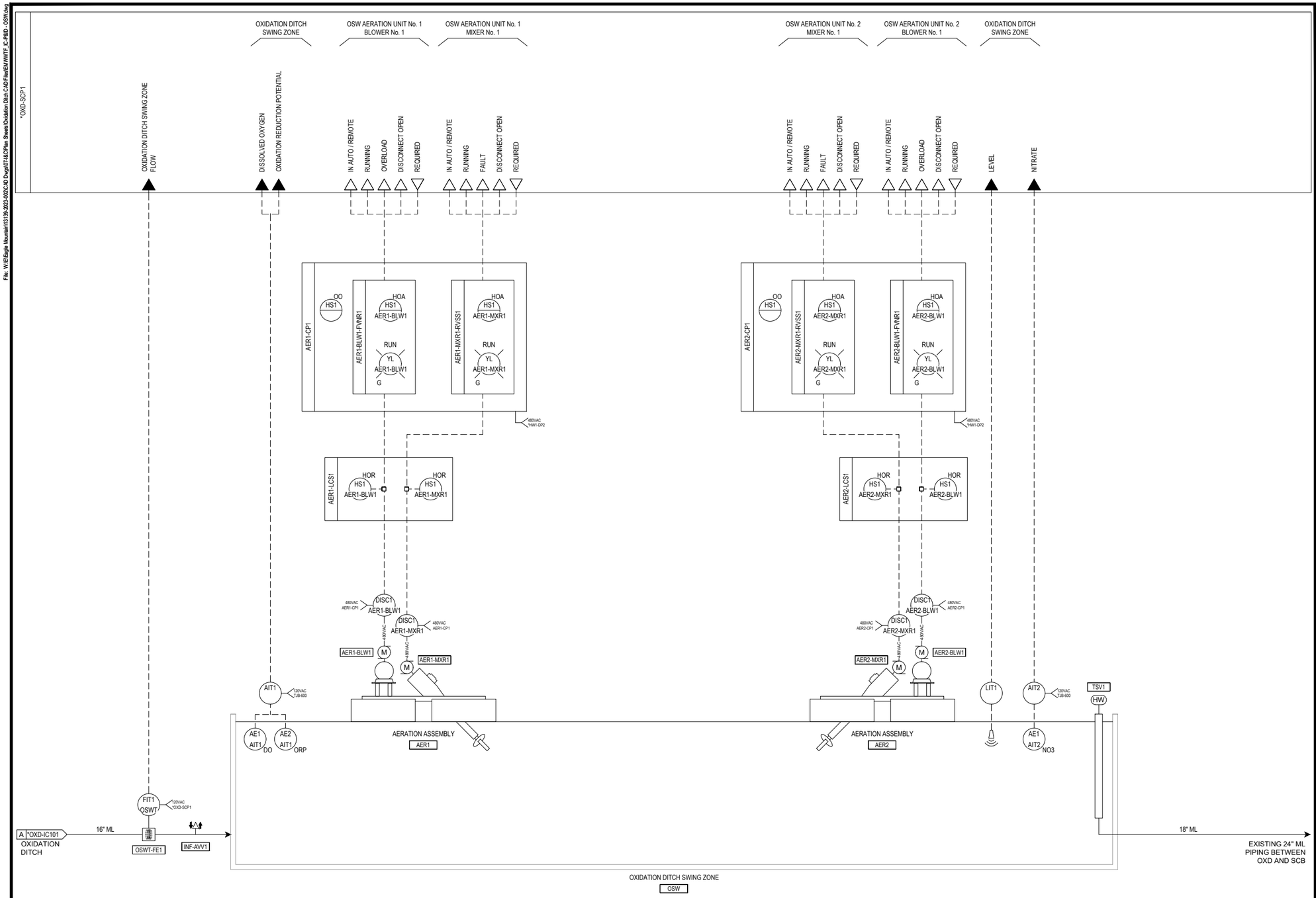
Plotted By: Ian Smith Date: Thursday, April 16, 2026



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Plotted By: Ian Smith Date: Friday, April 17, 2026

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. ALL TAG NUMBERS SHALL BE PRECEDED BY "OSW-" UNLESS OTHERWISE DENOTED WITH AN ASTERISK (*).

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
P&ID - OXIDATION DITCH SWING ZONE

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TRK
CHECKED BY: JC
APPROVED BY: KCW / CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **OSW**
SHEET NO: **IC101**

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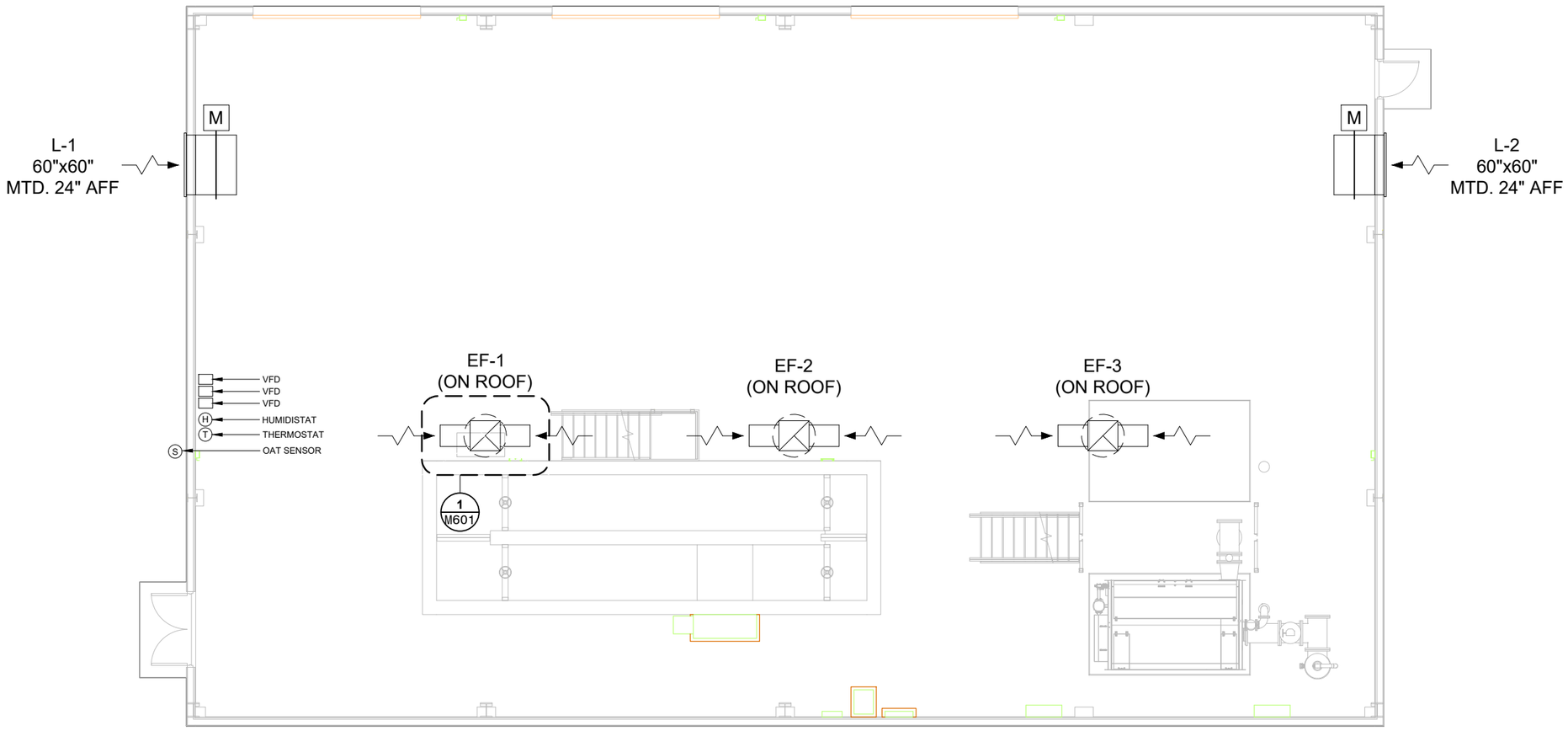


1 M101 **MAIN LEVEL MECHANICAL PLAN**

0 2' 4' 6' 8' 10' 12' 14'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 6933923-2202
SAMUEL J. FANKHAUSER
4/17/26
STATE OF UTAH

STATUS	SYM	DATE	APPR
ISSUED FOR GMP (NOT FOR CONSTRUCTION)			

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
MAIN LEVEL MECHANICAL PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: RMD
CHECKED BY: CJB
APPROVED BY: SJF

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **TTF**

SHEET NO: **M101**

Plotted By: Grant.Lindahl Date: Friday, April 17, 2026

File: \AE2S.com\Nasuni\Projects\Eagle Mountain\13139-2023\002\CAD Dwgs\05-Mechanical\Autocad\Plan Sheets\TERTIARY TREATMENT PROJECT_M.dwg

SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular aluminum ductwork for odor control and corrosive air systems.
2. Duct fittings, joints, sealants, and reinforcements.
3. Hangers and supports.

1.2 REFERENCES

A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
B. SMACNA - HVAC Duct Construction Standards (Latest Edition).
C. SMACNA - HVAC Air Duct Leakage Test Manual.

1.3 PERFORMANCE REQUIREMENTS

A. Pressure Class: ±10 in. w.g. minimum.
B. Leakage Class: Seal Class A (no visible leakage).
C. Service: Continuous exposure to humid, corrosive wastewater air containing hydrogen sulfide (H_2S).
D. Deflection: Comply with SMACNA for pressure class indicated.

1.4 SUBMITTALS

A. Product Data: Duct materials, sealants, gaskets, and fasteners.
B. Shop Drawings:

1. Duct layouts, dimensions, and reinforcement details.
2. Jointing methods and support spacing.
   C. Leakage Test Procedures (if required).

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCT MATERIALS

A. Material: Aluminum Alloy 5052-H32 per ASTM B209.
B. Maximum Duct Size: 28 in. x 28 in.
C. Minimum Thickness: 16 gauge for all duct sizes in this project.
D. Pressure Class: ±10 in. w.g.

2.2 DUCT FABRICATION

A. Fabricate in accordance with SMACNA for rectangular ducts at ±10 in. w.g., except as modified herein.
B. Reinforcement:

1. Provide transverse joint reinforcement at all joints.
2. Provide intermediate stiffeners at maximum 4 ft spacing.
3. Cross-break or bead all panels to prevent oil canning.

C. Fittings:

1. Same material, equal or greater thickness than adjoining duct.
2. Radius elbows (minimum 1.5D where space permits).
3. Fully sealed tees, transitions, and offsets.

D. Construction:

1. Seal Class A+ (seal all seams, joints, reinforcements, and penetrations).
2. Grind smooth all internal welds.
3. Provide drainable construction:
   a. Slope horizontal ducts 1/8 in./ft minimum.
   b. Provide capped drain connections at low points.

2.3 JOINTS AND SEALANTS

A. General: Provide airtight, watertight, and vapor-tight joints suitable for wastewater odor control systems.
B. Longitudinal Seams:

1. Continuously welded or mechanically formed and fully sealed.

C. Transverse Joints:

1. Welded flanges or aluminum companion angle flanges (minimum 2" x 2" x 3/16").
2. Maximum spacing between joints: 4 ft.

D. Gaskets:

1. Closed-cell EPDM or neoprene, 1/4-inch thick.
2. Continuous installation; resistant to H_2S and moisture.

E. Sealant:

1. Non-hardening, flexible, chemical-resistant sealant rated for hydrogen sulfide environments.

F. Fasteners:

1. Type 316 stainless steel preferred; Type 304 minimum.
2. Isolate dissimilar metals to prevent galvanic corrosion.

2.4 HANGERS AND SUPPORTS

A. Materials:

1. Type 316 stainless steel preferred; Type 304 minimum.
2. All components suitable for corrosive wastewater environments.

B. Hanger Type:

1. Trapeze hangers with continuous threaded rod.

C. Upper Attachments:

1. Stainless steel or aluminum channel framing (Unistrut or equal).
2. Anchored to structure with corrosion-resistant concrete anchors.

D. Duct Supports:

1. Full-width trapeze support with continuous channel.
2. Minimum 2-inch-wide saddle or bearing surface.
3. Provide EPDM/neoprene isolation pad between duct and support.

E. Support Spacing:

1. Maximum 6 ft on center.

F. Additional Supports:

1. At changes in direction.
2. At branch connections.
3. Within 2 ft of equipment connections.

G. Installation:

1. Prevent sagging, vibration, misalignment, and joint stress.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install ductwork in accordance with SMACNA and this specification.
B. Provide sealed, rigid, and properly aligned duct systems.
C. Maintain slope for drainage.

3.2 FIELD QUALITY CONTROL

A. Inspect duct system for leakage, proper sealing, and support installation.
B. Repair deficiencies prior to system operation.

3.3 CLEANING AND PROTECTION

A. Clean interior of ductwork prior to operation.
B. Protect duct system from contamination and damage during construction.

END OF SECTION

SECTION 23 09 23 - DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

SEQUENCE OF OPERATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide control sequences for ventilation system serving tertiary treatment building.
B. System shall control space humidity, maintain minimum air changes, and maintain building negative pressure.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SYSTEM COMPONENTS

A. Exhaust Fans:
1. EF-1, EF-2, EF-3: Roof-mounted, each with VFD control

B. Outside Air Intake Louvers:
1. L-1, L-2: Motorized, fully modulating dampers

C. Sensors:
1. Space Relative Humidity Sensor
2. Space Temperature Sensor
3. Outside Air Temperature (OAT) Sensor

3.2 SEQUENCE OF OPERATION

3.2.1 GENERAL

A. Ventilation system shall operate continuously unless manually disabled for maintenance.
B. Building Automation System (BAS) shall control exhaust airflow and outside air intake to maintain humidity and ventilation requirements.
C. System shall maintain slight negative pressure relative to outdoors.

3.2.2 MINIMUM VENTILATION

A. Provide minimum ventilation rate equal to 6,670 CFM (2,225 CFM PER FAN).
B. Exhaust fans shall not operate below minimum VFD speed required to maintain minimum airflow.
C. Intake louvers shall maintain minimum position to support required airflow (3,335 CFM EACH).

3.2.3 HUMIDITY CONTROL

A. BAS shall modulate exhaust fan VFD speed to maintain space relative humidity setpoint of 55% RH (adjustable).
B. As space RH rises above setpoint:
1. Increase exhaust fan speed (all fans in parallel)
2. Modulate intake louvers open proportionally
C. As space RH falls below setpoint:
1. Reduce exhaust fan speed to minimum
2. Modulate intake louvers toward minimum position

3.2.4 OUTSIDE AIR TEMPERATURE RESET

A. OAT > 20°F:
1. Enable full modulation of exhaust fans from minimum to maximum capacity
2. Maximum ventilation up to 20,000 CFM.
B. OAT between 0°F and 20°F:
1. Limit maximum exhaust airflow to approximately 12,000 CFM (4,000 CFM PER FAN).
2. Maintain active humidity control within limited range
C. OAT < 0°F:
1. Disable RH-based increase in airflow
2. Operate system at minimum ventilation rate only 6,670 CFM (2,225 CFM PER FAN).
3. Maintain intake louvers at minimum position

3.2.5 BUILDING PRESSURE CONTROL

A. Intake louvers shall modulate in coordination with exhaust airflow to maintain slight negative pressure.
B. Intake airflow shall be less than exhaust airflow.
C. Provide manual or automatic balancing to prevent positive pressurization.

3.2.6 FAN OPERATION

A. All exhaust fans shall operate simultaneously at reduced speed to satisfy minimum ventilation.
B. Fans shall modulate in parallel via VFD control.

3.2.7 STARTUP

A. Upon system enable:
1. Open intake louvers to minimum position
2. Start all exhaust fans
3. Ramp fans to minimum speed
4. Enable humidity control loop

3.2.8 SHUTDOWN

A. System is intended for continuous operation.
B. Shutdown only upon manual command for maintenance.

3.2.9 SAFETIES AND ALARMS

A. Low Space Temperature Alarm:
1. Alarm at space temperature < 40°F (adjustable)
B. High Humidity Alarm:
1. Alarm at RH > 65% (adjustable)
C. Fan Failure:
1. Proof of operation required for each fan
2. Failure generates alarm
3. Remaining fans shall increase speed to maintain airflow where possible
D. Louver Failure:
1. Failure to achieve commanded position generates alarm

3.2.10 MISCELLANEOUS

A. Destratification fans shall operate continuously.
B. All setpoints shall be adjustable through BAS.
C. System shall be commissioned to verify airflow at minimum and maximum conditions.

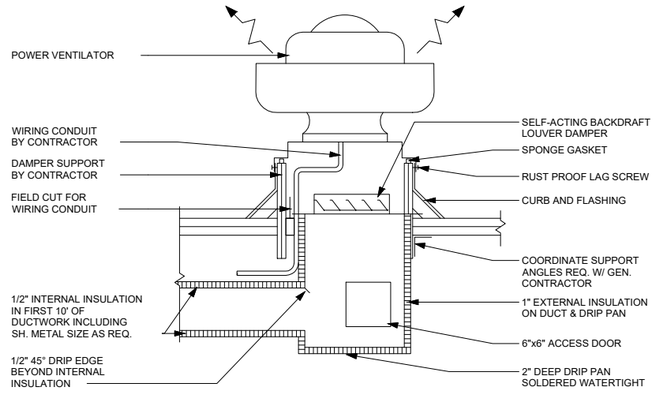
END OF SECTION

LOUVER SCHEDULE			
PARAMETER	UNITS	VALUE	VALUE
TAG		L-1	L-2
MAKE		RUSKIN	RUSKIN
MODEL		6375DX	6375DX
DEPTH		6"	6"
MATERIAL		ALUM.	ALUM.
SERVICE		INTAKE	INTAKE
LOUVER SIZE (W x H)	IN	60x60	60x60
AIRFLOW	CFM	10,000	10,000
NET VELOCITY	FT/MIN	696	696
STATIC PRESSURE	IN	0.08	0.08
INSTALLED ON		METAL	METAL
REMARKS		1,2,3,4,5,6	1,2,3,4,5,6

NOTES:
1. LOUVERS TO BE AMCA CERTIFIED.
2. 19 GAUGE GALVANIZED 0.5" SQUARE MESH BIRD SCREEN ON INTERIOR FACE.
3. LOUVER TO BE CUSTOM COLOR SELECTED BY ARCHITECT/OWNER.
4. PROVIDE FLASHING AND CAULK WATERTIGHT TO BUILDING.
5. PITCH AND SEAL DUCTWORK TO DRAIN ALL WATER OUT THROUGH LOUVER.
6. PROVIDE 120 V FULLY MODULATING MOTORIZED LOW LEAK DAMPER.

EXHAUST FAN SCHEDULE				
PARAMETER	UNITS	VALUE	VALUE	VALUE
TAG		EF-1	EF-2	EF-3
MAKE		GREENHECK	GREENHECK	GREENHECK
MODEL NUMBER		CUBE-360VG	CUBE-360VG	CUBE-360VG
TYPE		ROOF UPBLAST	ROOF UPBLAST	ROOF UPBLAST
AIRFLOW	CFM	6,670	6,670	6,670
STATIC PRESSURE	IN. W.C.	0.25	0.25	0.25
WEIGHT	LBS	275	275	275
MOTOR	HP	1	1	1
ELEC. CHAR.	V/PH	460/3	460/3	460/3
CONTROL		SEE SPEC	SEE SPEC	SEE SPEC
REMARKS		2	2	2

NOTES:
1. HERESITE COATED
2. ROOF CURB W/ HINGED ACCESS



1 M601 **TYPICAL ROOF MOUNTED EXHAUST FAN**
SCALE: NONE

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 6933923-2202
SAMUEL J. FANKHAUSER
4/17/26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

PROJECT TITLE:

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **SPEC. NOTES, SCHEDULES, DETAILS**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

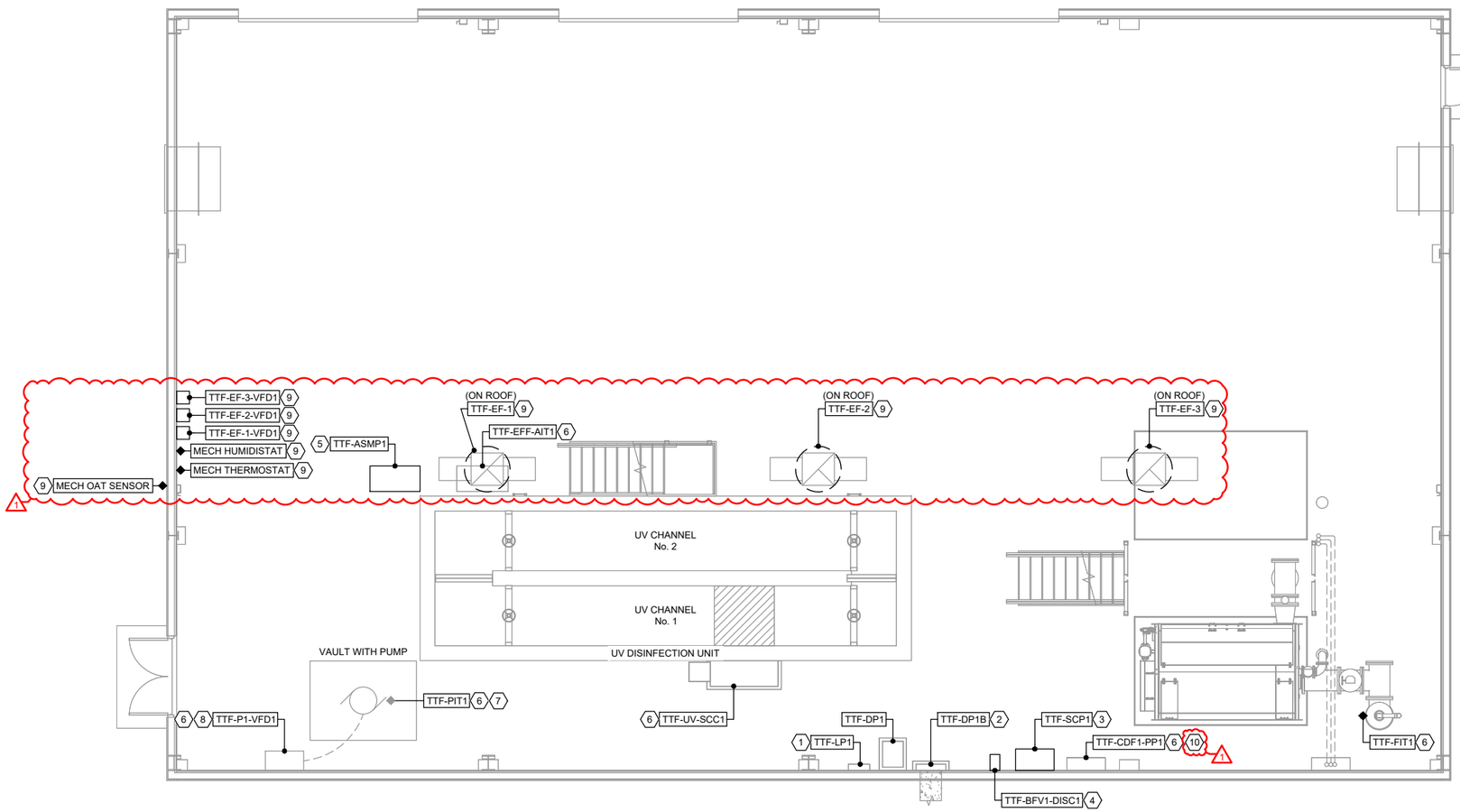
PREPARED BY: RMD
CHECKED BY: CJB
APPROVED BY: SJF

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **TTF**

SHEET NO: **M601**

Plotted By: Grant.Lindahl Date: Friday, April 17, 2026



1 E101 **TTF GRADE LEVEL PROCESS ELECTRICAL PLAN**

0 2' 4' 6' 8' 10' 12' 14'

NORTH

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	
1	04-28-26	ADDENDUM #1

CJS APPR

CONSTRUCTION NOTES

1. UTILIZE TWO (2) 20A/1P EXISTING SPARE BREAKERS IN TTF-LP1 TO POWER THE FOLLOWING. ONE BREAKER TO FEED TTF-SCP1, AND ONE TO FEED TTF-ASMP1. SEE THE CABLE AND CONDUIT SCHEDULE FOR MORE INFORMATION.
2. UTILIZE ONE (1) 15A/3P EXISTING SPARE BREAKER IN TTF-DP1B TO POWER TTF-BFV1. PROVIDE THREE (3) 15A/3P BREAKERS MATCHING EXISTING PANELBOARD RATINGS TO FEED THE THREE EXHAUST FANS. SEE THE CABLE AND CONDUIT SCHEDULE AND PANELBOARD SCHEDULE FOR MORE INFORMATION.
3. TTF-SCP1 FURNISHED AS PART OF THE HARDWARE SYSTEM INTEGRATOR PACKAGE (40 61 13) AND MOUNTED ON HOUSEKEEPING PAD OR STRUT STAND MOUNTED (AS NEEDED) BY CONTRACTOR. HARDWARE SYSTEM INTEGRATOR TO DESIGN PANEL BASED ON 40 61 13, PROVIDING EQUIPMENT TO SUPPLY A FULLY FUNCTIONAL CONTROL PANEL, INCLUDING BUT NOT LIMITED TO, ENCLOSURE, POWER SUPPLIES, PLC, NETWORK SWITCH, SFP, FIBER PATCH PANEL, OIT, AND TERMINALS. TERMINATE CONTROL, SIGNAL, AND DATA CABLING FOR EXISTING AND PROPOSED EQUIPMENT IN TTF-SCP1. ENCLOSURE SHALL BE SIZED TO ACCOMMODATE FUTURE ADDITIONAL UV AND TERTIARY FILTER TRAINS I/O AND CONTROLS.SEE THE CABLE AND CONDUIT SCHEDULE AND I/O SCHEDULE FOR MORE INFORMATION.
4. SEE SW/E002 FOR DISCONNECT REQUIREMENTS.
5. AUTOSAMPLER SHALL BE PROVIDED BY THE CONTRACTOR. RECEPTACLE FOR CORD AND PLUG SHALL BE OUTDOOR RATED AND PROVIDE PROTECTION FROM ELEMENTS WHILE IN USE.
6. CONNECT CONTROL, SIGNAL, AND DATA CABLING FOR EXISTING EQUIPMENT TO TTF-SCP1. SEE THE CABLE AND CONDUIT SCHEDULE AND I/O SCHEDULE FOR MORE INFORMATION.
7. DEMOLISH EXISTING PRESSURE TRANSMITTER CABLE AND RECIRCUIT PER THE CABLE AND CONDUIT SCHEDULE.
8. HARDWARE SYSTEM INTEGRATOR SHALL RECONFIGURE AND REWIRE VFD CONTROLS TO BE CONTROLLED FROM THE NEW CONTROL PANEL TTF-SCP1 PLC WHILE IN AUTO.
9. MECHANICAL EQUIPMENT PROVIDED BY THE CONTRACTOR. SEE THE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
10. PROTOCOL CONVERTER SHALL BE PROVIDED BY THE HARDWARE SYSTEM INTEGRATOR AND INSTALLED WITHIN TTF-CDF1-PP1. DIN RAIL, TERMINAL BLOCKS, OCPD, WIRING, ETC SHALL BE PROVIDED AS REQUIRED. SHALL BE PHOENIX CONTACT 1062380 OR EQUAL. THE PLC WITHIN TTF-CDF1-PP1 MAY REQUIRE ADDITIONAL CONFIGURATION. CONDITIONS TO BE MONITORED SHALL BE CONFIRMED WITH OWNER AND ENGINEER DURING COMMISSIONING. THE INTENT IS TO CONVERT FROM E/IP TO MODBUS TCP/IP. REFER TO NETWORK DIAGRAM FOR ADDITIONAL INFORMATION.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
TTF GRADE LEVEL ELECTRICAL PROCESS PLAN

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A
SHEET DESIGNATOR: **TTF**
SHEET NO: **E101**

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Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

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1 E101 **SOLIDS BUILDING CP-2 MODIFICATIONS**

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

CONSTRUCTION NOTES

1. TERMINATE THE 6-STRAND MULTIMODE FIBER OPTIC CABLE IN SPARE PORTS IN EXISTING FIBER PATCH PANEL. TWO STRANDS WILL PROVIDE COMMUNICATION TO TTF-SCP1. FOUR STRANDS WILL SERVE AS SPARES.
2. PROVIDE AND INSTALL AN ETHERNET SWITCH WITH MINIMUM OF SIX COPPER PORTS AND TWO SFP PORTS. JUMPER THE TWO COMMUNICATION FIBER STRANDS FROM FIBER PATCH PANEL TO SFP PORT. MISCELLANEOUS CONTROL PANEL HARDWARE SUCH AS MINIATURE CIRCUIT BREAKERS, TERMINAL BLOCKS, AND SIMILAR SHALL BE PROVIDED AS REQUIRED. A 24VDC POWER CALCULATION SHALL BE PERFORMED TO DETERMINE LOADING OF EXISTING, ADDITIONAL 24VDC POWER SUPPLY SHALL BE INSTALLED IF REQUIRED.
3. JUMPER CAT6 CABLE FROM NEW ETHERNET SWITCH TO SPARE COPPER PORT IN EXISTING ETHERNET SWITCH.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
SOLIDS BUILDING CP-2 MODIFICATIONS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PGM
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SB**

SHEET NO: **E101**

Plotted By: Ian Smith Date: Thursday, April 16, 2026

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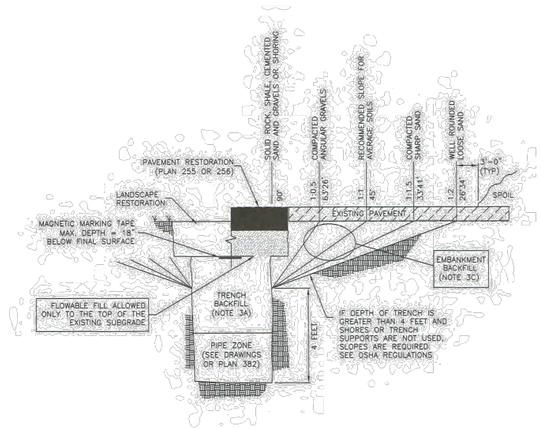
Trench backfill

1. **GENERAL**
   A. The drawing applies to backfilling a trench (and embankment) above the pipe zone.
2. **PRODUCTS**
   A. Backfill: Common fill, APWA Section 31 05 13. Maximum particle size 3-inches.
   B. Flowable Fill: APWA Section 31 05 15. Target is 60 psi in 28 days with 90 psi maximum in 28 days, It must flow easily requiring no vibration for consolidation.
3. **EXECUTION**
   A. Trench Backfill Above the Pipe Zone: Follow requirement indicated in APWA Section 33 05 20 and the following provisions. See Standard Plan 382 for backfilling the pipe zone.
      1) DO NOT USE sewer rock, pea gravel, or recycled RAP aggregate as trench backfill.
      2) Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a standard proctor density, APWA Section 31 23 26.
      3) Water jetting is NOT allowed.
   B. Flowable Fill: If controlled low strength material is placed in the trench. Cure the material before placing surface restorations.
   C. Embankment Backfill: When trench sides are sloped proceed as follows.
      1) Maximum lift thickness is 8-inches before compaction.
      2) Compact per APWA Section 31 23 26 to 95 percent or greater relative to a standard proctor density.
      3) Submission of quality control compaction test result data may be requested by ENGINEER at any time. Provide results of tests immediately upon request.
   D. Surface Restoration:
      1) Landscaped Surface: Follow APWA Section 32 92 00 (turf or grass) or APWA Section 32 93 13 (ground cover) requirements. Rake to match existing grade. Replace vegetation to match pre-construction conditions.
      2) Paved Surface: Follow APWA Section 33 05 25 (bituminous pavement surfacing), or APWA Section 33 05 25 (concrete pavement surfacing). Do not install surfacing until compaction density is acceptable to ENGINEER. .

381

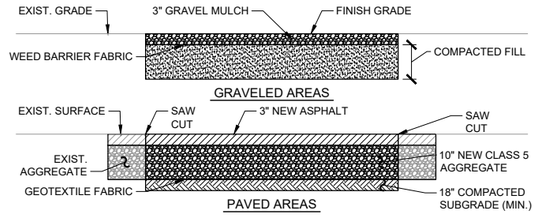
1 TRENCH BACKFILL NOTES
701 NO SCALE

NARRATIVE: THIS PLAN SHOWS VARIOUS SLOPES RECOMMENDED FOR VARIOUS TYPES OF SLOPE STABILITY PROBLEMS. THE VERTICAL TEXT INDICATES VARIOUS MATERIALS THAT MAY BE ENCOUNTERED. THE SERVICES OF A PROFESSIONAL SOILS ENGINEER SHOULD BE USED TO VERIFY SLOPE STABILITY.



APWA Utah Chapter — *Trench backfill* — Plan 381 July 2016

2 TRENCH BACKFILL
C701 NO SCALE



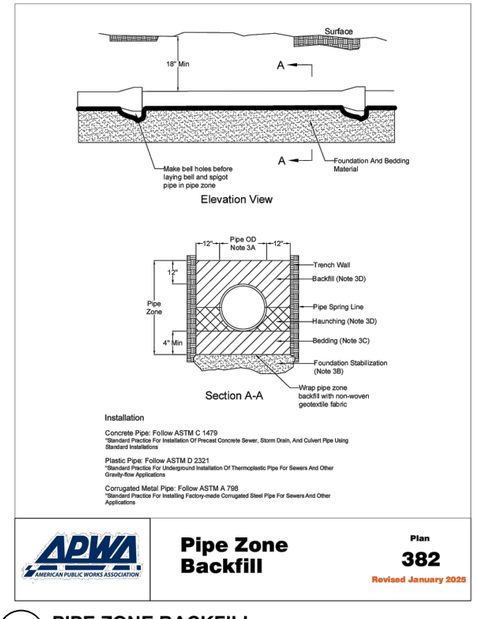
3 SURFACE RESTORATION
C701 NO SCALE

PIPE ZONE BACKFILL

1. **GENERAL**
   A. Install the pipe in the center of the trench.
2. **PRODUCTS**
   A. Backfill: Common fill, APWA Section 31 05 13. Maximum particle size 2-inches.
   B. Concrete: APWA Section 03 30 04.
   C. Flowable Fill: Target is 60 psi in 28 days with 90 psi maximum in 28 days, APWA Section 31 05 15. It must flow easily requiring no vibration for consolidation.
   D. Stabilization-Separation Geotextile: Moderate or high at CONTRACTOR's choice, APWA Section 31 05 19.
3. **EXECUTION**
   A. Excavate the Pipe Zone: Width is measured at the pipe spring line and includes any necessary sheathing. Provide width recommended by pipe manufacturer. Follow manufacturer's recommendations when using trench boxes.
   B. Foundation Stabilization: Obtain ENGINEER's permission before installing common fill. Vibrate to stabilize. Installation of stabilization-separation geotextile will be required to separate backfill material and native subgrade materials if common fill cannot provide a working surface or prevent soils migration.
   C. Bedding: Follow APWA Section 33 05 20 requirements and the following provisions.
      1) Furnish 3/4" minus washed rock for plastic pipe and 1" minus washed rock for concrete pipe material unless specified otherwise by pipe manufacturer.
      2) Maximum lift thickness is 8-inches.
      3) Bedding immediately under the pipe should not be compacted, but loosely placed.
      4) Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
   D. Pipe Zone: DO NOT USE sewer rock, pea gravel, or recycled RAP aggregate in the pipe zone. Water jetting is NOT allowed.
      1) Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26 unless pipe manufacturer requires more stringent installation.
      2) Submission of quality control compaction test result data developed for the haunch zone may be requested by ENGINEER at any time. CONTRACTOR is to provide results of tests immediately upon request.
   E. Flowable Fill (when required and if allowed by pipe manufacturer):
      1) Place the controlled low strength material, APWA Section 31 05 15.
      2) Prevent pipe flotation by installing in lifts and providing pipe restraints as required by pipe manufacturer.
      3) Reset pipe to line and grade if pipe "floats" out of position.

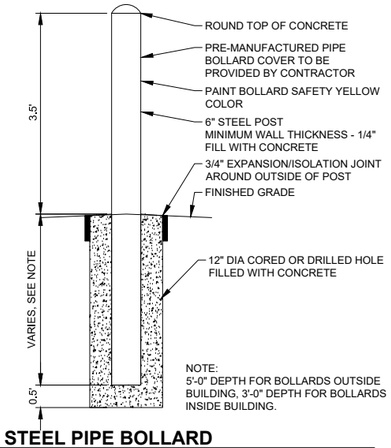
382 Revised January 2025

4 PIPE ZONE BACKFILL NOTES
C701 NO SCALE



APWA American Public Works Association — **Pipe Zone Backfill** — Plan 382 Revised January 2025

5 PIPE ZONE BACKFILL
C701 NO SCALE



6 TYPICAL STEEL PIPE BOLLARD
C701 NO SCALE

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER NO. 12623759-2202 RUSSELL SPRAGUE 4/17/2026 STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR		
	DATE	
	SYM	

PROJECT TITLE:
EAGLE MOUNTAIN WASTEWATER TREATMENT FACILITY UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

PROJECT LOCATION: SE1/4 SECTION 28 TOWNSHIP 34S, RANGE 11W

AE2S OFFICE: 3400 N ASHTON BLVD #105, LEHI, UT 84043 PH: 801-331-8489

SHEET TITLE: **DETAILS**

CLIENT: **EAGLE MOUNTAIN CITY**, EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: PWH
CHECKED BY: CITY
APPROVED BY: KCW

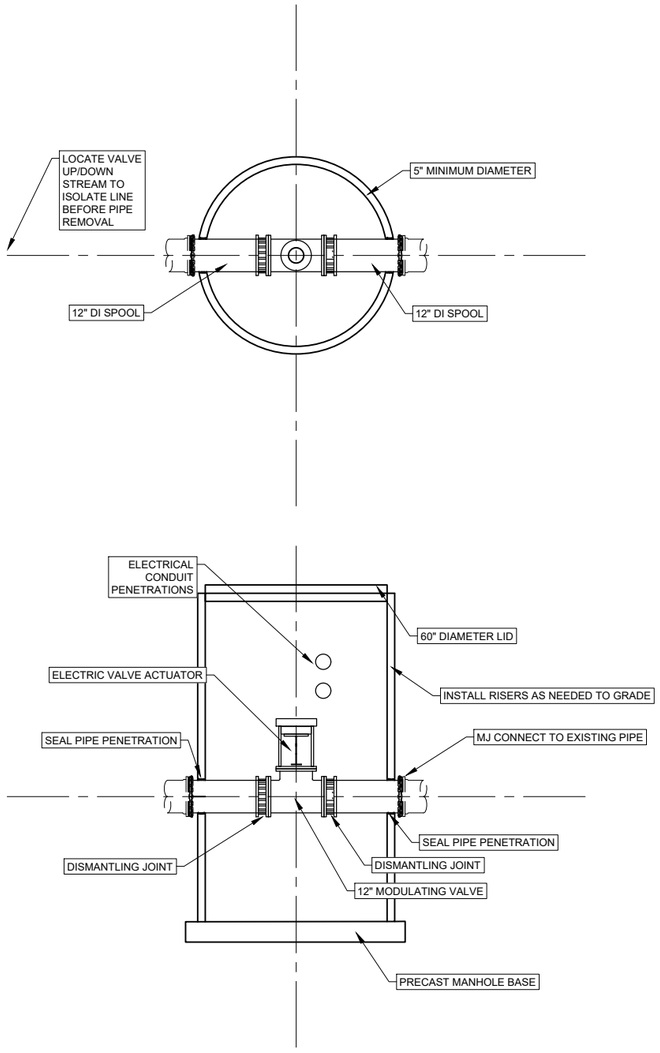
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **C701**

Plotted By: Russell Sprague Date: Friday, April 17, 2026

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\05-Civil\Plan Sheets\C-DETL.dwg



1/702 MANHOLE DETAIL WITH MODULATING VALVE AND ELECTRIC ACTUATOR

Plotted By: Russell Sprague Date: Friday, April 17, 2026

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
NO. 12623759-2202
RUSSELL SPRAGUE
4/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

Advanced Engineering and Environmental Services, LLC www.ae2s.com

EAGLE MOUNTAIN WASTEWATER TREATMENT FACILITY UPGRADES

PROJECT TITLE:

PROJECT LOCATION: SE1/4 SECTION 28 TOWNSHIP 34S, RANGE 11W

AE2S OFFICE: 3400 N ASHTON BLVD #105, LEHI, UT 84043 PH: 801-331-8489

SHEET TITLE: **DETAILS CONT.**

CLIENT: **EAGLE MOUNTAIN CITY**, EAGLE MOUNTAIN CITY, UTAH

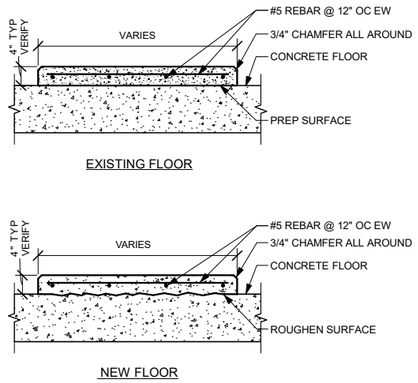
PREPARED BY: PWH
CHECKED BY: CITY
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

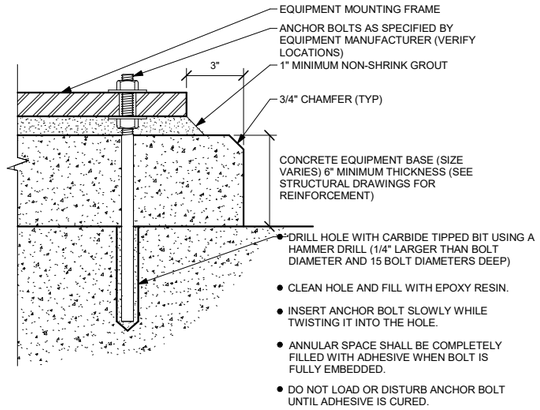
SHEET DESIGNATOR: **SD**

SHEET NO: **C702**

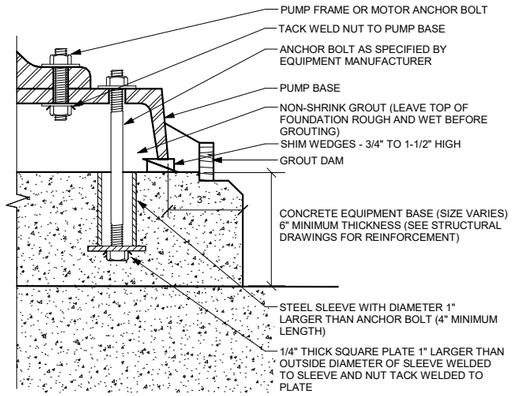
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SD_OXD_v28.rvt



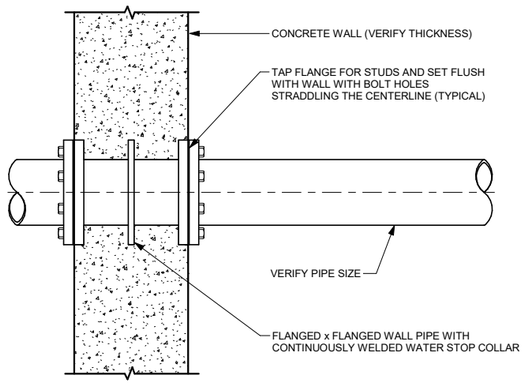
1 P701 CONCRETE HOUSEKEEPING PAD DETAIL
SCALE: NONE



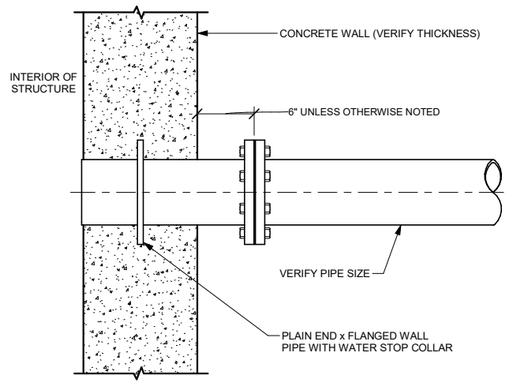
2 P701 EQUIPMENT BASE DETAIL
SCALE: NONE



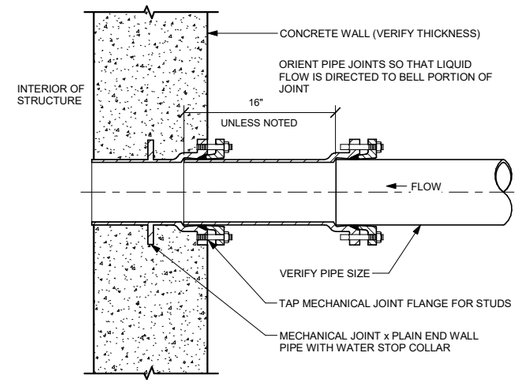
3 P701 PUMP BASE DETAIL
SCALE: NONE



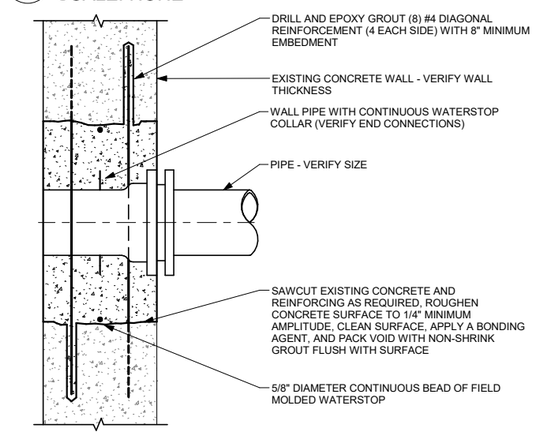
4 P701 FL x FL WALL PIPE DETAIL
SCALE: NONE



5 P701 FL x PE WALL PIPE DETAIL - TYPE 2
SCALE: NONE



6 P701 MJ x PE WALL PIPE DETAIL
SCALE: NONE



7 P701 WALL PIPE IN EXISTING WALL DETAIL - TYPE 2
SCALE: NONE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS STANDARD DETAILS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY:	TWK
CHECKED BY:	JBB
APPROVED BY:	KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **SD**

SHEET NO: **P701**

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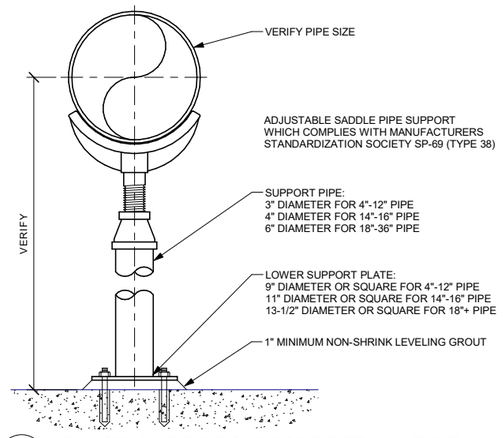
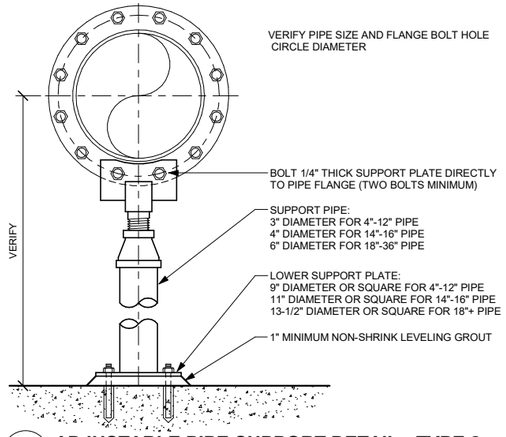
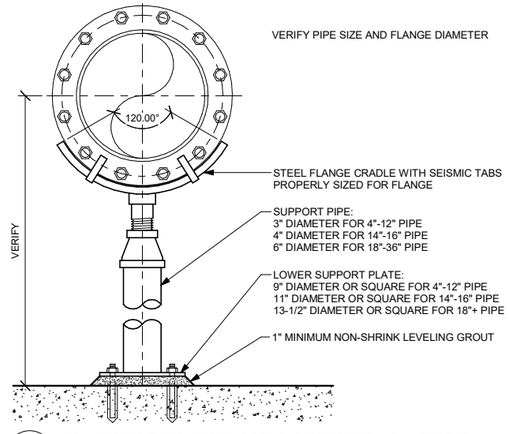


1 P702 ADJUSTABLE PIPE SUPPORT DETAIL - TYPE 1
SCALE: NONE



2 P702 ADJUSTABLE PIPE SUPPORT DETAIL - TYPE 2
SCALE: NONE



3 P702 ADJUSTABLE PIPE SUPPORT DETAIL - TYPE 3
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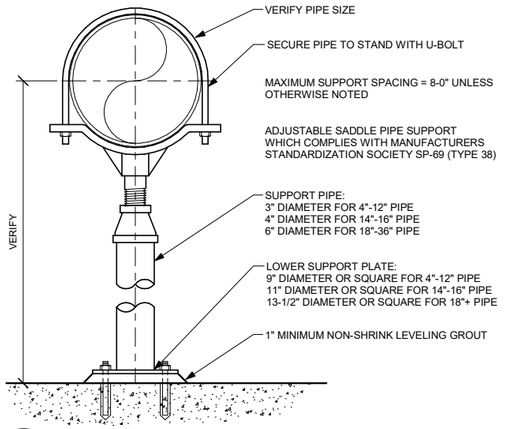

4 P702 ADJUSTABLE PIPE SUPPORT DETAIL - TYPE 4
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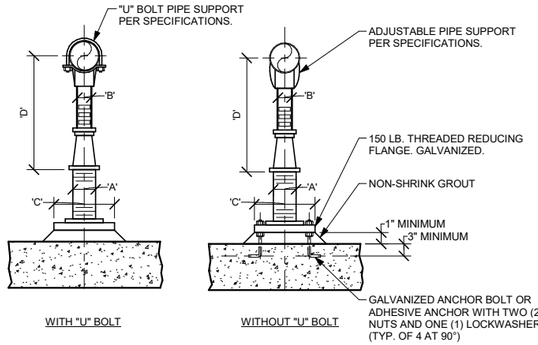


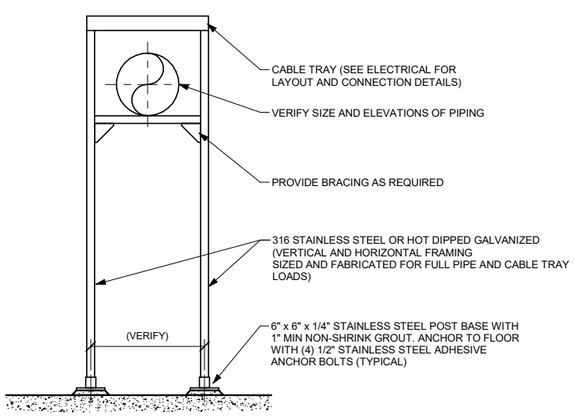
ADJUSTABLE PIPE SUPPORT WITH OR WITHOUTH "U" BOLT

ADJUSTABLE PIPE SUPPORT
APPROXIMATE DIMENSIONS IN INCHES

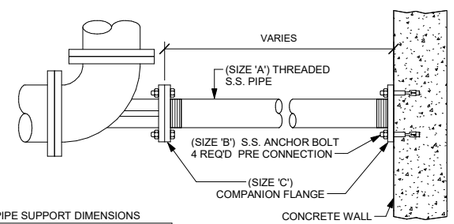
NOMINAL PIPE SIZE	'A'	'B'	'C'	'D' MINIMUM	'D' MAXIMUM
2-1/2	2-1/2	1-1/2	9	8	11-1/2
3	2-1/2	1-1/2	9	8-1/4	11-3/4
3-1/2	2-1/2	1-1/2	9	8-1/2	12
4	3	*2-1/2	9	10-1/4	14
6	3	*2-1/2	9	11-5/8	15-1/4
8	3	*2-1/2	9	13-5/8	16-1/2
10	3	*2-1/2	9	14-5/8	18-1/4
12	3	*2-1/2	9	15-5/8	19-3/4
14	4	3	11	18-7/8	20-3/4
16	4	3	11	19-7/8	22-1/4
18	6	3-1/2	13-1/2	21-1/4	24
20	6	3-1/2	13-1/2	23-1/4	25-1/2
24	6	4	13-1/2	26-1/2	28-1/4
30**	6	4	13-1/2	29-5/8	31-1/2
32**	6	4	13-1/2	30-5/8	32-3/4
36**	6	4	13-1/2	32-5/8	34-3/4
42**	PER MANUFACTURERS RECOMMENDATIONS				
48**	PER MANUFACTURERS RECOMMENDATIONS				
60**	PER MANUFACTURERS RECOMMENDATIONS				

* SEE MFR
**REQUIRES UBOLT ASSEMBLY

5 P702 ADJUSTABLE PIPE SUPPORT DETAIL - TYPE 5
SCALE: NONE



6 P702 STRUT "H" STYLE PIPE SUPPORT DETAIL
SCALE: NONE



PIPE SUPPORT DIMENSIONS

PIPE SIZE	'A'	'B'	'C'
4"	2"	5/8"Øx4"	2"x2"
6"	2"	5/8"Øx6"	2-1/2"x2"
8"-10"	3"	5/8"Øx6"	4"x3"
12"-16"	4"	3/4"Øx8"	6"x4"
18"-24"	6"	3/4"Øx8"	8"x6"

7 P702 BASE BEND THRUST PIPE SUPPORT DETAIL
SCALE: NONE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

REVISIONS			
SYM	DATE	DESCRIPTION	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

SHEET TITLE:
PROCESS STANDARD DETAILS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TWK
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **SD**

SHEET NO: **P702**

Advanced Engineering and Environmental Services, LLC www.ae2s.com

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SD_OXD_v28.rvt
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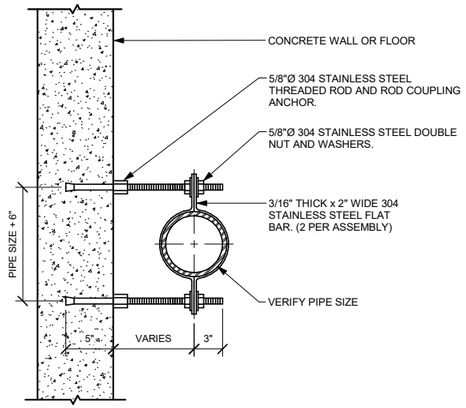
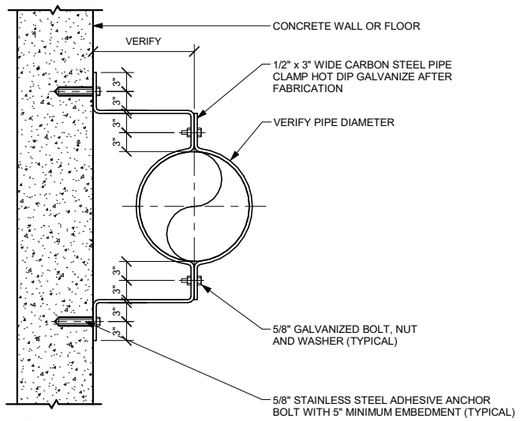
Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SD_OXD_v28.rvt



1 P703 PIPE SUPPORT DETAIL - TYPE 1
SCALE: NONE



2 P703 PIPE SUPPORT DETAIL - TYPE 2
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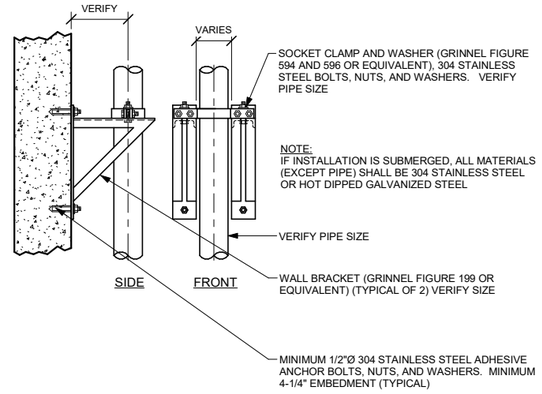
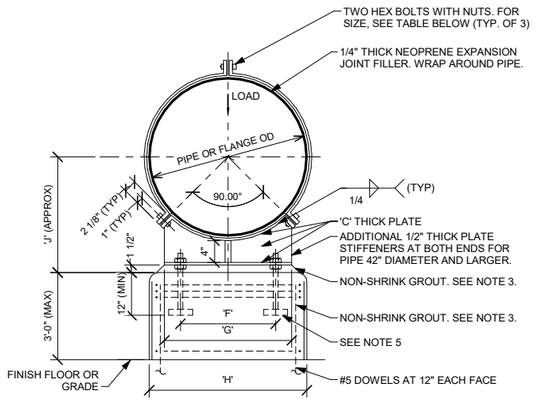
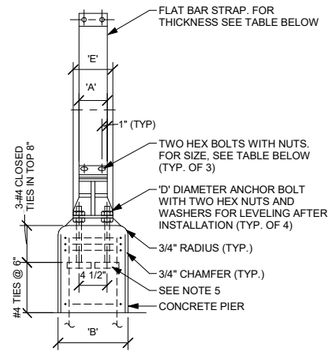


3 P703 VERTICAL PIPE SUPPORT DETAIL
SCALE: NONE



4 P703 PIPE SUPPORT WITH STRAP DETAIL
SCALE: NONE

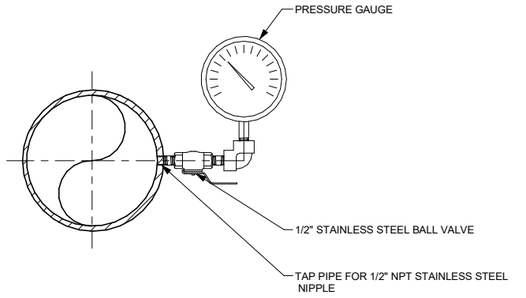


NOTES:

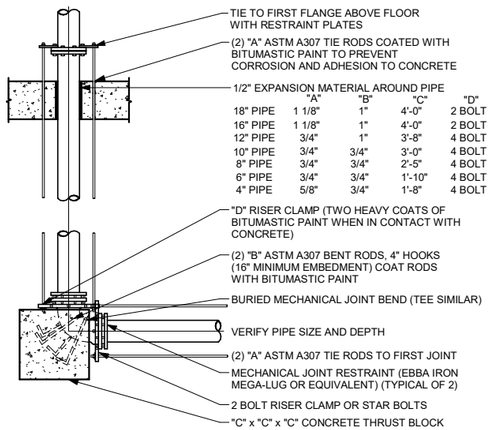
1. HOT DIP GALVANIZE PARTS AFTER FABRICATION.
2. WHEN SUPPORTING PIPE AND FLANGE ALTERNATELY ON THE SAME LINE, CONCRETE PIERS FOR PIPE SUPPORTS SHALL ALL HAVE THE SAME DIMENSION 'H' FOR FLANGE SUPPORT.
3. WHERE DIFFERENTIAL SETTLEMENT IS LIKELY TO OCCUR, OMIT GROUT AS DIRECTED BY THE ENGINEER.
4. WHERE DIRECTED BY THE STRUCTURAL ENGINEER, BOTTOM OF PIERS SHALL EXTEND BELOW BOTTOM OF SLAB.
5. ANCHOR BOLT OR CONCRETE ANCHOR WITH TWO NUTS AND ONE WASHER. PROVIDE 4X1/2X4" BAR WELDED TO BOLT (TYP. OF 4, MINIMUM)
6. WHERE PIPE SUPPORT OCCURS ON GRADE, REFER TO STRUCTURAL DRAWINGS FOR DETAILS.

DIMENSIONS IN INCHES

NOMINAL PIPE DIAMETER						STRAP		SUPPORTING							
								PIPE				FLANGE			
	'A'	'B'	'C'	'D'	'E'	BOLT SIZE	FLAT BAR	'F'	'G'	'H'	'J'	'F'	'G'	'H'	'J'
6	4	12	3/8	5/8	6	1/2	1/4	4 1/2	6	12	10	6 1/2	11	16	13
8	4	12	3/8	5/8	6	1/2	1/4	5	8	13	11	7 1/2	13	18	14
10	4	12	3/8	5/8	6	1/2	1/4	6	9	15	12	9	15	20	15
12	4	12	3/8	5/8	6	1/2	1/4	7	11	17	13	10	17	22	16
14	4	12	3/8	5/8	6	1/2	1/4	8	12	17	14	11	18	23	17
16	4	12	3/8	5/8	6	1/2	1/4	9	13	19	15	12	20	26	18
18	4	12	3/8	5/8	6	1/2	1/4	10	14	20	16	13	21	26	19
20	5	12	3/8	5/8	6	5/8	3/8	10	15	21	17	15	23	28	21
22	5	12	3/8	5/8	6	5/8	3/8	12	18	24	18	16	25	30	22
24	5	12	3/8	5/8	6	5/8	3/8	13	19	24	19	16	26	32	23
26	5	12	3/8	3/4	7	5/8	3/8	14	21	27	20	18	26	34	24
30	5	12	3/8	3/4	7	5/8	3/8	6	23	28	22	20	31	36	26
34	5	15	3/8	3/4	7	5/8	3/8	18	26	32	24	22	35	41	29
36	6	15	3/8	3/4	7	3/4	3/8	19	27	32	25	24	36	42	30
42	6	18	3/8	1	9	3/4	3/8	21	31	36	28	27	41	47	33
48	6	18	3/8	1	9	3/4	3/8	24	36	42	31	30	46	52	37
54	6	18	3/8	1	9	3/4	3/8	28	40	46	34	34	50	56	40
60	6	18	3/8	1 1/8	9	3/4	3/8	32	45	52	37	36	56	62	44
66	6	18	1/2	1 1/8	9	3/4	3/8	33	49	56	40	40	61	68	47
72	6	18	1/2	1 1/8	9	3/4	3/8	36	53	60	43	44	65	72	50



5 P703 AIR PRESSURE GAUGE DETAIL
SCALE: NONE



	"A"	"B"	"C"	"D"
18" PIPE	1 1/8"	1"	4'-0"	2 BOLT
16" PIPE	1 1/8"	1"	4'-0"	2 BOLT
12" PIPE	3/4"	1"	3'-8"	4 BOLT
10" PIPE	3/4"	3/4"	3'-0"	4 BOLT
8" PIPE	3/4"	3/4"	2'-5"	4 BOLT
6" PIPE	3/4"	3/4"	1'-10"	4 BOLT
4" PIPE	5/8"	3/4"	1'-8"	4 BOLT

6 P703 JOINT RESTRAINT DETAIL
SCALE: NONE

AE2S
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PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
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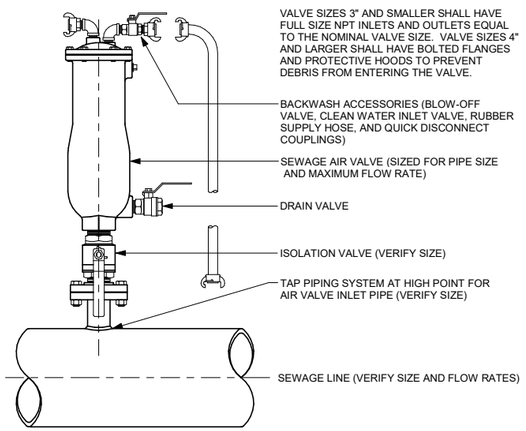
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

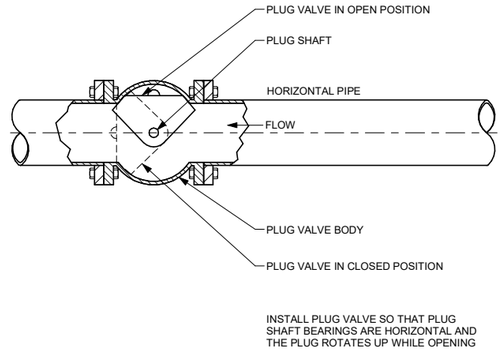
SHEET DESIGNATOR: **SD**

SHEET NO: **P703**

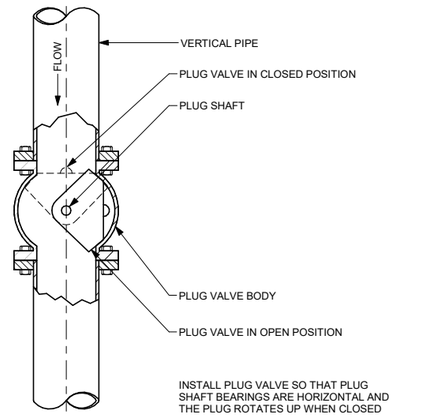
4/17/2026 5:58:22 PM



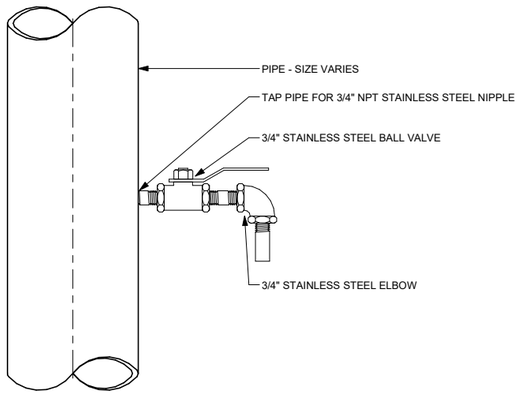
1 / P704 SEWAGE AIR / VACUUM RELEASE VALVE DETAIL
SCALE: NONE



2 / P704 PLUG VALVE HORIZONTAL INSTALLATION DETAIL
SCALE: NONE



3 / P704 PLUG VALVE VERTICAL INSTALLATION DETAIL
SCALE: NONE



4 / P704 SAMPLE TAP DETAIL - TYPE 2
SCALE: NONE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 12134498-2202
KELSEY WAGNER
04/17/2026
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	DESCRIPTION	APPR

REVISIONS

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PROCESS STANDARD DETAILS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: TWK
CHECKED BY: JBB
APPROVED BY: KCW

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT PROJECT NO: 00000-0000

SHEET DESIGNATOR: **SD**

SHEET NO: **P704**

Autodesk Docs://13139-2023-002 Eagle Mountain WWTP Expansion/EMWWTP_GEN-SD_OXD_v28.rvt
4/17/2026 5:58:23 PM

Rack/Slot	Point	Type	IS	Tagname	Description	EGU Lo	EGU Hi	EGU Tag	Signal
BMXCPS3500					POWER SUPPLY 120VAC				
RACK 0					MODICON M580 PROCESSOR, ETHERNET				
SLOT 0 AND 1									
BMEP582020									
RACK 0	0	DI		OXD-IRSW-P1-VFD1.YN	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
SLOT 2	1	DI		OXD-IRSW-P1-VFD1.YL	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 RUNNING	OFF	RUNNING		120VAC
BMXDAI1604	2	DI		OXD-IRSW-P1-VFD1.YA	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 FAULT	ALARM	NORMAL		120VAC
	3	DI		OXD-IRSW-P1-VFD1.TAH	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 OVERTEMP	ALARM	NORMAL		120VAC
	4	DI		OXD-IRSW-P1-VFD1.ZIO	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 DISCONNECT OPEN	OPEN	CLOSED		120VAC
	5	DI		OXD-IRSW-P2-VFD1.YN	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	6	DI		OXD-IRSW-P2-VFD1.YL	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 RUNNING	OFF	RUNNING		120VAC
	7	DI		OXD-IRSW-P2-VFD1.YA	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 FAULT	ALARM	NORMAL		120VAC
	8	DI		OXD-IRSW-P2-VFD1.TAH	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 OVERTEMP	ALARM	NORMAL		120VAC
	9	DI		OXD-IRSW-P2-VFD1.ZIO	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 DISCONNECT OPEN	OPEN	CLOSED		120VAC
	10	DI		OXD-IRSW-P3-VFD1.YN	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	11	DI		OXD-IRSW-P3-VFD1.YL	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 RUNNING	OFF	RUNNING		120VAC
	12	DI		OXD-IRSW-P3-VFD1.YA	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 FAULT	ALARM	NORMAL		120VAC
	13	DI		OXD-IRSW-P3-VFD1.TAH	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 OVERTEMP	ALARM	NORMAL		120VAC
	14	DI		OXD-IRSW-P3-VFD1.ZIO	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 DISCONNECT OPEN	OPEN	CLOSED		120VAC
	15	DI			WIRED SPARE				120VAC
RACK 0	0	DI		OSW-AER1-MXR1.YN	OXIDATION DITCH SWING ZONE AERATOR No. 1 MIXER IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
SLOT 3	1	DI		OSW-AER1-MXR1.YL	OXIDATION DITCH SWING ZONE AERATOR No. 1 MIXER RUNNING	OFF	RUNNING		120VAC
BMXDAI1604	2	DI		OSW-AER1-MXR1.YA	OXIDATION DITCH SWING ZONE AERATOR No. 1 MIXER FAULT	ALARM	NORMAL		120VAC
	3	DI		OSW-AER1-MXR1.ZIO	OXIDATION DITCH SWING ZONE AERATOR No. 1 MIXER DISCONNECT OPEN	OPEN	CLOSED		120VAC
	4	DI		OSW-AER1-BLW1.YN	OXIDATION DITCH SWING ZONE AERATOR No. 1 BLOWER IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	5	DI		OSW-AER1-BLW1.YL	OXIDATION DITCH SWING ZONE AERATOR No. 1 BLOWER RUNNING	OFF	RUNNING		120VAC
	6	DI		OSW-AER1-BLW1.YAH	OXIDATION DITCH SWING ZONE AERATOR No. 1 BLOWER OVERLOAD TRIPPED	ALARM	NORMAL		120VAC
	7	DI		OSW-AER1-BLW1.ZIO	OXIDATION DITCH SWING ZONE AERATOR No. 1 BLOWER DISCONNECT OPEN	OPEN	CLOSED		120VAC
	8	DI			WIRED SPARE				120VAC
	9	DI			WIRED SPARE				120VAC
	10	DI			WIRED SPARE				120VAC
	11	DI			WIRED SPARE				120VAC
	12	DI			WIRED SPARE				120VAC
	13	DI			WIRED SPARE				120VAC
	14	DI			WIRED SPARE				120VAC
	15	DI			WIRED SPARE				120VAC
RACK 0	0	DI		OSW-AER2-MXR1.YN	OXIDATION DITCH SWING ZONE AERATOR No. 2 MIXER IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
SLOT 4	1	DI		OSW-AER2-MXR1.YL	OXIDATION DITCH SWING ZONE AERATOR No. 2 MIXER RUNNING	OFF	RUNNING		120VAC
BMXDAI1604	2	DI		OSW-AER2-MXR1.YA	OXIDATION DITCH SWING ZONE AERATOR No. 2 MIXER FAULT	ALARM	NORMAL		120VAC
	3	DI		OSW-AER2-MXR1.ZIO	OXIDATION DITCH SWING ZONE AERATOR No. 2 MIXER DISCONNECT OPEN	OPEN	CLOSED		120VAC
	4	DI		OSW-AER2-BLW1.YN	OXIDATION DITCH SWING ZONE AERATOR No. 2 BLOWER IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	5	DI		OSW-AER2-BLW1.YL	OXIDATION DITCH SWING ZONE AERATOR No. 2 BLOWER RUNNING	OFF	RUNNING		120VAC
	6	DI		OSW-AER2-BLW1.YAH	OXIDATION DITCH SWING ZONE AERATOR No. 2 BLOWER OVERLOAD TRIPPED	ALARM	NORMAL		120VAC
	7	DI		OSW-AER2-BLW1.ZIO	OXIDATION DITCH SWING ZONE AERATOR No. 2 BLOWER DISCONNECT OPEN	OPEN	CLOSED		120VAC
	8	DI		OXD-IMLR-PV1.YN	IMLR FLOW CONTROL VALVE IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	9	DI		OXD-IMLR-PV1.YA	IMLR FLOW CONTROL VALVE FAULT	ALARM	NORMAL		120VAC
	10	DI		OXD-OSWT-PV1.ZIO	OSWT ISOLATION VALVE OPEN	CLOSED	OPEN		120VAC
	11	DI		OXD-OSWT-PV1.ZIC	OSWT ISOLATION VALVE CLOSED	OPEN	CLOSED		120VAC
	12	DI		OXD-OSWT-PV1.YN	OSWT ISOLATION VALVE IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	13	DI		OXD-OSWT-PV1.YA	OSWT ISOLATION VALVE FAULT	ALARM	NORMAL		120VAC
	14	DI			WIRED SPARE				120VAC
	15	DI			WIRED SPARE				120VAC
RACK 0	0	DI		OXD-SCP1.EA1	OXIDATION DITCH SUPERVISORY CONTROL PANEL UPS CIRCUIT AVAILABLE	ALARM	NORMAL		120VAC
SLOT 5	1	DI		OXD-SCP1.EA2	OXIDATION DITCH SUPERVISORY CONTROL PANEL NON-UPS CIRCUIT POWER AVAILABLE	ALARM	NORMAL		120VAC
BMXDAI1604	2	DI		OXD-SCP1.EA3	OXIDATION DITCH SUPERVISORY CONTROL PANEL 24VDC POWER SUPPLY No. 1 FAILURE	ALARM	NORMAL		120VAC
	3	DI		OXD-SCP1.EA4	OXIDATION DITCH SUPERVISORY CONTROL PANEL 120VAC UPS FAILURE	ALARM	NORMAL		120VAC
	4	DI		OXD-SCP1.XA	OXIDATION DITCH SUPERVISORY CONTROL PANEL SPD FAILURE	ALARM	NORMAL		120VAC
	5	DI			WIRED SPARE				120VAC
	6	DI			WIRED SPARE				120VAC
	7	DI			WIRED SPARE				120VAC
	8	DI			WIRED SPARE				120VAC
	9	DI			WIRED SPARE				120VAC
	10	DI		HW1-DP2-SPD1.XA	HW1 DISTRIBUTION PANEL No. 2 SPD FAILURE	ALARM	NORMAL		120VAC
	11	DI			WIRED SPARE				120VAC
	12	DI			WIRED SPARE				120VAC
	13	DI			WIRED SPARE				120VAC
	14	DI			WIRED SPARE				120VAC
	15	DI			WIRED SPARE				120VAC

Rack/Slot	Point	Type	IS	Tagname	Description	EGU Lo	EGU Hi	EGU Tag	Signal
RACK 0	0	RO		OXD-IRSW-P1-VFD1.MC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 REQUIRED	OFF	REQUIRED		RELAY
SLOT 6	1	RO		OXD-IRSW-P2-VFD1.MC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 REQUIRED	OFF	REQUIRED		RELAY
BMXDRA1605	2	RO		OXD-IRSW-P3-VFD1.MC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 REQUIRED	OFF	REQUIRED		RELAY
	3	RO		OSW-AER1-MXR1.MC	OXIDATION DITCH SWING ZONE AERATOR No. 1 MIXER REQUIRED	OFF	REQUIRED		RELAY
	4	RO		OSW-AER1-BLW1.MC	OXIDATION DITCH SWING ZONE AERATOR No. 1 BLOWER REQUIRED	OFF	REQUIRED		RELAY
	5	RO		OSW-AER2-MXR1.MC	OXIDATION DITCH SWING ZONE AERATOR No. 2 MIXER REQUIRED	OFF	REQUIRED		RELAY
	6	RO		OSW-AER2-BLW1.MC	OXIDATION DITCH SWING ZONE AERATOR No. 2 BLOWER REQUIRED	OFF	REQUIRED		RELAY
	7	RO		OXD-OSWT-PV1.ZCO	OSWT ISOLATION VALVE OPEN COMMAND	CLOSE	OPEN		RELAY
	8	RO			WIRED SPARE				RELAY
	9	RO			WIRED SPARE				RELAY
	10	RO			WIRED SPARE				RELAY
	11	RO			WIRED SPARE				RELAY
	12	RO			WIRED SPARE				RELAY
	13	RO			WIRED SPARE				RELAY
	14	RO			WIRED SPARE				RELAY
	15	RO			WIRED SPARE				RELAY
RACK 0	0	AI		OXD-IRSW-FIT1.FI	OXIDATION DITCH INTERNAL RECYCLE & SWING FLOW	0.0	XX.X	GPM	4-20 mA
SLOT 7	1	AI		OSW-OSWT-FIT1.FI	OXIDATION DITCH SWING ZONE INFLUENT FLOW	0.0	XX.X	GPM	4-20 mA
BMXAMI0810	2	AI	X	OXD-LIT1.LI	OXIDATION DITCH LEVEL	0.0	XX.X	FT	4-20 mA
	3	AI	X	OSW-LIT1.LI	OXIDATION DITCH SWING ZONE LEVEL	0.0	XX.X	FT	4-20 mA
	4	AI		OSW-AIT1.AI1	OXIDATION DITCH SWING ZONE DISSOLVED OXYGEN	0.0	XX.X	MG/L	4-20 mA
	5	AI		OSW-AIT1.AI2	OXIDATION DITCH SWING ZONE OXIDATION REDUCTION POTENTIAL	0.0	XX.X	MV	4-20 mA
	6	AI		OSW-AIT2.AI1	OXIDATION DITCH SWING ZONE NITRATE	0.0	XX.X	MG/L	4-20 mA
	7	AI							4-20 mA
RACK 0	0	AI		OXD-IRSW-P1-VFD1.SI	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 SPEED FEEDBACK	0.0	60.0	HZ	4-20 mA
SLOT 8	1	AI		OXD-IRSW-P2-VFD1.SI	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 SPEED FEEDBACK	0.0	60.0	HZ	4-20 mA
BMXAMI0810	2	AI		OXD-IRSW-P3-VFD1.SI	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 SPEED FEEDBACK	0.0	60.0	HZ	4-20 mA
	3	AI			WIRED SPARE				4-20 mA
	4	AI			WIRED SPARE				4-20 mA
	5	AI			WIRED SPARE				4-20 mA
	6	AI			WIRED SPARE				4-20 mA
	7	AI			WIRED SPARE				4-20 mA
RACK 0	0	AI		OXD-IMLR-PV1.ZI	IMLR FLOW CONTROL VALVE POSITION INDICATION	0.0	100.0	%	4-20 mA
SLOT 9	1	AI			WIRED SPARE				4-20 mA
BMXAMI0810	2	AI			WIRED SPARE				4-20 mA
	3	AI			WIRED SPARE				4-20 mA
	4	AI			WIRED SPARE				4-20 mA
	5	AI			WIRED SPARE				4-20 mA
	6	AI			WIRED SPARE				4-20 mA
	7	AI			WIRED SPARE				4-20 mA
RACK 0	0	AO		OXD-IRSW-P1-VFD1.SC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 1 SPEED COMMAND	0.0	100.0	%	4-20 mA
SLOT 10	1	AO		OXD-IRSW-P2-VFD1.SC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 2 SPEED COMMAND	0.0	100.0	%	4-20 mA
BMXAMO0802	2	AO		OXD-IRSW-P3-VFD1.SC	OXIDATION DITCH INTERNAL RECYCLE & SWING PUMP No. 3 SPEED COMMAND	0.0	100.0	%	4-20 mA
	3	AO		OXD-IMLR-PV1.ZC	IMLR FLOW CONTROL VALVE POSITION COMMAND	0.0	100.0	%	4-20 mA
	4	AO			WIRED SPARE				4-20 mA
	5	AO			WIRED SPARE				4-20 mA
	6	AO			WIRED SPARE				4-20 mA
	7	AO			WIRED SPARE				4-20 mA
RACK 0					SLOT FILLER				
SLOT 11									
BMXXEM010									

1 E601 **PLC IO SCHEDULE**
OXD-SCP1

AE2S
Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

APPR	DATE	SYM

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

PROJECT TITLE:

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **PLC IO SCHEDULE - OXD SCP1**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **E601**

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Schedules.dwg
Plotted By: Ian Smith Date: Friday, April 17, 2026

Rack/Slot	Point	Type	IS	Tagname	Description	EGU Lo	EGU Hi	EGU Tag	Signal
BMXCPS3500					POWER SUPPLY 120VAC				
RACK 0					MODICON M580 PROCESSOR, ETHERNET				
SLOT 0 AND 1									
BMEP582020									
RACK 0	0	DI		TTF-P1-VFD1.YN	TTF PLANT WATER PUMP IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
SLOT 2	1	DI		TTF-P1-VFD1.YL	TTF PLANT WATER PUMP RUNNING	OFF	RUNNING		120VAC
BMXDAI1604	2	DI		TTF-P1-VFD1.YA	TTF PLANT WATER PUMP FAULT	ALARM	NORMAL		120VAC
	3	DI		TTF-BFV1.YN	TTF FLOW CONTROL VALVE IN AUTO / REMOTE	MANUAL	IN AUTO		120VAC
	4	DI		TTF-BFV1.YA	TTF FLOW CONTROL VALVE FAULT	ALARM	NORMAL		120VAC
	5	DI		TTF-ASMP1.YA	TTF AUTOSAMPLER GENERAL ALARM	ALARM	NORMAL		120VAC
	6	DI			WIRED SPARE				120VAC
	7	DI			WIRED SPARE				120VAC
	8	DI			WIRED SPARE				120VAC
	9	DI			WIRED SPARE				120VAC
	10	DI			WIRED SPARE				120VAC
	11	DI			WIRED SPARE				120VAC
	12	DI			WIRED SPARE				120VAC
	13	DI			WIRED SPARE				120VAC
	14	DI			WIRED SPARE				120VAC
	15	DI			WIRED SPARE				120VAC
RACK 0	0	DI		TTF-SCP1.EA1	OXIDATION DITCH SUPERVISORY CONTROL PANEL UPS CIRCUIT AVAILABLE	ALARM	NORMAL		120VAC
SLOT 3	1	DI		TTF-SCP1.EA2	OXIDATION DITCH SUPERVISORY CONTROL PANEL NON-UPS CIRCUIT POWER AVAILABLE	ALARM	NORMAL		120VAC
BMXDAI1604	2	DI		TTF-SCP1.EA3	OXIDATION DITCH SUPERVISORY CONTROL PANEL 24VDC POWER SUPPLY No. 1 FAILURE	ALARM	NORMAL		120VAC
	3	DI		TTF-SCP1.EA4	OXIDATION DITCH SUPERVISORY CONTROL PANEL 120VAC UPS FAILURE	ALARM	NORMAL		120VAC
	4	DI		TTF-SCP1.XA	OXIDATION DITCH SUPERVISORY CONTROL PANEL SPD FAILURE	ALARM	NORMAL		120VAC
	5	DI			WIRED SPARE				120VAC
	6	DI			WIRED SPARE				120VAC
	7	DI			WIRED SPARE				120VAC
	8	DI			WIRED SPARE				120VAC
	9	DI			WIRED SPARE				120VAC
	10	DI		TTF-DP1-SPD1.XA	TTF DISTRIBUTION PANEL No. 1 SPD FAILURE	ALARM	NORMAL		120VAC
	11	DI		TTF-LP1-SPD1.XA	TTF LIGHTING PANEL No. 1 SPD FAILURE	ALARM	NORMAL		120VAC
	12	DI		TTF-MSH1.YL	TTF BUILDING HUMIDISTAT ACTIVATED	NORMAL	ACTIVATED		120VAC
	13	DI		TTF-TSH1.YL	TTF BUILDING THERMOSTAT ACTIVATED	NORMAL	ACTIVATED		120VAC
	14	DI			WIRED SPARE				120VAC
	15	DI			WIRED SPARE				120VAC
RACK 0	0	RO		TTF-P1-VFD1.MC	TTF PLANT WATER PUMP REQUIRED	OFF	REQUIRED		RELAY
SLOT 4	1	RO			WIRED SPARE				RELAY
BMXDRA1605	2	RO			WIRED SPARE				RELAY
	3	RO			WIRED SPARE				RELAY
	4	RO			WIRED SPARE				RELAY
	5	RO			WIRED SPARE				RELAY
	6	RO			WIRED SPARE				RELAY
	7	RO			WIRED SPARE				RELAY
	8	RO			WIRED SPARE				RELAY
	9	RO			WIRED SPARE				RELAY
	10	RO			WIRED SPARE				RELAY
	11	RO			WIRED SPARE				RELAY
	12	RO			WIRED SPARE				RELAY
	13	RO			WIRED SPARE				RELAY
	14	RO			WIRED SPARE				RELAY
	15	RO			WIRED SPARE				RELAY

Rack/Slot	Point	Type	IS	Tagname	Description	EGU Lo	EGU Hi	EGU Tag	Signal
RACK 0	0	AI		TTF-P1-VFD1.SI	TTF PLANT WATER PUMP SPEED FEEDBACK	0.0	60.0	HZ	4-20 mA
SLOT 5	1	AI		TTF-FIT1.FI	TTF FILTER INFLUENT FLOW	0.0	XX.X	GPM	4-20 mA
BMXAMI0810	2	AI		TTF-EFF-AIT1.AE1	TTF EFFLUENT TURBIDITY	0.0	XX.X	NTU	4-20 mA
	3	AI		TTF-PIT1.PI	TTF EFFLUENT PRESSURE	0.0	XX.X	PSI	4-20 mA
	4	AI			WIRED SPARE				4-20 mA
	5	AI			WIRED SPARE				4-20 mA
	6	AI			WIRED SPARE				4-20 mA
	7	AI			WIRED SPARE				4-20 mA
RACK 0	0	AI		TTF-BFV1.ZI	TTF FLOW CONTROL VALVE POSITION INDICATION	0.0	100.0	%	4-20 mA
SLOT 6	1	AI		TTF-TIT1.TI	TTF BUILDING OUTSIDE AIR TEMPERATURE	0.0	XX.X	°F	4-20 mA
BMXAMI0810	2	AI			WIRED SPARE				4-20 mA
	3	AI			WIRED SPARE				4-20 mA
	4	AI			WIRED SPARE				4-20 mA
	5	AI			WIRED SPARE				4-20 mA
	6	AI			WIRED SPARE				4-20 mA
	7	AI			WIRED SPARE				4-20 mA
RACK 0	0	AO		TTF-P1-VFD1.SC	TTF PLANT WATER PUMP SPEED COMMAND	0.0	100.0	%	4-20 mA
SLOT 7	1	AO		TTF-BFV1.ZC	TTF FLOW CONTROL VALVE POSITION COMMAND	0.0	100.0	%	4-20 mA
BMXAMO0802	2	AO		TTF-ASMP1.FC	TTF AUTOSAMPLER FLOW PACE COMMAND	0.0	XX.X	GPM	4-20 mA
	3	AO			WIRED SPARE				4-20 mA
	4	AO			WIRED SPARE				4-20 mA
	5	AO			WIRED SPARE				4-20 mA
	6	AO			WIRED SPARE				4-20 mA
	7	AO			WIRED SPARE				4-20 mA
RACK 0					SLOT FILLER				
SLOT 8									
BMXXEM010									
RACK 0					SLOT FILLER				
SLOT 9									
BMXXEM010									
RACK 0					SLOT FILLER				
SLOT 10									
BMXXEM010									
RACK 0					SLOT FILLER				
SLOT 11									
BMXXEM010									

1 E602 **PLC IO SCHEDULE**
TTF-SCP1

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
Cody Shevich
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR
1	04-28-26	CJS
		ADDENDUM #1

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PLC IO SCHEDULE - TTF SCP1

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**
SHEET NO: **E602**

File: W:\E\Eagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Schedules.dwg
Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

File: W:\Eagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Schedules.dwg

ELECTRICAL INSTRUMENTATION SCHEDULE				
TAG ID	TYPE	SPECIFICATION	DETAIL	REMARKS
OSW-OSWT-FIT1	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	407100		INTEGRAL TRANSMITTER
OSW-OSWT-FE1	ELECTROMAGNETIC FLOWMETER ELEMENT	407100		0 x DN INLET/OUTLET
OXD-IRSW-FIT1	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	407100		INTEGRAL TRANSMITTER
OXD-IRSW-FE1	ELECTROMAGNETIC FLOWMETER ELEMENT	407100		0 x DN INLET/OUTLET
OSW-LIT1	RADAR LEVEL TRANSMITTER	407200	RADAR LEVEL TRANSMITTER DETAIL	
OXD-LIT1	RADAR LEVEL TRANSMITTER	407200	RADAR LEVEL TRANSMITTER DETAIL	
HW1-AIT1	ANALYTICAL TRANSMITTER	407500		
HW1-AIT1-AE1	ANALYTICAL ELEMENT - pH	407500	PH SENSOR MOUNTING DETAIL	
OSW-AIT2	ANALYTICAL TRANSMITTER	407500		
OSW-AIT2-AE1	ANALYTICAL ELEMENT - NITRATE	407500	DO / ORP / NITRATE SENSOR MOUNTING DETAIL	
OSW-AIT1	ANALYTICAL TRANSMITTER	407500		
OSW-AIT1-AE1	ANALYTICAL ELEMENT - DISSOLVED OXYGEN	407500	DO / ORP / NITRATE SENSOR MOUNTING DETAIL	
OSW-AIT1-AE2	ANALYTICAL ELEMENT - OXIDATION REDUCTION POTENTIAL	407500	DO / ORP / NITRATE SENSOR MOUNTING DETAIL	

1 / E603 **INSTRUMENTATION SCHEDULE**

JUNCTION BOX / LOCAL CONTROL STATION SCHEDULE						
JUNCTION BOX / LOCAL CONTROL STATION TAG		OSW-AER1-LCS1	OSW-AER2-LCS1	OXD-IRSW-P1-LCS1	OXD-IRSW-P2-LCS1	OXD-IRSW-P3-LCS1
HEIGHT (IN)		8	8	8	8	8
WIDTH (IN)		6	6	6	6	6
DEPTH (IN)		4	4	4	4	4
NEMA RATING		4X	4X	4X	4X	4X
TERMINAL BLOCKS (QTY)		15	15	15	15	15
HAND-OFF-REMOTE SWITCHES (QTY)		2	2	1	1	1
CIRCUIT TYPE	4-20mA					
	24VDC					
	120VAC	X	X	X	X	X
	480VAC					
ASSOCIATED CABLE AND CONDUIT TAG'S		OSW-AER1	OSW-AER2	OXD-IRSW-P1	OXD-IRSW-P2	OXD-IRSW-P3

1 / E603 **JBOX AND CONTROL STATION SCHEDULE**

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. REFER TO THE FLOWMETER SCHEDULE WITHIN THE PROCESS SHEETS FOR ALL FLOWMETER FLOW TUBE DIAMETERS.
2. SOME OF THE DETAILS LISTED ON THIS SHEET ARE LOCATED WITHIN THE PROCESS STANDARD DETAIL SHEETS.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
VARIOUS SCHEDULES

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A
SHEET DESIGNATOR: **SD**
SHEET NO: **E603**

Plotted By: Ian Smith Date: Friday, April 17, 2026

File: W:\E\Eagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Schedules.dwg

PANEL SCHEDULE

PANEL: TTF-DP1B LOCATION: TTF BUILDING VOLTS: 480 / 277 PHASE: 3 W: 4

AMP MAIN BKR: 125 AIC RATING: 42,000 MOUNT: SURFACE FED FROM: TTF-DP1

CIRCUIT DESCRIPTION	LOAD VA	CKT. BKR.	P	CKT. No.	PH.	CKT. No.	P	CKT. BKR.	LOAD VA	CIRCUIT DESCRIPTION
				1	A	2				
FUTURE DISC FILTER	11000	60	3	3	B	4	3	20	2500	UV-HSC2
				5	C	6				
				7	A	8				
SPARE		15	3	9	B	10	3	15	1000	WEIR GATE
				11	C	12				
				13	A	14				
TTF-EF1-VFD1	1700	15	3	15	B	16	3	15	1000	FUTURE WEIR GATE
				17	C	18				
				19	A	20				
TTF-EF2-VFD1	1700	15	3	21	B	22	3	15	1000	TTF-BFV1
				23	C	24				
				25	A	26				
TTF-EF3-VFD1	1700	15	3	27	B	28				
				29	C	30				
				31	A	32				
				33	B	34				
				35	C	36				
				37	A	38				
				39	B	40				
				41	C	42				

CONNECTED TOTALS: KVA 22 AMPS 26

NOTES:
- ALL CIRCUIT BREAKERS SHALL BE LOCKABLE IN THE OFF POSITION
- EXISTING LOAD VA VALUES ARE ESTIMATES, TO BE CONFIRMED IN FIELD

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
PANEL SCHEDULE - TTF

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

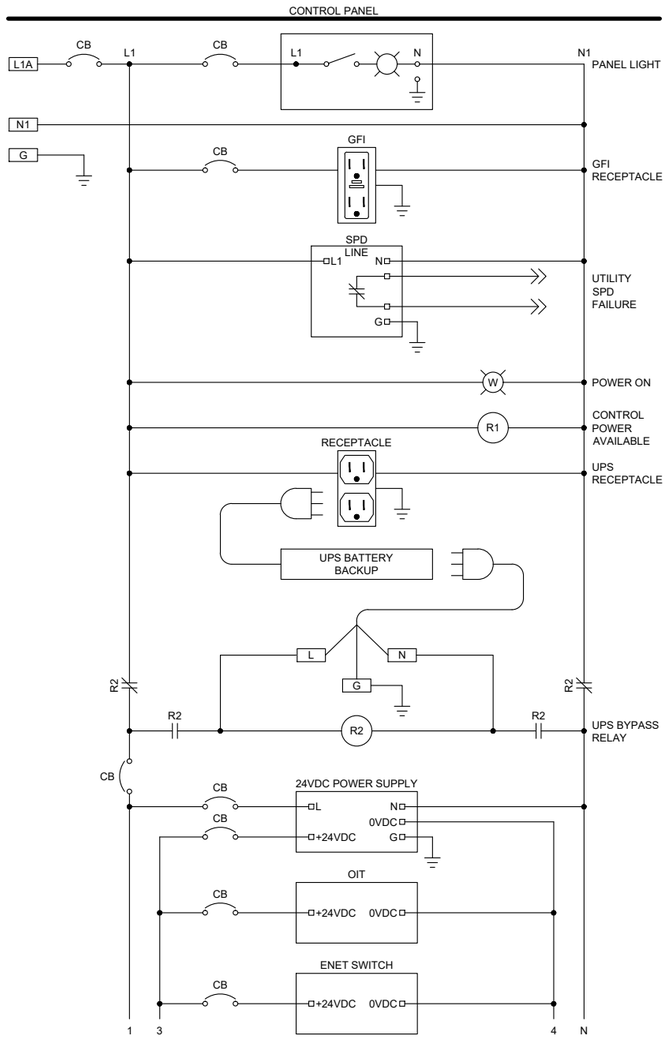
PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: SD

SHEET NO: E604

Plotted By: Ian Smith Date: Friday, April 17, 2026

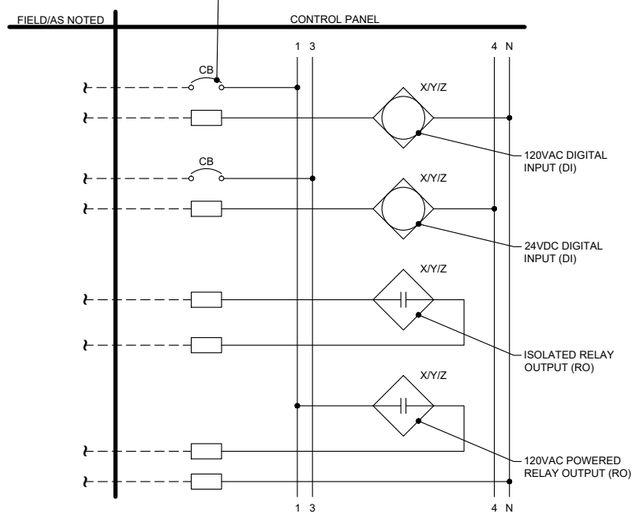
File: W:\EE\Eagle Mountain\13139-2023-002\CAD Dwg\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Wiring Diagrams.dwg



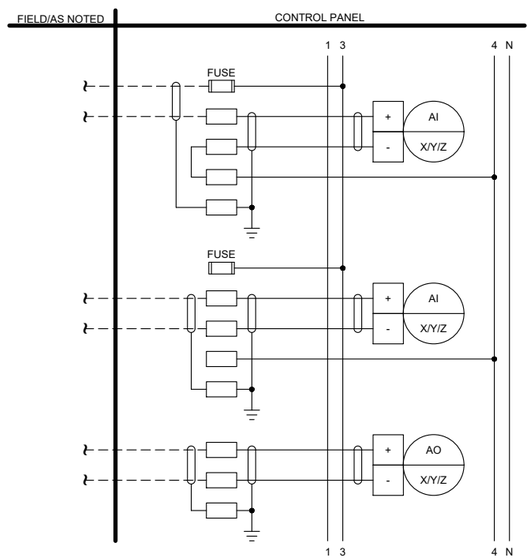
1 **E605** **PANEL POWER SCHEMATIC**
SCALE: NONE

NOTE(S):

- PROVIDE ONE (1) CIRCUIT BREAKER FOR INPUTS COMING FROM A COMMON PIECE OF EQUIPMENT.
- PROVIDE ONE (1) SPARE WIRED FUSE FOR EVERY FOUR (4) SPARE DIGITAL INPUTS AS A MAXIMUM. THOSE SPARE FUSES MUST BE LOCATED NEXT TO EACH OTHER ON A SINGLE INPUT CARD OTHERWISE ANOTHER FUSE SHALL BE PROVIDED.
- ALL I/O DIGITAL INPUTS THAT ARE FROM EQUIPMENT AND INSTRUMENTS OUTSIDE THE BUILDING WALLS CONTAINING THE CONTROL PANEL SHALL BE THROUGH INTERPOSING RELAYS AND THE FIELD VOLTAGE SHALL BE 120VAC.

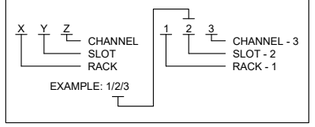


2 **E605** **DIGITAL SCHEMATIC**
SCALE: NONE



3 **E605** **ANALOG SCHEMATIC**
SCALE: NONE

CONTROL LABELING REFERENCE



POWER RAIL LEGEND

CALLOUT	DESCRIPTION
L1,N1	120VAC NON-UPS POWER
1,N	120VAC UPS POWER
3,4	24VDC UPS POWER

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

APPR	DATE	SYM

PROJECT TITLE:

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:

VARIOUS WIRING SCHEMATICS

CLIENT:

EAGLE MOUNTAIN CITY

EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **E605**

Plotted By: Ian Smith Date: Friday, April 17, 2026

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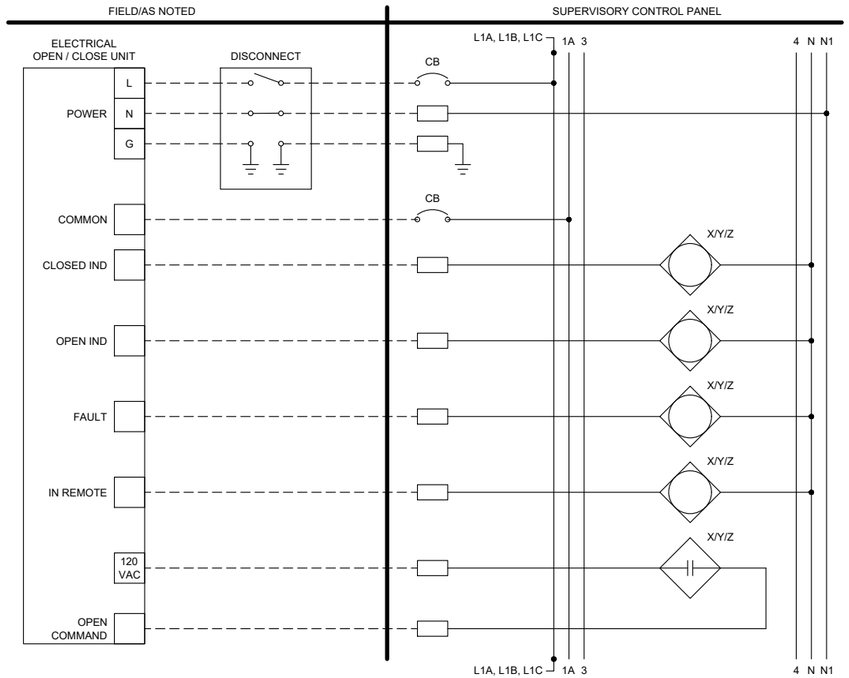
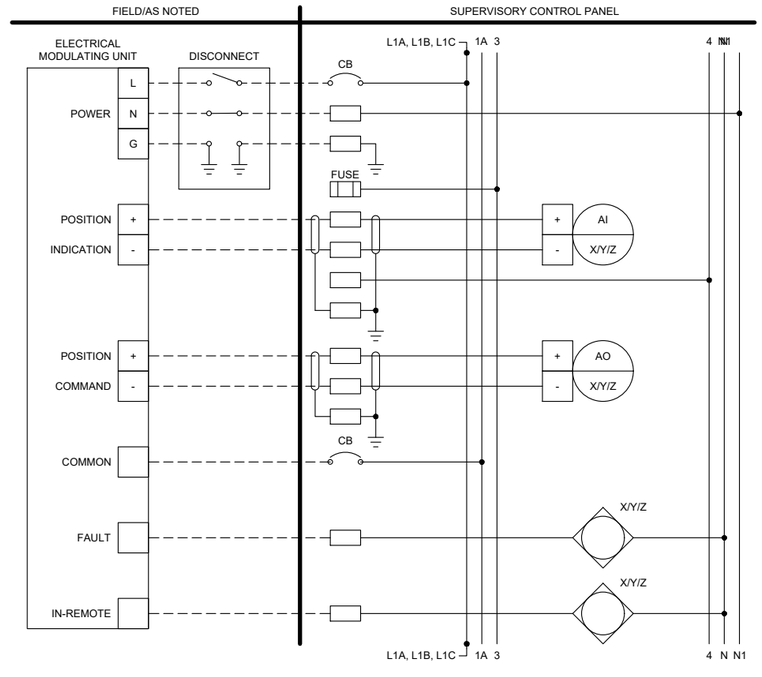


1 E606 **ELECTRIC OPEN / CLOSE VALVE SCHEMATIC**
SCALE: NONE



2 E606 **ELECTRIC MODULATING VALVE SCHEMATIC**
SCALE: NONE

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: **ISSUED FOR GMP (NOT FOR CONSTRUCTION)**

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
VARIOUS WIRING SCHEMATICS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

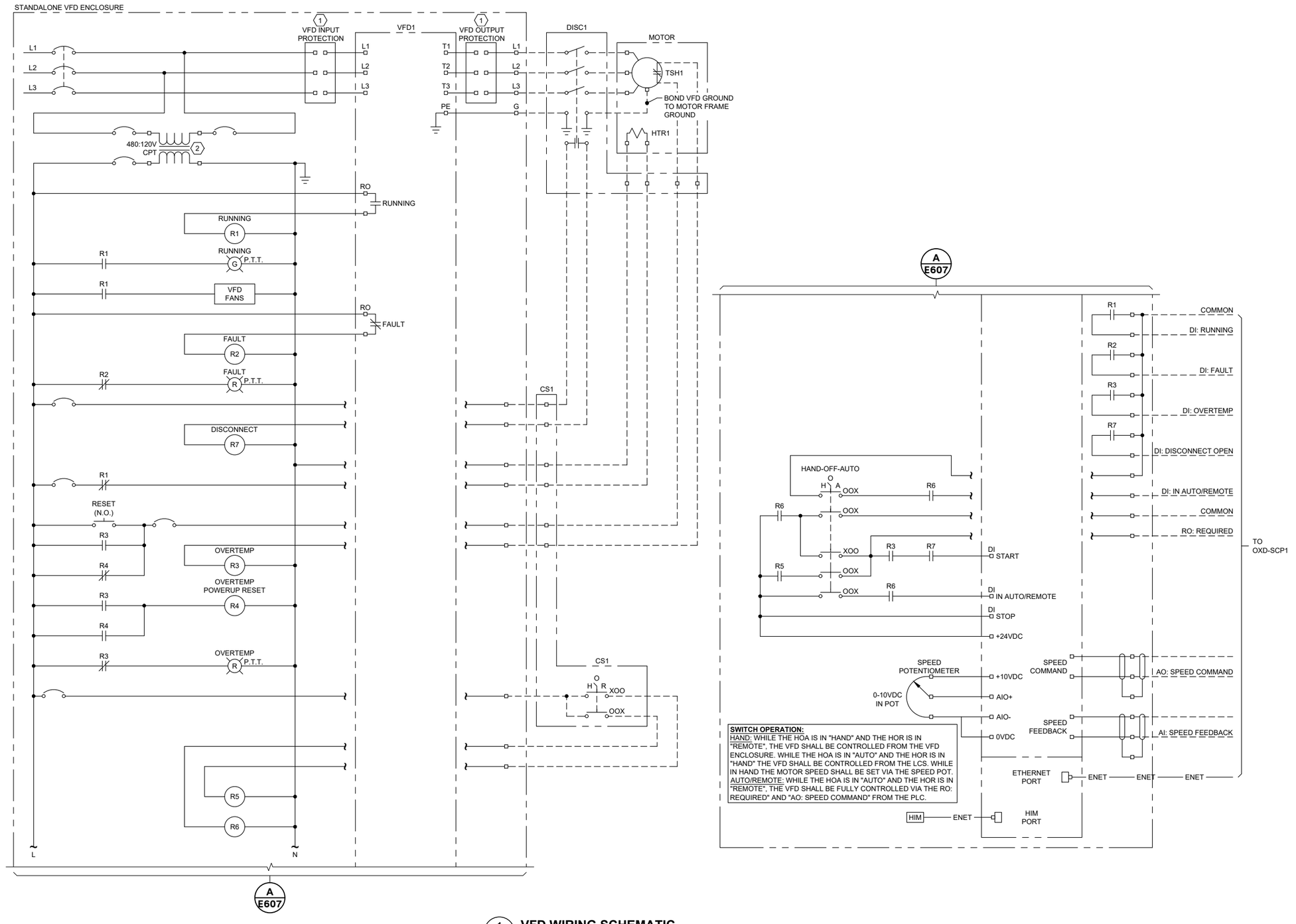
PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**
SHEET NO: **E606**

Plotted By: Ian Smith Date: Friday, April 17, 2026

File: W:\EEagle Mountain\13139-2023-002\CAD Dwg\00-Electric\#Autocad\Plan Sheets\Oxidation Ditch CAD Files\E-Various Wiring Diagrams.dwg



1 / E607 VFD WIRING SCHEMATIC
OXD-IRSW-P1-VFD1, OXD-IRSW-P2-VFD1, OXD-IRSW-P3-VFD1

Plotted By: Ian Smith Date: Friday, April 17, 2026

AE2S
Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

GENERAL NOTES

1. UTILIZE I/O EXPANSION MODULES AS REQUIRED.

CONSTRUCTION NOTES

1. REFER TO ONE-LINE DIAGRAMS AND SPECIFICATIONS (26 29 23) FOR INPUT AND OUTPUT FILTER REQUIREMENTS.
2. CONTROL POWER TRANSFORMER (CPT) SHALL BE SIZED ADEQUATELY TO ACCOUNT FOR THE ADDITIONAL LOADING FROM THE MOTOR CONDENSATION HEATER.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES
Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
VFD WIRING SCHEMATICS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

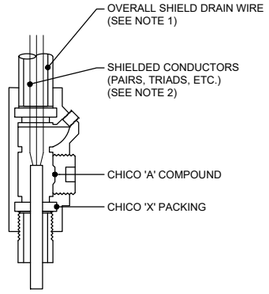
SHEET DESIGNATOR: **SD**
SHEET NO: **E607**

File: W:\EEagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheet\Oxidation Ditch CAD Files\E-Various Details.dwg

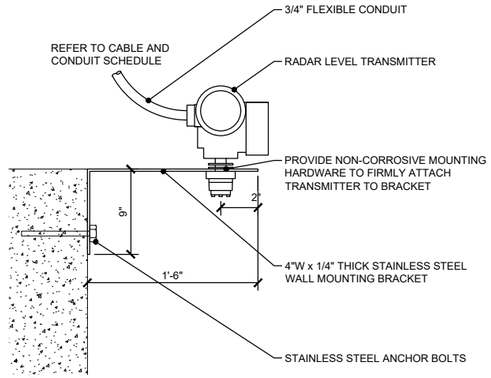
GENERAL NOTES

1. PROTECT SHIELD FOIL FROM CONTACTING CONNECTOR BODY. SHRINK TUBE TO BE APPLIED TO FULL LENGTH OF EXPOSED DRAIN WIRE.
2. SHIELDED AND TWISTED PAIR INSTRUMENTATION AND COMMUNICATION CABLES SUCH AS CAT5/6 ETHERNET, PROFIBUS, MODBUS, AND SIMILAR CABLE TYPES SHALL NOT REQUIRE THE REMOVAL OF THE SHIELDING MATERIAL OR UNTWISTING OF THE TWISTED PAIRS, AS EXCEPTED UNDER ARTICLE 501-15 OF THE NEC. SHIELDING MATERIAL MUST BE PREVENTED FROM UNWRAPPING.

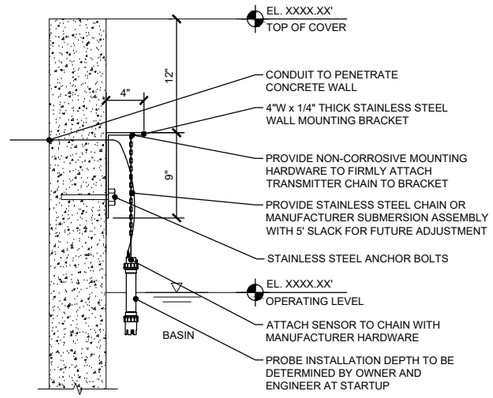
NOTE: ELECTRICAL CONTRACTOR SHALL VERIFY THAT ONLY QUALIFIED INDIVIDUALS ARE TASKED WITH SEAL INSTALLATION. SEALS ARE SUBJECT TO RANDOM QA INSPECTION.



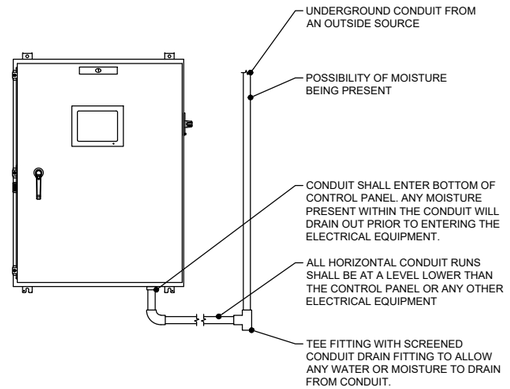
1 E701 CONDUIT SEAL DETAIL
SCALE: NONE
EQPM074



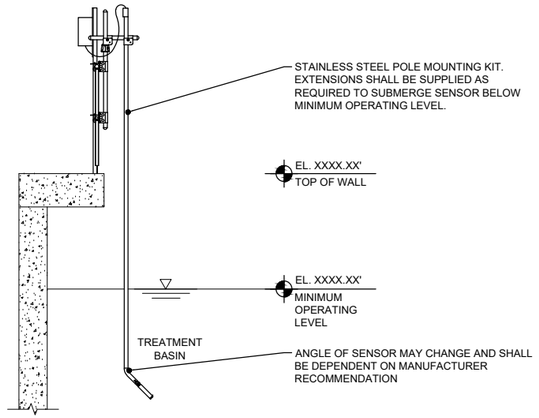
2 E701 RADAR LEVEL TRANSMITTER DETAIL
SCALE: NONE
EQPM093



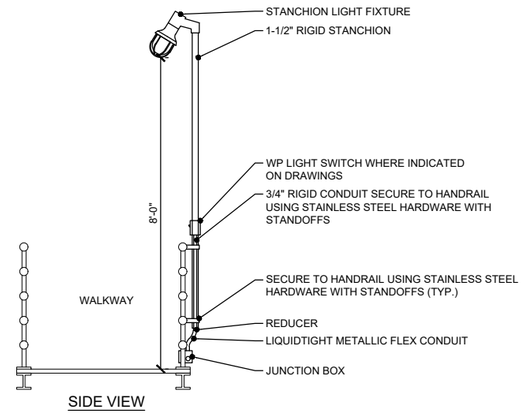
3 E701 pH SENSOR MOUNTING DETAIL
SCALE: NONE



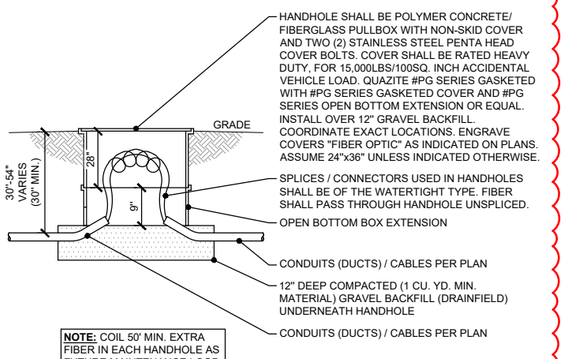
4 E701 CONDUIT 'DRAINAGE' TEE DETAIL
SCALE: NONE
EQPM020



5 E701 DO / ORP / NITRATE SENSOR MOUNTING DETAIL
SCALE: NONE
EQPM100



6 E701 STANCHION LIGHT FIXTURE DETAIL
SCALE: NONE
LGHT013



NOTE: COIL 50' MIN. EXTRA FIBER IN EACH HANDHOLE AS FUTURE MAINTENANCE LOOP.

7 E701 HANDHOLE DETAIL
SCALE: NONE
EQPM005

1

Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

AE2S

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY J. SHEVICH
04-17-26
STATE OF UTAH

STATUS	DATE	SYM	APPR
ISSUED FOR GMP (NOT FOR CONSTRUCTION)	04-28-26	1	CJS
ADDENDUM #1			

EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

PROJECT TITLE:

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE: **STANDARD DETAILS**

CLIENT: **EAGLE MOUNTAIN CITY**
EAGLE MOUNTAIN CITY, UTAH

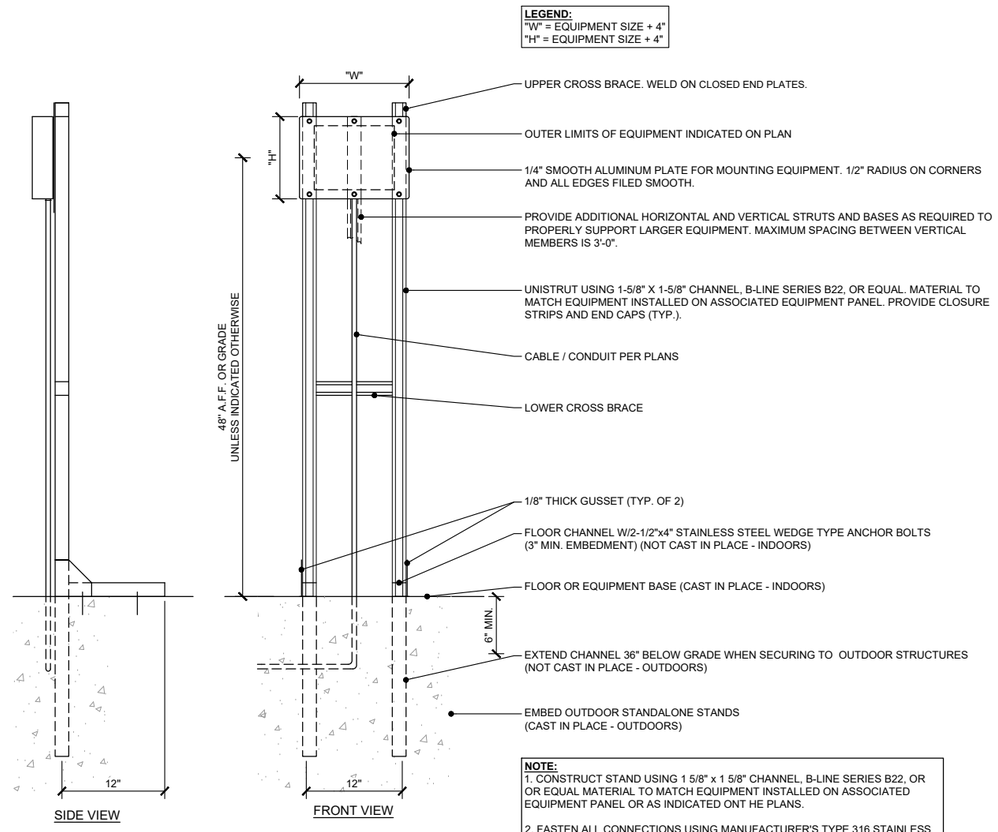
PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CDH

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **E701**

File: W:\EEagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad Plan Sheets\Oxidation Ditch CAD Files\E-\Various Details.dwg



NOTE:
1. CONSTRUCT STAND USING 1 5/8" x 1 5/8" CHANNEL, B-LINE SERIES B22, OR OR EQUAL MATERIAL TO MATCH EQUIPMENT INSTALLED ON ASSOCIATED EQUIPMENT PANEL OR AS INDICATED ONT HE PLANS.

2. FASTEN ALL CONNECTIONS USING MANUFACTURER'S TYPE 316 STAINLESS STEEL CONNECTORS & STAINLESS STEEL BOLTS, WASHERS, AND NUTS.

3. ANCHOR BOLTS OF SIZE, EMBEDMENT, AND TYPE PER MFR RECOMMENDATIONS FOR EQUIPMENT WEIGHTS AND FLOOR CONSTRUCTION.

1 / E702 **STRUT MOUNTING STAND DETAIL**
SCALE: NONE

EQPM011

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
STANDARD DETAILS

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **E702**

Plotted By: Ian Smith Date: Friday, April 17, 2026

File: W:\EEagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad Plan Sheets\Oxidation Ditch CAD Files\E-Cable and Conduit Schedule.dwg

CABLE AND CONDUIT SCHEDULE - OXIDATION DITCH

TAGNAME	IDENTIFIER	CONDUIT QTY	CONDUIT SIZE	COMBINED CONDUIT ID	SERVICE RATING VOLT	SERVICE RATING PHASE	CONDUCTORS # OF	PARALLEL SETS CURRENT CARRYING QTY	TYPE	SIZE	NTRL	GND	FROM	TO	NOTES CABLE TYPE
HW1-AIT1	A	1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	CP-HW	HW1-AIT1	TYPE S1
	B	1	3/4"		MANUFACTURER PROVIDED CABLE								HW1-AIT1	HW1-AIT1-AE1	-
HW1-ASMP1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	LP-HW	HW1-ASMP1	TYPE P1
	B	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	HW1-ASMP1	CP-HW	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	HW1-ASMP1	CP-HW	TYPE S1
HW1-DP2	A	1	3-1/2"		277/480	3	1	3	1/C	#500	#500	#3	DP-HW	HW1-DP2	TYPE P1
	B	1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	HW1-DP2 (SPD1)	OXD-SCP1	TYPE P1
OSW-AER1	A	1	1-1/2"		480	3	1	3	1/C	#2	-	#6	HW1-DP2	OSW-AER1-CP1	TYPE P1
	B	1	3/4"		CONTROL	-	-	14	1/C	#14	-	-	OSW-AER1-CP1	OSW-SCP1	TYPE P1
	C	1	1"		480	3	1	3	1/C	#6	-	#8	OSW-AER1-CP1	OSW-AER1-MXR1-DISC1	TYPE P2
	D	1	3/4"		480	3	1	3	1/C	#12	-	#12	OSW-AER1-CP1	OSW-AER1-BLW1-DISC1	TYPE P2
	E	1	1"		CONTROL	-	-	1	12/C	#14	-	-	OSW-AER1-CP1	OSW-AER1-LCS1	TYPE C1
	F	1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	OSW-AER1-LCS1	OSW-AER1-DISC1	TYPE P1
	G	1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	OSW-AER1-LCS1	OSW-AER1-DISC2	TYPE P1
	H	1	1"		480	3	1	3	1/C	#6	-	#8	OSW-AER1-MXR1-DISC1	OSW-AER1-MXR1	TYPE P2
	I	1	3/4"		480	3	1	3	1/C	#12	-	#12	OSW-AER1-BLW1-DISC1	OSW-AER1-BLW1	TYPE P2
OSW-AER2	A	1	1-1/2"		480	3	1	3	1/C	#2	-	#6	HW1-DP2	OSW-AER2-CP1	TYPE P1
	B	1	3/4"		CONTROL	-	-	14	1/C	#14	-	-	OSW-AER2-CP1	OSW-SCP1	TYPE P1
	C	1	1"		480	3	1	3	1/C	#6	-	#8	OSW-AER2-CP1	OSW-AER2-MXR1-DISC1	TYPE P2
	D	1	3/4"		480	3	1	3	1/C	#12	-	#12	OSW-AER2-CP1	OSW-AER2-BLW1-DISC1	TYPE P2
	E	1	1"		CONTROL	-	-	1	12/C	#14	-	-	OSW-AER2-CP1	OSW-AER2-LCS1	TYPE C1
	F	1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	OSW-AER2-LCS1	OSW-AER2-DISC1	TYPE P1
	G	1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	OSW-AER2-LCS1	OSW-AER2-DISC2	TYPE P1
	H	1	1"		480	3	1	3	1/C	#6	-	#8	OSW-AER2-MXR1-DISC1	OSW-AER2-MXR1	TYPE P2
	I	1	3/4"		480	3	1	3	1/C	#12	-	#12	OSW-AER2-BLW1-DISC1	OSW-AER2-BLW1	TYPE P2
OSW-AIT1	A	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OSW-AIT1	TYPE S1
	B	1	3/4"		MANUFACTURER PROVIDED CABLE								OSW-AIT1	OSW-AIT1-AE1	-
	C	1	3/4"		MANUFACTURER PROVIDED CABLE								OSW-AIT1	OSW-AIT1-AE2	-
OSW-AIT2	A	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OSW-AIT2	TYPE S1
	B	1	3/4"		MANUFACTURER PROVIDED CABLE								OSW-AIT2	OSW-AIT2-AE1	-
OSW-LIT1		1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OSW-LIT1	TYPE S1
OXD-IMLR-PV1	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	HW1-DP2	OXD-IMLR-PV1-DISC1	TYPE P2
	B	1	3/4"		480	3	1	3	1/C	#12	-	#12	OXD-IMLR-PV1-DISC1	OXD-IMLR-PV1	TYPE P2
	C	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-SCP1	OXD-IMLR-PV1	TYPE P1
	D	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IMLR-PV1	TYPE S1
OXD-IRSW-FIT1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-SCP1	OXD-IRSW-FIT1	TYPE P2
	B	1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-FIT1	TYPE S1
OXD-IRSW-P1	A	1	1"		480	3	1	3	1/C	#6	-	#10	HW1-DP2	OXD-IRSW-P1-VFD1	TYPE P1
	B	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	OXD-SCP1	OXD-IRSW-P1-VFD1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-P1-VFD1	TYPE S1
	D	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	OXD-SCP1	OXD-IRSW-P1-VFD1	TYPE D3
	E	1	1-1/2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P1-VFD1	OXD-IRSW-P1-DISC1	TYPE P4
	F	1	1"		CONTROL	-	-	1	9/C	#14	-	-	OXD-IRSW-P1-VFD1	OXD-IRSW-P1-LCS1	TYPE C1
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P1-LCS1	OXD-IRSW-P1-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P1-DISC1	OXD-IRSW-P1	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P1-DISC1	OXD-IRSW-P1 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P1-VFD1	OXD-IRSW-P1 (HTR1)	TYPE P2
OXD-IRSW-P2	A	1	1"		480	3	1	3	1/C	#6	-	#10	HW1-DP2	OXD-IRSW-P2-VFD1	TYPE P1
	B	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE S1
	D	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE D3
	E	1	1-1/2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P2-VFD1	OXD-IRSW-P2-DISC1	TYPE P4
	F	1	1"		CONTROL	-	-	1	9/C	#14	-	-	OXD-IRSW-P2-VFD1	OXD-IRSW-P2-LCS1	TYPE C1
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P2-LCS1	OXD-IRSW-P2-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P2-DISC1	OXD-IRSW-P2	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P2-DISC1	OXD-IRSW-P2 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P2-VFD1	OXD-IRSW-P2 (HTR1)	TYPE P2
OXD-IRSW-P3	A	1	1"		480	3	1	3	1/C	#6	-	#10	HW1-DP2	OXD-IRSW-P3-VFD1	TYPE P1
	B	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE S1
	D	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE D3
	E	1	1-1/2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P3-VFD1	OXD-IRSW-P3-DISC1	TYPE P4
	F	1	1"		CONTROL	-	-	1	9/C	#14	-	-	OXD-IRSW-P3-VFD1	OXD-IRSW-P3-LCS1	TYPE C1
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P3-LCS1	OXD-IRSW-P3-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P3-DISC1	OXD-IRSW-P3	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P3-DISC1	OXD-IRSW-P3 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P3-VFD1	OXD-IRSW-P3 (HTR1)	TYPE P2
OXD-LIT1		1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OXD-LIT1	TYPE S1
OSW-OSWT-FIT1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-SCP1	OSW-OSWT-FIT1	TYPE P2
	B	1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OSW-OSWT-FIT1	TYPE S1
OXD-OSWT-PV1	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	HW1-DP2	OXD-OSWT-PV1-DISC1	TYPE P2
	B	1	3/4"		480	3	1	3	1/C	#12	-	#12	OXD-OSWT-PV1-DISC1	OXD-OSWT-PV1	TYPE P2
	C	1	3/4"		CONTROL	-	-	1	7/C	#14	-	-	OXD-SCP1	OXD-OSWT-PV1	TYPE C1
OXD-SCP1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	LP-HW	OXD-SCP1	TYPE P1
	B	1	3/4"		DATA	-	-	1	CAT 6	-	-	-	CP-HW	OXD-SCP1	TYPE D4

CABLE AND CONDUIT SCHEDULE - OXIDATION DITCH

TAGNAME	IDENTIFIER	CONDUIT QTY	CONDUIT SIZE	COMBINED CONDUIT ID	SERVICE RATING VOLT	SERVICE RATING PHASE	CONDUCTORS # OF	PARALLEL SETS CURRENT CARRYING QTY	TYPE	SIZE	NTRL	GND	FROM	TO	NOTES CABLE TYPE
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P1-LCS1	OXD-IRSW-P1-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P1-DISC1	OXD-IRSW-P1	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P1-DISC1	OXD-IRSW-P1 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P1-VFD1	OXD-IRSW-P1 (HTR1)	TYPE P2
OXD-IRSW-P2	A	1	1"		480	3	1	3	1/C	#6	-	#10	HW1-DP2	OXD-IRSW-P2-VFD1	TYPE P1
	B	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE S1
	D	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	OXD-SCP1	OXD-IRSW-P2-VFD1	TYPE D3
	E	1	1-1/2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P2-VFD1	OXD-IRSW-P2-DISC1	TYPE P4
	F	1	1"		CONTROL	-	-	1	9/C	#14	-	-	OXD-IRSW-P2-VFD1	OXD-IRSW-P2-LCS1	TYPE C1
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P2-LCS1	OXD-IRSW-P2-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P2-DISC1	OXD-IRSW-P2	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P2-DISC1	OXD-IRSW-P2 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P2-VFD1	OXD-IRSW-P2 (HTR1)	TYPE P2
OXD-IRSW-P3	A	1	1"		480	3	1	3	1/C	#6	-	#10	HW1-DP2	OXD-IRSW-P3-VFD1	TYPE P1
	B	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE S1
	D	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	OXD-SCP1	OXD-IRSW-P3-VFD1	TYPE D3
	E	1	1-1/2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P3-VFD1	OXD-IRSW-P3-DISC1	TYPE P4
	F	1	1"		CONTROL	-	-	1	9/C	#14	-	-	OXD-IRSW-P3-VFD1	OXD-IRSW-P3-LCS1	TYPE C1
	G	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	OXD-IRSW-P3-LCS1	OXD-IRSW-P3-DISC1 (AUX1 & TSH1)	TYPE P1
	H	1	2"		480	3	1	1	3/C	#8	-	#8	OXD-IRSW-P3-DISC1	OXD-IRSW-P3	TYPE P4
		"	"		CONTROL	-	-	2	1/C	#14	-	-	OXD-IRSW-P3-DISC1	OXD-IRSW-P3 (TSH1)	TYPE P1
	I	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-IRSW-P3-VFD1	OXD-IRSW-P3 (HTR1)	TYPE P2
OXD-LIT1		1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OXD-LIT1	TYPE S1
OSW-OSWT-FIT1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	OXD-SCP1	OSW-OSWT-FIT1	TYPE P2
	B	1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	OXD-SCP1	OSW-OSWT-FIT1	TYPE S1
OXD-OSWT-PV1	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	HW1-DP2	OXD-OSWT-PV1-DISC1	TYPE P2
	B	1	3/4"		480	3	1	3	1/C	#12	-	#12	OXD-OSWT-PV1-DISC1	OXD-OSWT-PV1	TYPE P2
	C	1	3/4"		CONTROL	-	-	1	7/C	#14	-	-	OXD-SCP1	OXD-OSWT-PV1	TYPE C1
OXD-SCP1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	LP-HW	OXD-SCP1	TYPE P1
	B	1	3/4"		DATA	-	-	1	CAT 6	-	-	-	CP-HW	OXD-SCP1	TYPE D4

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Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
No. 14196304-2202
CODY SHEVICH
04-17-26
STATE OF UTAH

STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR
1	04-28-26	CJS

ADDENDUM #1

GENERAL NOTES

1. CIRCUITS MAY PASS THROUGH COMMON PULLBOXES, ENCLOSURES, OR TRENCHES AND SHALL REMAIN UNSPLICED THROUGHOUT. REFER TO OVERALL OXIDATION DITCH ELECTRICAL SITE PLAN FOR DETAILS.
2. ALL CIRCUITRY ROUTED THROUGH CABLE TRAY SHALL BE TC RATED CABLE IN ADDITION TO THE TYPE SHOWN.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
CABLE AND CONDUIT SCHEDULE - (OXD)

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: **SD**

SHEET NO: **E801**

Plotted By: Cole Tveit Date: Tuesday, April 28, 2026

File: W:\EEagle Mountain\13139-2023-002\CAD Dwgs\06-Electrical\Autocad\Plan Sheets\Oxidation Ditch\CAD Files\E-Cable and Conduit Schedule.dwg

CABLE AND CONDUIT SCHEDULE - TERTIARY TREATMENT FACILITY

TAGNAME	IDENTIFIER	CONDUIT QTY	CONDUIT SIZE	COMBINED CONDUIT ID	SERVICE RATING VOLT	SERVICE RATING PHASE	CONDUCTORS # OF PARALLEL SETS	CONDUCTORS CURRENT CARRYING QTY	CONDUCTORS CURRENT CARRYING TYPE	CONDUCTORS CURRENT CARRYING SIZE	CONDUCTORS NTRL	CONDUCTORS GND	FROM	TO	NOTES CABLE TYPE
MECH HUMIDISTAT		1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	TTF-SCP1	MECH HUMIDISTAT	TYPE P1
MECH OAT SENSOR	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	TTF-SCP1	MECH OAT SENSOR	TYPE P2
	B	1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	TTF-SCP1	MECH OAT SENSOR	TYPE S1
MECH THERMOSTAT		1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	TTF-SCP1	MECH THERMOSTAT	TYPE P1
TTF-ASMP1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	TTF-LP1	TTF-ASMP1	TYPE P1
	B	1	3/4"		CONTROL	-	-	4	1/C	#14	-	-	TTF-SCP1	TTF-ASMP1	TYPE P1
	C	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	TTF-SCP1	TTF-ASMP1	TYPE S1
TTF-BFV1	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	TTF-DP1B	TTF-BFV1-DISC1	TYPE P1
	B	1	3/4"		480	3	1	3	1/C	#12	-	#12	TTF-BFV1-DISC1	TTF-BFV1	TYPE P2
	C	1	3/4"		CONTROL	-	-	1	4/C	#14	-	-	TTF-SCP1	TTF-BFV1	TYPE C1
	D	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	TTF-SCP1	TTF-BFV1	TYPE S1
TTF-CDF1-PP1		1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	TTF-SCP1	TTF-CDF1-PP1	TYPE D3
TTF-DP1		1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	TTF-SCP1	TTF-DP1 (SPD)	TYPE P1
TTF-EF-1	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	TTF-DP1B	TTF-EF-1-VFD1	TYPE P1
	B	1	1"		480	3	1	1	3/C	#12	-	#12	TTF-EF-1-VFD1	TTF-EF-1	TYPE P4
TTF-EF-2	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	TTF-DP1B	TTF-EF-2-VFD1	TYPE P1
	B	1	1"		480	3	1	1	3/C	#12	-	#12	TTF-EF-2-VFD1	TTF-EF-2	TYPE P4
TTF-EF-3	A	1	3/4"		480	3	1	3	1/C	#12	-	#12	TTF-DP1B	TTF-EF-3-VFD1	TYPE P1
	B	1	1"		480	3	1	1	3/C	#12	-	#12	TTF-EF-3-VFD1	TTF-EF-3	TYPE P4
TTF-EFF-AIT1		1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	TTF-SCP1	TTF-EFF-AIT1	TYPE S1
TTF-FIT1		1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	TTF-SCP1	TTF-FIT1	TYPE S1
TTF-LP1		1	3/4"		CONTROL	-	-	2	1/C	#14	-	-	TTF-SCP1	TTF-LP1 (SPD)	TYPE P1
TTF-P1-VFD1	A	1	3/4"		CONTROL	-	-	8	1/C	#14	-	-	TTF-SCP1	TTF-P1-VFD1	TYPE P1
	B	1	1"		SIGNAL	-	-	2	2/C	#16	-	SHIELD	TTF-SCP1	TTF-P1-VFD1	TYPE S1
	C	1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	TTF-SCP1	TTF-P1-VFD1	TYPE D3
TTF-PIT1		1	3/4"		SIGNAL	-	-	1	2/C	#16	-	SHIELD	TTF-SCP1	TTF-PIT1	TYPE S1
TTF-SCP1	A	1	3/4"		120	1	1	1	1/C	#12	#12	#12	TTF-LP1	TTF-SCP1	TYPE P1
	B	1	3/4"		DATA	-	-	1	MM FBR-6 STR	-	-	-	TTF-SCP1	CP-2	TYPE D1
TTF-UV-SCC1		1	3/4"		DATA	-	-	1	CAT 6 SHIELDED	-	-	-	TTF-SCP1	TTF-UV-SCC1	TYPE D3

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Plotted By: Cole Twelt Date: Tuesday, April 28, 2026

Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively

PROFESSIONAL ENGINEER
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CODY SHEVICH
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STATUS: ISSUED FOR GMP (NOT FOR CONSTRUCTION)

SYM	DATE	APPR
1	04-28-26	CJS
	ADDENDUM #1	

GENERAL NOTES

1. CIRCUITS MAY PASS THROUGH COMMON PULLBOXES, ENCLOSURES, OR TRENCHES AND SHALL REMAIN UNSPLICED THROUGHOUT. REFER TO OVERALL OXIDATION DITCH ELECTRICAL SITE PLAN FOR DETAILS.
2. ALL CIRCUITRY ROUTED THROUGH CABLE TRAY SHALL BE TC RATED CABLE IN ADDITION TO THE TYPE SHOWN.

PROJECT TITLE:
EAGLE MOUNTAIN WWTF OXIDATION DITCH UPGRADES

Advanced Engineering and Environmental Services, LLC www.ae2s.com

SHEET TITLE:
CABLE AND CONDUIT SCHEDULE - (TTF)

CLIENT:
EAGLE MOUNTAIN CITY
EAGLE MOUNTAIN CITY, UTAH

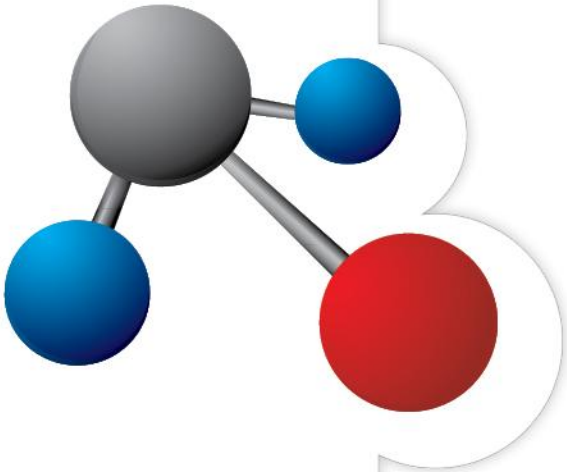
PREPARED BY: BDB
CHECKED BY: CJS
APPROVED BY: CJS

PROJECT NO: 13139-2023-002
DATE: APRIL 2026
ALT. PROJECT NO: N/A

SHEET DESIGNATOR: SD

SHEET NO: E802

Eagle Mountain WWTF Oxidation Ditch Upgrades



PREPARED FOR:

AE2S Project No. P13139-2023-002

Project Manual

Advanced Engineering and Environmental Services, LLC
3400 N Ashton Blvd Suite 105, Lehi, UT 84043
Ph: 801-331-8489 Web: www.AE2S.com

SECTION 00 01 05
CERTIFICATIONS PAGE

PLANS AND SPECIFICATIONS FOR EAGLE MOUNTAIN WWTF - OX DITCH

EAGLE MOUNTAIN CITY, UTAH

April 2026

CIVIL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Utah.

Russell Sprague, AE2S
Date: April 17, 2026 Reg. No. 12623759-2202

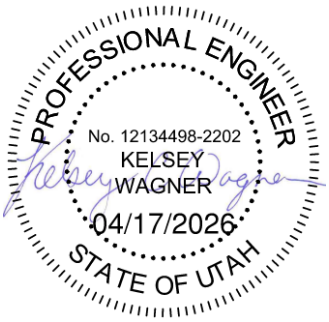
Structural Engineering

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Utah.

Kirk Ehlke, AE2S
Date: April 17 , 2026 Reg. No. 11338224-2202

PROCESS ENGINEER

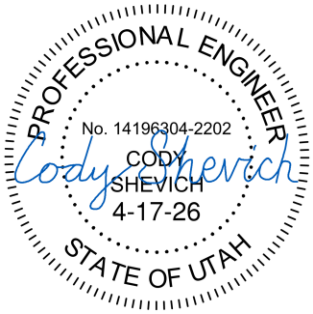
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Utah.



Kelsey Wagner, AE2S
Date: April 17 , 2026 Reg. No. 12134498-2202

ELECTRICAL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Utah.



Cody Schevich, AE2S
Date: April 17 , 2026 Reg. No. 14196304-2202

END OF CERTIFICATIONS PAGE

SECTION 00 01 10

TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01 11 00	SUMMARY OF WORK
01 12 16	WORK SEQUENCE
01 14 00	WORK RESTRICTIONS
01 25 00	SUBSTITUTION PROCEDURES
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 29 00	PAYMENT PROCEDURES
01 29 75	MEASUREMENT AND PAYMENT
01 31 13	PROJECT COORDINATION
01 31 19	PROJECT MEETINGS
01 33 00	SUBMITTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 45 00	QUALITY CONTROL
01 45 33	CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES
01 50 00	TEMPORARY FACILITIES AND CONTROLS
01 52 00	CONSTRUCTION FACILITIES
01 55 00	VEHICULAR ACCESS AND PARKING AREAS
01 55 29	STAGING AREAS
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES
01 61 00	COMMON PRODUCT REQUIREMENTS
01 65 00	PRODUCT DELIVERY REQUIREMENTS
01 73 29	CUTTING AND PATCHING
01 75 00	STARTING AND ADJUSTING
01 77 00	CLOSEOUT PROCEDURES

01 78 23 OPERATION AND MAINTENANCE DATA

01 79 00 DEMONSTRATION AND TRAINING

01 91 00 COMMISSIONING

DIVISION 02 - EXISTING CONDITIONS

02 41 13 SELECTIVE SITE DEMOLITION

DIVISION 03 - CONCRETE

03 01 00 MAINTENANCE OF CONCRETE

03 10 00 CONCRETE FORMING AND ACCESSORIES

03 20 00 CONCRETE REINFORCING

03 30 00 CAST-IN-PLACE CONCRETE

DIVISION 04 – MASONRY

04 05 11 MORTAR AND MASONRY GROUT

04 20 00 UNIT MASONRY

DIVISION 05 – METALS

05 12 00 STRUCTURAL STEEL FRAMING

05 51 33 METAL LADDERS

05 52 13 PIPE AND TUBE RAILINGS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 71 00 FIBERGLASS REINFORCED GRATING AND STRUCTURAL SHAPES

DIVISION 08 - OPENINGS

08 31 23 PROCESS FLOOR ACCESS HATCHES

DIVISION 09 - FINISHES

09 90 02 HIGH PERFORMANCE PAINTING AND COATING

DIVISION 26 - ELECTRICAL

26 00 01 ELECTRICAL GENERAL REQUIREMENTS

26 05 02 EXCAVATING, TRENCHING AND BACKFILLING

26 05 10 MOTORS

26 05 19 POWER AND INSTRUMENTATION CABLE - LESS THAN 600V

26 05 34 CONDUIT

26 05 36 CABLE TRAY FOR ELECTRICAL SYSTEMS

26 05 37 BOXES

26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

26 24 16 PANELBOARDS

26 27 26 WIRING DEVICES

26 28 13 FUSES

26 28 18 ENCLOSED SWITCHES

26 29 23 VARIABLE FREQUENCY MOTOR CONTROLLERS

26 43 00 SURGE PROTECTIVE DEVICES

DIVISION 31 - EARTHWORK

31 05 13 SOILS FOR EARTHWORK

31 23 13 SUBGRADE PREPARATION

31 23 16 EXCAVATION

31 23 23 FILL AND BACKFILL

31 23 33 TRENCHING AND BACKFILLING

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 01 00.91 PAVEMENT REMOVAL, REPAIR AND SURFACING

32 05 16 AGGREGATES FOR EXTERIOR IMPROVEMENTS

32 11 23 AGGREGATE BASE COURSES

32 11 27 GRAVEL SUB-BASE, BASE COURSE AND SURFACING

32 12 16 ASPHALT PAVING

32 16 13 CURBS, GUTTERS, AND SIDEWALKS

32 97 00 RESTORATION OF DISTURBED AREAS

DIVISION 33 - UTILITIES

33 05 26 UTILITY IDENTIFICATION

33 05 61 CONCRETE MANHOLES

33 31 19 SITE PIPING

DIVISION 40 - PROCESS INTEGRATION

40 27 00 PROCESS PIPING - GENERAL

40 27 05 PROCESS PIPING SUPPORT SYSTEMS

40 27 10 PROCESS PIPING SPECIALTIES

40 27 20 PROCESS VALVES

40 27 21 PROCESS ELECTRIC ACTUATORS

40 27 60 PROCESS IDENTIFICATION

40 27 97 PROCESS GAUGES

40 27 98 PROCESS PIPE IDENTIFICATION

40 42 80 PROCESS PIPING LEAKAGE TESTING

40 61 13 PROCESS CONTROL SYSTEM GENERAL REQUIREMENTS

40 61 96 PROCESS CONTROL DESCRIPTIONS

40 61 96.111 OXIDATION DITCH PUMP AND VALVING PROCESS CONTROL DESCRIPTION

40 61 96.112 OXIDATION SWING ZONE AERATION MIXER PROCESS CONTROL DESCRIPTION

40 61 96.113 TERTIARY TREATMENT FACILITY PROCESS CONTROL DESCRIPTION

40 63 13 PROCESS CONTROL PANELS AND HARDWARE

40 63 14 JUNCTION BOXES AND CONTROL STATIONS

40 63 43 PROGRAMMABLE LOGIC CONTROLLERS

40 70 01 INSTRUMENTATION GENERAL REQUIREMENTS

40 71 00 FLOW MEASUREMENT

40 72 00 LEVEL MEASUREMENT

40 73 00 PRESSURE MEASUREMENT

40 75 00 PROCESS LIQUID ANALYTICAL MEASUREMENT

DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

43 22 70 AUTOMATIC SAMPLER

43 23 31 VERTICAL TURBINE SOLIDS HANDLING PUMPS

DIVISION 46 - WATER AND WASTEWATER EQUIPMENT

46 05 01 WASTEWATER EQUIPMENT GENERAL PROVISIONS

46 41 00 EXISTING AERATION EQUIPMENT

SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 OVERVIEW

A. This section includes:

1. Project Description.

2. Contract Information.

3. Administrative and Procedural Sections.

4. Critical Work Sequences.

1.02 PROJECT DESCRIPTION

GMP No. 2 - Eagle Mountain WWTF Oxidation Ditch Upgrades

The Project Work consists of constructing and performing associated services for work generally described as, but not necessarily limited to, the following: The Work shall be completed under one Contract and consists of all labor, skill and materials required to properly construct the Eagle Mountain WWTF Oxidition Ditch Upgrades (Project). The project includes the construction of one large platforms in the Oxidation Ditch (OXD) thatsupport three (3) vertical turbine solids-handling pumps. Additional work involves retrofitting the existing cannibal tank repurposed as the Oxidation Ditch Swing Zone (OSW) with two (2) existing aerator mixers to increase the capacity of the WWTF.

A. The Work includes the following:

1. Civil earthwork, grading, yard piping, road and asphalt, and demolition.

2. Structural earthwork, foundations, walls and platforms.

3. Process work includes piping, valves, aeration mixers, pumps, and other appurtenances.

4. Electrical, Instrumentation, and Controls includes electrical supply, wiring, cable and conduit, electrical and control panels, lighting, process and mechanical instrumentation, and appurtenances.

1.03 ADMINISTRATIVE AND PROCEDURAL SECTIONS

A. Division 00 – Procurement and Contracting Requirements: All Sections.

B. Division 01 – General Requirements: All Sections.

1.04 DESCRIPTION OF WORK FOR ALL CONSTRUCTION

A. General: The following is provided to assist the Bidder in locating the major components and Work associated with the various bid items. It is not intended to provide a list of every drawing or specification that describes work associated with each bid item. In addition to the work shown or specified in the Specifications and Drawings listed below, Bidder shall include all work related to each bid item in the bidder's price for each bid item including, but not limited to, Division 00, Division 01, Civil, Architectural, Structural, Process, Mechanical, and Electrical.

1. Base Bid:

a. Specifications: All Divisions and Sections:
b. Drawings: All Drawings.

1.05 CRITICAL WORK SEQUENCES

A. Coordinate construction schedule and operations with Owner and Engineer to accommodate Owner occupancy requirements.

B. It is essential to keep the OXD in operation and treating wastewater for the duration of the upgrades project with minimal shutdowns. Any shutdown periods must be coordinated with Owner and Engineer.

C. Work on the OSW can be completed without disrupting wastewater treatment and can be completed first.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 11 00

SECTION 01 12 16
WORK SEQUENCE

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. General Work Sequence.

2. Sequence of Construction.

1.02 GENERAL WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner and Engineer to accommodate Owner occupancy requirements.

B. CMGC shall stockpile excavated material in the temporary and permanent locations as indicated on the Construction Drawings.

C. The existing wastewater system, including treatment facilities, shall remain operational throughout the duration of construction.

D. CMGC shall stay within time restraints for certain construction tasks as identified in the Contract Documents.

E. CMGC shall complete fill and compaction activities appropriately ahead of facility construction as to not delay overall construction sequence.

F. CMGC shall not provide final driveway and sidewalk surfaces prior to completion of major excavation and structure construction activities. One freeze thaw cycle shall be completed on the aggregate base course and first asphalt lift prior to placing final wear course for any asphalt installation.

G. All existing structures shall be protected from damage throughout the duration of the Project. CMGC shall provide shoring, bracing, and/or sheet piling as necessary to protect all the structures during construction.

H. CMGC shall provide Owner and Engineer full access to new and existin facilities for the duration of the project.

I. The Owner will make a reasonable attempt to alter operational procedures, including temporary shutdowns of the existing utilities and facilities, to allow for CMGC work.

J. The work sequence provided below is for the CMGC's information. CMGC shall be free to modify the work sequence to meet CMGC’s needs subject to the approval of the Owner and Engineer, and providing such modifications permit the treatment works to meet all its permits, compliance schedules, and regulations. The following sequence of work will be necessary to provide uninterrupted

treatment. Contractor shall perform tasks in the order indicated. This is not an exhaustive list of all work to be completed, but gives general idea of the sequencing required.

1.03 SEQUENCE OF CONSTRUCTION

A. CMGC shall submit a detailed construction sequence identifying all dates when interruption, temporary or bypass, will occur. Dates shall be updated as construction progresses.

B. Coordinate electrical and mechanical construction sequence with general construction sequencing.

C. CMGC shall perform Construction in a manner allowing for continued operation of all facility components as required. This specifically includes, but is not limited to, continuous operation of the existing treatment facility until the new facility can be brought online. The following construction sequence shall be followed:

1. Relocation of underground utilities, and all other items to allow new Work to proceed as required.

2. All yard piping and appurtenances including connections into existing and new structures and piping as indicated by the Drawings. Yard piping installations affecting roadways shall be completed between spring and fall. Contractor shall be responsible for providing a usable roadway matching pre-construction conditions.

3. Access to the treatment facility and buildings by Owner must be maintained.

4. Electrical and piping connections shall be made to minimize downtime of equipment and processes.

5. Individual unit processes may be tested, but all treatment train units must be prepared for operations prior to full scale testing and operations.

1.04 ELECTRICAL SEQUENCE OF CONSTRUCTION

A. Coordinate electrical construction sequence with general, process, and mechanical sequencing to provide treatment and operation of building systems.

B. Provide temporary wiring to all loads during changeovers and to facilitate new construction. Install and maintain temporary wiring in accordance with NEC Article 305.

C. Where new power distribution and/or motor control equipment is to be installed in place of existing equipment, comply with the following:

1. Install and energize new equipment. Relocate existing equipment if space conflicts occur. Provide temporary feeders as required.

2. Transfer loads from existing equipment to new equipment one at a time. Ensure operation of each load prior to proceeding to next load.

3. Provide temporary control and signal wiring to maintain automatic control of automatically-operated equipment. Maintain safety interlocks for all control circuits.

4. After all loads have been transferred, remove existing equipment and wiring. Permanently wire new equipment.

D. For each treatment process having redundant equipment that is to be used during construction, only one of the redundant equipment items shall be disabled at a time.

E. If equipment is not capable of operating in an automatic mode with personnel and equipment safety devices functional, then it shall be the Contractor's responsibility to pay any wages resulting from additional manpower or man hours until the normal mode of operation is achieved.

F. WWTF Facility Electric Service, Transformer Installation, and Emergency Generator Construction Sequence

1. Coordinate Work with Owner, Engineer, and Rocky Mountain Power .

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 12 16

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SECTION 01 14 00
WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. CMGC Use of Site and Premises.
2. Owner Occupancy Requirements.
3. Contract.
4. Access to Streets and Highways.
5. Other Construction Requirements.
6. Special Work Requests.

1.02 CMGC USE OF SITE AND PREMISES

A. Limit use of Site and premises to allow:

1. Owner occupancy.
2. Work by Others.

B. Coordinate performance of all Work with Owner operations.

C. Coordinate use of premises under direction of Engineer. CMGC shall confine construction equipment, storage of materials and equipment and operations of workmen to areas permitted by law, ordinances, permits, or requirements of Contract Documents, and shall not unreasonably encumber premises with construction equipment or other materials or equipment.

D. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

E. Move any stored products, under CMGC's control, which interfere with operations of the Owner.

F. Construction personnel may park only in areas designated by the Owner.

G. Obtain and pay for use of storage or work areas needed for operations.

H. CMGC shall notify and coordinate with Police Department, Fire Department, and Hospital/Ambulance Services. Notice shall include work schedule as construction proceeds, when work affects or obstructs intersections and streets, and when work is completed, or suitable access is available in streets and intersections.

I. CMGC shall provide the name, address, and telephone number of person who has access to equipment and is authorized to make emergency repairs to CMGC's work, such as to correct trench cave-ins, move excavated material, and correct other problems during weekends and off-work hours, so access can be maintained for firefighting equipment, and to maintain barricades for public safety.

J. The CMGC must be satisfied through personal examination of the Site(s) as to all local conditions affecting their performance of the Contract. The CMGC is deemed to accept such conditions as found to exist.

K. The CMGC shall preserve all monuments, benchmarks, reference points, and stakes. In case of destruction thereof, the CMGC will be charged with expense of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or benchmarks which must be removed or disturbed shall be protected until properly referenced for relocation. The CMGC shall furnish materials and assistance for the proper replacement of such monuments or benchmarks.

L. Damaged Property:

1. Patch and or clean existing improvements and restore damage of property on, or adjacent to the Site(s) occasioned by the Work, including but not limited to, lawns, walks, driveways, roadways, curbs, pavements, structures, and utilities which are cut or damaged by operations and are not designated for removal, relocation, or replacement in the course of construction.

2. If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the CMGC shall restore the damaged property to a condition equal to or better than that existing before the damage at no additional cost to the Owner. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.

3. Provide written acceptance of restoration by authority or Owner.

M. Existing Facilities:

1. The CMGC shall take all necessary field measurements affecting all existing construction, wiring, piping, and equipment in this Contract and shall be solely responsible for proper fit between all Work under the Contract and existing structures, piping, and equipment.

2. Dimensions given on the drawings related to existing structures are based upon existing construction record drawings and it shall be the responsibility of the CMGC to verify the accuracy of all dimensions shown

for existing structures, piping, and equipment. Any discrepancies shall be brought to the attention of the Engineer prior to the start of new construction or ordering of any materials. CMGC shall be responsible for any materials ordered that will not fit due to the failure to verify any discrepancies of existing structures, piping, and equipment prior to the start of new construction.

N. Existing Utilities:

1. Existing underground utilities, as shown on the drawings, are located in accordance with available data but locations shall be determined by the CMGC prior to beginning construction. A utility locate is required prior to any excavation.

2. CMGC shall protect all existing utilities and provide temporary removal and replacement or relocation as required for completion of the Work in the contract documents. No additional payment shall be made for this work.

3. Existing utilities not shown on the drawings and requiring relocation shall be exposed by the CMGC without damage. If damaged, the CMGC shall bear the responsibility and cost of repair or replacement.

O. Environmental Resources:

1. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this Contract. Confine activities to areas defined by the contract documents.

2. Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without permission from the Owner. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.

3. Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using other approved techniques.

4. The erosion and sediment controls selected and maintained by the CMGC shall be such that water quality standards are not violated as a result of the CMGC's activities. Maintain temporary erosion and sediment control measures such as fencing, berms, dikes, drains, sedimentation

basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.

5. See Section 01 57 00 for additional requirements.

1.03 OWNER OCCUPANCY REQUIREMENTS

A. Cleanliness is crucial and the CMGC shall maintain a clean and orderly site at all times.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations. Schedule all Work to accommodate this requirement. No interruption will be permitted which adversely affects the degree of service the Owner provides. CMGC shall provide temporary facilities and make temporary modifications as necessary to keep the facilities in operation during the construction period.

C. Pre-plan, schedule, coordinate, and stage for required materials, manpower, contractors, subcontractors, etc. to complete critical elements of Work.

D. Existing materials and equipment removed and not reused as part of the Work, and not identified elsewhere in the contract documents for salvage, shall be properly disposed of by the CMGC at no additional cost to Owner.

1.04 ACCESS TO STREETS AND HIGHWAYS

A. Maintain suitable means of access for property owners abutting streets and highways and access roads involved in construction, except as specifically permitted otherwise by Owner.

B. Whenever construction is stopped due to inclement weather, weekends, holidays, or other reasons, suitable access shall be provided for all property owners.

C. Maintain access for firefighting equipment and access to fire hydrants.

D. Maintain two-way traffic at all times during construction on all impacted streets and highways.

1.05 SPECIAL WORK REQUEST

A. Saturday and Sunday work is allowed for the purposes of clean-up work only (no underground work shall be allowed) by the CMGC without prior written approval from the Engineer or Owner. Work shall not start on Saturday or Sunday before 9:00 AM.

B. If the CMGC plans to conduct work other than clean-up work, the CMGC shall submit a Special Work Request to the Engineer and Owner for written approval. Engineer shall provide the CMGC with the appropriate form. All requests shall be made at least two (2) weeks in advance of scheduled work.

C. Special Work Request restrictions shall apply for North Dakota state observed holidays. CMGC shall submit a Special Work Request if work is scheduled for these dates.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 14 00

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SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

2.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.

2. Agrees to provide the same warranty for the substitution as for the specified product.

3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.

D. Limit each request to a single proposed substitution item.

2.02 RESOLUTION

2.03 ACCEPTANCE

END OF SECTION 01 25 00

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SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Submittals.
2. Documentation of Change in Contract Price and Contract Time.
3. Change Procedures.
4. Work Change Directive.
5. Stipulated Price Change Order.
6. Time and Material Change Order.
7. Execution of Change Orders.
8. Correlation of Contractor Submittals.

B. Related Sections include:

1. Section 00 52 00 – Agreement Form.
2. Section 00 63 49 – Work Change Directive Form.
3. Section 00 63 63 – Change Order Form.
4. Section 00 72 00 – General Conditions.
5. Section 00 73 00 – Supplementary Conditions.
6. Section 01 29 00 – Payment Procedures.
7. Section 01 33 00 – Submittal Procedures.
8. Section 01 61 00 – Common Product Requirements.
9. Section 01 77 00 – Closeout Procedures.

1.02 SUBMITTALS

A. Submit name of the individual authorized to receive change documents, and be responsible for informing others in CMGC's employ or Subcontractors of changes to the Work.

B. Change Order Forms: Engineers Joint Contract Document Committee (EJCDC) form C-941 (2018 Edition).

1.03 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

A. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Provide additional data to support computations:

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Overhead and profit (in accordance with provisions of Section 00 72 00 – General Conditions).

4. Justification for any change in Contract Time.

5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a time and material basis, with additional information:

1. Origin and date of claim.

2. Dates and times work was performed, and by whom.

3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.04 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time by issuing supplemental instructions.

B. The Engineer may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised Drawings and specifications and a change in Contract Time for executing the change. CMGC will prepare and submit an estimate within five (5) days.

C. The CMGC may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract

Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

1.05 WORK CHANGE DIRECTIVE

A. Engineer may issue a document, signed by the Owner, instructing the CMGC to proceed with a change in the Work, which may require subsequent inclusion in a Change Order if any change in Contract Price or Contract Time is required.

B. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time. A work change directive will not include any change in Contract Price or Contract Time without written notice and approval by the Engineer for inclusion in a Change Order.

C. Promptly execute the change in Work.

1.06 STIPULATED PRICE CHANGE ORDER

A. Based on Proposal Request and CMGC's fixed price quotation or based on CMGC's request for a Change Order as approved by Engineer.

1.07 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

B. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.

C. Maintain detailed records of work done on Time and Material basis.

D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.08 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract. The form to be used shall be that indicated in Paragraph 1.02.B of this Section. Engineer will then present the proposed signed Change Order to Owner for approval. Upon obtaining approval, the Change Order will be submitted to the Owner for signatures as provided in Conditions of Contract.

1.09 CORRELATION OF CMGC SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 26 00

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Format and Preparation of Applications.
2. Schedule of Values
3. Submittal Procedures.
4. Substantiating Data.

B. Related Sections include:

1. Section 00 52 00 – Agreement.
2. Section 00 72 00 – General Conditions.
3. Section 01 26 00 – Contract Modification Procedures.
4. Section 01 33 00 – Submittal Procedures.
5. Section 01 77 00 – Closeout Procedures.

1.02 FORMAT AND PREPARATION OF APPLICATIONS

A. Utilize: Engineers Joint Contract Document Committee (EJCDC) Application for Payment Form (C-620, 2018 Edition).

B. Preparation

1. Present required information in typewritten form.
2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
4. List each authorized Change Order as an extension on Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
5. Prepare Application for Final Payment as specified in Section 01 77 00.

1.03 SCHEDULE OF VALUES

A. Submit:

1. Typed schedule of values in format similar to EJCDC Application for Payment (C-620, 2018 Edition).

2. In duplicate within 15 days after date of Owner-Contractor Agreement.

B. Format:

1. Utilize the Table of Contents within Contract Documents.

2. Identify line items corresponding with number and title of Specification Section.

3. Identify site mobilization, bonds, and insurance.

4. Include within each line item a direct proportional amount of Contractor's overhead and profit.

C. Revise Schedule of Values to list approved Change Orders, and submit with each Application for Payment.

1.04 SUBMITTAL PROCEDURES

A. Submittals

1. Three (3) copies of each Application for Payment.

2. Updated construction schedule with each Application for Payment.

3. Payment Periods: As stipulated in the Agreement.

4. Submit with transmittal letter as specified for Submittals in Section 01 33 00.

5. Administrative actions which must precede or coincide with submittal of final application for payment include:

a. Submit lien waivers, warranties and bonds, and project record documents with final application for payment.
b. Completion of all work not included in substantial completion as defined in General and Supplementary Conditions.
c. Completion of project closeout procedures as indicated in Section 01 77 00.
d. Removal of temporary facilities and services.
e. Removal of surplus materials, rubbish, or similar elements.
f. Final cleaning.
g. Transmittal of project construction record documents to Owner and Engineer.

h. Consent of surety for final payment.

1.05 SUBSTANTIATING DATA

A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

B. Beginning with the second Application for Payment, each Application shall include an affidavit from Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

C. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

D. Provide copies of invoice(s) for payment of materials stored on-site. Payment will not be made for materials that are not stored on-site or within a bonded warehouse that has been approved by Engineer and Owner.

E. Contractor shall supply substantiating information in compliance with federal and state requirements for monthly utilization reports and weekly prevailing wage and labor rates for laborers on-site.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 29 00

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SECTION 01 29 75
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Measurement and payment criteria applicable to the Work.

2. Defect assessment and non payment for rejected Work.

B. Related Sections

1. Section 00 41 00 – Bid Form.

2. Section 00 52 00 – Agreement.

3. Section 00 72 00 – General Conditions.

4. Section 00 73 00 – Supplementary Conditions.

5. Section 01 11 00 – Summary of Work.

6. Section 01 26 00 – Contract Considerations and Alternates.

7. Section 01 29 00 – Payment Procedures.

1.02 AUTHORITY

A. The Engineer and Owner will make final determinations regarding the completeness of Work, and subsequent payment of such Work.

B. The Engineer and Owner will take all measurements and compute quantities accordingly.

C. Contractor shall assist by providing necessary measurements, supporting data, and field data as required.

1.03 BID ITEMS

A. Quantities indicated in the Bid Form are for Bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit prices contracted.

C. No other items of Work required by the Drawings or Specifications shall be measured or paid for separately, but shall be included as part of the listed item to which the Work pertains. Failure to list all such related Work in the following

descriptions of items shall not invalidate this stipulation nor relieve the Contractor from his obligation for such Work.

1. Bonding & Insurance

2. Mobilization & Demobilization

    a. See 1.08B of this Section.

3. Construction Surveying & Staking

    a. Includes all labor, materials, equipment, and supplies to perform construction staking, generate as-built survey data, and provide redlines for as-build drawings.

4. Quality Control (Third Party Inspections).

    a. Includes all third-party inspections required by Project Specifications.

5. Demolition & Disposal

    a. Includes all labor, materials, equipment, and supplies to perform selective site demolition and properly salvage or dispose of demolished items and materials in accordance with 02 41 13 - Selective Site Demolition.

6. Building Domestic and Utility Water System

    a. Includes all labor, materials, equipment, and supplies to install and commission both culinary and process water connections.
    b. This does not include site piping for the water systems.

7. Exterior & Interior Building Lighting

    a. Includes all labor, materials, equipment, and supplies to install both internal and external lighting for the facility as shown in the Project Drawings.

8. VorTech VPA-S (Fully Equipped)

    a. Includes all labor, materials, equipment, and supplies to install and commission VorTech VPA-S
    b. See 01 23 00 - Alternates for Bid Alternates.

9. VorTech Platform System

    a. Includes all labor, materials, equipment, and supplies to install the platforms for the disk filter units as shown in the Project Drawings.

10. Process Piping & Appurtenances

    a. Includes all labor, materials, equipment, and supplies to install and commission all process piping with associated appurtenances, including pipe supports, valves, couplings, and pressure gauges as shown in the Project Drawings.

11. EI&C Equipment & Conduit

a. Includes all labor, materials, equipment, and supplies to install and commission all electrical service components including associated cabling, all facility electrical components including transformers, MCC, and panelboards with associated cabling and equipment terminations, grounding, lighting, and all instrumentation and network circuiting as shown in the Project Drawings.
b. This does not include SCADA control panels, programming, nor integration.

12. Site Electrical Service, Conduit & Grounding

    a. Includes all labor, materials, equipment, and supplies to install all conduit and grounding components.

13. Exterior Concrete

    a. Includes all labor, materials, equipment, and supplies to form, pour, and finish exterior concrete surfaces, including walkways and driveways.

14. Exterior Asphalt Pavement

    a. Includes all labor, materials, equipment, and supplies to prepare the subgrade, install base layers, and apply and finish asphalt pavement.

15. Site Grading/Drainage

    a. Includes all labor, materials, equipment, and supplies to perform site grading and install drainage systems to ensure proper water runoff and site leveling.

16. Site Culinary Connections

    a. Includes all labor, materials, equipment, and supplies to install and commission all piping with associated appurtenances, including valves, couplings, and process equipment as shown in the Project Drawings.

17. Site Process Water Connections

    a. Includes all labor, materials, equipment, and supplies to install and commission all piping with associated appurtenances, including valves, couplings, and process equipment as shown in the Project Drawings.

18. Allowances (SCADA Integration, Dorsett Controls)

    a. Allocation in bid to provide all labor, materials, equipment, and supplies to install and commission the SCADA control panels with all associated hardware, software, programming, and all other items related to full SCADA integration.
    b. Dorsett Controls is the preferred SCADA provider for the City.
    c. See 01 21 00 - Allowances.

19. Bid Alternate No. 1

    a. Alternate Manufacturer of

1) Includes all labor, materials, equipment, and supplies to install and commission of two (2) jet aerators.

20. Bid Alternate No. 2

a. Alternate Manufacturer of

1) Includes all labor, materials, equipment, and supplies to install and commission of one (1) Hyperclassic.

1.04 PAYMENT

A. Payment includes: Full compensation for all required mobilization, bonding, insurance, labor, skill, products, tools, equipment, rentals, transportation, services, incidentals, erection, application and installation of the Work; submittal of Shop Drawings, product data and operation and maintenance data or manuals, record data, start-up and system demonstration, where required, warranties, overhead and profit.

B. Final Payment for Work will be made on the basis of the Work accepted by the Engineer and Owner.

1.05 EXCAVATION AND TRENCHING

A. Except where otherwise specified, the unit or lump sum price for each item of Work which involves excavation or trenching shall include all costs for such Work. No separate payment shall be made for excavation or trenching.

1.06 DEFECT ASSESSMENT

A. Replace the Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the price will be adjusted to a new price at the discretion of the Engineer and Owner.

2. The defective Work will be partially repaired to the satisfaction of the Engineer and Owner, and the price will be adjusted at the discretion of the Engineer and Owner.

C. The authority of the Engineer and Owner to assess the defect and determine payment adjustment is final.

1.07 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.

2. Products determined as unacceptable before or after placement.

3. Products not completely unloaded from the transporting vehicle.

4. Products placed beyond the lines and levels of the required Work.

5. Products remaining on hand after completion of the Work.

6. Loading, hauling, and disposing of rejected Products.

1.08 SCHEDULE OF PRICES

A. Bonding:

1. This item shall consist of all bonding and insurance for all Work included within the Construction Contract. The bonding and insurance shall be limited to five percent (5%) of the total Contract Bid Price.

B. Mobilization:

1. This item shall consist of all Work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to and from the Project Site; for the establishment and subsequent removal of all offices and storage facilities, Contractor's buildings, and other facilities necessary for Work on the project; and for all licenses, fees, and permits; and for all other Work and operations which must be performed, or costs incurred, prior to beginning and after completion of Work on the various items on the Project Site.

2. Partial payments for mobilization will be made on the basis of:

a. 50% of the contract amount when the work is 10% complete
b. 75% of the contract amount when the work is 50% complete
c. 100% of the contract amount when 100% of the work is complete.

3. Upon completion of all Work on the Project, payment of any amount bid for mobilization in excess of 10 percent of the total contract amount will be paid.

1.09 CHANGES IN PLAN QUANTITY

A. Plan quantities are based on assumed existing conditions and/or as stated in payment sections or notes. An increase or decrease from the number of units shown in the Bid Form shall not cause a change in the unit price except as allowed by the General Conditions.

1.10 INCIDENTAL ITEMS

A. Work required by the Contract Documents but not listed as a bid item shall be considered incidental to the Contract.

B. Clean-up and restoration of all Work areas, storage areas, and traffic and haul routes shall be considered incidental to the Contract, and shall be performed as required by the Contract Documents or as directed by the Engineer.

C. Repair of new and existing surfaces or features damaged by Contractor's Work operations shall be performed incidental to the Contract, and shall consist of restoration in-kind to the satisfaction of the Engineer.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 29 75

SECTION 01 31 13
PROJECT COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Coordination and project conditions.

2. Field engineering.

B. Related Sections include:

1. Section 01 10 00 – Summary of Work.

2. Section 01 29 00 – Payment Procedures.

3. Section 01 33 00 – Submittal Procedures.

4. Section 01 77 00 – Closeout Procedures.

1.02 COORDINATION AND PROJECT CONDITIONS

A. General:

1. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

2. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

3. Coordinate space requirements, supports, and installation of mechanical and electrical Work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

4. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

5. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

6. Coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

B. Responsibilities of the CMGC :

1. Afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work.

2. Connect and coordinate Work with other Contractors Work as required by the Contract Documents.

3. Allocate and coordinate use of Site for field offices and construction trailers and for access, traffic, and parking facilities.

4. Instruct and coordinate the use of temporary utilities and construction facilities.

5. Coordinate field engineering and layout Work.

6. Verify all shop drawing dimensions.

7. Coordinate the Work of the individual Contractors.

8. Submit (and revise) progress schedule in accordance with Section 01 33 00 – Submittal Procedures coordinating the entire project construction schedule.

9. Organize and submit Applications for Payment. Submit applications on EJCDC C-620 forms for review by Engineer.

10. Submit shop drawings, product data, and samples in accordance with Section 01 33 00 – Submittal Procedures.

11. Submit request for interpretation of Contract Documents and obtain instructions through Engineer.

12. Process requests for Change Orders through Engineer.

13. Organize all closeout submittals and preliminary inspection reports for transmittal to Engineer. Organize all record drawings and submit to Engineer. Review all drawings before submitting to Engineer.

14. Notify Engineer when all trades are ready for final inspection and organize Substantial and Final inspections.

15. Provide record drawing information to Engineer.

16. Ensure punch list items are completed prior to scheduling final inspection by Engineer.

1.03 FIELD ENGINEERING

A. The Owner and Engineer will provide control datum for construction is that shown on Drawings.

B. CMGC shall locate and protect survey control and reference points.

C. CMGC will provide services of a licensed surveyor in order to establish required elevations, lines and levels utilizing recognized engineering practices. The CMGC is required to install work per drawings dimensions and elevations.

D. CMGC shall confirm Drawing dimensions and elevations. Notify Engineer concerning errors or ambiguities.

E. Site service utilities are shown in their approximate locations on the Drawings. CMGC shall be responsible to field verify all utility locations as required to accommodate construction activities.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 31 13

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SECTION 01 31 19
PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Preconstruction meeting.
2. Site mobilization meeting.
3. Progress meetings.
4. Pre-installation meeting.

B. Related Sections include:

1. Section 01 10 00 – Summary of Work.
2. Section 01 77 00 – Closeout Procedures.

1.02 PRECONSTRUCTION MEETING

A. Engineer will schedule a preconstruction kick-off meeting after Notice of Award.

B. Attendance required by

1. CMGC.
2. CMGC's superintendent.
3. Owner.
4. Engineer.
5. Major Subcontractor(s).

C. Agenda:

1. Contract Forms and Conditions of the Contract.
2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
4. Designation of personnel representing the parties in Contract, and the Engineer.

5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

6. Scheduling.

7. Use of premises by Owner and CMGC.

8. Survey and construction staking.

9. Site security, public access, and mobility.

10. Procedures for testing.

11. Inspection, testing, and acceptance of materials during construction.

12. Procedures for maintaining record documents.

13. Requirements of the primacy agencies.

D. Engineer will record minutes and distribute copies after meeting within fourteen (14) days to participants and those affected by decisions made.

1.03 PROGRESS MEETINGS

A. Engineer will:

1. Schedule and administer meetings at the Project site throughout progress of the Work at weekly intervals, or as deemed necessary by the Engineer.

2. Make arrangements for hosting meetings.

B. Attendance required by:

1. CMGC

2. CMGC(s) Job Superintendent.

3. Owner.

4. Engineer.

5. Major Subcontractors and suppliers.

6. Others as appropriate to agenda topics for each meeting.

C. Agenda:

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identification of problems which impede planned progress.

5. Review of submittals schedule and status of submittals.

6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule.

8. Corrective measures to regain projected schedules.

9. Planned progress during succeeding Work period.

10. Coordination of projected progress.

11. Maintenance of quality and Work standards.

12. Effect of proposed changes on progress schedule and coordination.

13. Other business relating to Work.

D. Engineer will record minutes and distribute copies within seven (7) days after meeting to participants and those affected by decisions made.

1.04 PRE-INSTALLATION MEETING

A. When required in individual Specification sections, convene a pre-installation meeting at the site prior to commencing Work of the section.

1. Require attendance of parties directly affecting, or affected by, Work of the specific section.

2. Notify Engineer seven (7) days in advance of meeting date.

3. Prepare agenda and preside at meeting.

4. Review conditions of installation, preparation and installation procedures.

5. Review coordination with related Work.

B. Engineer will record minutes and distribute copies within fourteen (14) days after meeting to participants and those affected by decisions made.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 31 19

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Submittal Procedures.
2. Submittal Schedules
3. Construction Progress Schedules.
4. Proposed Products List.
5. Tabulation of Subcontractors.
6. Tabulation of Suppliers.
7. Request for Interpretation.
8. Product Data.
9. Shop Drawings.
10. Samples.
11. Test Reports.
12. Manufacturer’s Certificates.
13. Manufacturer's Instructions.
14. Manufacturer's Field Reports.
15. Excessive Shop Drawing Reviews.
16. Prevailing Wage Compliance.
17. DBE Compliance.

B. Related Sections include:

1. Section 01 45 00 – Quality Control.
2. Section 01 77 00 – Closeout Procedures.
3. Section 01 78 23 – Operations and Maintenance Data.
4. Divisions 2 through 46.

1.02 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Submit revised submittals with original number and a sequential alphabetic suffix.

C. CONTRACTOR shall send each submittal in electronic format to be distributed by Engineer for review. Upon approval, Contractor shall submit four (4) hard copies to be retained by ENGINEER and ENGINEER'S Subconsultants.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

E. Contractor shall completely review all submittal materials prior to submission to Engineer. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

G. ENGINEER will attempt to complete a review of each submittal in a timely manner within 30 calendar days of receipt of each submittal. Failure of ENGINEER to review a submittal within the estimated review timeframe shall not be basis for the CONTRACTOR to request or receive additional Contract Price or Contract Time.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. Highlight and/or clearly designate specific product details and information so as to confirm product meets or exceeds Specifications.

I. Provide space for Contractor and Engineer review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements. Clearly transmit Engineer review comments to suppliers and subcontractors as required to minimize product delivery errors and miscommunications.

L. Submittals not requested will not be recognized or processed.

M. ENGINEER will review submittals in order received unless CONTRACTOR requests, in writing, a revised order of review. A revision in order may add to the length of review time required for previously submitted submittals.

N. Submittal of more than three major submittals per week may add to the required length of review time. ENGINEER shall notify CONTRACTOR of submittal review scheduling conflicts.

1.03 SUBMITTAL SCHEDULES

A. CONTRACTOR shall submit a schedule of submittal dates for shop drawings, product data, and samples.

B. The submittal schedule shall identify specification sections and anticipated submittal dates. Indicate any critical submittals and dates for ENGINEER'S review.

C. Provide decision dates for selection of finishes and samples.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date of Owner-Contractor Agreement.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version. Application for Payment will not be processed until updated construction schedule has been submitted.

D. Prepare schedules as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first workday of each week as well as the proposed start and completion dates of each major portion of Work.

E. Sheet Size: Minimum 11x17 inches. Large sizes than 11x17 inches shall be in multiples of 8½x11 inches.

F. Content

1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Indicate the early and late start, early and late finish, float dates, and duration.

2. Identify each item by Specification section number.

3. Identify Work of separate stages and other logically grouped activities.

4. Provide sub-schedules to define critical portions of the entire schedule.

5. Include conferences and meetings in schedule.

6. Indicate estimated percentage of completion for each item of Work at each submission.

7. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from

Engineer. Allow sufficient time for review by Engineer. Indicate decision dates for selection of finishes.

8. Coordinate content with schedule of values.

G. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule.

H. Distribution

1. Distribute copies of reviewed schedules to Project Site file, Subcontractors, suppliers, and other concerned parties.

2. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

1.05 PROPOSED PRODUCTS LIST

A. Within fifteen (15) days after date of Owner-Contractor Agreement, submit list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 TABULATION OF SUBCONTRACTORS

A. CONTRACTOR shall submit a complete list of subcontractors who will provide work on the project.

B. The submitted list shall include the following information for each subcontractor:

1. Name

2. Address

3. Type of work to be provided

4. Applicable specifications sections

5. Contact person

C. CONTRACTOR'S use of specific subcontractors shall be subject to the requirements included in the specifications.

1.07 TABULATION OF SUPPLIERS

A. CONTRACTOR shall submit a list of suppliers who will provide materials, equipment, or components which are integral to the Work.

B. The submitted list shall include the following information for each subcontractor:

1. Name

2. Address

3. Type of work to be provided

4. Applicable specifications sections

5. Contact person

C. CONTRACTOR'S use of specific suppliers for providing equipment, materials, or components shall be subject to the requirements of the specifications.

1.08 REQUESTS FOR INTERPRETATION

A. CONTRACTOR shall submit in writing all requests for interpretation or for information regarding the Contract Documents on the form provided by the ENGINEER.

B. ENGINEER does not guarantee that a response can be provided in the amount of time requested, but ENGINEER shall respond in writing to CONTRACTOR'S request within a reasonable amount of time given the extent of the request for interpretation of information required.

1.09 PRODUCT DATA

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Submit the number of copies that the Contractor requires, plus five (5) copies that will be retained by the Engineer and Engineer's Subconsultant.

D. Mark each copy to identify applicable Products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

E. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service of functional equipment and appliances.

F. Premium and High Efficiency Product Data: The City will participate in various rebate programs for premium and high-efficiency equipment and products. Provide Proof of Purchase and Compliance product data as needed to complete the various rebate forms. Rebate forms are included as attachments to Section 01 61 00 – Common Product Requirements.

1.10 SHOP DRAWINGS

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Submit in electronic format for ENGINEER'S review. Upon approval, submit four (4) hard copies that will be retained by the Engineer and Engineer's Subconsultant.

E. All shop drawings shall be submitted through the CONTRACTOR in accordance with the procedures outlined in this specification. Shop drawings received from anyone other than through the CONTRACTOR will not be reviewed.

F. Shop drawings shall include data and technical drawings prepared specifically for this Project, including where required, but not limited to the following:

1. Fabrication drawings
2. Installation drawings
3. Shopwork manufacturing instructions
4. Templates or patterns
5. Coordination drawings
6. Schedules
7. Design calculations

G. Shop drawings shall contain complete detail showing conformance with the Contract Documents and such other specified information as required, including but not limited to the following

1. Related work with applicable cross references
2. Physical configuration
3. Dimensional information, including any variations from actual conditions
4. List of materials

5. Structural construction and assemblies

6. Anchor bolt details showing type, size, embedment, and locations

7. Machinery and equipment details

8. Auxiliary items to machinery and equipment

9. Protective coatings and factory finishes

10. Electrical information including motor sizes, wiring and circuit diagrams, and instrumentation

11. Testing results

12. Warranty information

H. Detail all connections required to complete the work.

I. Approval of shop drawings by ENGINEER shall not relieve the CONTRACTOR from responsibility of deviations from drawings or specification, unless deviations or changes have been brought to ENGINEER'S attention at time of submission, nor shall it relieve the CONTRACTOR from responsibility for errors or omissions in shop drawings.

1.11 SAMPLES

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

B. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit the number of samples specified in individual Specification sections; one (1) of which will be retained by Engineer.

F. Reviewed samples that may be used in the Work are indicated in individual Specification sections.

G. Samples will not be used for testing purposes unless specifically stated in the Specification section.

1.12 TEST REPORTS

A. Submit for the Engineer's knowledge as Contract Administrator or for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

C. Retain one (1) copy of all test reports and results on-site in a location accessible to Engineer.

1.13 MANUFACTURER'S CERTIFICATES

A. When specified in individual Specification sections, submit certification by the manufacturer, installation/application Subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.14 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01 45 00 – Quality Control, Manufacturers' Field Services article.

1.15 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Engineer's benefit as Contract Administrator or for the Owner.

B. Submit report in duplicate within 15 days of observation to Engineer for information.

C. Submit the manufacturer's field reports for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.16 EXCESSIVE SHOP DRAWING REVIEWS

A. The maximum number of submittal reviews for any one product or specification section shall be two (2).

B. Compensation for third or subsequent reviews will be required as outlined below:

1. OWNER will compensate ENGINEER for "additional services".

2. OWNER will deduct amount of such compensation from payment to CONTRACTOR.

3. ENGINEER'S compensation shall be at ENGINEER'S standard hourly rates, plus reimbursable expenses at cost.

1.17 PREVAILING WAGE COMPLIANCE

A. Projects requiring prevailing wage rates for the Minnesota Department of Labor and Industry will require submission of payroll records or Form WH-347, and Form WH-348, Statement of Compliance.

1.18 DBE COMPLIANCE

A. Contractor shall meet all federal and state requirements.

B. Within fifteen (15) days of award of the prime contract, copies of all small, minority, and women's business related subagreements between the prime contractor and first-tier subcontractors shall be submitted to the OWNER. Subsequently, the prime contractor shall obtain and submit to the OWNER a copy of all small, minority, and women's business related sub-tier contracts within fifteen (15) days after execution of same.

C. During construction, the prime contractor shall identify the completion date and actual final dollar value of work completed pursuant to each small, minority, and women's business subagreement and sub-tier contract. Any and all changes in previously reported anticipated small, minority, and women's business utilization shall be reported to the OWNER promptly, in writing, with appropriate documentation and reasons.

D. In the event the prime CONTRACTOR fails to conform to its small, minority, and women's business obligations, it shall explain to the OWNER, in writing, the reason for non-utilization of the small, minority, and women's business. If there is non-utilization without good cause, the OWNER will advise the CONTRACTOR, in writing, of corrective actions to be initiated.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 33 00

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SECTION 01 40 00
QUALITY REQUIREMENTS

PART 3 EXECUTION

1.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

1.02 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION 01 40 00

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SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).

1.02 SUMMARY

A. Section includes:

1. Quality Assurance - Control of Installation.
2. Tolerances.
3. References and Standards.
4. Testing Responsibilities.
5. Inspection and Testing Services.
6. Mill Tests.
7. Factory Tests.
8. Manufacturer’s Instructions.
9. Manufacturer’s Certificates.
10. Manufacturers' Field Services.
11. Qualification Tests.
12. Laboratory Tests.
13. Product Field Tests.
14. Material Field Tests.
15. Coating Field Tests.
16. Mock – up.
17. Construction Vibration Monitoring

B. Related Sections include:

1. Section 01 33 00 – Submittal Procedures.

2. Section 01 45 33 - Code-Required Special Inspections

3. Section 01 75 00 – Starting and Adjusting.

4. Divisions 02 through 46.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturer’s instructions, including each step in sequence.

C. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on Contract Drawings, shop drawings, or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

H. Completed Work shall be plumb, level, true to line or plane, and free from damage.

1.04 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.05 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING RESPONSIBILITIES

A. Contractor's Responsibility:

1. Contractor shall be responsible for all quality control testing or inspections including mill tests, factory tests, qualification tests, laboratory tests, and field tests other than those required and specified in Parts 1.15 and 1.16 below.

2. Quality control required by codes or ordinances, or by the plan approval authority, unless otherwise provided in the Contract Documents.

3. Contractor's convenience testing.

4. Coordinate with each independent agency to accommodate required services with minimum delay in progress of work, and to avoid moving or replacing work. Schedule times for quality control services.

5. Cooperate with independent agencies performing required quality control services. Notify testing agency sufficiently in advance of operations to permit assignment of personnel. Provide auxiliary services as required, including, but not limited to the following:

   a. Providing access to work
   b. Taking samples or assistance with taking samples
   c. Delivery of samples to testing laboratories
   d. Security and protection of samples and test equipment at Site

6. Contractor shall be responsible for vibration monitoring and reporting at two locations on the WTP site starting a minimum of one week before construction starts and continuing for the duration of construction.

B. Owner's Responsibility:

1. Owner responsible quality control shall be specifically indicated. If quality control measure is not indicated as Owner responsibility it is the Contractor's responsibility.

C. Retesting Responsibility:

1. Where results of quality control prove unsatisfactory and do not indicate compliance with Contract Documents all costs associated with retesting is the Contractor's responsibility.

2. The costs for retesting of Owner responsible quality control shall be deducted from the Contract amount by supplemental agreement.

1.07 INSPECTION AND TESTING SERVICES

A. The Owner shall appoint, employ, and pay for specified services of an independent firm to perform testing including:

1. Concrete materials and mix designs.

2. Concrete formwork.

3. Concrete reinforcement.

4. Masonry walls.

5. Structural Steel.

6. Asphaltic materials and mix designs.

7. Embedment and backfill materials.

8. Soil Density.

9. Applied Fireproofing

10. Intumescent Mastic Fireproofing

11. Bacteriological testing.

12. Weld Radiographs and Weld Inspection Report.

13. All other tests and engineering data required for Engineer's review of materials and equipment proposed to be used in the Work. Contractor shall obtain Engineer's acceptance of the testing firms before having services performed, and shall pay all costs for these testing services. All costs for testing shall be incidental.

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Engineer.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Owner, Building Official, Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. The Owner will select an independent testing agency qualified in accordance with referenced ASTM standards and that is acceptable to the Engineer, if required for certain types of testing.

F. Comply with pertinent codes, regulations, and industry standards except when more stringent standards or tolerances are specified.

G. The contractor shall cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 48 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

H. Testing does not relieve Contractor from performing Work according to contract requirements.

I. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for re-testing will be paid by the Contractor.

1.08 MILL TESTS

A. Mill or shop tests shall be conducted and test reports submitted where this type of test is specified.

B. Mill or shop tests shall be accomplished by the manufacturer or fabricator of the materials. Mill tests may be conducted by an independent testing laboratory. These tests shall be performed in accordance with applicable ASTM standards.

1.09 FACTORY TESTS

A. Factory tests of process, mechanical, and electrical equipment relative to performance, capacity, rating, efficiency, or other such requirements shall be conducted in the factory or shop for each item supplied when this type of test is specified.

B. Factory testing shall be performed in accordance with applicable standards and test codes.

C. Where factory tests are required or specified, reports of the test results shall be submitted to ENGINEER for approval prior to shipment. CONTRACTOR shall submit the number of test reports for approval required by the CONTRACTOR plus four (4) copies to be retained by the ENGINEER.

D. Factory observation of fabrication procedures, materials used, and testing methods may be performed by a representative of the OWNER or ENGINEER. OWNER shall pay for factory observation.

1.10 MANUFACTURERS' INSTRUCTIONS

A. Comply with manufacturer's instructions in full detail for storage, installation, assembly, installation, start-up, and adjustment. CONTRACTOR shall follow appropriate sequencing as recommended by manufacturer.

B. Should manufacturer's instructions conflict with Contract Documents, CONTRACTOR shall request clarification from ENGINEER prior to proceeding.

C. If required by individual product or equipment specification sections, CONTRACTOR shall submit manufacturer's printed instructions prior to assembly and installation.

1.11 MANUFACTURERS' CERTIFICATES

A. Submit manufacturer's certificate indicating that equipment or products meet or exceed specified requirements where required in the individual specification sections.

B. Certificates shall be submitted prior to shipment of equipment or products.

1.12 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and other services as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00.

1.13 QUALIFICATION TESTS

A. Should a product, material, or method for assembly of unknown or questionable quality to the ENGINEER be proposed by the CONTRACTOR, additional tests may be required by the ENGINEER.

B. Additional testing as required by the ENGINEER shall be used as a basis to establish acceptance or rejection.

1.14 LABORATORY TESTS

A. Laboratory tests shall be conducted and test reports shall be submitted where this type of test is specified. All laboratory tests shall be made by an independent laboratory approved by the ENGINEER. These tests shall be performed in accordance with applicable ASTM standards.

B. Laboratory tests may be witnessed by representatives of the OWNER or ENGINEER.

C. Submit two (2) copies of all laboratory tests to the ENGINEER for record.

1.15 PRODUCT FIELD TESTS

A. Product field tests shall be set up and completed by the CONTRACTOR. CONTRACTOR shall provide all tools, equipment, instruments, personnel, and other facilities required for the completion of each test.

B. Product field tests of process equipment, mechanical systems, electrical systems, piping systems, and similar facilities shall be conducted where this type of test is specified.

C. Product field tests include the determination of performance, capacity, efficiency, function, tightness, leakage, and other special requirements. Product field tests shall be performed in accordance with applicable standards and test codes.

D. Product field tests may be witnessed by representatives of OWNER and ENGINEER.

E. Submit two (2) copies of all product field tests to the ENGINEER for record.

1.16 MATERIALS FIELD TESTS

A. Routine tests of materials incorporated into the Project will be performed by an independent testing laboratory arranged and paid for by the Owner and acceptable to the ENGINEER.

B. Results of materials field testing shall be reported to the ENGINEER and CONTRACTOR.

C. Material field tests may be witnessed by representatives of the OWNER, ENGINEER, and ENGINEER'S subconsultant and such witnessing shall be paid for by the OWNER.

D. CONTRACTOR shall provide at least two different certified gradation tests from each source of materials provided for the project site or one (1) sample from each 1,500 tons of finished product used. Certified gradation tests shall be done in accordance with ASTM C136 and be performed by the independent testing laboratory hired by the CONTRACTOR.

E. CONTRACTOR shall provide at least two (2) different certified moisture-density relationship (compaction curve) tests from each source of materials provided to the project site. Certified moisture-density relationship tests shall be done in accordance with ASTM D698 and be performed by the independent testing laboratory hired by the CONTRACTOR.

F. The following inspections and testing shall be conducted by the independent testing laboratory hired by the OWNER and accepted by the ENGINEER with

results being reported to the CONTRACTOR and ENGINEER. See Structural Special Inspection Tables on Drawings for additional requirements.

1. Excavating, Filling, and Grading Soil Compaction Testing:

Item	Frequency
Building or Structure Sites and Roadway and Parking Area Subgrade Preparation (excavation areas)	One (1) approved test per 1,000 sf of any area that indicate soil bearing capacity as required.
Roadway and Parking Area Subgrade Preparation (fill areas)	One (1) approved test per 2,000 sf per 4-foot lift.
Building or Structure Sites (fill areas)	One (1) approved test per 1,000 sf per 8-inch compacted lift of all fill materials.
Utility and Piping Trenches	One (1) approved test per 500 feet of mainline pipe at 4-foot from top of pipe/bedding, and at staggered 4-foot intervals up to and including the top of subgrade.
Aggregate Base	Proof roll all pavement areas.
Parking Areas and Sidewalks	Proof roll all areas subject to vehicle traffic.

2. Concrete Specimens:

   a. Cast four (5) cylinders per set – one (1) at 7 days, two (3) at 28 days, and one (1) for 54 days.
   b. Cast one set of cylinders for five (5) cubic yards or larger per unit or structure. Cast an additional set of cylinders for each additional 50 cubic yards of cast-in-place concrete or masonry grout.
   c. Where field-cured companion cylinders are specifically noted, 2 per set shall be cast, field cured and tested.
   d. Where the Contractor elects to prepare field-cured companion cylinders for their own use to determine early curing periods, at least two (2) cylinders shall be tested at each desired curing period. A test of less than 2 cylinders will not be acceptable as proof of achievement of specified curing strengths. The costs of all companion cylinders not specifically required shall be the cost of the Contractor and not the Owner.
   e. Standard tests to be performed on fresh concrete each time cylinders are cast are slump, air content, and temperature.
   f. Concrete temperature shall be tested hourly, and recorded, when air temperature is 40 degrees Fahrenheit and below, and when 80 degrees Fahrenheit and above.

g. See Section 01 45 33 Code Required Special Inspections and Procedures and Division 03- Concrete and Drawings for additional requirements.

3. Bituminous Specimens:

   a. Obtain samples of placed bituminous prior to bituminous being rolled at the rate of one (1) sample per 100-ton of each mix placed per lift with a minimum of one (1) sample per mix per lift per day. CONTRACTOR shall cooperate with ENGINEER in obtaining the samples.
   b. Perform testing for gradation and extraction on each sample.

4. All Structural Welding:

   a. Visual observation at all connections.
   b. Non-Destructive testing at full or partial penetration welds.
      1) Weld Radiographs and Weld Inspection Report.
   c. See Drawings and specification section 01 45 33 and Division 05 for additional requirements.

5. High Strength Bolting for Structural Steel

   a. Visual observation at all connections.
   b. Tension testing for ten (10) percent of all connections with a minimum of two (2) bolts per connection.
   c. See Drawings and specification section 01 45 33 and Division 05 for additional requirements.

6. Masonry:

   a. See Drawings and specification section 01 45 33 and Division 05 for additional requirements.

1.17 COATINGS FIELD TESTS

A. An independent testing company hired by the Owner will provide testing of coatings and coating systems. Owner shall pay for testing of coatings and coating systems.

1.18 MOCK-UP

A. Tests will be performed under provisions identified in this Section and identified in the respective product specification Sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining work.

D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.19 CONSTRUCTION VIBRATION MONITORING

A. Vibration producing activities (such as blasting, pile driving, vibratory compaction, pavement breaking or operation of heavy construction equipment) may be required for construction of this project. The Contractor is advised that structures are located close to the proposed work and that construction activities shall be conducted so as to preclude damage to these structures and undue annoyance to occupants. The contractor shall be responsible for all damage caused by his activities

B. Contractor shall be responsible for vibration monitoring and reporting at two locations on the WTP site starting a minimum of one week before construction starts and continuing for the duration of construction. Reports shall be submitted to the Engineer.

PART 2 PRODUCTS

2.01 NOT USED.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION 01 45 00

SECTION 01 45 33
CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Code-required special inspections.

B. Testing services incidental to special inspections.

C. Submittals.

1.02 RELATED REQUIREMENTS

A. Section {\id\#1000009} - {\t\#1000009}.

B. Section {\id\#1000010} - {\t\#1000010}.

1.03 DEFINITIONS

A. Code or Building Code: ICC (IBC)-2015, Edition of the International Building Code and specifically, Chapter 17 - Special Inspections and Tests.

B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

C. Special Inspection:

1. Special inspections are separate from and independent of tests and inspections conducted by Owner or CMGC for the purposes of quality assurance and contract administration.

1.04 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

B. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2025b.

C. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2025.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.

E. ICC (IBC)-2015 - International Building Code; 2015.

1.05 SUBMITTALS

A. See Section 01 33 00 - {\t\#1000008}, for submittal procedures.

B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency is required to:

1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.

2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

3. Submit certification that Special Inspection Agency is acceptable to AHJ.

C. Special Inspection Reports: After each special inspection, Special Inspector is required to promptly submit at least two copies of report; one to Engineer and one to the AHJ.

1. Include:

a. Date issued.
b. Project title and number.
c. Name of Special Inspector.
d. Date and time of special inspection.
e. Identification of product and specifications section.
f. Location in the Project.
g. Type of special inspection.
h. Date of special inspection.
i. Results of special inspection.
j. Compliance with Contract Documents.

2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.

D. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Engineer and AHJ, in quantities specified for Product Data.

1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.06 SPECIAL INSPECTION AGENCY

A. Contractor will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ATM E329 and required by the building code.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.

1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.

2. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

3.02 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION

3.03 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

A. Bolts Installed in Concrete: Where allowable loads have been increased or where strength design is used, verify compliance with approved Contract Documents and ACI CODE-318, Sections 8.1.3 and 21.2.8 prior to and during placement of concrete; continuous.

B. Anchors Installed in Hardened Concrete: Verify compliance with ACI CODE-318, Sections 3.8.6, 8.1.3, and 21.2.8; periodic.

C. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M, and ACI CODE-318, Sections 5.6 and 5.8 and record the following, continuous:

1. Slump.

2. Air content.

3. Temperature of concrete.

D. Concrete and Shotcrete Placement: Verify application techniques comply with approved Contract Documents and ACI CODE-318, Sections 5.9 and 5.10; continuous.

E. Materials: If the CMGC cannot provide sufficient data or documentary evidence that concrete materials comply with the quality standards of ACI CODE-318, the AHJ will require that the Special Inspector verify compliance with the appropriate standards and criteria in , Chapter 3.

3.04 SPECIAL INSPECTIONS FOR SOILS

A. Materials and Placement: Verify each item below complies with approved construction documents and approved geotechnical report.

1. Design bearing capacity of material below shallow foundations; periodic.

2. Design depth of excavations and suitability of material at bottom of excavations; periodic.

3. Materials, densities, lift thicknesses; placement and compaction of backfill: continuous.

4. Subgrade, prior to placement of compacted fill verify proper preparation; periodic.

B. Testing: Classify and test excavated material; periodic.

3.05 SPECIAL INSPECTIONS FOR CAST-IN-PLACE DEEP FOUNDATIONS

A. Materials, Equipment and Final Placement: Verify each item below complies with approved construction documents and approved geotechnical report.

1. Element length; continuous.

2. Element diameters and bell diameters; continuous.

3. End bearing strata capacity; continuous.

4. Placement locations and plumbness; continuous.

B. Drilling Operations: Observe and maintain complete and accurate records for each element; continuous.

C. Material Volume: Record concrete and grout volumes.

D. Concrete Elements Associated with Cast-in-Place Deep Foundations: Perform additional inspections as required by the Special Inspections for Concrete Construction article of this section.

3.06 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

A. Special Inspection Agency shall:

1. Provide qualified personnel at site. Cooperate with Engineer and CMGC in performance of services.

2. Perform specified sampling and testing of products in accordance with specified reference standards.

3. Ascertain compliance of materials and products with requirements of Contract Documents.

4. Promptly notify Engineer and CMGC of observed irregularities or non-compliance of work or products.

5. Perform additional tests and inspections required by Engineer.

6. Submit reports of all tests or inspections specified.

B. Limits on Special Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the work.

3. Agency may not assume any duties of CMGC.

4. Agency has no authority to stop the work.

C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Engineer.

D. Re-testing required because of non-compliance with specified requirements shall be paid for by CMGC.

3.07 CONTRACTOR DUTIES AND RESPONSIBILITIES

A. CMGC Responsibilities, General:

1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.

2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.

3. Provide incidental labor and facilities:

a. To provide access to work to be tested or inspected.
b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
c. To facilitate tests or inspections.
d. To provide storage and curing of test samples.

4. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.

5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by CMGC beyond specified requirements.

END OF SECTION 01 45 33

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SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary Electricity.
2. Temporary Lighting for Construction Purposes.
3. Temporary Heating.
4. Temporary Ventilation.
5. Fire Protection.
6. Temporary Piping and Plumbing.
7. Telephone/Email Service.
8. Temporary Water Service.
9. Temporary Sanitary Facilities.
10. First Aid Facilities.
11. Fencing.
12. Barriers.
13. Enclosures.
14. Temporary Controls.
    a. Storm Water Permits.
    b. Erosion Prevention Practices.
    c. Sediment Control Practices
    d. Dewatering and Basin Drainage.
    e. Inspections and Maintenance of SWPPP.
    f. Pollution Prevention Management Measures
    g. Dust Control
    h. Noise Control
    i. Road Cleaning
15. Protection of Installed Work.
16. Temporary Construction Protection.
17. Security.

18. Parking.

19. Vehicle Access.

20. Progress Cleaning and Waste Removal.

21. Field Offices and Sheds.

22. Removal of Utilities, Facilities, and Controls.

B. Related Sections include:

1. Section 01 11 00 - Summary of Work.

2. Section 01 61 00 - Common Product Requirements.

3. Section 01 77 00 - Closeout Procedures.

4. Division 26 - Electrical.

1.02 TEMPORARY ELECTRICITY

A. By CMGC

1. CMGC shall have access to Owner supplied power on site. CMGC is responsible for supplying and coordination connection to this power source including but not limited to:

a. Coordinate with requirements of Division 26.
b. Provide temporary electric feeder from existing or new electrical service at all sites. Do not disrupt Owner's use of service.
c. Provide separate metering so the Owner is able to track electric usage and bill the CMGC accordingly.
d. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
e. Provide main service disconnect and over-current protection at convenient location.
f. Permanent convenience receptacles may be utilized during construction.
g. Pay for power required and used from utility source during construction operations
h. Exercise measures to conserve power usage.

2. Should the CMGC need to utilize an onsite power generator the CMGC shall make provisions to limit noise from the generator. The generator shall not operate above 75Dba within 25 feet of the generator.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. By CMGC

1. CMGC shall provide and pay for fuel-powered light plants or other light generating equipment for construction operations as required at all staging, assembly, and construction areas.

2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

3. Maintain lighting and provide routine repairs.

4. Permanent building lighting may be utilized during construction. Replace lamps at final completion for all permanent fixtures.

1.04 TEMPORARY HEATING

A. By CMGC

1. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

2. If required, provide separate metering or reimburse Owner for cost of energy used.

3. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

4. Maintain minimum ambient temperature of 50 degrees F in areas, unless indicated otherwise in product sections.

5. Exercise measures to minimize construction heating.

1.05 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Coordinate use of existing facilities with Owner. CMGC shall extend and supplement with temporary units as required to meet construction requirements.

1.06 FIRE PROTECTION

A. CMGC shall provide and maintain in working order throughout the entire construction period fire extinguishing equipment in each separate construction area. Fire extinguishing equipment shall be of adequate size, number, and capacity for the required areas in accordance with all applicable codes and satisfactory to the local Fire Marshall.

B. Fire extinguishers shall be non-freeze type such as A-B-C rated dry chemical and be of the size and capacity required for each individual area.

C. CMGC shall provide and maintain in working order fire extinguishing equipment within enclosed construction sheds and field offices.

1.07 TEMPORARY PIPING AND PUMPING

A. General CMGC shall provide and maintain temporary pumps, piping, automatic controls, and related appurtenances to allow bypassing and continuous operation of facilities during construction where required.

B. CMGC shall submit to Engineer for approval a temporary pumping and piping plan for all bypassing activities required. Plan shall include methods, pump information, piping layouts, inlet and discharge locations, control system, and duration of bypassing operation.

C. All costs including power, installation, operation, maintenance, and removal shall be the CMGC's responsibility.

D. All bypassing systems shall be properly sized for the application, with redundancy, to assure that there are no sewage spills or backups. CMGC shall provide means for preventing backups, spills, and surcharges during connection, disconnection, and operation of temporary bypassing systems. CMGC shall be responsible for all damages caused directly or indirectly by sewage backups, spills or surcharging related to inadequacy or failure of bypassing operations.

E. Bypassing operations should be scheduled and limited to the minimum time required to complete required construction activities.

F. In the event of an emergency, CMGC shall have on standby, a means to provide a temporary bypass to collect and dispose of sewage.

G. Standby power shall be provided for all bypass pumping systems.

1.08 TELEPHONE/EMAIL SERVICE

A. Provide, maintain, and pay for telephone and E-mail service to project superintendent from time of project mobilization to final completion.

1.09 TEMPORARY WATER SERVICE

A. CMGC shall verify location of temporary water supply on or near site and shall provide piping, hoses, meter, and fittings required to distribute it as required by the Work. CMGC shall supply approved backflow prevention and metering equipment.

B. CMGC shall not be charged for reasonable water use throughout the construction period. CMGC shall make all reasonable efforts to conserve water. Owner reserves the right to charge CMGC for water use deemed to be excessive.

C. CMGC shall not damage plumbing at source of temporary water.

D. Where water source is not available at or near site, CMGC shall make arrangements with Owner for source of water at appropriate hydrant locations. CMGC shall provide tanker truck, and metering equipment necessary to measure water from hydrant locations.

1.10 TEMPORARY SANITARY FACILITIES

A. CMGC shall provide and maintain required facilities and enclosures. Provide from time of project mobilization to final completion.

1.11 FIRST AID FACILITIES

A. First aid facilities shall be provided and maintained by the CMGC in accordance with all federal, state, and local laws and regulations.

1.12 FENCING

A. By CMGC:

1. Provide temporary fencing around open excavation areas.

2. Owner and Engineer shall be provided with any keys necessary to access the project site.

1.13 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for plants designated to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.14 ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with locks; Owner shall have access to site at all times.

B. Provide temporary partitions with access doors to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment. Temporary partitions shall be double walled made of wood framing and plastic sheeting (or approved equivalent) to completely seal off new Work from the rest of the existing facility. Dust is not allowed to enter the contained areas of the existing facility. All areas affected by dust will be cleaned at CMGC’s expense

and all motors affected by dust shall be replaced at CMGC's expense. Ventilation shall be provided for prep/coating Work and use of the existing building ventilation system is not acceptable. The CMGC shall exhaust the air to the exterior atmosphere at a minimum of 6 air changes per hour to prevent the buildup and migration of dust and fumes. All areas of the existing structure removed/altered shall be replaced or repaired to existing or better condition as determined by the Engineer

C. Temperatures inside the enclosures and/or enclosed parts of structures shall be not less than 60 degrees F for 48 hours prior to and during time when concrete work, cement finishing, or masonry work are being completed or curing and not less than 50 degrees F when other trades are working.

D. Provide temporary partitions and ceilings as required to separate work areas from existing Owner occupied areas, to prevent the penetration of dust and moisture.

E. Provide temporary closures over wall and floor openings to enclose work.

1.15 TEMPORARY CONTROLS

A. Storm Water Permits

1. CMGC shall obtain all necessary permits from Watershed Districts or responsible regulatory agencies for temporary erosion control measures. CMGC shall obtain an NPDES storm water permit for construction disturbing more than one acre of area in conjunction with the Owner.

2. CMGC shall provide and maintain all best management practices necessary for erosion prevention, sediment control, dewatering and basin draining, and pollution prevention management measures at the Site in accordance with the requirements of the NPDES Storm Water permit and associated storm water pollution prevention plan (SWPPP) to be submitted to the NDDH following award of the contract and prior to beginning construction.

3. The following paragraphs outline general best management practices that will be included in the SWPPP submitted to the NDDH. The SWPPP and NPDES shall be located at the site at all times during the construction. CMGC shall meet the general requirements as outlined below and any additional requirements required as a part of the review and approval of the NPDES storm water permit and SWPPP.

B. Erosion Prevention Practices:

1. CMGC shall schedule construction activities and conduct operations so as to minimize erosion of soils.

2. CMGC shall phase construction activities to minimize the amount of disturbed areas at one time Provide temporary seeding, vegetative buffer strips, mulch or wood fiber blanket, and/or sod stabilization in disturbed areas not being actively worked and not yet ready for final grading and stabilization. Exposed soils shall be stabilized as soon as possible but in no case wait longer than 14 days without providing temporary or permanent stabilization.

3. If CMGC chooses to disturb more than 10+ acres at one time temporary sediment basins shall be constructed in accordance with the following:

    a. Provide storage for a 2-year, 24-hour storm, but not less than 1800 feet per acre.
    b. Prevent discharge of floating debris.
    c. Allow for maintenance.
    d. Provide emergency overflow.
    e. Be built concurrent with start of soil disturbance.
    f. Consider public safety.

4. Temporary sediment control basins may also be necessary for steep slope areas or high erodible soils. CMGC shall construct temporary sediment control basins as necessary to meet additional requirements following review and approval of the NPDES storm water permit and associated SWPPP.

C. Sediment Control Practices:

1. Provide temporary measures such as silt fencing, berms, dikes, and turf establishment to prevent erosion. Construct drainage facilities and turf establishment concurrently with earthwork operations.

2. Incorporate erosion control measures at the earliest time practical time during construction. Provide erosion control measures as directed prior to the disturbance of in-place ground cover in critical areas which area tributary to public waters.

3. CMGC shall maintain all temporary erosion control measures throughout the duration of the project and remove them upon completion of permanent erosion control measures and turf establishment.

4. Protect all existing and new storm drain inlets.

5. Control temporary soil stockpiles.

6. Control vehicle tracking with stone pads, concrete, steel wash racks, or equivalent.

7. Provide gravel construction entrances at field entrances to the Site.

8. Remove sediment tracked onto streets within 24 hours of detection.

9. CMGC shall be responsible for periodically cleaning out and disposing of all sediment once the storage capacity of the drainage feature or structure receiving the sediment is reduced by one-half.

10. CMGC shall be responsible for cleaning out and disposing of all sediment at the completion of the project.

11. The CMGC is responsible for removing the temporary erosion and sediment control devices and verifying the cleaning out of all storm drainage structures, including flumes, pipes, and ditches once final stabilization has occurred.

12. Maintain temporary erosion control devices until permanent facilities are constructed and final soil stabilization has occurred.

D. Dewatering and Basin Drainage:

1. Grade site to drain and maintain excavations free of water.

2. Dewatering and basin draining must discharge to a temporary or permanent sedimentation basin.

3. Provide, maintain, and operate pumping equipment as required.

4. Prevent erosion and scour at dewatering or pumping locations, disperse over natural rock riprap, sand bags, plastic sheeting, or other accepted measures.

5. Provide water barriers as required to protect site from soil erosion.

E. Inspections and Maintenance of SWPPP:

1. Shall be conducted by CMGC.

2. Occur every seven days.

3. Occur within 24 hours of ½” storm.

4. Be routinely recorded and kept with the SWPPP.

5. Occur once a month on final stabilized area.

6. Ensure integrity and effectiveness of erosion prevention and sediment control measures.

7. Repair or replace nonfunctional best management practices or erosion control measures.

8. Drain and remove sediment from basins.

9. Inspect surface waters, drainage ditches and conveyance systems for sediment.

10. Remove sediment deposits and stabilize any exposed soil during sediment removal.

11. Inspect and clean vehicle exits.

12. Ensure infiltration areas are protected.

F. Pollution Prevention Management Measures:

1. CMGC shall provide proper collection and disposal of solid waste. All construction debris and solid waste shall be contained in dumpsters or roll off boxes. All dumpsters and roll off boxes shall be located behind erosion control devices and a minimum of 10 feet from any catch basin structure.

2. All construction material shall be stored in an orderly manner.

3. All chemicals on site shall be kept in sealed containers with their original labeling and Material Safety Data sheets available.

4. All appropriate agencies shall be notified of any spill of fuel, oil, or other hazardous chemicals immediately upon detection.

5. Establish a specific truck washing site.

6. There shall be no on site engine degreasing.

G. Dust Control:

1. CMGC shall be responsible for dust control throughout the duration of the Project.

2. Work shall be executed by methods to minimize raising dust from construction operations.

3. Provide appropriate dust control measures as required to prevent excessive dust from dispersing into the air.

H. Noise Control:

1. CMGC shall be responsible for noise control throughout the duration of the Project.

2. Avoid the use of tools and equipment which produce harmful noise.

3. Restrict the use of noise making tools and equipment to required hours of construction.

I. Road Cleaning:

1. As required, the CMGC shall sweep or clean all roads and streets that are affected by vehicle traffic entering or leaving the site.

1.16 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.17 TEMPORARY CONSTRUCTION PROTECTION

A. Shoring and Bracing:

1. CMGC shall provide and maintain temporary supports, shoring, and bracing as required for protection of work.

2. CMGC shall assure the adequacy of all temporary shoring and bracing.

3. Repair or replace damaged work occasioned by inadequate temporary supports, shoring, or bracing.

4. Leave temporary supports, shoring, and bracing in place until permanent construction is complete to point where installed work is properly supported.

1.18 SECURITY

A. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

C. Deliveries, CMGC shall inform

1. Engineer and Owner of all equipment deliveries at least 24 hours in advance of

2. Equipment/material arrivals scheduled for delivery to Owner occupied facilities.

D. Security will be the CMGCs responsibility for any Work occurring after normal operating hours. Upon completion of this Work, CMGC shall ensure project site doors and gates are locked and secure. No claims shall be made against Engineer or Owner for any act of an employee or trespasser, and CMGC shall make good on any damage to Owner's property, resulting from CMGC's failure to provide sufficient security in the absence of the Engineer and Owner.

E. CMGC to discuss security with his employees and sub-contractors and advise them to immediately report anything suspicious which could be a security issue.

1.19 PARKING

A. CMGC and personnel shall park all personal vehicles in an area acceptable to Owner and applicable property owners.

B. Do not block or hinder access to local property, driveways, or walkways.

1.20 VEHICLE ACCESS

A. By General CMGC.

1. Maintain access roads leading into Site.

2. Provide means of removing mud from vehicle wheels before entering streets and roads.

3. Construct and maintain temporary roads accessing public roads to serve construction areas.

4. Provide aggregate materials as an incidental to the Contract is access roads are not suitable for truck and equipment traffic or to accommodate local rainfall events.

5. When finished using access road(s) remove temporary access roads and return surface to pre-existing or better condition, as an incidental to the project.

B. Traffic Control

1. CMGC shall provide and maintain signs, warning lights, and barricades to adequately protect warn and protect the public from hazardous protrusions, materials, excavations, and equipment resulting directly or indirectly from construction activities.

2. All traffic control devices including signs, warning lights, and barricades shall conform to the requirements of the North Dakota Department of Transportation (ND DOT).

3. Traffic control setup and layout shall conform to requirements of the ND DOT and shall be the sole responsibility of the CMGC.

4. CMGC shall give Owner and Engineer at 48 hours' notice prior to a partial blockage or closure of any street or public right of way. When working in the right of way of county roads, CMGC shall be responsible for acquiring the necessary permits for working in a right-of-way.

5. Traffic control devices shall be inspected daily. Warning lights should be checked for proper operation and cleaned as required. All broken or ineffective traffic control devices shall be replaced immediately.

6. CMGC shall designate an individual and one alternate to have responsible charge of proper installation and maintenance of the traffic control devices. These individuals shall be available on a 24-hour on call basis.

1.21 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

D. CMGC shall salvage all existing pumps and blowers and shall store them on the site at a location to be determined by the Owner, where the Owner will retain possession of the items. At the discretion of Owner, CMGC shall salvage select control panels and shall store them on the site at a location to be determined by the Owner, where the Owner will retain possession of the items.

E. CMGC shall maintain site clean and free of obstructions that may cause injuries or otherwise prevent staff (Owner, Engineer, CMGCs, etc.) from performing their job effectively.

1.22 FIELD OFFICES AND SHEDS

A. Construction Field Office (trailer or shed): At CMGC's option.

B. Locate Field Offices and construction trailer or shed a minimum distance of 30 feet from existing and new structures. Owner's approval of location is required.

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Final Application for Payment inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 50 00

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SECTION 01 52 00
CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Construction Trailers and Sheds.
2. First Aid Facilities.
3. Sanitary Facilities.
4. Temporary Housing.
5. Progress Cleaning and Waste Removal.
6. Removal of Construction Facilities.

1.02 CONSTRUCTION AND SHEDS

A. Construction trailers or sheds: At Contractor's option. Coordinate locations with Owner.

B. Locate Field Offices and construction trailer or shed a minimum distance of 30 feet from existing and new structures. Owner's approval of location is required.

C. Contractor responsible for Temporary Utilities to feed Construction Facilities.

1.03 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide from time of project mobilization to final completion.

1.04 FIRST AID FACILITIES

A. First aid facilities shall be provided and maintained by the Contractor in accordance with all federal, state, and local laws and regulations.

1.05 TEMPORARY HOUSING

A. Owner will not allow temporary housing on-site.

1.06 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipes, excavations, work areas, and other closed or remote spaces, prior to enclosing the space.

C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

D. Contractor shall maintain site clean and free of obstructions that may cause injuries or otherwise prevent staff (Owner, Engineer, Contractor, etc.) from performing their job effectively.

1.07 REMOVAL OF CONSTRUCTION FACILITIES

A. Remove temporary utilities, equipment, facilities, and materials prior to Final Application for Payment inspection.

B. Remove underground installations as required. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 52 00

SECTION 01 55 00
VEHICULAR ACCESS AND PARKING AREAS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Parking.
2. Temporary Access Roads.
3. Traffic Control.
4. Entrance Road.
5. Haul Routes.

1.02 PARKING

A. Contractor and personnel shall park all personal vehicles in an area acceptable to Owner and applicable property owners.

B. Contractor shall provide and maintain a surface suitable for parking vehicles.

1.03 ACCESS ROADS

A. Maintain access roads leading into Site and parking areas.

B. Provide means of removing mud from vehicle wheels before entering streets and roads.

C. Construct and maintain temporary roads accessing public roads to serve construction areas.

D. Temporary construction entrances shall be constructed as indicated in the specifications or contract drawings.

1.04 TRAFFIC CONTROL

A. Contractor shall maintain two-way traffic at all times on impacted roadways.

B. Contractor shall provide and maintain signs, warning lights, and barricades to adequately protect warn and protect the public from hazardous protrusions, materials, excavations, and equipment resulting directly or indirectly from construction activities.

C. All traffic control devices including signs, warning lights, and barricades shall conform to the requirements of the Utah Manual on Uniform Traffic Control Devices.

D. Traffic control setup and layout shall conform to requirements of the manual for Traffic Control Zone Layouts (field manual) and shall be the sole responsibility of the Contractor.

E. Contractor shall give Owner and Engineer at least 48 hours' notice prior to a partial blockage or closure of any street or public right of way. When working in the right of way of county roads, Contractor shall be responsible for acquiring the necessary permits for working in a right-of-way.

F. Traffic control devices shall be inspected daily. Warning lights should be checked for proper operation and cleaned as required. All broken or ineffective traffic control devices shall be replaced immediately.

G. Contractor shall designate an individual and one alternate to have responsible charge of proper installation and maintenance of the traffic control devices. These individuals shall be available on a 24-hour on call basis.

1.05 ENTRANCE ROAD

A. Not Used.

1.06 HAUL ROUTES

A. The Contractor shall take whatever steps are necessary to ensure that no overloading is done and road restrictions are followed by all suppliers and Sub-contractors. This will insure that no city, county, state or other restrictions are violated. It shall be the responsibility of the Contractor to familiarize himself with all local regulations before starting construction. Any road damaged by the Contractor shall be repaired to the original condition at the Contractor's expense, to the satisfaction of the Engineer.

1.07 REMOVAL OF ACCESS FACILITIES

A. Remove temporary facilities and materials, prior to Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 55 00

SECTION 01 55 29
STAGING AREAS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Staging Areas

2. Stockpile Areas

1.02 STAGING AREAS

A. Contractor shall coordinate and utilize only areas within the construction limits for construction facilities, storage of materials and equipment, parking, and staging operations.

B. The areas and grounds utilized shall be left clean and restored to original condition.

C. Contractor shall be responsible for coordination of construction, staging, and temporary stockpile activities with Owner.

1.03 STOCKPILE AREAS

A. Contractor shall stockpile excess material from excavations in locations acceptable to Owner.

B. Contractor shall make arrangements to stockpile materials within areas of the Construction limits.

C. Contractor shall coordinate construction, staging, and stockpile activities and Owner shall not be responsible for any additional charges due to moving of staging and/or stockpile materials multiple times.

D. Temporary and final stockpiles shall be maintained during construction and protected from erosion.

E. The areas and grounds utilized shall be left clean and restored to original condition.

1.04 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Prohibit traffic from landscaped areas.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 55 29

SECTION 01 56 00
TEMPORARY BARRIERS AND ENCLOSURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary Fencing.
2. Temporary Barriers.
3. Temporary Construction Protection.
4. Security.

1.02 TEMPORARY FENCING

A. Provide fencing around open excavation areas.

1.03 TEMPORARY BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for plants designated to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.04 TEMPORARY CONSTRUCTION PROTECTION

A. Shoring and Bracing:

1. Contractor shall provide and maintain temporary supports, shoring, and bracing as required for safety and protection of work.
2. Contractor shall assure the adequacy of all temporary shoring and bracing.
3. Repair or replace damaged work occasioned by inadequate temporary supports, shoring, or bracing.
4. Leave temporary supports, shoring, and bracing in place until permanent construction is complete to point where installed work is properly supported.

1.05 SECURITY AND SAFETY

A. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Upon completion of this Work, Contractor shall ensure doors and gates are locked and secure. No claims shall be made against Engineer or Owner for any act of an employee or trespasser, and Contractor shall make good on any damage to Owner’s property, resulting from Contractor’s failure to provide sufficient security in the absence of the Engineer and Owner.

C. Unexpected deliveries pose security concerns; therefore, Contractor shall inform Engineer and Owner of all equipment deliveries at least 24 hours in advance of equipment / material arrivals.

D. Contractor to discuss security with his employees and sub-contractors and advise them to immediately report anything suspicious which could be a security issue.

E. Provide and maintain all necessary barriers to protect open excavated areas and open holes.

F. Provide temporary signs required for the execution of the Work such as “Office”, “Men at Work”, “Danger”, “High Voltage”, etc.

1.06 REMOVAL OF TEMPORARY BARRIERS AND ENCLOSURES

A. Remove temporary barriers and enclosures, prior to Final Application for Payment inspection.

B. Remove underground installations as required. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 56 00

SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This Section includes:

1. Products.

2. Transportation and Handling.

3. Storage and Protection.

4. Product Options.

5. Substitutions.

B. Related Sections include, but are not limited to:

1. Section 00 73 00 - Supplementary Conditions

2. Section 01 45 00 – Quality Control

1.02 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components designated for re-use.

B. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60, 61, 600, and 372, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

D. Provide interchangeable components of the same manufacturer for components being replaced.

E. Equipment covered by Division 26 shall be listed by UL, or by a nationally recognized third party testing laboratory. All costs associated with obtaining the listing shall be the responsibility of the Contractor. If no third-party testing laboratory provides the required listing, an independent test shall be performed at

Contractor's expense. Before the test is conducted, Contractor shall submit a copy of the testing procedure to be used.

F. Premium and High Efficiency Products

1. The City of Eagle Mountain City or other entities may participate in various rebate programs to promote installation of high and premium efficiency equipment and products. The Contractor shall supply the necessary information for the Owner to complete the rebate forms.

2. Premium and High Efficiency Products shall be as specified in their associated technical specifications.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

J. Contractor shall be responsible to arrange for, receive, inspect, and unload all shipments of materials or equipment. Contractor shall provide haul route information to shipping companies.

1.05 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with an option for an "Or Equal" or "Approved Equivalent" or "Prior Approved Equivalent" Manufacturer: Submit a request for the "or equal/approved equivalent" in accordance with the following substitutions article. Requests and Engineer's acceptance of "Or Equal" or "Approved Equal" or "Prior Approved Equivalent" Manufacturers is allowed during bidding only.

1.06 DESIGN REQUIREMENTS

A. Design and installation of systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of the 2021 edition of the International Building Code (IBC).

1. Basic Wind Speed: 115 mph, Exposure B

2. Ground Snow Load: 26-psf

3. Seismic:

a. S_s (maximum short-term spectral response acceleration) = 0.736
b. S_1 (maximum 1-second spectral response acceleration) = 0.235
c. S_{DS} (design short-term spectral response acceleration) = 0.5942
d. S_{D1} (design 1-second spectral response acceleration) = 0.3447
e. I_e (Seismic Importance Factor) = 1.25
f. Risk Category = III
g. Seismic Design Category = D

B. Proof of Compliance:

1. Structural integrity and anchorage shall be certified by an approved calculation that demonstrates the adequacy of the anchorage system for seismic forces. This calculation may be based on principles of structural analysis and engineering mechanics, or based on similarity to approved shake-table tests.

2. The Contractor shall submit for review and approval test data or calculations certified by a Civil or Stuctural Engineer registered in the State of Utah to show compliance with the above requirements.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 4,900 feet above mean sea level.

1.08 SUBSTITUTIONS

A. Equal" or "Approved Equivalent" or "Acceptable" or "Prior Approved Equivalent" products will be considered **only** if written request is made to the Engineer at least **14** days prior to Bid opening.

B. Substitutions will be considered when a Product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Bidder: Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

2. Will provide the same warranty for the Substitution as for the specified Product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse Owner and Engineer for redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit two copies of request for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

3. Fully identify the substitutions effects on all facets of the Work and construction schedule.

4. The Engineer or Owner will notify Contractor in writing of decision to accept or reject request.

5. Accepted substitutions will be listed by addendum.

PART 2 PRODUCTS

2.01 UNIFORMITY

A. For any type of similar equipment, i.e., motors, drive units, etc., provide equipment of the same manufacturer.

B. Inform all subcontractors and suppliers of the selected manufacturers to ensure equipment uniformity.

C. Obtain each separate type of product from the same manufacturer.

2.02 TOOLS

A. For any equipment or equipment components requiring special tools, the Contractor shall supply the Owner with such tools to allow for the maintenance and removal/replacement of equipment components.

2.03 CONSUMABLES

A. Provide Owner with all consumable items that are required during start-up and initial operation (90 days minimum) of all Project components including, but not limited to; coolant, fluids, oil, grease, other lubricants, filters, bulbs, batteries, etc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all equipment in full compliance with the manufacturer's recommendations.

B. Obtain services of qualified and approved factory representatives to install, check, and approve the installation of all equipment.

C. Service representative:

1. Present for the start-up and initial operation of all equipment.

2. Certify in writing that:

a. Equipment is properly installed and ready for operation.
b. Equipment properly aligned.
c. Direction of rotation checked.
d. Lubrication is proper.
e. Unit is free from undue stress from connecting pipe or anchorage.
f. Unit has operated at full load conditions.
g. Unit has operated in full compliance with the project specifications and the manufacturer's recommendations.

END OF SECTION 01 61 00

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SECTION 01 65 00
PRODUCT DELIVERY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Products.

2. Preparation for Shipment.

3. Transportation and Handling.

B. Related Sections include, but are not limited to:

1. Section 01 33 00 – Submittals.

PRODUCTS

A. Products: Means goods of new material, machinery, components, equipment, fixtures, and systems. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work.

B. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

D. Provide interchangeable components of the same manufacturer for components being replaced.

PREPARATION FOR SHIPMENT

A. Prior to packaging equipment, Supplier shall provide packing list along with estimated package dimensions – Length x Width x Height (L x W x H) – for each package exceeding a 3-foot dimension in L, W, or H to Buyer. All Goods to be installed shall be shipped to the Point of Destination, freight paid by Supplier.

B. All equipment shall be suitably packaged by Supplier to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

C. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to final acceptance of equipment shall be repainted to the satisfaction of Buyer.

D. Grease and lubricating oil shall be applied to all bearings and similar items.

E. Delivery schedule for shipment of products shall be established by the Installation Contractor. Supplier shall coordinate delivery schedule with installation contractor accordingly.

TRANSPORTATION AND HANDLING

A. Before shipping each item of equipment shall be tagged or marked by Supplier as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of equipment shall be included with each shipment.

B. Transport and handle Products in accordance with manufacturers' instructions.

C. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

D. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

E. Supplier shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the Point of Destination. Supplier shall comply with the requirements specified herein and shall provide required information concerning the shipment and delivery of the Goods specified in this Contract. These requirements also apply to any Sub-Suppliers making direct shipments to the Point of Destination.

F. Delivery of portions of the equipment in several individual shipments shall be subject to review of Buyer before shipment. When permitted, all such partial shipments shall be plainly marked to identify, to permit easy accumulation, and to facilitate eventual installation.

PART 2 PRODUCTS

5.01 UNIFORMITY

A. For any type of similar equipment, i.e., motors, drive units, etc., provide equipment of the same manufacturer.

B. Inform all Subcontractors and Suppliers of the selected manufacturers to ensure equipment uniformity.

TOOLS

A. For any equipment or equipment components furnished requiring special tools, Supplier shall provide the special tools to the Installation Contractor. Installation Contractor shall supply the Owner with these tools to allow for the maintenance and removal/replacement of equipment components.

B. Each submersible pump, mixer, and other equipment (excluding diffusers) which require periodic removal from their submerged state shall be supplied with their own davit arm and sleeve.

CONSUMABLES

A. Provide Buyer with all consumable items that are required during start-up and initial operation (90 days minimum).

PART 3 EXECUTION

8.01 NOT USED.

END OF SECTION 01 65 00

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SECTION 01 73 29
CUTTING AND PATCHING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Requirements and limitations for cutting and patching of Work.

B. Related Sections include:

1. Section 01 10 00 – Summary of Work.

2. Section 01 33 00 – Submittal Procedures.

3. Section 01 61 00 – Common Product Requirements.

4. Individual Product Specification Sections:

a. Cutting and patching incidental to Work of this Section.
b. Advance notification to other Sections of openings required in Work of those Sections.

1.02 SUBMITTALS

A. Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.

2. Integrity of weather exposed or moisture resistant element.

3. Efficiency, maintenance, or safety of any operational element.

4. Visual qualities of sight exposed elements.

5. Work of Owner or separate contractor(s).

B. Include in request:

1. Identification of Project.

2. Location and description of affected Work.

3. Necessity for cutting or alteration.

4. Description of proposed Work and Products to be used.

5. Alternatives to cutting and patching.

6. Effect on work of Owner or separate contractor(s).

7. Written permission of affected separate contractor(s).

8. Date and time Work will be executed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Those required for original installation.

B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 61 00 – Common Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, assess conditions affecting performance of Work.

C. Understand and become familiar with required coating systems, application requirements, and spatial concerns, issues, and dimensions required to perform the Work.

D. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas that may be exposed by uncovering Work.

C. Maintain excavations free of water.

D. Verify that all materials are clean and free from defects.

3.03 CUTTING

A. Execute cutting and fitting to complete the Work.

B. Uncover work to install improperly sequenced Work.

C. Remove and replace defective or non-conforming Work.

D. Remove samples of installed Work for testing, when requested.

E. Coordinate openings in the Work for penetration of process, mechanical and electrical Work.

F. Employ original installer of new Work to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces. Employ experienced personnel or original supplier for applying specialized coating systems.

G. Cut rigid materials, masonry, prestressed concrete, and concrete using masonry saw or core drill. Pneumatic tools not allowed without prior approval. Protect finished water reservoirs from materials produced during saw cutting and core drilling.

3.04 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit Products together to integrate with other Work.

C. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer of new Work to perform patching for weather and moisture resistant elements, and sight-exposed surfaces.

E. Restore Work with new Products in accordance with requirements of Contract Documents.

F. Fit Work airtight and water tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision or remedy.

3.05 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product sections; match existing Products and Work for patching and extending Work.

B. Employ skilled and experienced installer to perform alteration Work.

C. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

D. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.

E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with a neat transition to adjacent finishes.

F. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Engineer for review.

H. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition; to Engineer for review request instructions from Engineer.

I. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

J. Finish surfaces as specified in individual Product Sections.

END OF SECTION 01 73 29

SECTION 01 75 00
STARTING AND ADJUSTING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance.
2. Scheduling.
3. Preparation.
4. Starting Systems.
5. Start-Up Period.
6. Adjusting.
7. Acceptance of Equipment and Systems.
8. Guarantee and/or Warranty Period.

B. Related Sections include:

1. Section 01 33 00 – Submittal Procedures.
2. Section 01 45 00 – Quality Control.
3. Section 01 77 00 – Closeout Procedures.
4. Section 01 78 23 – Operations and Maintenance Data.
5. Section 01 79 00 – Demonstration and Training.

1.02 QUALITY ASSURANCE

A. Provide authorized and qualified manufacturer's representative to inspect, check, and approve equipment installation prior to start-up and to assist with demonstration testing.

B. Authorized representative shall supervise placing equipment into operation.

C. Prior to demonstration to Owner and Engineer, provide written confirmation that systems have been tested, adjustments have been made, and equipment is ready for start-up demonstration.

D. Provide access to equipment and systems. Operate systems at designated times and under conditions required.

E. CMGC shall submit four (4) copies of written start-up report for each system or equipment item following each start-up.

1.03 SCHEDULING

A. CMGC shall submit four (4) copies of preliminary start-up, and instruction schedule at least 15 calendar days prior to proposed dates. List times and dates for each system or equipment item. Include names of CMGC's and subcontractors personnel, manufacturer, and/or authorized representative proposed to perform services. Provide documentation to verify their qualifications.

B. CMGC shall coordinate scheduling of start-up. Scheduling of start-up shall be subject to approval of Owner and Engineer.

C. CMGC shall notify Owner and Engineer of changes in scheduling at least five (5) days in advance prior to scheduled start-up of individual systems or equipment. Scheduling changes shall be subject to approval by Owner and Engineer.

PART 2 PRODUCTS

2.01 NOT USED.

PART 3 EXECUTION

3.01 PREPARATION

A. Confirm wiring to motors and controls are operational.

B. Inspect equipment for cleanliness and remove or clean foreign matter.

C. Lubricate each piece of equipment according to manufacturer’s instructions. Check alignment, drive rotation, equipment speed, control sequence, and other conditions which may cause damage. Provide adjustment as required.

D. Confirm that equipment is properly anchored and supported.

E. Confirm wiring to motors and controls are operational.

F. Confirm that auxiliary systems such as seal water and spray water systems are operational.

G. Confirm that tests, meter readings, and specific electrical characteristics, including motor amperage agree with those specified.

H. Confirm that control system is operation in automatic mode.

I. Inspect hand and automatic valves, clean bonnets and stems, tighten packing glands to ensure no leakage. Adjust valves as necessary for proper operation. Verify valve proper valve positioning for prior to start-up and testing of associated equipment.

J. Provide instruments required for testing, adjusting, and balancing operations.

K. All costs associated with starting, testing, adjusting, and balancing equipment including power and fuel costs shall be responsibility of the CMGC.

3.02 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Engineer and Owner seven (7) days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturer’s instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 33 00 that equipment or system has been properly installed and is functioning correctly.

3.03 START-UP PERIOD

A. Following successful completion of demonstration testing per Section 01 79 00 – Demonstration and Training, the CMGC shall be responsible for the operation and control of new equipment and/or systems for a minimum period of 15 days.

B. CMGC shall be responsible for making any changes, repairs, or replacements during this 15 day operating period.

C. During the 15 day testing period, the CMGC shall provide supervisory personnel who fully understand the operation of the equipment. It is the intention that during this period, the Owner’s personnel will become familiar with the operation and maintenance of the equipment or system.

D. All costs associated with operating and maintaining the installed equipment and/or systems, including power and fuel costs shall be the responsibility of the CMGC.

3.04 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

3.05 ACCEPTANCE OF EQUIPMENT AND SYSTEMS

A. Upon completion of training specified in Section 01 79 00 – Demonstration and Training, receipt of the final operation and maintenance manuals per Section 01 78 23 – Operations and Maintenance Data, receipt of the required start-up and demonstration testing reports, and following successful completion of the 15 day operating period, ENGINER shall promptly review submittals of the manuals and reports.

B. CMGC shall provide additional information or tests if required by the Engineer.

C. Following review of the information, Engineer shall recommend approval of the equipment and acceptance of the installation to the Owner. The Owner shall provide in writing notice of acceptance of the equipment within a reasonable time after receipt of Engineer's recommendation.

D. Equipment placed into temporary operation prior to final completion of the project shall be readjusted and/or calibrated as required prior to final completion of the project.

E. After equipment has been tested, adjusted, and accepted in writing by the Owner, but before final acceptance of the entire project, the Owner will assume operation and maintenance responsibilities for the equipment or systems, including power and fuel costs. The Owner may place portions of the facility into operation prior to final acceptance of the entire project.

3.06 GUARANTEE AND/OR WARRANTY PERIOD

A. The guarantee or warranty period for all equipment and/or systems will start from the date of written notice of final acceptance of the equipment and/or systems by the Owner.

B. There will be no exceptions to the start of the guarantee or warranty period.

END OF SECTION 01 75 00

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Closeout Procedures.
2. Substantial Completion.
3. Final Completion.
4. Final Cleaning.
5. Project Record Documents.
6. Spare parts and Maintenance Products.
7. Warranties and Bonds.
8. Maintenance Service.
9. Final Adjustment of Accounts.

B. Related Sections include:

1. Section 00 72 00 – General Conditions.
2. Section 00 73 00 – Supplementary Conditions.
3. Section 01 31 13 – Project Coordination.
4. Section 01 50 00 – Temporary Facilities and Controls.
5. Section 01 75 00 – Starting and Adjusting.
6. Section 01 78 23 – Operation and Maintenance Data.

1.02 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the Project.

1.03 SUBSTANTIAL COMPLETION

A. Prior to substantial completion CMGC shall review Contract Documents for items which are not complete or need to yet be completed including submittal of all manuals, and testing reports. CMGC shall make a list of incomplete work, a value of the incomplete work, and reasons why work is incomplete. CMGC shall complete all items required to be completed as part of substantial completion.

B. CMGC shall provide a written notice to Engineer that the work, or specific portions of the work, is substantially complete and ready for review. If there are any items remaining to be corrected or completed CMGC shall submit a list of these items along with the notice of substantial completion. Along with the list of items the CMGC should provide a written explanation of why these items are not considered necessary for substantial completion.

C. Upon receipt of CMGC's notice of substantial completion, Engineer will proceed with inspection for substantial completion.

D. Following the substantial completion inspection by the Engineer and Engineer's subconsultants, Engineer will either prepare certificate of substantial completion, or notify the CMGC in writing that substantial completion has not been meant listing the various reasons.

E. CMGC shall promptly complete the items required to meet substantial completion and submit a second notice of substantial completion to the Engineer.

F. Engineer will review the work a second time do determine the status of substantial completion.

G. When Engineer considers the project to be substantially complete, Engineer will prepare the preliminary certificate of substantial completion along with a substantial completion punch list of items to be completed prior to final payment. Engineer will deliver preliminary certificate and punch list to Owner and consider any objections by the Owner as provided in the Conditions of the Contract.

H. Upon agreement by Owner and Engineer of substantial completion and punch list items, Engineer will execute and deliver to the CMGC and Owner a final certificate of substantial completion along with substantial completion punch list of items to be completed prior to final payment.

I. A maximum of two (2) reviews of substantially complete work will be completed by Engineer and Engineer's subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:

1. Owner will compensate Engineer for additional reviews.

2. Owner will deduct the amount of compensation paid to the Engineer for additional reviews from the payment to the CMGC.

3. Compensation shall be at Engineer's standard hourly rates plus actual cost of reimbursables.

1.04 FINAL COMPLETION

A. Following substantial completion CMGC shall complete remaining work and items to be corrected as part of substantial completion punch list as well as final cleaning and transferring site to Owner.

B. When CMGC considers that all work is complete, CMGC shall provide written notice of final completion to Engineer.

C. Following receipt of final completion certification, Engineer and Engineer's subconsultants shall review the work to verity that the requirements for final completion have been met.

D. Upon review of work for final completion Engineer will either request the CMGC to make closeout submittals or will notify CMGC that the work is not complete with a list of incomplete or defective work. CMGC shall promptly take steps to correct all listed deficiencies and incomplete work before sending a second written notice of final completion certification to Engineer.

E. If final completion was not met following first review, Engineer will review work a second time to determine if the requirements for final completion have been met.

F. A maximum of two (2) reviews of final complete work will be completed by Engineer and Engineer's subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:

1. Owner will compensate Engineer for additional reviews.

2. Owner will deduct the amount of compensation paid to the Engineer for additional reviews from the payment to the CMGC.

3. Compensation shall be at Engineer's standard hourly rates plus actual cost of reimbursables.

G. When Engineer considers all work to be complete in accordance with the Contract Documents, Engineer shall request the CMGC to make closeout submittals.

1.05 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean debris from gutters and drainage systems.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.06 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling current and future reference by Owner and Engineer.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.

5. Details not on original Contract drawings.

G. Submit documents to Engineer with claim for final Application for Payment.

1.07 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.08 WARRANTIES AND BONDS

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in D size three ring binders with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance.

1.09 MAINTENANCE SERVICE

A. Furnish service and maintenance of components during the warranty period.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

1.10 FINAL ADJUSTMENT OF ACCOUNTS

A. CMGC shall submit a final statement of accounting to Engineer. Statement shall reflect all adjustments to the contract sum and include the following:

1. Original contract sum.

2. Additions and deductions resulting from:

a. All previous change orders
b. Allowances
c. Unit prices
d. Deductions for uncorrected work
e. Penalties and bonuses
f. Deductions for liquidated damages

g. Deductions for multiple reviews
h. Other adjustments

3. Total contract sum as adjusted.

4. Previous payments.

5. Sum remaining due.

B. Engineer will prepare a final change order, reflecting approved adjustments to the contract sum which were not previously made by change orders.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 77 00

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance.
2. Format.
3. Contents of Each Volume.
4. Manual for Equipment and Systems.
5. Instruction of Owner's personnel.
6. Submittals.

B. Related Sections include:

1. Section 01 33 00 – Submittal Procedures.
2. Section 01 45 00 – Quality Control.
3. Section 01 77 00 – Closeout Procedures.

1.02 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT

A. Prepare data in the form of an instructional manual. Arrange data in numerical format.

1. Binders:

a. Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
b. 2 inch maximum ring size.
c. When multiple binders are used, correlate data into related consistent groupings.

2. Cover; Identify:

a. Each binder with typed title OPERATION AND MAINTENANCE INSTRUCTIONS.
b. Title of Project.
c. Subject matter of contents.

d. Volume number.
e. Year of construction.

3. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

B. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

C. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages. Folded paper should be unfoldable without removal from binder.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, CMGC, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.

3. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Certificates.
c. Photocopies of warranties.
d. Bonds.

E. Flash Drive:

1. A flash drive shall be provided with all documents included with an index, tabs, and labels as previously required for the binders.

1.04 CONTENTS OF EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, Subconsultants, and CMGC with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

F. Warranties: Prepare and submit per Section 01 77 00 – Closeout Procedures.

G. Bonds: Prepare and submit per Section 01 77 00 – Closeout Procedures.

H. Flash Drive: A flash drive shall be provided with all volume contents in electronic format or scanned to a portable document file (.pdf). The documents shall be placed as required under the appropriate tabs and labels as previously required for the compact discs. Each file shall be adequately labeled to identify the contents without opening the document.

1.05 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

C. Provide servicing and lubrication schedule, and list of lubricants required.

D. Include manufacturer's printed operation and maintenance instructions.

E. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

F. Provide CMGC's coordination drawings, with color coded piping diagrams as installed.

G. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

H. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage, and local sources of supply.

I. Additional Requirements: As specified in individual Product specification sections.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

K. Flash Drive: A flash drive shall be provided with all manuals in electronic format or scanned to a portable document file (.pdf). The documents shall be placed as required under the appropriate tabs and labels as previously required for the compact disc. Each file shall be adequately labeled to identify the contents without opening the document.

1.06 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.07 SUBMITTALS

A. Submit electronic copies of preliminary draft or proposed formats and outlines of contents before Substantial Completion. Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit electronic copies of completed volumes fifteen (15) working days prior to final inspection. One (1) copy will be returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.

D. Submit two (2) sets of revised final volumes in final form within ten (10) days after final inspection.

E. Submit a minimum of two (2) complete copies of the flash drives with final documents in electronic format within then (10) days after final inspection.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION 01 78 23

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SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance.
2. Scheduling.
3. Demonstration Testing.
4. Equipment Training.

B. Related Sections include:

1. Section 01 45 00 – Quality Control.
2. Section 01 75 00 – Starting and Adjusting.
3. Section 01 77 00 – Closeout Procedures.

1.02 QUALITY ASSURANCE

A. Provide authorized and qualified manufacturer's representative to inspect, check, and approve equipment installation prior to start-up and to assist with demonstration testing.

B. Authorized representative shall supervise placing equipment into operation.

C. Prior to demonstration to OWNER and ENGINEER, provide written confirmation that systems have been tested, adjustments have been made, and equipment is ready for start-up demonstration.

D. Provide access to equipment and systems. Operate systems at designated times and under conditions required.

E. CONTRACTOR shall submit four (4) copies of written demonstration testing report following completion of demonstration testing for each equipment item. Report shall describe the test, test conditions, and result.

1.03 SCHEDULING

A. CONTRACTOR shall submit four (4) copies of demonstration testing and instruction schedule at least 15 calendar days prior to proposed dates. List times and dates for each system or equipment item. Include names of CONTRACTOR'S and subcontractors personnel, manufacturer, and/or authorized representative proposed to perform services. Provide documentation to verify their qualifications.

B. CONTRACTOR shall coordinate scheduling of start-up, demonstration testing, and instruction of OWNER'S personnel by manufacturer's representatives. Scheduling of start-up, demonstration testing, and instructional activities shall be subject of approval of OWNER and ENGINEER.

C. CONTRACTOR shall notify OWNER and ENGINEER of changes in scheduling at least five (5) days in advance prior to demonstration testing or instructional services for an individual systems or equipment. Scheduling changes shall be subject to approval by OWNER and ENGINEER.

PART 2 PRODUCTS

2.01 NOT USED.

PART 3 EXECUTION

3.01 DEMONSTRATION TESTING

A. Upon completion of inspection, adjusting, and balancing per Section 01 75 00 – Starting and Adjusting; demonstrate that each separate piece of equipment of each system and related mechanical or instrumentation and control equipment operate in accordance with the requirements of the Contract Documents. Where no performance requirements are specified, demonstrate the equipment operates in accordance with the manufacturer's requirements and industry standards for the specific application.

B. Demonstration tests shall confirm smooth operation, without excessive noise or vibration; equipment is responsive to manual and automatic controls; control and protective devices are properly set; and equipment will run on controlled or intermittent basis.

C. Demonstrate all alarm and safety lockout systems for correct functioning with instrumentation and control. Each remote control point and alarm point shall be tested.

D. In the event of demonstration test failure, the equipment shall be adjusted, repaired, or replaced subject to approval of the ENGINEER. Following adjustment, repairs, or replacement the equipment shall be demonstration tested again. All costs for adjustment, repairs, or replacement shall be the responsibility of the CONTRACTOR.

E. All costs associated with the demonstration testing, including power and fuel costs shall be the responsibility of the CONTRACTOR.

3.02 EQUIPMENT TRAINING

A. The CONTRACTOR shall provide competent personnel who fully understand the operation of the equipment and who are authorized by the manufacturer to

instruct the OWNER on the operation and maintenance of each equipment item and/or system.

B. Instruction and training shall take place following initial start-up, balancing, and testing of equipment or system. The instruction and training may take place prior to demonstration testing or during the 15 day operation period, but shall take place prior to acceptance of the installation by the OWNER.

C. Training shall be of the on-the-job type, and shall cover all areas of control, operation, and maintenance.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six (6) months.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. The amount of time required for instruction on each item of equipment and system is not less than that specified in individual sections.

I. Taping of Training Sessions:

1. The Owner reserves the right to use any types of audio/visual recording devices during start-up and training activities.

END OF SECTION 01 79 00

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SECTION 01 91 00
COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

A. Requirements for functional testing, performance and operational testing, and commissioning of equipment and systems.

B. Description of the commissioning process and responsibilities common to all parties.

C. Commissioning, including Functional Tests, performance and operational testing, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion

1.02 SCOPE OF COMMISSIONING

A. The following are to be commissioned:

1. Plumbing Systems
2. HVAC Systems
3. Special Ventilation
4. Electrical Systems
5. Electronic Safety and Security
6. Process Integration Equipment
7. Material Processing and Handling Equipment
8. Process Gas and Liquid Handling Equipment
9. Water and Wastewater Equipment
10. Other equipment and systems identified elsewhere in Contract Documents as requiring commissioning.

B. The commissioning process will be directed by the Installation Contractor and monitored by the Engineer.

C. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:

1. Verify applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum

standards and that they receive adequate operational checkout by installing contractors.

2. Verify and document proper performance of equipment and systems

3. Verify that O&M documentation is complete.

4. Verify that Owner's operating personnel are adequately trained.

1.03 RELATED REQUIREMENTS

A. Section 01 75 00 - Starting and Adjusting

B. Section 01 78 23 - Operation and Maintenance Manuals

C. Section 01 79 00 - Classroom and Demonstration Training

1.04

SUBMITTALS

A. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

B. Product Data: If submittals to Engineer do not include the following, submit copies as soon as possible:

1. Manufacturer's product data, cut sheets, and shop drawings.

2. Manufacturer's installation instructions.

3. Startup, operating, and troubleshooting procedures.

4. Fan and pump curves.

5. Factory test reports.

6. Warranty information, including details of Owner’s responsibilities with regard to keeping warranties in force.

C. Startup Plans and Reports.

D. Completed Checklists.

E. Commissioning Plan.

F. Commissioning Reports.

1.05 DEFINITIONS

A. Commissioning Plan: An overall plan, developed in conjunction with Owner, Engineer, and Contractor, that provides the structure, schedule, and coordination planning for the commissioning process.

B. Functional Tests (FT): Test of the dynamic function and operation of equipment and systems using manual (direct observation) and/or remote monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operations. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying temperatures, alarm, power failure, local/remote, etc. FTs are performed after pre-functional tests and startups are completed.

C. Performance and Operational Testing (POT): Test of systems after written acceptance of the FT. The POT test period will be used to develop adequate process conditions to fully establish compliance with the performance requirements of the Contract Documents. Contractor shall supervise, control and be responsible for the operation and maintenance of equipment and systems during POT providing qualified and appropriately licensed personnel.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will not become the property of Owner.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:

1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.

2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.

3. Calibration: According to the manufacturer’s recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra

cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.

1. Dataloggers required to perform Functional Tests will be provided by the Contractor and will not become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

A. Engineer, Owner, and Contractor will develop the Commissioning Plan.

1. Engineer to attend meetings called by the Contractor for purposes of completing the commissioning plan.

2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Schedule:

1. Submit anticipated dates of startup of each item of equipment and system to Engineer within 60 days after award of Contract.

2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.

3. Pre-functional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.

4. Provide sufficient notice to Engineer for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.

C. Submit directly to the Engineer.

3.03 FUNCTIONAL TESTS

A. Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests, after completion of Pre-functional Checklist and before Substantial Completion.

C. Engineer will witness Functional Tests, Contractor shall provide adequate notice to Engineer in advance of functional testing.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Engineer will document the deficiency and the Contractor's stated intentions regarding correction.

1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.

2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Engineer; the Contractor will reschedule the test and the Contractor shall re-test.

3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.

4. Contractor shall bear the cost of Owner and Engineer's personnel time witnessing re-testing.

E. Functional Test Procedures:

1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Engineer and Contractor.

2. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Engineer is Functional Testing.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal

requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.04 FUNCTIONAL TEST PROCEDURES – GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.

C. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

D. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

E. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

F. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.

G. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.

H. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:

1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Engineer's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.

2. Other points will be monitored by the Contractor using dataloggers.

3. At the option of the Engineer, some control system monitoring may be replaced with datalogger monitoring.

4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.

5. Graphical output is desirable and is required for all output if the system can produce it.

6. Monitoring may be used to augment manual testing.

3.05 PERFORMANCE AND OPERATIONAL TESTING

A. Contractor shall supervise, control, and be responsible for the operation and maintenance of the new equipment and/or system during a period of at least fifteen (15) days or until performance requirements are met, whichever is greater, after the written acceptance of the FT for each individual item that is placed into operation. The Contractor shall remain responsible for making required changes, repairs and replacements to the installation during this period. Final written acceptance of the equipment shall not be given until after fifteen (15) days of continuous successful operation.

B. The POT test period will be used develop adequate process conditions to fully establish compliance with the performance requirements of the Contract Documents.

C. During the POT, the Contractor shall provide supervisory and appropriately licensed personnel satisfactory to the Engineer. It is the intent that during the POT period, the Owner's personnel will become completely familiar with the operation and maintenance of the systems undergoing POT.

D. During the POT, the Owner will arrange to have a complement of operating personnel available, and these operators will be paid by the Owner.

3.06 OPERATION AND MAINTENANCE MANUALS

A. See Section 01 78 23 for additional requirements.

B. Add design intent documentation furnished by Engineer to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to Engineer for review; make changes recommended by Engineer.

D. Contractor will add commissioning records to manuals prior to submission to Owner.

END OF SECTION 01 91 00

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SECTION 02 41 13
SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extent of selective demolition work is indicated on Drawings.

B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:

1. Removal of site items indicated in Drawings.

C. Removal and satisfactory disposal of pavement materials including asphalt pavement, concrete pavement, concrete driveways, alleys, sidewalks, handicapped curb ramps, and curb and gutter.

D. Related work specified elsewhere: Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.

E. Relocation of pipes, conduits, ducts, other mechanical and electrical work are specified by respective trades.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.03 REFERENCES

A. General Industry Safety and Health Standards, Occupational Safety and Health Administration (OSHA), as found in Code of Federal Register (CFR) in 29 CFR 1910.

1.04 SUBMITTALS

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Engineer for review prior to commencement of Work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.

B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

C. Coordinate with Owner's continuing occupation of portions of existing building, and with Owner's reduced usage of any portion thereof.

D. Submit project record documents under provisions of Section 01 77 00.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable codes for worker safety, confined space entry, dust control, and water and sludge discharges and disposal.

B. Obtain required permits from authorities.

C. Notify affected utility companies before starting Work and comply with applicable requirements.

D. Do not close or obstruct roadways except as permitted by Owner. Do not close or obstruct egress width to exits without prior written permission of Owner.

E. Do not disrupt or compromise effectiveness of existing facilities without written permission of Owner.

F. Conform to procedures applicable if hazardous materials or situations discovered.

1.06 SCHEDULING

A. Schedule Work under the provisions of Sections 01 10 00.

B. Schedule Work to coincide with new construction and Owner operations.

C. Fully describe demolition preparation, including saw cutting, coring, demolition, and removal procedures; schedule; temporary structural supports; environmental controls; disposal plans; and surface and substrate preparations for subsequent work.

1.07 JOB CONDITIONS

A. Occupancy: Owner will be continuously occupying areas immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items to be demolished.

1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations may occur by Owner's removal and salvage operations prior to start of selective demolition work.

C. Partial Demolition and Removal: Materials of marketable value that are removed in accordance with the provisions of the Project, but that are not to be possessed by the Owner, shall become the property of the Contractor and shall be removed from the right-of-way. Transport salvaged items from site as they are removed.

1. Storage or sale of removed items on site will not be permitted.

D. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

1. Confine Work and stockpiling to within Owner’s property or easement as approved by Engineer. Leave undisturbed all street and utility appurtenances not indicated for removal or renovation.

2. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of buildings.

3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of element to be demolished, and adjacent facilities or work to remain.

4. Maintain, during operation and at completion, pavement removal areas in such condition that they will be well drained at all times.

5. Protect and maintain survey monuments or any construction staking from disturbance during pavement removal.

E. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

F. Explosives: Use of explosives will not be permitted.

G. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

H. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

3.01 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

3.02 PREPARATION

A. Become familiar with required lines of removal and saw cutting.

B. Identify underground utilities.

C. Provide, erect, and maintain adequate barriers and warning lights.

D. Keep streets, sidewalks, and driveways in usable condition; avoid property owner inconvenience insofar as practicable; do not trespass on private property.

E. Verify traffic control in place prior to commencement of pavement removal.

F. Inspect and record existing conditions onsite and at adjacent areas prior to starting construction. Commencement of this Section's Work means acceptance of existing conditions.

G. Locate, identify, stub off and disconnect utility services that are not indicated to remain.

H. Provide by-pass connections as necessary to maintain continuity of service.

3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

C. Salvage Items: Where indicated on Drawings as "Salvage", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.

3.04 PAVING REMOVAL

A. Saw cutting will be required on concrete and asphalt pavements. Pavement removal beyond the limits established in the notes on the Drawings shall be replaced at the Contractor's expense.

B. Saw cut vertically; remove on straight lines approximately parallel or perpendicular to centerline of pavement.

C. Saw cut vertically full depth to obtain a clean break. After saw cutting, use pneumatic jackhammer or similar device prior to breaking out pavement.

D. Break out remainder of pavement.

E. Disturbances, breakage, or damage to areas not designated for removal shall be restored at Contractor's expense prior to making final payment.

F. Leave underlying sub-base material in a condition suitable for traffic if construction sequence involves delays and if local situation requires access by the public.

G. Pavement removed beyond the limits established shall be replaced to the same specifications as the adjacent removal at Contractor's expense.

H. Pavers shall be removed and salvaged without imposing any damage.

3.05 TOLERANCES

A. Saw cut full depth to achieve a clean break.

B. If line of removal falls within 2 feet of an existing joint, adjust line of removal to be the existing joint.

C. Remove entire width of sidewalk if removal width is less than sidewalk width.

3.06 DISPOSAL

A. Remove broken pavement and dispose of materials not indicated to be stockpiled or remain as Owner's property to a location chosen by the Contractor that is acceptable to local authorities and regulatory agencies.

B. The Contractor shall provide the Engineer with information and documentation substantiating proper disposal arrangements and operations. All material generated by this project must be disposed of at a permitted site. Depending on what material is generated and whether it is contaminated or uncontaminated will determine which permitted facility can accept it. Permitted facilities include construction and demolition debris sites, restricted use sites, and regional landfills.

C. Remove and dispose of materials not indicated to be stockpiled or remain as Owner's property to a location chosen by the Contractor that is acceptable to local authorities and regulatory agencies.

D. The Contractor shall provide the Engineer with information and documentation substantiating proper disposal arrangements and operations.

END OF SECTION 02 41 13

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SECTION 03 01 00
MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cleaning of concrete surfaces.

B. Repair of exposed structural, shrinkage, and settlement cracks.

C. Resurfacing of concrete surfaces having spalled areas and other damage.

D. Patching and repair of new concrete surfaces.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

B. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2021.

C. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.

D. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

E. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars; 2021.

F. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

G. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2014.

H. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs; 2025.

I. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2024.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

C. Installer's qualification statement.

D. Project Record Documents: Accurately record actual locations of structural reinforcement repairs and type of repair.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.06 MOCK-UPS

A. Horizontal Surface Repair: Total of 10 foot square area, demonstrating each type of repair.

B. Vertical Surface Repair: Total of 10 foot square area, demonstrating each type of repair.

C. Where color or texture matching is required, first prepare a small size sample on cementitious board.

D. Locate mock-up(s) where directed.

E. Re-work mock-up(s) until satisfactory to Engineer.

F. Satisfactory mock-up(s) may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

A. Degreaser:

1. Manufacturers:

a. SpecChem, LLC; Orange Peel: www.specchemllc.com.
b. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. Detergent: Non-ionic detergent.

C. Blasting Medium: _____.

2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

A. Manufacturers:

1. BASF Corporation: www.buildingsystems.basf.com.

2. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

3. SpecChem, LLC: www.specchemllc.com/#sle.

4. W. R. Meadows, Inc: www.wrmeadows.com/#sle.

5. L&M Construction Chemicals, Inc.: www.lmcc.com.

6. Five Star Products, Inc.: www.fivestarproducts.com.

7. Xypex: www.xypex.com.

8. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.

1. In-place material capable of withstanding freeze/thaw conditions (if required by the Engineer).

2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.

3. Integral corrosion inhibitor.

4. Color: As directed by Engineer.

5. Products: As determined by the manufactures listed above.

C. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.

1. In-place material resistant to freezing conditions.

2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.

3. Integral corrosion inhibitor.

4. Products: As determined by the manufactures listed above.

D. Cementitious Repair Mortar, Form and Pour/Pump Grade: Flowable, one- or two-component, factory-mixed, polymer-modified cementitious mortar; in-place material resistant to freezing conditions.

1. Mixed with water in proportions as recommended by manufacturer.

2. Integral corrosion inhibitor.

3. Products: As determined by the manufactures listed above.

E. Cementitious Hydraulic Waterstop: Very fast setting, low slump, hand formable, and capable of stopping active water leaks; in-place material resistant to freezing conditions.

1. Products: As determined by the manufactures listed above.

2.03 EPOXY PATCHING AND REPAIR MATERIALS

A. Manufacturers:

1. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

2. SpecChem, LLC: www.specchemllc.com/#sle.

3. W. R. Meadows, Inc: www.wrmeadows.com/#sle.

4. Xypex: www.xypex.com.

5. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. Epoxy Repair Mortar: Epoxy resin mixed with aggregate and other materials in accordance with manufacturer's instructions for purpose intended; comply with pot life and workability limits.

1. Products: As determined by the manufactures listed above.

a. Substitutions: See Section 01 61 00 - Common Product Requirements.

C. Epoxy Injection Adhesive:

1. Products: As determined by the manufactures listed above.

D. Epoxy Bonding Adhesive: Non-sag, two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.

1. Non-Load-Bearing Applications: ASTM C881/C881M, Type I, II, III, IV, or V, whichever is appropriate to application.

2. Load-Bearing Applications: ASTM C881/C881M, Type IV or V, whichever is appropriate to application.

3. Products: As determined by the manufactures listed above.

2.04 ACCESSORIES

A. Portland Cement: ASTM C150/C150M, Type I, grey.

B. Sand: ASTM C33/C33M or ASTM C404; uniformly graded, clean.

C. Water: Clean and potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

A. Identify unsound and deteriorated concrete by sounding techniques, or as directed by Engineer.

B. Remove unsound, honeycombed, deteriorated, or otherwise defective areas of concrete from work areas.

3.03 CLEANING EXISTING CONCRETE

A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.

B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.

1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.

2. Clean out cracks and voids using same methods.

C. The following are acceptable cleaning methods, in order from gentlest to less gentle:

1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.

2. Increasing the water washing pressure to maximum of 400 psi.

3. Adding detergent to washing water; with final water rinse to remove residual detergent.

4. Steam-generated low-pressure hot-water washing.

5. Abrasive blasting: Use only abrasive media that have been proven not to damage concrete by testing on mock-up.

3.04 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.

B. Apply coating of bonding agent to entire concrete surface to be repaired.

C. Fill voids with cementitious mortar flush with surface.

1. Fill all voids (honeycombs, rock pockets, bug holes, air bubbles, etc.) with any dimension larger than 1/4" in new concrete.

2. Coordinate work with final coating and liner systems if applicable.

D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch over entire surface, terminating at a vertical change in plane on all sides.

E. Trowel finish to match adjacent concrete surfaces.

F. Damp cure for four days.

END OF SECTION 03 01 00

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

B. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).

C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

D. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

E. ACI 350.5 - Specifications for Environmental Concrete Structures.

F. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.

B. Product Data:

1. Form release agent.

2. Form ties.

3. Products to be used for sealing tie holes.

C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in Utah.

1. Unless otherwise specified, limit deflection of facing materials to comply with tolerance limits established by Contract Documents and with tolerances required by equipment manufacturers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.

B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

C. Protect plastic foam products from damage and exposure to sunlight.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

1. 3/4 inch (unless noted otherwise)

D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.

F. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.

G. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the CMGC.

B. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

2.03 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gauge, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Preformed Plastic Forms: Thermoplastic form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 4 inches thick unless noted otherwise on drawings. .

2.04 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-Off.

1. Form Snap-Off Ties:

a. Material: Stainless Steel
b. Type: Conical or Spherical
c. Back Break Dimension: 1-1/2 inch
d. Provide waterproofing washer which is oriented perpendicular to tie and designed to prevent disturbance during concrete installation.

2. Form Removable Ties:

a. Material and Type: As selected by Contractor.
b. Tapered minimum 1-inch diameter at smallest end.
c. Removable form tie plugs for through-wall removable ties shall be mechanical type plugs with stainless steel composition.
1) Products:
(a) Sika Corporation; Sika X-Plug.
(b) Dayton Superior; A58 Sure Plug.
(c) Substitutions: See Section 01 61 00 - Common Product Requirements

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

1. Do not use materials containing diesel oil or petroleum-based compounds.

2. Composition: Colorless, reactive, water-based compound.

3. For use with potable water structures. product must meet NSF 61 requirements.

4. Products: Not for use with potable water structures

   a. SpecChem, LLC; Bio Strip WB (water-based): www.specchemllc.com/#sle.
   b. BASF Corporation: MasterFinish Series.
   c. Substitutions: See Section 01 61 00 - Common Product Requirements.

5. Products: For use with potable water structures

   a. Dayton Superior; Clean Strip J1EF.
   b. Atlas Tech Products; Atlas Bio-Guard.
   c. Substitutions: See Section 01 61 00 - Common Product Requirements

C. Filler Strips for Chamfered Corners: Rigid plastic or Wood type; 3/4 inch size; maximum possible lengths.

D. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

F. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

G. Waterstops: As specified in Section 03 30 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted without specific approval from the Engineer.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. The forms shall be constructed, shored, braced and tied to maintain their position and shape during and after placing concrete. The forms shall have adequate stiffeners, wales and braces to prevent noticeable deflection or waviness. Forms

shall be sufficiently rigid to limit deflection under the weight of wet concrete to 1/8 inch.

C. Forms for beams, floor slabs and similar members shall be constructed with a camber in order that deflection due to the weight of forms, reinforcing, and wet concrete shall be zero to 1/2 inch positive camber after forms are removed.

D. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

E. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

F. Align joints and make watertight to prevent leakage of mortar. Keep form joints to a minimum.

G. Obtain approval before framing openings in structural members that are not indicated on drawings.

H. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

I. Coordinate this section with other sections of work that require attachment of components to formwork.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes that are affected by agent.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Position recessed anchor slots for brick veneer masonry anchors and precast veneer anchors to spacing and intervals specified in other sections.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install formwork waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

1. Forms must be left in place for a minimum of 36 hours after concrete placement.

2. Forms and shoring supporting elevated slabs must be left in place until the concrete has reached it's specified 28 day compressive stregth and minimum of 7 days.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Concrete shall not display any evidence of damage or excessive deflection due to form removal or loss of temporary support.

D. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

E. Shoring and/or forms shall be left in place as necessary to carry any construction equipment or materials that are placed during construction.

F. Concrete curing and protection operations are to be maintained after forms have been removed and as specified in Section 03 30 00 - Cast-in-Place Concrete.

END OF SECTION 03 10 00

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SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

C. Concrete anchors where otherwise not specified.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 04 20 00 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

B. ACI MNL-66 - ACI Detailing Manual; 2020.

C. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

E. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2014.

F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.

G. CRSI (DA4) - Manual of Standard Practice; 2009.

H. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1. Prior to submitting reinforcing shop drawings, submit all construction joint locations to Engineer for approval as specified in Section 03 30 00 - Cast-in-Place Concrete.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301.

B. Provide Engineer with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

1.06 DELIVERY, STORAGE, AND HANDLING

A. In accordance with ACI 301 and recommendations of CRSI Placing Reinforcing Bars.

B. Rebar shall be prevented from bending and/or damage as a result of construction operations.

C. Rebar storage on site shall exist in dedicated, elevated locations no less than 20 yards away from high traffic areas.

D. Rebar shall be regularly cleansed of dirt, concrete, dust, and other foreign substances which accelerate corrosion and/or inhibit concrete bonding to the rebar.

E. Rebar shall not be laid on flat ground and shall be elevated via large timber or similar solutions.

F. Rebar not conforming to conditions listed above shall be brought to the attention of the Engineer on site for acceptance/rejection prior to installation.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.

2. Unfinished.

B. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel or plastic components for placement within 2 inches of weathering surfaces.

C. Rebar Dowel Anchorage: Post installed epoxy and acrylic systems.

1. Submit proposed system for each specific use.

2. Manufacturers:

   a. Hilti USA: www.hilti.com.
   b. Simpson Strong-Tie: www.strongtie.com.
   c. Dewalt Anchors and Fasteners: www.dewalt.com.

2.02 MECHANICAL SPLICES AND CONNECTIONS:

A. Coupler Systems: Mechanical devices for splicing reinforcing bars.

1. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.

2. Capable of developing, in tension or compression, 125 percent of minimum tensile strength of bar.

3. To be used at locations shown on Drawings; or as proposed by Contractor for specific locations.

4. Products:

   a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for splicing reinforcing bars.

1. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.

2. Capable of developing, in tension or compression, 125 percent of minimum tensile strength of bar.

3. To be used at locations shown on Drawings; or as proposed by Contractor for specific locations.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice and ACI 318.

B. Welding of reinforcement is permitted only with the specific approval of Engineer. Perform welding in accordance with AWS D1.4.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

1. Submit and review locations of splices with Engineer.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

C. Do not displace or damage vapor barrier.

D. Accommodate placement of formed openings. Provide reinforement around openings as indicated in Contract Documents.

E. Splicing:

1. Minimum length of lap splices shall comply with table in Contract Documents.

2. Use lap splices, unless otherwise shown or permitted in writting by Engineer.

3. Stagger splices in adjacent bars where indicated.

F. Maintain concrete cover as indicated in Contract Documents.

G. Conform to applicable code, contract drawings and General Structural Notes for concrete cover over reinforcement.

H. Reinforcement shall not be cut unless shown on Structural drawings or by Engineer approval. Cut reinforcement shall be spliced with the following:

1. Coupler system as shown above.

2. Lap splice to meet Class B requirements.

3. Engineer approved alternate method.

I. All slab reinforcing must be on chairs. Hand lifting without supports during pour is prohibited.

J. All dowels between concrete elements must be tied in place prior to pour. Wet sticking dowels during pour is prohibited.

K. Reinforcement shall be free of foreign particles or coatings including form oils. Replace reinforcement that cannot be cleaned.

L. Upon completion of placement of reinforcing, notify Engineer and allow 24 hours for review prior to commencement of concrete placement.

M. Bond and ground all reinforcement to requirements of Section 26 05 26.

3.02 ANCHOR BOLTS AND EMBEDDED PARTS

A. Anchor bolts and anchor bolt groups shall be supported and set using templates attached to the forms, and embedded ends securely tied to prevent displacement during placing of concrete.

B. Tolerances from dimensions shown on the Drawing shall be in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges", AISC 303-05.

C. Unless shown otherwise, anchor bolts shall be set perpendicular to the theoretical bearing surface. Welding to anchor bolts will not be permitted. Exposed anchor bolt threads shall be given a coat of grease and protected from corrosion or other damage to the threads.

END OF SECTION 03 20 00

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SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Foundation.

B. Controlled low strength material.

C. Bonding and jointing products, including waterstops.

D. Joint devices associated with concrete work.

E. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 20 00 - Concrete Reinforcing.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

B. ACI 301 - Specifications for Concrete Construction; 2020.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

D. ACI 305.1 - Specification for Hot Weather Concreting; 2014.

E. ACI 306.1 - Standard Specification for Cold Weather Concreting; 1998.

F. ACI 308.1 - Specification for Curing Concrete; 2011.

G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2019.

H. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary; 2020.

I. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

J. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

K. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

L. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

M. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

N. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

O. ACI 305.1 - Specification for Hot Weather Concreting.

P. ACI 306.1 - Standard Specification for Cold Weather Concreting.

Q. ACI 308.1 - Specification for Curing Concrete.

R. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

S. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.

T. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

U. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2021.

V. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

W. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.

X. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

Y. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

Z. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.

AA. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

BB. ASTM C231/231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

CC. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

DD. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.

EE. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.

FF. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes; 2023.

GG. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

HH. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2024.

II. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

JJ. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2025.

KK. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).

LL. ASTM D2103 - Standard Specification for Polyethylene Film; 2023a.

MM. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric); 2014.

NN. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

OO. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.

PP. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

QQ. Portland Cement Association (PCA).

RR. PCA - Design and Control of Concrete Mixtures.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.The mix design shall be specific to this project and conditions of placement. with a written request for acceptance. The data submitted shall include:

1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.

2. Indicate proposed mix design complies with requirements of ACI 318-Chapter 19 and Chapter 26

3. Indicate proposed mix design complies with requirements of ACI 350, Chapter 4 and Chapter 5

4. Fine and coarse aggregate gradations per ASTM C33.

5. Method of determining the mix design proportions.

6. Water to cementitious material ratio.

7. Air content and unit weight.

8. Compressive strength at 7 and 28 days per ASTM C 39.

9. The proportions and types of all materials including admixtures.

10. The Shale and deleterious contents of all aggregates used.

11. Sulfate-resistant cement test results per ASTM C 1012.

12. Aggregate Alkali-Silica Reactivity test results per ASTM C 1567.

D. Waterstops and Construction Joint Devices: Submit the following for each proposed product type.

1. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.

2. Shop Drawings: Details of splices, method of securing and supporting waterstop in forms to maintain orientation and location during placement.

3. Product Data.

E. Test Reports: Submit report for each test or series of tests specified.

F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

G. Submit hot weather concreting procedures for concreted installed and/or cured during ambient temperatures over 80 degrees F. Submittal shall include specific procedures in conformance with ACI 305.1. Submittal shall include, but not be limited to, the following:

1. Procedures for concrete delivery, including measuring and recording concrete temperatures at discharge.

2. Methods for controlling temperature of reinforcement and embedded elements before and during placement.

3. Procedures for measuring and recording concrete temperatures.

4. Curing methods used to ensure proper design strength of concrete.

5. Methods for preventing drying during dry and/or windy conditions.

H. Submit cold weather concreting procedures for concrete installed and/or cured during temperatures described in ACI 306.1. Submittal shall include specific procedures in accordance with ACI 306.1. Submittal shall include, but not be limited to, the following:

1. Procedures for protecting subgrade from frost and accumulation of snow or ice on forms, reinforcement and other embeded members prior to placement.

2. Methods for placing concrete to ensure no damage from cold weather effects.

3. Methods for protecting concrete from cold weather and timing of addition/removal of said thermal protection.

4. Procedures for measuring and recording concrete temperatures.

5. Curing methods used to ensure proper design strength of concrete is met while following proper thermal protection procedures.

6. Methods for ensuring concrete does not become damaged due to thermal shock upon removal of forms and/or thermal protection.

I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301, ACI 318, and ACI 350

B. Follow requirements of ACI 305.1 when concreting during hot weather.

C. Follow requirements of ACI 306.1 when concreting during cold weather.

D. Schedule pre-pour meeting/conference with Engineer, concrete supplier, independent testing agency, and all sub-contractors at least one week prior first concrete pour. Submit meeting minutes as Information Submittal.

1. Agenda shall include:

   a. Mix designs and admixture dosage at site.
   b. Concrete testing at site.
   c. Placement methods, techniques, equipment and consolidation.
   d. Concrete finishing procedures.
   e. Concrete curing procedures.
   f. Protection procedures for hot and/or cold weather conditions.

2. Additionally pre-pour conferences shall be held with Engineer at least one week prior to concrete pours greater than 200 cubic yards.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00 - Concrete Forming and Accessories.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 20 00 - Concrete Reinforcing.

2.03 CONCRETE MATERIALS

A. Cement:

1. Portland Cement: ASTM C150/C150M, Type II - Moderate Portland type.

2. Blended Hydraulic Cement: ASTM C595/C595M, Type IL, Portland-Limestone.

3. Acquire all cement for entire project from same source or resubmit mill certificates if a different source is required.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

1. Acquire all aggregates for entire project from same source or resubmit aggregate data if a different source is required.

2. Shale or deleterious content shall be no more than 0.5 percent for slabs and water bearing structures and 1 percent for all other concrete.

C. Fly Ash: ASTM C618, Class F.

D. Water: Per ASTM C1602 and "potable".

2.04 ADMIXTURES

A. Unless otherwise permitted, furnish admixtures from one manufacturer.

B. Do not use chemical admixtures that contain intentionally-added chlorides.

C. Air Entrainment Admixture: ASTM C260/C260M.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Accelerating Admixture: ASTM C494/C494M Type C.

G. Retarding Admixture: ASTM C494/C494M Type B.

H. Water Reducing Admixture: ASTM C494/C494M Type A.

I. Shrinkage Reducing Admixture: ASTM C494/C494M, Type S.

2.05 ACCESSORY MATERIALS

A. Controlled Low Strength Material (CLSM): Shall be a mixture of cement, Pozzolan, coarse and fine aggregate, admixtures, and water; mixed in accordance with ASTM C94 - Ready Mixed Concrete.

1. Minimum Compressive Strength at 28 days:

   a. Normal CLSM for pipeline shall be 100 psi.
   b. Structural backfill or bearing CLSM shall be 750 psi.

2. Composition: As determined by the ready mix supplier to achieve the minimum strength required.

3. Total Air Content: 4 - 7 percent.

4. Maximum Slump: 9 inches.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.

1. Grout: Comply with ASTM C1107/C1107M.

2. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.

3. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.

4. Flowable Products:

   a. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com
   b. Master Builders Solutions US LLC; MasterFlow 100 :www.master-builders-solutions.com
   c. W. R. Meadows, Inc; 588-10K: www.wrmeadows.com
   d. Substitutions: See Section 01 60 00 - Product Requirements.

5. Low-Slump, Dry Pack Products:

   a. Five Star Products, Inc; Five Star Grout 100: www.fivestarproducts.com/.
   b. Master Builders Solutions US LLC: MasterFlow 100: www.master-builders-solutions.com
   c. SpecChem, LLC; SC Multipurpose Grout: www.specchemllc.com/.
   d. Substitutions: See Section 01 61 00 - Common Product Requirements.

C. Repair Material:

1. In accordance with requirements of 03 01 00 - Maintenance of Concrete.

2.06 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System:

1. Complying with ASTM C881/C881M, Type V.

2. Products:

a. BASF Building Systems Inc; Concresive Standard LVI..
b. Eulid Chemical Co; Euco #352 Epoxy System LV.
c. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. Bond Breaker:

1. Nonstaining, providing positive bond prevention.

C. Repair Material:

1. In accordance with requirements of 03 01 00 - Maintenance of Concrete.

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

1. Products must meet NSF requirements when indicated in mix design.

2. Products:

a. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/.
b. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/.
c. Master Builders Solutions US LLC; MasterKure ER 50: www.master-builders-solutions.com
d. W. R. Meadows, Inc; Evapre or Evapre-RTU: www.wrmeadows.com/.
e. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

1. Products must meet NSF requirements when indicated in mix design.

2. Products:

a. Dayton Superior Corporation; Safe Cure and Seal 1315 EF: www.daytonsuperior.com/.
b. SpecChem, LLC; E-Cure: www.specchemllc.com.
c. BASF Construction Chemicals; MasterKure CC 200WB.

d. Substitutions: See Section 01 61 00 - Common Product Requirements.

C. Coordinate all curing materials with coatings and floor finishing. Use water curing for all applications unless approved by the Engineer.

D. Moisture-Retaining Sheet: ASTM C171.

1. Curing paper, regular.

2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

E. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

F. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. General:

1. Prepare design mixtures for each type and strength of concrete, selecting and proportioning ingredients in accordance with requirements of ACI 301.

2. Desired fresh properties of concrete shall be determined by Contractor, and coordinated with concrete producer. Fresh properties of concrete shall remain stable to satisfaction of Contrator, for duration of placement and consolidation, and shall remain in conformance with requirements of Contract Documents.

B. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.

1. For both methods, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

D. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

E. Alkali-Aggregate Reactivity Resistance:

1. Do not use aggregates known to be susceptible to alkali-carbonate reaction (ACR).

2. Aggregates shall be tested to determine potential alkali-aggregate reactivity in concrete in accordance with ASTM C1260 or ASTM C1567.

a. Expansion less than 0.1% after 16 days with each of the aggregates (coarse and fine) and the supplementary cementing materials of the proposed mix design in accordance with ASTM C1567.
b. Aggregates that indicate expansion greater than 0.1% after 16 days shall not be used.
c. Alkali content of cement used in proposed concrete mixture shall not be greater than alkali content of cement used in test for alkali-aggregate reactivity resistance.

F. Normal Weight Concrete for foundation footings and other miscellaneous exterior structural concrete (concrete exposed to freeze thaw cycles):

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,500 pounds per square inch.

2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.

3. Water-Cement Ratio: Maximum 45 percent by weight.

4. Total Air Content: 5-8 percent, determined in accordance with ASTM C231/C231M.

5. Maximum Slump:

a. 4 inches (prior to high-range water reducing admixtures).
b. 8 inches (after to high-range water reducing admixtures)

6. Maximum Aggregate Size: 3/4 inch.

2.09 MIXING

A. General: In accordance with ACI 301, except as modified herin.

B. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 2 minutes.

1. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions.

C. Transit Mixers: Comply with ASTM C94/C94M.

D. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

E. Do not use expansive component in same concrete batch with MVRA or PIA.

F. Do not use shrinkage-reducing admixture (SRA) in same concrete batch with MVRA or PIA.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 BATCHING, MIXING, AND DELIVERY

A. Concrete shall be furnished by an acceptable ready mixed concrete supplier, and shall conform to ASTM C94 except as indicated otherwise in this specification. The time from start of concrete mixing to completion of discharge from the truck shall not exceed 1-1/2 hours.

B. Delivery Tickets A delivery ticket shall be prepared for each load of ready mixed concrete and a copy of the ticket shall be handed to Engineer by the truck operator at the time of delivery. Tickets shall indicate the name and location of Contractor, the project name, the mixture identification, the quantity of concrete delivered, the quantity of each material in the batch, the outdoor temperature in the shade, the time at which the cementitious materials were added, and the numerical sequence of the delivery.

C. Mixing Water. Mixing water shall not be added in transit. Any amount of water withheld from the truck mixer shall be clearly indicated on the delivery ticket. Water added at the site shall not exceed the amount withheld, and shall not be added without oversight by Owner's on site inspector.

D. The consistency of concrete shall be suitable for the placement conditions. Aggregates shall flow uniformly throughout the mass, and the concrete shall flow sluggishly when vibrated or spaded. The slump shall be kept uniform.

3.03 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

B. Minimum Time between Abutting/Adjacent Sections:

1. Foundations: 7 days

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Place concrete for floor slabs in accordance with ACI PRC-302.1.

C. Notify Engineer not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Pumping systems used to convey concrete shall limit slump loss to not exceed 1 inch. The slump loss shall be determined by tests made at each end of the pumping system.

1. Aluminum conveying devices shall be prohibitted.

H. Concrete shall be placed so that segregation does not occur. Downpipes or tremies shall be used to place concrete as close to its final destination as possible.

1. Concrete's free fall should not exceed 5 feet.

I. Concrete is to be placed in horizontal uniform layers not to exceed 24 inches. Consolidate concrete by mechanically vibrating.

J. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

K. Evaporation Reducer Application:

1. Use on flatwork when environmental conditions are anticipated to cause rapid drying of the concrete surface. Do not use on potable water structures, unless product is NSF 61 approved.

2. Spray onto surface of fresh concrete immediately after screeding to react with surface moisture.

3. Reapply as needed to ensure a continuous moist surface until final finishing is completed.

L. Hot Weather Concreting: Follow requirements of ACI 305.1, except as modified herin.

1. Maintain concrete temperature below 90 degrees F at time of placement.

2. Follow procedure methods per Contractor submitted and approved Hot Weather Concreting plan

M. Cold Weather Concreting: Follow requirements of ACI 306.1, except as modified herein.

1. Cold weather requirements shall apply when ambient temperature is or approach below 40 F.

2. Follow procedure methods per Contractor submitted and approved Cold Weather Plan.

3. Protect concrete from freezing until end of curing period and until concrete has attained a compressive strength of 3,500 psi.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308.1 . Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Water Containment Concrete: Water curing methods only (Method 1 and Method 3).

2. Non-Water Containment Concrete: Contractor option with methods listed.

3. Where surfaces are to recieve coatings, painting, cementitious material, or other similar finishes, use only water curing methods.

C. Formed Surfaces:

1. Method 1: Provide water curing methods as described for a minimum of seven (7) days.

   a. Curing to start as soon as forms have been removed. Keep continuously moist by saturated by the following methods.
      1) Ponding: Maintain 100 percent coverage of water over areas, continuously.
      2) Spraying: Spray water over floor slab areas and maintain wet.
      3) Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

2. Method 2: Application of approved curing compound.

   a. Curing compound to be applied immediately after the removal of concrete forms.
   b. Curing compound to be applied by means and application rate recommended by manufacturer.
   c. Not allowed at water containment concrete.

3. Method 3: Concrete forms to be left in place to provide protection for a minimum of seven (7) days.

a. Exposed surfaces to be maintained as described by Method 1.

D. Surfaces Not in Contact with Forms:

1. Method 1: Provide water curing methods as described for a minimum of seven (7) days.

a. Curing to start as soon as forms have been removed. Keep continuously moist by saturated by the following methods.
1) Ponding: Maintain 100 percent coverage of water over areas, continuously.
2) Spraying: Spray water over floor slab areas and maintain wet.
3) Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

2. Method 2: Application of approved curing compound.

a. Curing compound to be applied immediately after removal of forms.
b. Curing compound to be applied by means and application rate recommended by manufacturer.
c. Not allowed at water containment concrete.

3. Method 3: Water curing as described in Method 1 for a minimum of three (3) days followed by the application of Moisture-Retainings sheets for a minimum of five (5) days.

a. Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00 - Quality Control.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Unless otherwise specified, sample concrete for testing from point of delivery.

1. Pumped Concrete: Sample concrete for testing from point of placement .

F. Compressive Strength Tests: ASTM C39/C39M. For each test, in accordance with ASTM C31, mold and cure five concrete test cylinders.

1. Sample frequency: Obtain test samples for every concrete pour greater than five (5) cubic yards. Additionally obtain test samples for every 50 cu yd of concrete placed.

2. Test cylinders to be tested at the following age: One (1) at 7 days, three (3) at 28 days, and one (1) at 54 days.

3. Additional concrete cylinders to be tested at days other than those specified above must be requested by the Contractor. Costs of additional cylinders will be by the Contractor.

G. Cold Weather Concreting:

1. During cold weather concreting conditions, cast compressive strength cylinders for field curing as follows.

   a. Obtain three (3) additional test cylinder for field curing.

2. Field cured specimens shall be in addition to specimens cast for lab testing.

3. Protect field cured specimens from weather and place under same protection provided for concrete structure.

4. Field cured specimens to be kept in same protective environment as representive concrete structure to determine if specified strength has been achieved.

5. Test cylinders in accordance with ASTM C39/C39M and ASTM C31/C31M.

H. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

I. Perform one air test for each set of test cylinders taken. Air content shall be tested per ASTM C231. Concrete tested for air shall be sampled for at the point of discharge where pumping is being used.

J. Take and record temperature of all concrete tested in accordance with ASTM C1064.

K. Maintain records of concrete placement. Record date, location, time truck left plant, time truck started emptying, time truck empty, quantity, air temperature, and test samples taken.

3.07 PATCHING AND REPAIR

A. Allow Engineer to observe concrete surfaces immediately upon removal of forms. Patch imperfections as specified in Section 03 01 00 per manufacturer's instructions. Areas patched prior to Engineer’s observation and concurrence will

require removal of patching material to allow observation. Costs associated with removal and replacement shall be paid by the Contractor.

3.08 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Engineer and CMGC within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. If concrete tests fail to meet required strength, additional tests will be directed by Engineer. If additional tests fail to confirm required strength, the Contractor shall pay for all the cost of Work to replace defective concrete. Contractor shall pay for all additional tests and engineering services.

D. Repair or replacement of defective concrete will be determined by the Engineer. The cost of additional testing shall be borne by CMGC when defective concrete is identified.

E. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.09 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. Do not allow construction loads in excess of final design loads on any structural concrete members without shoring and possible re-shoring.

END OF SECTION 03 30 00

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2023, with Errata (2025).

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022, with Errata (2025).

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.

E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

K. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.

L. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

N. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

O. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.

P. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.

Q. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.

R. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2014.

S. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

T. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

U. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

V. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.

W. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.

X. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

Y. SSPC-SP 3 - Power Tool Cleaning; 2018.

1.04 SUBMITTALS

A. See Section 01 33 00 Submittal Procedures

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.

2. Connections not detailed.

3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172 or the AISC certification program.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172) or accredited by the AISC certification program.

C. Erector: Company specializing in performing the work of this section with minimum five years of documented experience.

D. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Utah.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

E. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.

F. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.

G. Pipe: ASTM A53/A53M, Grade B, Finish black.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, medium carbon, plain or galvanized (match adjacent finish).

I. Headed or Threadded and Nutted Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or A563M nuts and ASTM F436 Type 1 washers.

J. Load Indicator Washers: Provide washers complying with ASTM F959 at all connections requiring fully tensioned high-strength bolts.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

M. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors where possible. Indicate sizes and locations of field welds on shop drawings.

D. Develop required camber for members.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC-SP 3.

B. Galvanize structural steel members as indicated on the drawings and all steel members embedded or in contact with concrete to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.

2.04 SOURCE QUALITY CONTROL

A. Welded Connections: Visually inspect all shop-welded connections and test at least 50 percent of full penetration welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94/E94M.

2. Ultrasonic testing performed in accordance with ASTM E164.

3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.

4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Engineer.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing at least 100 percent of bolts at all fully tensioned connection.

C. Welded Connections: Visually inspect all field-welded connections and test at least 100 percent of full penetration welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94/E94M.

2. Ultrasonic testing performed in accordance with ASTM E164.

3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.

4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION 05 12 00

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SECTION 05 51 33
METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefabricated ladders.

B. Prefabricated ship ladders.

1.02 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders; current edition.

B. 29 CFR 1926.1053 - Ladders; Current Edition.

C. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2018.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

K. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

M. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.

N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

O. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Plates: ASTM A283/A283M.

C. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

D. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

E. Bolts, Nuts, and Washers: ASTM A307, plain.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 PREFABRICATED LADDERS

A. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.

1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.

2. Materials: Carbon steel; Grade 36, minimum.

3. Finish: Manufacturer's standard hot-dipped galvanizing; comply with ASTM A153/A153M.

B. Prefabricated Ship Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.

1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.

2. Materials: Carbon steel; Grade 36, minimum.

3. Finish: Manufacturer's standard hot-dipped galvanizing; comply with ASTM A153/A153M.

2.04 FINISHES - STEEL

A. Prepare surfaces to be primed in accordance with SSPC-SP2.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION 05 51 33

SECTION 05 52 13
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps.

D. Floor edge railings and guardrails.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04 20 00 - Unit Masonry: Placement of anchors in masonry.

C. Section 05 51 00 - Metal Stairs: Attachment plates for handrails specified in this section.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2022.

C. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.

D. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Drawn Pipe for General Purpose Applications; 2021.

E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.

1.04 SUBMITTALS

A. See Section 01 33 00 Submittal Procedures, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

C. Product Data: Manufacturer's specifications and installation instructions for all components of each product type specified.

D. Samples: Submit two, 12 inch long samples of handrail. Submit two samples of elbow, Tee, wall bracket, escutcheon, and end stop.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Handrails and Railings:

1. The Wagner Companies; ____: www.wagnercompanies.com/#sle.

2. Julius Blum & Co., Inc. ; Product Connectorail System.

3. Moultrie Manufacturing Company; Product: Wesrail II.

2.02 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.

C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.

D. Allow for expansion and contraction of members and building movement without damage to connections or members.

E. Dimensions: See drawings for configurations and heights.

1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.

2. Intermediate Rails: 1-1/2 inches diameter, round.

3. Posts: 1-1/2 inches diameter, round.

4. Kick Plate: 4 inches.

F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.

2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.

3. For anchorage to stud walls, provide backing plates, for bolting anchors.

4. Posts: Provide heavy duty adjustable flanged brackets.

5. Provide sleeves for embedding in concrete at removeable sections.

G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.03 ALUMINUM MATERIALS

A. General: Aluminum Alloy shall be 6063-T6, 6063-T6, or 6061-T6.

B. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

C. Aluminum Tube: Minimum wall thickness of 0.127 inch; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

D. Solid Bars and Flats: ASTM B211 (ASTM B211M).

E. Non-Weld Mechanical Fittings: Slip-on cast aluminum, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

F. Straight Splice Connectors: Concealed spigot; cast aluminum.

G. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

2.04 ALUMINUM RAILING SYSTEM

A. Material shall conform to 2.03 and be finished in accordance with 2.06.

B. Railing system shall be permanently anchored unless noted to be removable as indicated on drawings.

C. Rails: Fabricate rails from anodized aluminum pipe with nominal sizes specified.

D. Posts:

1. Fabricate posts from anodized aluminum pipe with nominal size specified. Provide post reinforcement of solid aluminum reinforcing bar.

E. Fittings:

1. Fittings shall be of wrought material of aluminum. Tee-fittings and elbows that are fabricated from more than one piece shall be of welded construction with no weld marks visible when the fitting is installed.

F. Connector Sleeves:

1. Internal connector sleeves shall be of extruded aluminum.

G. Mounting Flanges:

1. Heavy-duty floor flange shall be of cast aluminum with a solid aluminum reinforcing bar.

2. Fascia flanges shall be of aluminum with a solid aluminum reinforcing bar.

H. Toe Board: Toe Board shall be of extruded aluminum.

I. Wall Brackets: Provide wall brackets and escutcheons for handrails mounted directly to walls.

J. Provide complete gate assemblies, including hinges and latch, in locations and configurations indicated on the drawings.

2.05 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Form rail-to-end post connections and all changes in rail direction by radius elbows.

E. Cut material square and remove burrs from all exposed edges, with no chamfer.

F. Make exposed joints tight and flush.

G. Close exposed ends of handrail with appropriate end cap.

H. For posts set in concrete, furnish matching sleeves or inserts not less than 5 inches long.

I. Locate intermediate rails as indicated on the drawings.

J. Verify dimensions on site prior to shop fabrication.

K. Provide weep holes or other means to exit entrapped water from hollow sections of railing members exposed to exterior, condensation, or moisture from other sources.

2.06 ALUMINUM FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Supply items required to be cast into concrete, embedded in masonry, or placed in partitions with setting templates, for installation as work of other sections.

B. Apply two coats of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Anchor railings securely to structure.

D. Provide expansion joints as needed to allow for thermal expansion or contraction.

E. Provide for water to drain from the railing system hollow sections by drilling weep holes at bottom locations or other approved methods.

F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

3.05 CLEANING

A. As installation is completed, wash thoroughly using clean water and soap; rinse with clean water.

B. Do not use acid solution, steel wool, or other harsh abrasives.

C. If stain remains after washing, remove finish and restore in accordance with NAAMM Metal Finishes Manual.

D. Finish must not be removed from anodized aluminum. Return component to anodizer for re-anodizing.

3.06 REPAIR OF DEFECTIVE WORK

A. Remove stained or otherwise defective work and replace with material that meets specification requirements.

END OF SECTION 05 52 13

SECTION 06 71 00
FIBERGLASS REINFORCED GRATING AND STRUCTURAL SHAPES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Perimeter closure.

B. FRP pultruded floor grating.

C. FRP structural shapes and fabrications.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 05 12 00 - Structural Steel Framing.

1.03 REFERENCE STANDARDS

A. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

1.04 PERFORMANCE REQUIREMENTS

A. The design of FRP products including connnections shall be in accordance with governing buildng codes and standards as applicable.

B. Design Live Load:

1. Uniform Live Load: 100 lb/sq ft minimum.

2. Concentrated Load: 300 lb minimum.

C. Maximum Allowable Deflection Under Live Load: 1/360 of span; size components by single support design.

D. Maximum Spacing Between Bars: As specified or per delegated design.

E. Structural members shall be designed to support all applied loads. Deflections in any direction shall not be more than L/240 of span for structural members. Connections shall be designed to transfer the loads.

1.05 SUBMITTALS

A. See Section 01 33 00 Submittal Procedures.

B. Product Data: Provide span and deflection tables.

C. Shop Drawings: Indicate details of component supports, openings, perimeter construction details, and tolerances.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. Samples: Submit two samples, 12x12 inch in size illustrating surface finish, color, and texture.

E. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

F. Manufacturer's Installation Instructions: Indicate special requirements for opening and perimeter framing.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design gratings and plates under direct supervision of a Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Static coefficient of friction for non-slip finishes shall be tested to exceed 0.80 COF for both wet and dry conditions.

C. FRP Materials:

1. The material covered by these specifications shall be furnished by an ISO-9001:2000 certified manufacturer of proven ability who has regularly engaged in the manufacture and installation of FRP systems.

2. Substitution of any component or modification of system shall be made only when approved by the Engineer.

3. Fabricator Qualifications: Firm experienced in successfully producing FRP fabrications similar to that indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.

4. In addition to requirements of these specifications, comply with manufacturer’s instructions and recommendations for work.

PART 2 PRODUCTS

2.01 MANUFACTURERS - FRP GRATINGS AND FABRICATIONS

A. Enduro Systems Inc.; Composite Products Division.

B. Seasafe, Inc.; a Gibraltar Industries company.

C. Strongwell Corporation.

D. Fibergrate Composite Structures

E. Mona Composites

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. FRP products shall be manufactured using a pultruded process utilizing polyester resin with flame retardant and ultraviolet (UV) inhibitor additives. A synthetic surface veil shall be the outermost layer covering the exterior surface.

B. After fabrication, all cut ends, holes and abrasions of FRP shapes shall be sealed with a compatible resin coating.

C. All exposed surfaces shall be smooth and true to form, consistent with ASTM D4385.

2.03 ACCESSORIES

A. Fasteners and Saddle Clips: Stainless steel:

B. Perimeter Closure: Of same material and finish of grating.

C. FRP Support Member Fasteners: Stainless steel threaded rod with approved epoxy adhesive system.

2.04 FRP FABRICATIONS

A. Pultruded Glass-Fiber-Reinforced Gratings and Decking: Bar gratings and FRP decking assembled from components made by simultaneously pulling glass fibers and extruding thermosetting plastic resin through a heated die under pressure to produce a product without voids and with a high glass-fiber content.

1. Configuration: As indicated on the drawings.

2. Color: Grey.

3. Traffic Surface: Applied abrasive finish.

4. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Add additional support around openings with added frames and supports.

5. Removable grating openings: Provide grating for removal as indicated on drawings. Add additional support around openings with added frames and supports.

6. Hold down clamps shall be type 316L stainless steel hold downs as provided by FRP manufacturer. Use two (2) at each support with a minimum of four (4) per panel.

B. Frames and Supports for Glass-Fiber-Reinforced Plastic Gratings and Decking:

1. Structural members are to be designed and supplied to addequately support grating at perimeter and intermediate support locations. Structural support layout, member size, and orientation shall be designed and determined by the supplier.

2. Support member connection to foundation shall be designed and supplied as required.

3. Fabricate from glass-fiber-reinforced plastic shapes of sizes, shapes, and manufacturer's standard profiles indicated and as necessary to receive gratings. Miter connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

4. Unless otherwise indicated, use shapes made from same resin as gratings.

2.05 FASTENERS

A. General: Provide stainless steel fasteners for exterior use, where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Standards: All fasteners shall comply with:

1. Drilled-In Expansion Anchors: Expansion anchors complying with Fed. Spec. FF-S-325, Group VIII (anchors, expansion, [non-drilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with Fed. Spec. FF-B-575, Grade 5.

2. Lock washers: Helical spring type carbon steel, Fed. Spec. FF-W-84.

3. Bolts, nuts, machine screws, plain washers, masonry anchors, lock washers, and concrete anchors: Stainless Steel, ASTM A193.

4. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F 593 (ASTM F 738M) for bolts and ASTM F 594 (ASTM F 836M) for nuts, Alloy Group 1 (A1).

2.06 FINISHES

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on drawings.

B. Verify that opening sizes and dimensional tolerances are acceptable.

C. Verify that supports are correctly positioned.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions and according to the Project Documents.

B. Field cut as needed to fit installation. All field cutting shall be in accordance with the manufacturer’s recommended procedures.

C. Attach all gratings as removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.

D. Store FRP gratings indoors or otherwise protect them from unnecessary exposure to ultraviolet radiation.

E. All field-cut or damaged areas of FRP gratings shall be sealed with sealing resin according to the manufacturer’s recommendations.

3.03 DISSIMILAR MATERIALS

A. Where dissimilar metals are in contact, the metals shall be kept from direct contact by use of isolation material.

3.04 TOLERANCES

A. Conform to NAAMM MBG 531.

B. Maximum Variation From Top Surface Plane of Adjacent Sections: 1/8 inch

C. Replace defective or damaged slip-resistant metal fabrications as directed by engineer.

END OF SECTION 06 71 00

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SECTION 08 31 23
PROCESS FLOOR ACCESS HATCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installation of the following equipment in accordance with the provisions of the Contract Documents.

1. Aluminum Access Hatches

1.02 RELATED REQUIREMENTS

A. Section 01 33 00 — Submittal Procedures.

B. Section 01 45 00 — Quality Control.

C. Section 01 61 00 — Common Product Requirements.

D. Section 01 71 13 — Mobilization.

E. Section 01 70 00 – Starting and Adjusting

F. Section 01 77 00 — Closeout Procedures.

G. Section 01 78 23 — Operation and Maintenance Data.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit, in accordance with Section 01 33 00, detailed specifications, drawings, certified test results, and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for the complete operational system.

B. Manufacturer’s Instructions: Furnish under provisions of Section 01 33 00.

C. Manufacturer’s Field Service Reports: Furnish, under provisions of all Sections including Division 01, reports covering start up, demonstration, and instructions.

D. Operations and Maintenance Data: Submit in accordance with Section 01 78 23 on all parts, devices, equipment, and other accessories furnished forming the complete operational system. Include a complete write-up of how the system is to operate and how to make adjustments.

1.04 SYSTEM DESCRIPTION

A. Contractor shall provide hatches of size, material, rating, and all other properties as shown on the Drawings and in the hatch schedule included in this Section.

1.05 QUALITY ASSURANCE

A. The equipment supplier must have at least five continuous years' experience in the design, application and manufacture of access hatches. All material and equipment shall be new and of the highest quality.

B. Hatches and all other specified accessories and appurtenances shall be furnished by the access hatch manufacturer to ensure compatibility and integrity of the individual components, and provide the specified warranty for all components.

C. In order to assure uniform quality, ease of maintenance and minimal parts storage, it is the intent of these specifications that all access hatch assemblies and accessories called for under this section shall be supplied by a single manufacturer or authorized sales representative. The equipment manufacturer or authorized sales representative shall, in addition to the Contractor, assume the responsibility for proper installation and functioning of the equipment.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivered materials shall be stockpiled and stored at locations approved by the Owner until required for installation. Materials shall be stored in accordance with manufacturer's instructions.

B. Contractor shall inspect materials upon delivery for loss or damage in transit. Contractor shall be responsible for the replacement of damaged materials; damaged materials shall be removed from the Site.

1.07 WARRANTY

A. The equipment manufacturer shall warrant the equipment being supplied to the Owner against defects in workmanship and materials for a period of one (1) year under normal use, operation and service. The warranty shall be in published form and apply to all similar units. A warranty offered by a representative will not be acceptable in lieu of the manufacturer's warranty.

PART 2 PRODUCTS

2.01 H20 LOAD RATED ALUMINUM ACCESS HATCHES

A. Hatches shall be designed to meet H20 wheel loading requirements. Hatches shall be cast integral with the top slabs. Prior to manufacture and shipment of hatches, the placement of the hatches must be coordinated between Engineer, hatch manufacturer/supplier, pump manufacturer/supplier, and precast supplier. Final approval of hatches by Engineer must be received prior to manufacture and shipment.

B. Hatches shall have a ¼" thick, one piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor.

C. The inside frame shall have a door support ledge on two (2) sides.

D. The frame and ledge shall be supported by a full bed of concrete. The frame shall be coated with bitumastic coal tar epoxy where in contact with concrete.

E. The hatch door panels shall be ¼" aluminum diamond plate.

F. Doors shall open to 90 degrees with T-316 stainless-steel hold open arms. Hold open arms shall have vinyl gripped handles.

G. Doors shall include stainless-steel spring assist arms. Doors shall not require more than 30 pounds of lifting force to open. Doors shall close flush with the frame and shall lock positively when shut.

H. Hinges and all fastening hardware shall be T-316 stainless-steel.

I. Provide flush T-316 stainless-steel spring-loaded slam lock operable with a stainless-steel removable key from the top. Provide a stainless-steel turn handle with vinyl grip for operating lock from the bottom.

J. Provide flush lifting handle and recessed padlock hasp covered by a hinged lid flush with the surface.

K. Hatches shall be single leaf for 36" square and smaller and double leaf for hatches larger than 36" square.

L. Hatches shall include debris gasket and 1-1/2" drain coupling located in channel frame

M. All hatches shall include a "Safe Hatch" option designed to cover the hole per OSHA Standard 1910.23, provide fall through protection and controlled confined space entry. The safety grate shall be made of 6061-T6 aluminum with a minimum ultimate strength of 38,000 psi and a minimum yield strength of 35,000 psi per ASTM B221. Grate design shall use safety factors as defined in the "Specification for Aluminum Structures" by the Aluminum Association, Inc., 5th Edition, December 1986 for "Bridge Type Structures. The aluminum safety grating shall be designed for a minimum live load of 300 psf with a maximum deflection of 1/150th of the span. Welding shall be in accordance with ANSI/AWS D1.2-90 Structural Welding Code for Aluminum. Grate shall be painted with OSHA approved safety orange epoxy paint.

2.02 300 PSF LOAD RATED HATCHES

A. Hatches shall be designed to meet H20 wheel loading requirements. Hatches shall be cast integral with the top slabs. Prior to manufacture and shipment of hatches, the placement of the hatches must be coordinated between Engineer, hatch manufacturer/supplier, pump manufacturer/supplier, and precast supplier. Final approval of hatches by Engineer must be received prior to manufacture and shipment.

B. Hatches shall have a ¼" thick, one piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor.

C. The inside frame shall have a door support ledge on two (2) sides.

D. The frame and ledge shall be supported by a full bed of concrete. The frame shall be coated with bitumastic coal tar epoxy where in contact with concrete.

E. The hatch door panels shall be ¼" aluminum diamond plate.

F. Doors shall open to 90 degrees with T-316 stainless-steel hold open arms. Hold open arms shall have vinyl gripped handles.

G. Doors shall include stainless-steel spring assist arms. Doors shall not require more than 30 pounds of lifting force to open. Doors shall close flush with the frame and shall lock positively when shut.

H. Hinges and all fastening hardware shall be T-316 stainless-steel.

I. Provide flush T-316 stainless-steel spring-loaded slam lock operable with a stainless-steel removable key from the top. Provide a stainless-steel turn handle with vinyl grip for operating lock from the bottom.

J. Provide flush lifting handle and recessed padlock hasp covered by a hinged lid flush with the surface.

K. Hatches shall be single leaf for 36" square and smaller and double leaf for hatches larger than 36" square.

L. Hatches shall include debris gasket and 1-1/2" drain coupling located in channel frame

M. All hatches shall include a "Safe Hatch" option designed to cover the hole per OSHA Standard 1910.23, provide fall through protection and controlled confined space entry. The safety grate shall be made of 6061-T6 aluminum with a minimum ultimate strength of 38,000 psi and a minimum yield strength of 35,000 psi per ASTM B221. Grate design shall use safety factors as defined in the "Specification for Aluminum Structures" by the Aluminum Association, Inc., 5th Edition, December 1986 for "Bridge Type Structures. The aluminum safety grating shall be designed for a minimum live load of 300 psf with a maximum deflection of 1/150th of the span. Welding shall be in accordance with ANSI/AWS D1.2-90 Structural Welding Code for Aluminum. Grate shall be painted with OSHA approved safety orange epoxy paint.

2.03 SCHEDULE:

A. H20 Load Rated Hatches

1. MLS Wetwell:

a. Coordinate location with Engineer and pump supplier.
b. Quantity: Three (3)
c. Size: 30" x 36" clear opening, coordinate orientation and hinge side with Engineer

2. MLS Valve Vault :

a. Coordinate location with Engineer
b. Quantity: One (1)
c. Size: 36” by 36” clear opening, coordinate orientation and hinge side with Engineer

B. 300 PSF Load Rated Hatches

1. ABT Permeate Tank:

a. Coordinate location with Engineer
b. Quantity: One (1)
c. Size: 36” x 36” clear opening; coordinate orientation and hinge side with Engineer

2.04 ACCESSORIES & SPARE PARTS

A. Furnish the following spare parts:

1. One (1) operating wrench per hatch.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify locations with Engineer.

B. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

A. Install all equipment per the Manufacturer's recommendations.

B. Systems to be installed complete with all necessary connections and accessories.

C. Install frames plumb and level in openings. Secure rigidly in place.

D. Back-prime surfaces to contact concrete as per Manufacturer’s recommendations.

E. Adjust hatches to operate in a proper manner and easily without binding.

END OF SECTION 08 31 23

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SECTION 09 90 02
HIGH PERFORMANCE PAINTING AND COATING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes requirements for providing high performance painting and coating. Includes preparation, cleaning, protection, application and materials for areas that require high performance painting and coating systems.

B. Related Sections Include:

1. Division 01
2. Division 03 – Concrete.
3. Division 05 – Metals.
4. Division 40 – Process Integration.
5. Division 41 – Material Processing and Handling.
6. Division 43 – Process Gas and Liquid Handling Equipment.
7. Division 46 – Water and Wastewater Process Equipment.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Water Works Association (AWWA):
2. ANSI/ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
3. Environmental Protection Agency (EPA).
4. Occupational Safety and Health Act (OSHA).
5. Current Joint Standards for the Society for Protective Coatings (SPCC)/National Association of Corrosion Engineers International (NACE).
6. Ten States Standards – 54.5 Piping Code.
7. Montana Circular DEQ-2, Section 54.6 – Painting.
8. Utah Administrative Code R317-4.4.H – Painting.

9. Colorado Department of Public Health and Environment, WPC-DR-1 Section 2.3.8 - Painting.

10. Idaho Administrative Rules, IDAPA 58.01.16, Section 450.04.d – Painting.

1.03 DEFINITIONS

A. Conform to ANSI/ATSM D16 for interpretation of terms used in this Section.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00. Indicate each material and cross-referenced specified coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

B. Provide Product data on all Products including manufacturer's technical information, label analysis, and instructions for handling, mixing, storing, and applying each coating material. Submit manufacturer's application instructions under provisions of Section 01 33 00.

C. Provide a paint system data sheet for each coating system, including all components for providing a complete system. Components include surface preparation, primer, intermediate coats, and finish coats.

D. Provide paint manufacturers certification that proposed coating systems meet specified performance requirements.

E. Submit five (5) full color sample sheets illustrating available colors for each scheduled surface finish Product. During the shop drawing review process, Engineer and Owner will select color choices for surfaces to be coated. Submit samples under provisions of Section 01 33 00.

F. If the manufacturer of finish coating differs from that of shop primer, provide finish coating manufacturer's written confirmation that materials are compatible for each instance.

G. Before proceeding with Work under this section, finish one complete space or item of each color scheme required showing selected colors, finish texture, materials, quality of work, and special details.

1.05 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paints and finish products with minimum ten (10) years' experience.

B. Applicator: Minimum 10 years' experience in application of specified products.

C. Regulatory Requirements:

1. Meet federal, state, and local requirements limiting the emission of volatile organic compounds.

2. Perform surface preparation and painting in accordance with recommendations of the following:

   a. Paint manufacturer's instructions.
   b. SSPC PA 3, Guide to Safety in Paint Applications.
   c. Federal, state, and local agencies having jurisdiction.

D. Maintain examples of SSPC visual standards on Site.

E. Provide wet and dry paint thickness measurement instrument on Site.

F. Specification language for High Performance Coating Systems is based on Tnemec and Sherwin-Williams (SW) Industrial Coating.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivered materials shall be stockpiled and stored at locations approved by the OWNER until required for installation. Materials shall be transported, delivered, stored and handled in accordance with manufacturer's instructions and the requirements of Section 01 61 00.

B. Protect shop painted surfaces during shipment and handling by suitable provisions including padding, blocking, and use of canvas or nylon slings.

C. Primed surfaces shall not be exposed to weather for more than 2 months before being top-coated, or less time if recommended by coating manufacturer.

D. Take precautionary measures to prevent fire hazards and spontaneous combustion. Removal all paint waste from site daily and dispose of properly.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable state regulations, Environmental Protection Agency, Occupational Health and Safety Administration, Ten States Standards, Uniform Building Code, and Uniform Fire Codes and Standards.

B. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60, 600, and 372, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

1.08 THREE YEAR PERFORMANCE GUARANTEE

A. The quality of both materials and workmanship for the installed coating materials (as defined in this specification) will be the sole responsibility of the Contractor. It is hereby guaranteed that should the coating material delaminate, chip, peel, blister, crack or otherwise fail due to improper surface preparation, improper mixing and application or curing of coating materials or protection of the coating work during cure by the Contractor or due to lack of material quality on the part of

the material manufacturer, the Contractor shall repair or replace the damaged or failing coating to Owner's satisfaction at no cost to Owner and at Owner's convenience. Should the existing substrate below the coating fail causing such coating failure, except if related to inadequate surface preparation or coating quality causing substrate corrosion, the Contractor shall not be held liable.

B. It is further understood by the Contractor that any incompatibility with or error in formulation of the coating materials used on this project, which results in a coating failure, will be a financial matter strictly between the Coating System Manufacturer and the Contractor. The business responsibility and financial accountability for such a material related failure to Owner would remain solely with the Contractor.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. High Performance Painting and Coating Systems: All paint materials selected for coating systems for each type of system shall be the product of one manufacturer. Acceptable manufacturers are:

1. Tnemec

2. Sherwin-Williams (SW) Industrial Coating

B. Coating systems of all manufacturers must be in accordance with the Contract Documents. Being named as a manufacturer does not eliminate their responsibility of providing coating systems in compliance with the following specification section. Any deviations without sufficient evidence proving equal or superior quality shall be rejected without further review or comment.

C. Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

D. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions and obtain approval from Engineer before bidding in accordance with Division 01.

2.02 ABRASIVE MATERIALS

A. Select abrasive type and size to produce surface profile that meets coating manufacturer's recommendations for specific primer and coating system to be applied.

2.03 PAINT MATERIALS

A. General:

1. Manufacturer's highest quality products suitable for intended service.

2. Compatibility: Only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats.

2.04 MIXING

A. Multiple-Component Coatings:

1. Prepare using each component as packaged by paint manufacturer.

2. No partial batches will be permitted.

3. Do not use multiple-component coatings that have been mixed beyond their pot life.

4. Mix only components specified and furnished by paint manufacturer.

5. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

B. Colors: Formulate paints with colorants free of lead, lead compounds, or other materials that might be affected by presence of hydrogen sulfide or other gas likely to be present at Site.

2.05 SHOP FINISHES

A. Shop Blast Cleaning: Reference Paragraph, Shop Coating Requirements.

B. Surface Preparation: Provide Engineer minimum 7 days' advance notice to start of shop surface preparation work and coating application work.

C. Shop Coating Requirements:

1. When required by equipment Specifications, such equipment shall be primed and finish coated in shop by manufacturer and touched up in field with identical material after installation.

2. Where manufacturer's standard coating is not suitable for intended service condition, Engineer may approve use of a tie-coat to be used between manufacturer's standard coating and specified field finish. In such cases, tie-coat shall be surface tolerant epoxy as recommended by manufacturer of specified field finish coat. Coordinate details of equipment manufacturer's standard coating with field coating manufacturer.

D. Pipe:

1. Ductile Iron Pipe:

a. Use SSPC standards as a guide for desired prepared surface.
b. Follow recommendations of pipe and coating manufacturers for means and methods to achieve SSPC-equivalent surface.
c. The surface preparation and application of the primer and finish coats shall be performed by pipe manufacturer.
d. For high performance (epoxy) coatings, follow additional recommendations of pipe and coating manufacturers.
e. Prior to blast cleaning, grind smooth surface imperfections, including, but not limited to delaminating metal or oxide layers.
f. For conventional (alkyd) coatings, clean asphalt varnish supplied on pipe and apply one full coat of a tar stop before two full coats of the color coats specified.

2. Bituminous coated pipe shall not be allowed for pipe to be field coated.

2.06 SPARES

A. Furnish small quantity kits (minimum one gallon per product per color) for touchup painting and for painting other small areas.

PART 3 - EXECUTION

3.01 GENERAL

A. Provide Engineer minimum 7 days' advance notice to start of field surface preparation work and coating application work.

B. Perform the Work only in presence of Engineer, unless Engineer grants prior approval to perform the Work in Engineer's absence.

C. Schedule inspection of cleaned surfaces and all coats prior to succeeding coat in advance with Engineer.

3.02 ENVIRONMENTAL REQUIREMENTS:

A. Do not apply paint in temperatures or moisture conditions outside of manufacturer's recommended maximum or minimum allowable.

B. Do not perform final abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees Fahrenheit above dew point of ambient air.

3.03 EXAMINATION

A. Factory Finished Items:

1. Review other Section in which primers are provided to ensure compatibility of the total system for various substrates.

2. Schedule inspection with Engineer before repairing damaged factory finished items delivered to Site.

3. Test shop applied primer and finishes for compatibility with subsequent coating and covering materials.

4. Repair abraded or otherwise damaged areas on factory-finished items as recommended by coating manufacturer. Carefully blend repaired areas into original finish. If required to match colors, provide full finish coat in field.

B. Surface Preparation Verification: Inspect and provide substrate surfaces prepared in accordance with these Specifications and printed directions and recommendations of paint manufacturer whose product is to be applied. The more stringent requirements shall apply.

3.04 PROTECTION OF ITEMS NOT TO BE PAINTED

A. Remove, mask, or otherwise protect hardware, lighting fixtures, switchplates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not specified elsewhere to be painted.

B. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.

C. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process.

D. Mask openings in motors to prevent paint and other materials from entering.

E. Protect surfaces adjacent to or downwind of Work area from overspray.

F. Do not paint stainless steel bolts.

3.05 SURFACE PREPARATION

A. Field Abrasive Blasting:

1. Perform blasting for items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed or coated.

2. Refer to coating systems for degree of abrasive blasting required.

3. Where the specified degree of surface preparation differs from manufacturer’s recommendations, the more stringent shall apply.

B. Metal Surface Preparation:

1. Where indicated, meet requirements of SSPC Specifications summarized below:

a. SP 1, Solvent Cleaning: Removal of visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants by cleaning with solvent.
b. SP 2, Hand Tool Cleaning: Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, using nonpower hand tools.
c. SP 3, Power Tool Cleaning: Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, sing power-assisted hand tools.
d. SP 5, White Metal Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter by blast cleaning.
e. SP 6, Commercial Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter, except for random staining limited to no more than 33 percent of each unit area of surface which may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings.
f. SP 10, Near-White Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter, except for random staining limited to no more than 5 percent of each unit area of surface which may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings.

2. The words “solvent cleaning”, “hand tool cleaning”, “wire brushing”, and “blast cleaning” or similar words of equal intent in these Specifications or in paint manufacturer’s specification refer to the applicable SSPC specification.

3. Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Coating manufacturers’ recommendations for wet blast additives and first coat application shall apply.

4. Ductile Iron Pipe Supplied with Asphaltic Varnish Finish: Remove asphaltic varnish finish prior to performing specified surface preparation.

5. Hand tool clean areas that cannot be cleaned by power tool cleaning.

6. Round or chamfer sharp edges and grind smooth burrs, jagged edges, and surface defects.

7. Welds and Adjacent Areas:

a. Prepare such that there is:
1) No undercutting or reverse ridges on weld bead.

2) No weld spatter on or adjacent to weld or any area to be painted.
3) No sharp peaks or ridges along weld bead.

b. Grind embedded pieces of electrode or wire flush with adjacent surface of weld bead.

8. Preblast Cleaning Requirements:

a. Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning.
b. Cleaning Methods: Steam, open flame, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.
c. Clean small isolated areas as above or solvent clean with suitable solvent and clean cloth.

9. Blast Cleaning Requirements:

a. Type of Equipment and Speed of Travel: Design to obtain specified degree of cleanliness. Minimum surface preparation is as specified herein and takes precedence over coating manufacturer's recommendations.
b. Select type and size of abrasive to produce surface profile that meets coating manufacturer's recommendations for particular primer to be used.
c. Use only dry blast cleaning methods.
d. Do not reuse abrasive, except for designed recyclable systems.
e. Meet applicable federal, state, and local air pollution and environmental control regulations for blast cleaning, confined space entry (if required), and disposition of spent aggregate and debris.

10. Post-Blast Cleaning and Other Cleaning Requirements:

a. Clean surfaces of dust and residual particles from cleaning operations by dry (no oil or water vapor) air blast cleaning or other method prior to painting. Vacuum clean enclosed areas and other areas where dust settling is a problem and wipe with a tack cloth.

C. Paint surfaces the same day they are blasted. Reblast surfaces that have started to rust before they are painted.

D. Ductile and Cast Iron:

1. Prepare ductile or cast iron surfaces in accordance with NAPF 500-03-04 Abrasive Blast Cleaning with the exception that ALL rust and mold coating be removed. Only tightly adhered annealing oxide may remain.

2. Bituminous coated pipe shall NOT be allowed if field painting is required.

3. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

4. Shop prime for pipe:

    a. Immersed pipe: Polyamidoamine Epoxy Primer
    b. Non-immersed pipe: single- or multiple-component, moisture-curing urethane zinc-based or zinc and micaceous iron oxide-based primer at 2.5 to 3.5 mils DFT.

5. For ductile and cast iron pipe scheduled for insulative acrylic coating, prepare surface as above and shop prime with Tnemec Series 1224 or SW Macropoxy 646 at 4.0 to 8.0 DFT.

6. Field preparation, primer, intermediate, and top coat as specified herein to be performed by Division 09 contractor.

7. Prior to blast cleaning, grind smooth surface imperfections, including, but not limited to delaminating metal or oxide layers.

E. Galvanized Metal, Copper, and Nonferrous Metal Alloy Surface Preparation:

1. Remove soil, cement spatter, and other surface dirt with appropriate hand or power tools.

F. Remove oil and grease by wiping or scrubbing surface with suitable solvent, rag, and brush. Use clean solvent and clean rag for final wiping to avoid contaminating surface.

1. Obtain and follow coating manufacturer’s recommendations for additional preparation that may be required.

3.06 CONCRETE SURFACE PREPARATION:

1. Do not begin until 30 days after concrete has been placed.

2. Meet requirements of SSPC SP 13.

3. Voids and other defects that are at or near the surface shall be exposed during surface preparation.

4. Brush-off blast clean to remove loose concrete and laitance, and provide a tooth for binding. Upon approval by Engineer, surface may be cleaned by acid etching method. Approval is subject to producing desired profile as listed in section 3.07 below based on the required coating system. If not specifying, surface profile to the equivalent to No. 80 grit flint sandpaper. Acid etching of vertical or overhead surfaces shall not be allowed. Coordinate blast clean with buffing requirements provided in Division 03 – Concrete.

5. Remove grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods.

6. Secure coating manufacturer's recommendations for additional preparation, if required, for excessive bug holes exposed after blasting.

7. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.

3.07 SURFACE CLEANING

A. Brush-off Blast Cleaning:

1. Equipment, procedure, and degree of cleaning shall meet requirements of SSPC SP 7.

2. Abrasive: Either wet or dry blasting sand, grit, or nutshell.

3. Select various surface preparation parameters, such as size and hardness of abrasive, nozzle size, air pressure, and nozzle distance from surface such that surface is cleaned without pitting, chipping, or other damage.

4. Verify parameter selection by blast cleaning a trial area that will not be exposed to view.

5. Engineer will review acceptable trial blast cleaned area and use area as a representative sample of surface preparation.

6. Repair or replace surface damaged by blast cleaning.

B. Acid Etching:

1. After precleaning, spread the following solution by brush or plastic sprinkling can: One part commercial muriatic acid reduced by two parts water by volume. Adding acid to water in these proportions gives an approximate 10 percent solution of HCl.

2. Application:

a. Rate: Approximately 2 gallons per 100 square feet.
b. Work acid solution into surface by hard-bristled brushes or brooms until complete wetting and coverage is obtained. c. Acid will react vigorously for a few minutes, during which time brushing shall be continued.
c. After bubbling subsides (10 minutes), hose down remaining slurry with high pressure clean water.

d. Rinse immediately to avoid formation on the surface of salts that are difficult to remove.

3. Thoroughly rinse to remove any residual acid surface condition that may impair adhesion.

4. Ensure surface is completely dry before application of coating.

5. Apply acid etching to obtain a “grit sandpaper” surface profile. If not, repeat treatment.

C. Solvent Cleaning:

1. Consists of removal of foreign matter such as oil, grease, soil, drawing and cutting compounds, and any other surface contaminants by using solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods that involve a solvent or cleaning action.

2. Meet requirements of SSPC SP 1.

3.08 APPLICATION

A. General:

1. In general, all new and modified existing structures and items, whether specifically mentioned or not, shall be painted, unless otherwise noted. Do not paint exterior concrete surfaces, unless specifically indicated.

a. Interior concrete walls, floors, and ceilings within the facility.
b. Interior concrete block masonry within the facility and modified concrete block masonry.
c. All new doors and frames and window frames (if required) within the expanded facility.
d. Exterior, interior, and submerged ferrous metals.
e. Miscellaneous other metals.
f. Paint shop-primed equipment and fixtures.
g. Unfinished louvers, grilles, covers, and access panels on mechanical and electrical components; paint separately.
h. Prime and paint all surfaces located behind, underneath, or otherwise previously obstructed by items that have been removed or demolished.
i. Prime and paint all surfaces of new process pipes (non-insulated and insulated), electrical conduit, valves, fittings, meters, boxes, hangers, brackets, collars, and supports, except where items are prefinished.
j. Paint discharge heads and base plates of all new or modified pumps.
k. Prime and paint all new unburied exterior steel, ductile, galvanized, and PVC piping.
l. Replace identification markings on mechanical or electrical equipment when painted accidentally.

m. Paint exposed conduit and electrical equipment occurring in finished areas.
n. Paint both sides and edges of plywood backboards for electrical equipment before installing equipment.
o. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
p. All surfaces not specifically excluded.

2. Extent of Coating (Immersion): Coatings shall be applied to internal vessel and pipe surfaces, nozzle bores, flange gasket sealing surfaces, carbon steel internals, and stainless steel internals, unless otherwise specified.

B. For coatings subject to immersion, obtain full cure for completed system. Consult coatings manufacturer's written instructions for these requirements. Do not immerse coating until completion of curing cycle.

1. Apply coatings in accordance with these Specifications and paint manufacturers' printed recommendations and special details. The more stringent requirements shall apply. Allow sufficient time between coats to assure thorough drying of previously applied paint.

2. Apply a stripe coat of an approved coating system via brush or roller to all weld seams, edges, angles, and mechanical connections. Stripe coat shall be applied after primer coat and be of a different color than the primer coat.

3. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

4. Coat units or surfaces to be bolted together or joined closely to structures or to one another prior to assembly or installation.

5. On pipelines, terminate coatings along pipe runs to 1 inch inside pipe penetrations.

C. Keep paint materials sealed when not in use.

1. Where more than one coat is applied within a given system, alternate colors to provide a visual reference showing required number of coats have been applied.

D. Galvanized Metal, Copper, and Nonferrous Metal Alloys:

1. Concealed galvanized, copper, and nonferrous metal alloy surfaces (behind building panels or walls) do not require painting, unless specifically indicated herein.

2. Prepare surface and apply primer in accordance with Protective Coating System specification.

3. Apply intermediate and finish coats of the coating system appropriate for the exposure.

E. Porous Surfaces, Such as Concrete and Masonry:

1. Filler/Surfacer: Use coating manufacturer's recommended product to fill air holes, bug holes, and other surface voids and defects with any dimension greater than 1/4-inch with manufacturer recommended filler. This requirement applies to porous surfaces scheduled to received coatings as well as to porous surfaces that are not scheduled to receive additional coatings. Coordinate with Division 03 Contractor.

2. Prime Coat: May be thinned to provide maximum penetration and adhesion.

    a. Type and Amount of Thinning: Determined by paint manufacturer and dependent on surface density and type of coating.

3. Surface Specified to Receive Water Base Coating: Damp, but free of running water, just prior to application of coating.

F. Film Thickness and Coverage:

1. Number of Coats:

    a. Minimum required without regard to coating thickness.
    b. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions.

2. Application Thickness:

    a. Follow coating manufacturer's recommendations.
    b. Measure using a wet film thickness gauge to ensure proper coating thickness during application.

3. Film Thickness Measurements and Electrical Inspection of Coated Surfaces:

    a. Perform with properly calibrated instruments.
    b. Recoat and repair as necessary for compliance with Specification.
    c. Coats are subject to inspection by Engineer and coating manufacturer's representative.

4. Visually inspect concrete, masonry, nonferrous metal, plastic, and wood surfaces to ensure proper and complete coverage has been attained.

5. Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.

6. Apply additional coats as required to achieve complete hiding of underlying coats. Hiding shall be so complete that additional coats would not increase the hiding.

3.09 HIGH PERFORMANCE COATINGS SYSTEMS AND APPLICATION SCHEDULE

A. Unless otherwise shown or specified, paint surfaces in accordance with the following application schedule. In the event of discrepancies or omissions in the following, request clarification from Engineer before starting work in question.

B. Refer to 09 90 03 Coatings Schedule Supplement. Additional requirements are included in the Piping Schedule or Piping Specifications.

C. System No. 1: Ferrous Metals, Exterior Exposure, Non immersion

System Type	Surface Preparation	Primer Coat 3.0 to 5.0 DFT	Intermediate Coat,	Topcoat, 2.0 to 3.0 DFT
Polyamidoamine	SPCC SP6	Tnemec Series N140 or N69, SW Macropoxy 646	NA	Tnemec Series 1075, SW Acrolon 218

1. Use two coat coating system for maintenance coating of structural steel. For non-immersed, non-corrosive environments.

2. Use on new exposed metal surfaces, located outside of structures, including structural steel, metal decking, guard posts, hollow metal doors and frames, piping, equipment, and miscellaneous metal.

D. System No. 3: Ferrous Metals, Immersion

System Type	Surface Preparation	Primer Coat, 3.0 to 5.0 DFT	Intermediate Coat	Topcoat, 3.0 to 5.0 DFT
Polyamidoamine	SPCC SP10	Tnemec Series N140 or N69, SW Duraplate 235 MPE	NA	Tnemec Series N69, SW Duraplate 235 MPE

1. Verify with manufacturer a compatible field tie-in coat for shop primed items where applicable.

2. Use on immersed metal surfaces, metal surfaces above maximum liquid surface that are a part of immersed equipment, concrete embedded surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, pipe

fittings, pipe support systems, access manholes, gate guides and thimbles, structural steel, and surfaces of steel piping noted in the Piping Schedule or Piping Specifications.

a. Submerged, partially submerged and splash area metals not shop finished.

E. System No. 4: Ferrous Metals, Immersion and/or H_2S Exposure

System Type	Surface Preparation	Primer Coat	Intermediate Coat	Topcoat
Modified Polyamine Epoxy	SPCC SP 10	Self Priming	Tnemec Series 435 (15.0 to 20.0 mils DFT), SW Duraplate 5900 (15.0 to 20.0 mils DFT)	Tnemec Series 435 (15.0 to 20.0 mils DFT), SW Duraplate 5900 (15.0 to 20.0 mils DFT)

1. Use on immersed metal surface, metal surfaces above maximum liquid surface that are a part of immersed equipment, concrete embedded surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles, and structural steel, and interior surfaces of steel piping noted in the Piping Schedule in areas with potential H_2S exposure.

a. Scheduled for:
b. Surfaces and Building Names

F. System No. 5: Metals, Buried and/or Below Grade

System Type	Surface Preparation	Primer Coat, 3.0 to 5.0 mils DFT	Intermediate Coat	Topcoat, 16.0 to 20.0 mil DFT
Coal tar epoxy	SPCC SP10	Tnemec Series N140 or N69 (optional), SW Macropoxy 646 (optional)	NA	Tnemec Series 46H-413, SW Hi-Mil Sher-Tar Epoxy

1. For steel pipe and fittings, follow AWWA C209 and AWWA C214 with outer wrap.

2. For buried, below grade portions of metal items, except buried stainless steel, and the follow specific surfaces:

   a. Fasteners and accessories for buried piping
   b. Buried Valves

G. System No. 6: Metals, Concrete Embedded and Encased

System Type	Surface Preparation	Primer Coat	Intermediate Coat, 8.0 to 10.0 mils DFT	Topcoat, 8.0 to 10.0 mils DFT
Coal tar epoxy	SPCC SP6	NA	Tnemec Series 46H-413, SW Hi-Mil Sher-Tar Epoxy	Tnemec Series 46H-413, SW Hi-Mil Sher-Tar Epoxy

1. For concrete embedded and encased surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles.

H. System No. 7: Galvanized Metal, Copper, and Nonferrous Metal Alloy Conditioning:

System Type	Surface Preparation	Primer Coat, 3.0 to 5.0 mils DFT	Intermediate Coat	Topcoat, 3.0 to 5.0 mils DFT
Epoxy Polyamide	Abrasive brush blast to create a 1.5 mil profile	Tnemec Series N140 or N69, SW Macropoxy 646	NA	Tnemec Series N140 or N69, SW Macropoxy 646

1. Verify with manufacturer compatibility as a field tie-in coat.

2. Use on the following items or areas:

   a. Galvanized surfaces requiring painting.
   b. After application of System No. 7, apply System No. 1 topcoat for exterior, System No. 3 topcoat for interior.

I. System No. 10: Concrete, Precast and Poured in Place, Immersion, Light H_2S Vapor:

System Type	Surface Preparation	Primer Coat	Intermediate Coat	Topcoat,

		3.0 to 5.0 mils DFT		3.0 to 5.0 mils DFT
Polyamidoamine	SPCC SP13, ICRI CSP2-3	Tnemec Series N140 or N69, SW Duraplate 235 MPE	NA	Tnemec Series N140 or N69, SW Duraplate 235 MPE

1. Prep surface in accordance with concrete surface preparation.
2. For use on walls and ceilings in areas with light to moderate H_2S exposure.
3. Scheduled for:
    a. OSW between TOW elevation and 3 feet below TOW elevation.

J. System No. 11: Concrete, Precast and Poured in Place, Immersion, High H_2S

System Type	Surface Preparation	Primer Coat (to reduce offgassing)	Intermediate Coat	Topcoat
Modified Polyamine Epoxy	SPCC SP13, ICRI CSP3-5, apply filler as required	Tnemec Mortarclad 218 (1/16” to 1/8”), SW Corobond 100 (4 to 6 mils)	Tnemec Series 435 (20.0 to 30.0 mils DFT), Duraplate 5900 (20.0 to 30.0 mils DFT)	Tnemec Series 435 (20.0 to 30.0 mils DFT), Duraplate 5900 (20.0 to 30.0 mils DFT)

1. Prep surface in accordance with concrete surface preparation.
2. For use on walls and ceilings in areas with moderate to heavy H_2S exposure.
3. Schedule for:
    a. Not Used

K. System No. 12: Concrete, Precast and Poured in Place, Immersion, no H_2S exposure

System Type	Surface Preparation	Primer Coat 3.0 to 5.0 mils DFT	Intermediate Coat	Topcoat, 3.0 to 5.0 mils DFT

Polyamidoamine	SPCC SP13 ICRI CSP2-4	Tnemec Series N140 or N69, SW Duraplate 235 MPE	NA	Tnemec Series N140 or N69, SW Duraplate 235 MPE

1. Prep surface in accordance with concrete surface preparation.

2. For use on floors, walls and ceilings in areas with no to minimal H_2S exposure.

3. Scheduled for:

   a. Not Used

System Type	Surface Preparation	Primer Coat, Per Mnfr recommendation	Intermediate Coat Per Mnfr recommendation	Topcoat Per Mnfr recommendation
Epoxy	SPCC SP13 ICRI CSP5	Tnemec Series 218, SW Corobond 300 resurfacer	Tnemec Series 104, SW Sherglass FF	Tnemec Series 104 SW Sherglass FF

L. Prep surface in accordance with concrete surface preparation.

1. For use on floors and walls in secondary containment basins.

2. Scheduled for:

   a. Not Used

M. System No. 14: Aluminum and Dissimilar Metal Insulation:

System Type	Surface Preparation	Primer Coat	Intermediate Coat	Topcoat
Bituminous	Abrasive blast to provide a 3.0 mil angular anchor profile	NA	NA	Tnemec Series 46H-413, SW Hi-Mil Sher-Tar Epoxy

1. Use on aluminum surfaces embedded or in contact with concrete and for dissimilar metal insulation.

3.10 COLORS

A. Provide as designated herein and shown in Piping Schedule or as selected by Engineer.

B. Proprietary identification of colors is for identification only. Selected manufacturer may supply matches.

C. Equipment Colors:

1. Equipment includes the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits.

2. Paint nonsubmerged portions of equipment the same color as the piping it serves, except as itemized below:

a. Dangerous Parts of Equipment and Machinery: OSHA Orange.
b. Fire Protection Equipment and Apparatus: OSHA Red.
c. Radiation Hazards: OSHA Purple.
d. Physical hazards in normal operating area and energy lockout devices, including, but not limited to, electrical disconnects for equipment and equipment isolation valves in air and liquid lines under pressure: OSHA Yellow.

D. Pipe Identification Painting:

1. Color code nonsubmerged metal piping, except electrical conduit. Paint fittings and valves the same color as pipe, except equipment isolation valves.

2. Pipe Color Coding: In accordance with the “Recommended Standards For Wastewater Facilities” and as specified in Section 40 27 00.

3. On exposed stainless steel piping, apply color 24 inches in length along pipe axis at connections to equipment, valves, or branch fittings, at wall boundaries, and at intervals along piping not greater than 9 feet on center.

4. Pipe Supports: Painted light gray, as approved by Engineer.

3.11 FIELD QUALITY CONTROL

A. Sharp edges, weld spatter, scab marks, and other imperfections shall be ground to a smooth radius or removed and re-blasted before coating application.

B. Testing:

1. Thickness and Continuity Testing:

a. Measure coating thickness specified in mils with a magnetic type, dry film thickness gauge, in accordance with SSPC PA 2. Check

each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.

b. After repaired and recoated areas have dried sufficiently, retest each repaired area. Final tests may also be conducted by Engineer.

C. Inspection: Leave staging and lighting in place until Engineer has inspected surface or coating. Replace staging removed prior to approval by Engineer.

1. Provide additional staging and lighting as requested by Engineer.

D. Unsatisfactory Application:

1. If item has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.

2. Evidence of runs, bridges, holidays, laps, or other imperfections is cause for rejection.

3. Repair defects in accordance with written recommendations of coating manufacturer.

E. Damaged Coatings, Pinholes, and Holidays:

1. Feather edges and repair in accordance with recommendations of paint manufacturer.

2. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.

3. Apply finish coats, including touchup and damage-repair coats in a manner that will present a uniform texture and color-matched appearance.

3.12 MANUFACTURER'S SERVICES

A. In accordance with Section 01 45 00, Manufacturers' Field Services, coating manufacturer's representative shall be present at Site as follows:

1. On first day of application of any coating system.

2. A minimum of two additional Site inspection visits, each for a minimum of 4 hours, in order to provide Manufacturer's Certificate of Proper Installation.

3. As required to resolve field problems attributable to or associated with manufacturer's product.

4. To verify full cure of coating prior to coated surfaces being placed into immersion service.

3.13 CLEANUP

A. Upon completion of the Work, remove staging, scaffolding, and containers from Site or destroy in a legal manner.

B. Remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

END OF SECTION 09 90 02

SECTION 26 00 01
ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Electrical equipment, machinery, and installation.

B. The Electrical General Requirements outlined in this specification shall apply to Division 26 Electrical Specifications.

C. The Contractor shall provide supervision, labor, material, equipment, machinery and any other items necessary to complete the electrical systems. Items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated in the drawings, and as required for complete systems.

1.02 PERMITS AND FEES

A. The Contractor shall give necessary notices, obtain permits and pay government and state sales taxes, fees, and other costs, including utility connections or extensions; file necessary plans, prepare documents and obtain necessary approvals of governmental departments having jurisdiction; obtain required certificates of inspection for the work and deliver same to the Engineer before request for acceptance and final payment of the work.

1.03 INTENT

A. It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

1.04 SURVEYS AND MEASUREMENTS

A. The Contractor shall base measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify measurements at site and check correctness of same as related to the work.

B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, they shall notify the Engineer, through the General Contractor, and shall not proceed with the work until they have received instructions from the Engineer.

1.05 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. The engineering drawings and details shall be

examined for exact locations of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Engineer.

B. The Contractor shall follow drawings in laying out work, and check drawings of other trades to verify spaces in which work will be installed.

1.06 "OR EQUAL"

A. Wherever the words “or equal" or “equal to” or “equivalent” are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified but does not require prior written approval by the Engineer.

B. Wherever the words "approved equal" or "prior approved equivalent" are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified and shall be so approved in writing by the Engineer.

C. It is further understood that no material or work shall be presented to the Engineer as work or material equal to that specified with the full understanding on the part of the manufacturers and agents for the so called "equal" material, and the full understanding on the part of the Contractor, that the Engineer is to use his own judgment in the matter, that his decision is final, and that in the event of an adverse condition, no claim of any sort shall be made against the Owner or Engineer.

1.07 EQUIPMENT DEVIATIONS

A. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the mechanical, electrical, or structural layout; such redesign, new drawings and detailing required therefore shall be prepared by the Contractor at his own expense and approved by the Engineer.

B. Where such approved deviation requires a different quantity and arrangement of wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system at no additional cost to the Owner.

1.08 COOPERATION WITH OTHER TRADES

A. This Contractor shall give full cooperation to other trades and shall furnish in writing to the Contractor, with copies to the Engineer, any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Where the work of the Contractor will be installed in close proximity to, or will interfere with the work of other trades, they shall assist in working out space conditions to make a satisfactory adjustment. If the Contractor installs their work before coordinating with other trades or so as to cause any interference with work of other trades, they shall make the necessary changes in his work to correct the condition without extra charge.

C. The Contractor shall furnish to other trades, as required, necessary shop details for the proper installation of work and for the purpose of coordinating adjacent work.

D. Refer to other Divisions of the Specifications for equipment furnished by others and work required thereof by the Contractor.

1.09 PROTECTION

A. The Contractor shall protect work and material from damage by their work or workmen and shall be liable for damage thus caused.

B. The Contractor shall be responsible for work and equipment until finally inspected, tested, and accepted; contractor shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site, which is not immediately installed. Contractor shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

1.10 SCAFFOLDING, RIGGING, HOISTING

A. The Contractor shall furnish scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any electrical equipment and electrical apparatus furnished. Remove scaffolding, rigging, hoisting, and services from premises when no longer required.

1.11 MATERIAL AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new of first-class quality, and shall be furnished, delivered, erected, connected, and finished in every detail, and shall be so selected and arranged as to fit properly into the available spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Engineer shall be furnished.

B. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation or work, together with skilled workmen, helpers, and labor required to unload, transfer, erect, connect, adjust, start, operate, and test each system. The job superintendent shall be a Master Electrician licensed in the State where the work is being performed.

C. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval of the Engineer in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.12 STANDARDS AND CODES

A. Conform to the latest editions and supplements of codes, standards, and recommended practices in addition to the following:

1. Safety Codes:

a. National Electrical Safety Code Handbook
b. Occupational Safety and Health Standard (OSHA)

2. National Fire Codes:

a. NFPA 70 - National Electric Code (NEC)

3. Underwriters Laboratories, inc.:

a. UL 508A Standard - Industrial Control Panels
b. Applicable UL standards as referenced.
c. Material and equipment for the electrical portion of the system shall bear the approval label, or shall be listed by Underwriter's Laboratories, Limited Liability company or another Nationally Recognized Testing Laboratory (NRTL) approved by OSHA and the local electrical inspector.

4. Third Party Certifications:

a. Equipment not bearing a UL listing shall be provided with a third-party certification stamped by a registered Professional Engineer licensed in the state of which the work is being performed.

5. State Electrical Board:

a. Laws, Rules, Wiring Standards, and applicable local state standards.

1.13 TESTS AND OPERATION RECORDS

A. Test equipment installed and demonstrate its proper operation. No equipment shall be tested or operated for any other purpose, such as checking motor rotation, until it has been fully lubricated in accordance with manufacturer's instructions and, if it is a centrifugal pump, until it has been connected to piping systems and supplied with sufficient water so that it will not run dry.

1. Defects in workmanship, material, equipment or any grounds or short circuits shall be corrected before substantial completion.

B. The electrical system shall be tested in presence of the Engineer.

1. Measure resistance of electrical system with a "Megger" from busses of main switch to ground with main breaker open, and bonding jumper

between neutral and ground temporarily removed. Values shall be determined with all panelboards, motor controls and switch circuits open. If any value measured is less than 100,000 ohms, each feeder shall be measured and shall exceed those set forth in Article 110 of National Electrical Code.

C. Recording Data

1. Record nameplate horsepower, amperes, volts, phase, efficiency, service factor, and data on motors and other electrical equipment.

2. Record motor starter catalog number, size and rating and/or catalog number of thermal overload units installed in motor starters.

3. Record ampere per phase at normal or near normal loading of each item of equipment.

4. Record voltage and ampere per phase readings taken at service entrance equipment after substantial completion with operation at typical electrical load.

5. Record VFD settings, solid-state motor controller settings, electronic overload relay settings, relay settings, device settings, and related electronic equipment settings.

6. Record instrumentation and device calibration settings.

1.14 DEMONSTRATION OF COMPLETED ELECTRICAL SYSTEMS

A. General: Upon completion of entire electrical systems, Contractor shall demonstrate to Engineer's satisfaction that all installed electrical systems are in perfect operating condition, that they perform all power and control functions intended and that they are installed in strict accordance with project drawings and specifications.

END OF SECTION 26 00 01

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SECTION 26 05 02
EXCAVATING, TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

A. Provide trenching/backfill/compaction/surface restoration required to install electrical equipment.

PART 2 PRODUCTS

2.01 GENERAL BACKFILL REQUIREMENTS

A. Special Fill Gravel (Inside Building Line):

1. Washed type with 100% passing 3/4" sieve and gradation to ensure compactibility with no more than 5% passing No. 200 sieve.

B. Outside Building Line: Native backfill.

PART 3 EXECUTION

3.01 INSTALLATION

A. Clear trenching work area.

B. Excavate to depths as indicated on drawings or as required by NEC, whichever is greater.

C. Provide electrical ribbon marker tape above conduits in each trench.

D. Notify Engineer immediately if during progress of work, subsurface conditions are encountered which are different from those ordinarily anticipated.

E. Excavated material, free from foreign material, may be used for backfilling outside building and rough grading. Remove any excess from site.

F. Fill excavation below required depth with compacted special fill gravel.

G. Protect bottom of excavation from frost and do not place structures or conduit on frozen ground.

H. FILL WITHIN BUILDING (Under Concrete Slabs on Grade):

1. Place and compact fill in successive layers not to exceed eight (8) inches before compaction. Compact to minimum of 95% per ASTM D698.

I. Nonorganic material from building excavation may be used for fill within building.

J. Place a six-inch layer of special fill gravel immediately below the floor slab.

K. BACKFILL OUTSIDE BUILDING:

1. Do not start backfilling until the work which will be covered is completed, and areas are free of foreign material.

2. Place and compact fill in successive layers not to exceed eight (8) inches before compaction. Compact to minimum of 95% per ASTM D698.

L. Nonorganic material excavated from foundation areas may be used as backfill in exterior areas.

END OF SECTION 26 05 02

SECTION 26 05 10
MOTORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes process equipment, ventilation and general-purpose motors.

1.02 REFERENCES

A. Anti-Friction Bearing Manufacturers Association (AFBMA)

1. Load Ratings and Fatigue Life for Ball Bearings

B. Institute of Electrical and Electronic Engineers (IEEE)

1. IEEE 112 Standard Test Procedure for Polyphase Induction Motors and Generators

C. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code (NEC), Current Adopted Edition.

D. National Electrical Manufacturer's Association (NEMA).

1. NEMA MG 00001 - Motors and Generators.

2. NEMA EN 10250 - Enclosures for Electrical Equipment.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with Specification Section 01 33 00 - Submittal Procedures including, at a minimum:

1. Equipment mechanical and electrical specification sheets

2. Efficiency information

1.04 DELIVERY, STORAGE AND HANDLING

A. Motors shall be covered and stored in a dry, warm (50°F) location prior to installation.

B. Once installed, the space shall be heated and kept dry. The motor shall be covered until ready for service. Covering shall not trap moisture in the motor.

C. All vertical turbine type motors of 50 HP and larger shall be shipped with tilt and vibration sensors. Motors delivered with sensors indicating results outside manufacturer recommendations shall be recertified by factory representative prior to startup or final acceptance.

D. Vertical Turbine type motors larger than 25HP in size shall be shipped in crates. Open mounted motors which are bolted to pallets for shipping shall not be accepted.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data in accordance with 01 35 16.01 - LEED 2009 Material Cost Summary Form.

PART 2 PRODUCTS

2.01 MOTORS

A. Motors shall conform with applicable NEMA, IEEE, and ANSI standards. Motors using non-standard frames or otherwise of special characteristics will be permitted only by special permission of the Engineer, the intent being to confine such usage to cases of absolute necessity.

B. Motor ratings shall be based on current NEMA design standards for continuous duty and/or multiple starts per hour on motors through 100 horsepower. On motors larger than 100 horsepower starting shall be based on NEMA MG1-20.43 number of starts. Horsepower, torque, and speed characteristics shall be suitable for the full normal range of operating conditions of the driven equipment without exceeding 95% of the nameplate FLA and the temperature rise ratings regardless of size. Nameplate FLA shall be based on nameplate HP and shall not include the 15% S.F. In addition, all motors 1 horsepower and larger shall have a 1.15 service factor. Wherever horsepower ratings of motors proposed differ from those shown or specified, this fact shall be prominently noted on the shop drawings submitted, or otherwise brought to the attention of the Engineer.

C. Process and major equipment drive motors shall be 3 phase, squirrel-cage induction type NEMA Design B, dual voltage in all sizes and types where this rating is standard. Larger motors and special motors where dual voltage construction is not available shall be furnished in ratings consistent with the nominal system voltage. Where process drives of fractional horsepower are required, standard frame 56 units shall be supplied. Such drives requiring limited power input shall employ overload heaters undersized accordingly.

D. General purpose single phase motors, 1/3 HP and smaller, shall be 115 volt capacitor start type designed for continuous duty. Light duty motors of the domestic appliance variety will not be acceptable in this work. Bearings on frame 56 fractional horsepower motors shall be of the antifriction or sleeve type.

E. The Division furnishing motors, or equipment containing or including motors, shall be responsible for delivery, handling and setting regardless of local agreements as to actual work jurisdiction. Further, this responsibility shall include checking of lubrication, drive alignment and condition, indication of proper rotation, and any or all other matters relating to operative readiness. When all

checks are satisfactorily accomplished, the readiness of the unit for operation shall be indicated by a conspicuous and legible tag installed by the responsible individual.

F. As part of the operational test the responsible Division shall arrange for checking and recording of load current and verification of rating of overload heaters. No unattended operation of the equipment shall be permitted until completion of this procedure.

G. Motor frames shall be totally enclosed fan cooled (TEFC) unless otherwise specified.

H. All motors larger than NEMA 56 frame shall have antifriction (ball or roller) bearings, sized for a B10 life of at least 30,000 hours under normal loading conditions. Bearing shall be AFBMA standard sizes. Motors shall be equipped with end shield mounted ball bearings made to AFBMA standards and be of ample capacity for the motor rating. The bearing housing shall be large enough to hold sufficient lubricant to minimize the need for frequent relubrication, but facilities shall be provided for adding new grease and draining out old grease without major motor disassembly. The bearing housing shall have long, tight, running fits or rotating seals to protect against the entrance of foreign matter into the bearings, or leakage of grease out of the bearing cavity.

I. Balance and Vibration:

1. The vibration in any direction, as measured at the bearing housings, with the motors running at normal voltage and frequency, the shaft axis in normal position, and with one half of a standard key in the keyway shall conform with the following:

   VIBRATION LIMITS:

   Maximum Permissible Total Amplitude Peak to Peak (in.)

Frame Diameter Series	Below 1700 RPM	1700 - 3499 RPM	3500 & above RPM
180,210,220	0.002	0.0015	0.001
250,280,320	0.002	0.0015	0.001
360,400,440	0.002	0.0015	0.001

1. If balancing weights are added to the rotor, they shall be permanently secured by welding, peening, or other method approved by the Engineer.

J. Materials:

1. Stator Frames and Endshields as follows:

a. Dripproof and Standard Duty – TEFC: Stator frames and endshields, may be cast aluminum, steel, or cast iron, whichever is manufacturer's standard.
b. Severe Duty - TEFC and Explosion Proof: Frames and endshields shall be cast iron for all frame sizes. Extruded aluminum frames will be considered with prior approval.

2. Other External Parts as Follows:

a. Dripproof and Standard Duty - TEFC: Fan covers and conduit boxes may be cast iron, aluminum or steel, depending on manufacturer's standard.
b. Severe Duty - TEFC and Explosion Proof: Fan covers and conduit boxes shall be cast iron.

K. Conduit Boxes:

1. Conduit box mountings shall be arranged so conduit can be brought in from top, bottom or either side. Cast iron conduit boxes for all severe duty motors shall be tapped or threaded conduit connection. Conduit hole size shall conform to NEC Standards, depending on motor rating.

2. For motors with parallel sets of cables or other field circumstances which require it, Contractor shall provide a new terminal box which meets the size requirements of the NEC.

L. Eyebolts:

1. All motors weighing more than 50 lbs. shall be drilled and tapped for a lifting eyebolt.

M. Motor Leads:

1. Motor leads into conduit box shall have same insulation class as the winding and be equipped with a numbered brass or copper terminal staked or otherwise mechanically fastened to the lead sufficient to resist 15 lbs. pull. Leads shall be marked throughout the entire length to provide identification after terminals are taped or clipped.

N. Ventilating Fans:

1. Dripproof and TEFC: The fans forcing ventilating air through or over a motor may be steel, aluminum, or molded plastic, whichever is manufacturer's standard.

2. Severe Duty - TEFC and Explosion Proof: Ventilating fans shall be non-sparking, abrasion and chemical resistant, cast brass or polypropylene.

O. Shaft Seals:

1. All severe duty motors and TEFC motors, 254 frame and larger, shall have a rotating seal or slinger located on the shaft at the drive end endshield opening to prevent moisture or other foreign material from entering the bearing cavity.

P. Nameplates:

1. Aluminum nameplates may be used on drip-proof and standard TEFC motors. Severe duty enclosed motors shall have nameplates of stainless steel. Nameplates shall be stamped to include the following information:

a. Horsepower (not including 15% S.F.)
b. Speed
c. Time Rating
d. Frequency
e. Phases
f. Model Number
g. Rated Voltage
h. Service Factor (1.15 on all motors 1 HP and larger)
i. Full Load Amps (based on nameplate HP, not including 15% S.F.)
j. Insulation Class
k. NEMA Design
l. NEMA Code Letter
m. Maximum Ambient
n. Bearing Identification
o. Power Factor

Q. Connection Diagrams

1. The motor connection diagram shall be permanently attached to the motor either inside the conduit box or on the motor frame in a readable location from the conduit box side.

R. Locked Rotor Characteristics:

1. Unless shown otherwise, motors with a nameplate rating of 5 to 20 horsepower shall have a locked rotor characteristic not exceeding Code H. Motors with a nameplate rating of 25 through 50 horsepower shall not exceed NEMA Code G locked rotor characteristics. Motors larger than 50 horsepower shall not exceed NEMA Code F locked rotor characteristics.

S. Severe Duty:

1. Motors designated for severe duty shall have the following characteristics in addition to those designated in the specification:

a. Stainless steel nameplate.
b. Cast iron housing, bearing brackets, fan guard.
c. Cast iron conduit box.
d. Cast brass or polypropylene fan.

e. Zinc plated hardware.
f. Minimum of 2 extra epoxy varnish, or equal, dips and bakes on windings.

T. Inverter Duty (VFD Applications):

1. Motors designated for inverter duty shall meet standard NEMA MG1 Part 31 in addition to the following characteristics:

a. Specifically designed for use with a solid-state inverter variable frequency drive (VFD).
b. Minimum service factor of 1.00 when operating from a VFD.
c. 1600V insulation system designed for inverter duty, Class F temperature rise minimum.
d. Insulated or insulated/ceramic bearing on the non-drive end of the motor to complement the bearing protection (shaft grounding) ring (installed on the drive end of the motor) in eliminating circulating currents for NEMA and IEC motors 75hp and larger. Specialty, non NEMA motors, such as those used in submersible type applications, do not require the installation of the bearing protection ring on the drive end of the motor or the insulated or insulated/ceramic bearing on the non-drive end of the motor.
e. Thermal switch embedded in the motor windings to stop the VFD on motor overtemperature condition. Normally closed contacts rated 5A at 120 VAC, nominal.
f. Include appropriately sized Aegis™ SGR bearing protection ring on all NEMA and IEC motors 75 hp or larger to eliminate circulating currents that could potentially damage the motor bearings. Coat motor shaft will Aegis™ “Colloidal Silver Shaft Coating” product, Part No. CS015 prior to the installation of the bearing protection ring. Confirm and coordinate the type of protection ring mounting (conductive epoxy, standard, split ring, bolt-thru, press-fit, etc.) best suited for the shaft/motor installation being furnished.
g. Motor horsepower full load amps shall not exceed NEC table 430-250.

U. Heater:

1. Where specified in the process equipment section, motors shall contain internal heaters to operate on 120 VAC to minimize condensation inside the motors. Unless otherwise required, the nominal heater size shall be 150 VA minimum.

V. External Finish:

1. All motors shall be prime painted with corrosion resisting metal primer, and finish painted with a durable machinery gray enamel, manufacturer's standard unless otherwise specified.

2. All bolts, screws, and other external hardware shall be treated by zinc with iridite or zinc chromate for resistance to corrosion.

W. Testing:

1. Motor testing procedure shall be in accordance with the American Standard Test Code for polyphase induction motors and generators, IEEE 112A. All motors shall be given routine test to determine that they are free from electrical or mechanical defects. The routine test shall, as a minimum, conform to MG1-12.55.

X. Preparation for Shipment:

1. Before shipment, the shaft extension and any other bare exposed metal parts of each motor shall be coated with an easily removable rust preventative.

2. All motors shall be securely fastened to a hardwood skid or pallet for fork truck handling and be covered for protection against dirt and moisture during transit and for short time outdoor storage.

Y. Operating Characteristics:

1. Motors shall meet or exceed the starting locked rotor and maximum breakdown torques specified by NEMA for the NEMA design. The locked rotor starting currents shall not exceed NEMA maximum values for the specified NEMA design and rating. The current density and heating characteristics shall be such that the motors will not suffer damage if subjected to a maximum of ten (10) seconds stall at six times full load current. Except as noted, the services factor of the motor shall be in accordance with NEMA Standards. The insulation system of the motor shall be designed for 40,000 hours operation under usual service conditions as described under NEMA MG1-14.2. The motor manufacturer shall use IEEE standards to establish the suitability of the insulation system to meet these requirements.

Z. Energy Efficiency:

1. Motors of 1 horsepower and larger shall be of the premium efficient type. Energy efficient motors shall have a 1.15 service factor rating.

2. Efficiency shall be defined as the “NEMA Nominal Efficiency” at full load, as detailed in NEMA MG-1-12.58 and shall meet or exceed the values in the following tables. If a higher value is specified in the respective equipment section, then the higher value shall apply.

FULL LOAD EFFICIENCIES OF PREMIUM EFFICIENT MOTORS

OPEN MOTORS			HP	CLOSED MOTORS		
1200 RPM	1800 RPM	3600 RPM		1200 RPM	1800 RPM	3600 RPM
82.5	85.5	77.0	1.0	82.5	85.5	77.0
86.5	86.5	84.0	1.5	87.5	86.5	84.0
87.5	86.5	85.5	2.0	88.5	86.5	85.5
88.5	89.5	85.5	3.0	89.5	89.5	86.5
89.5	89.5	86.5	5.0	89.5	89.5	88.5
90.2	91.0	88.5	7.5	91.0	91.7	89.5
91.7	91.7	89.5	10.0	91.0	91.7	90.2
91.7	93.0	90.2	15.0	91.7	92.4	91.0
92.4	93.0	91.0	20.0	91.7	93.0	91.0
93.0	93.6	91.7	25.0	93.0	93.6	91.7
93.6	94.1	91.7	30.0	93.0	93.6	91.7
94.1	94.1	92.4	40.0	94.1	94.1	92.4
94.1	94.5	93.0	50.0	94.1	94.5	93.0
94.5	95.0	93.6	60.0	94.5	95.0	93.6
94.5	95.0	93.6	75.0	94.5	95.4	93.6
95.0	95.4	93.6	100.0	95.0	95.4	94.1
95.0	95.4	94.1	125.0	95.0	95.4	95.0
95.4	95.4	94.1	150.0	95.8	95.8	95.0
95.4	95.8	95.0	200.0	95.8	96.2	95.4
95.4	95.8	95.0	250.0	95.8	96.2	95.8
95.4	95.8	95.4	300.0	95.8	96.2	95.8
95.4	95.8	95.4	350.0	95.8	96.2	95.8
95.8	95.8	95.8	400.0	95.8	96.2	95.8
96.2	96.2	95.8	450.0	95.8	96.2	95.8
96.2	96.2	95.8	500.0	95.8	96.2	95.8

2.02 HAZARDOUS AREA CLASSIFICATION REQUIREMENTS

A. The requirements stated in this section are to be in addition to those described above for areas noted in hazardous area classifications on engineer's drawings.

B. Motors Installed within Class 1 Division 2 Group D environment(s):

1. Motors that are of the non-arcing squirrel-cage induction or totally enclosed submersible type shall have permanent marking on motor nameplate indicating equipment is suitable for use in a Class 1 Division 2 Group D environment or indication of maximum operating temperature of exposed surfaces do not exceed 80 percent of the autoignition temperature of the gas or vapor present in the installed environment.

2. Motors with potentially arcing components shall be rated for Class 1 Division 1 Group D.

3. Motors requiring space heaters installed within windings for condensation prevention shall be rated for Class 1 Division 2 Group D environment or have a visible label indicating the operating temperature of heater does not exceed 80 percent of ignition temperature of gasses present in the installed environment.

PART 3 EXECUTION

3.01 INSTALLATION

A. All wire terminations within the motor termination j-box for 480V class motors and below shall be performed by means of utilizing insulated connector blocks in lieu of wire nuts or split bolt connectors and mastic tape. The insulated connector blocks shall be manufactured by Polaris, Ilsco, or equal.

3.02 START UP

A. Check lubrication, drive alignment and condition, indication of proper rotation, and other matters relating to operative readiness. When all checks are satisfactorily accomplished, the readiness of the unit for operation shall be indicated by a conspicuous and legible tag.

B. Arrange for checking and recording of load current and verification of rating of overload heaters. No unattended operation of equipment shall be permitted until completion of this procedure.

END OF SECTION 26 05 10

SECTION 26 05 19
POWER AND INSTRUMENTATION CABLE - LESS THAN 600V

PART 1 GENERAL

1.01 SUMMARY

A. Conductors for the circuiting, control, and power distribution.

1.02 REFERENCE STANDARDS:

A. UL 486A-486B - Wire connectors

B. NEMA WC 70

C. NEMA WC30-1976

D. NFPA 70 - National Electrical Code

E. NFPA 79 - Electrical Standard for Industrial Machinery

1.03 DELIVERY, STORAGE, AND HANDLING:

A. Deliver conductors to project on standard coils or reels and suitably protected from weather and damage during storage and handling.

PART 2 PRODUCTS

2.01 CONDUCTORS

A. Type P1 - 600V Rated General Purpose Single Conductor Cable

1. Construction:

a. No. 14 AWG and larger: Stranded Copper, (THHN/THWN-2). Solid Copper is acceptable for lighting and branch circuits.
b. Conductors shall contain factory color coded insulation in standard colors to match the voltage level used.
c. Sequential footage markers shall be factory installed on the insulation jacket.
d. Provide Cable Tray (CT) rated cable where installed in cable tray.
e. Aluminum conductors are not permitted.

2. Feeder Conductors:

a. 98 percent conductivity copper, 600-volt insulation.

3. Branch Circuit Conductors:

a. 98 percent conductivity copper, 600-volt insulation.
b. Conductors smaller than No. 14 AWG are not permitted except in control panel.

4. Project Use Areas:

a. General use indoor building circuiting.

5. Manufacturer:

a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

B. Type P2 - 600V Rated Special Purpose Single Conductor Cable

1. Construction:

a. XHHW-2 insulation which is moisture, heat, and flame-retardant cross-linked polyethylene covered with an overall flame retardant, moisture and sunlight resistant PVC jacket.
b. Stranded Copper
c. Conductors shall contain factory color coded insulation in standard colors to match the voltage level used.
d. Sequential footage markers shall be factory installed on the insulation jacket.
e. Provide Cable Tray (CT) rated cable if installed in cable tray.
f. Aluminum conductors are not permitted.

2. Project Use Areas:

a. 600V and less service entrance conductors and feeders routed underground from the exterior to the interior.

3. Manufacturer:

a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

C. Type P4 - Multiconductor Shielded VFD Cable

1. Sizes #16 AWG through #2 AWG

a. Construction:
1) Three stranded, Class D, tin plated copper conductors with XLPE (crosslinked polyethylene) insulation.
2) Overall shield + 85% TC braid plus full-size TC drain wire.
3) Black sunlight-and oil-resistant PVC jacket.
4) One full-sized insulated ground conductor.
5) Cable construction for direct-buried applications shall include interlocked, corrugated aluminum armor protection.

b. Ratings/Listings:
1) 1000V UL Flexible Motor Supply
2) 600V UL 1277 Type TC-ER per the NEC.
3) 1000V UL 2277 Type WTTC
4) IEEE 1202/383
5) UL Direct Burial
6) 90 deg C Wet/Dry

7) UL 1685 Vertical Tray Flame Test
8) CE approved

2. Sizes #1 AWG through #4/0 AWG

a. Construction:
1) Three stranded, Class D, tin plated copper conductors with XLPE (crosslinked polyethylene) insulation.
2) Two spiral copper tape shields with 100% coverage.
3) Black sunlight-and oil-resistant PVC jacket.
4) Three symmetrical bare copper grounds.
5) Cable construction for direct buried applications shall include interlocked, corrugated aluminum armor protection.

b. Ratings/Listings:
1) 1000V UL Flexible Motor Supply
2) 600V UL 1277 Type TC-ER per the NEC.
3) 1000V UL 2277 Type WTTC
4) IEEE 1202/383
5) UL Direct Burial
6) 90 deg C Wet/Dry
7) UL 1685 Vertical Tray Flame Test
8) CE approved

3. Project Use Areas:

a. Motor branch circuit conductors for all VFD driven motors from the VFD to the motor.
b. Cables which pass through Hazardous Areas shall be rated for the environment and installed to meet all Article 500 NEC requirements.

4. Manufacturer:

a. Belden Series 29500
b. Service Wire Co. Equal
c. Okonite Co. Equal
d. Southwire Equal
e. Alpha Wire Equal

D. Type C1 - Multiconductor Control Cable

1. Construction

a. Conductor quantity and size as shown on the Drawings
b. Insulation: High dielectric strength, heat and moisture-resistant, colored PVC rated for continuous 90 deg C dry or wet to meet UL-83 requirements for Type THHN or THWN-2 wire.
c. Conductor group bound with spiral wrap of barrier tape
d. Color Code: In accordance with ICEA, Method 1, with printed number.
e. Overall Jacket: A flame-retardant sunlight-resistant black PVC jacket.

2. Ratings/Listings

a. UL 1581 listed as Type THHN/THWN rated VW-1
b. UL 83
c. Passes the ICEA T-29-520 210,000 Btu per hour Flame Test.
d. Shall be suitable to be installed in Cable Tray and be Exposed Run Rated (TC-ER)

3. Project Use Areas:

a. Use cable for all control circuiting requiring numerous conductors from a control panel to a field instrument or similar application.
b. Cables which pass through Hazardous Areas shall be rated for the environment and installed to meet all Article 500 NEC requirements.

4. Manufacturer:

a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

E. Type S1 - Signal Cable - Single Pair - Shielded/Twisted

1. Construction

a. Type CMP Single pair, twisted, 100% shield coverage, Class B, 16 AWG, stranded (19 x 29) tinned copper conductors (7 strand minimum).
b. 600V minimum insulation rating
c. 15 mil (nominal), 90 deg C PVC primary insulation with a flame retardant, low smoke PVC, plenum rated.
d. Conductors shall be shielded with a 0.35 x 5 mil (min.), 100% coverage, aluminum or copper mylar tape shield, with an 18-gauge strand copper drain wire.

2. Ratings/Listings:

a. Flame Resistance: Comply with UL 1685 & NFPA 262
b. UL Temperature Rating: 75 deg C Dry, 90 deg C wet
c. ICEA S-73-532, S-61-402

3. Project Use Areas:

a. Use cable for control circuiting requiring one shielded twisted pair from a control panel to a field instrument or similar application.

4. Manufacturer:

a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

F. Type D1 - Multimode Fiber Optic Cable

1. Cable to be built to OM3 standards.

2. Fiber optic cable shall be of the loose tube, multimode type with the following minimum requirements:

    a. All dielectric design with PVC jacket suitable for installing in outdoor duct and is also rated for indoor use, thereby eliminating the service entrance splicing to in-building cable. Multimode fibers shall have a 50-micron core, 125-micron cladding, and 250-micron buffer. Multi-tube design with fiber quantity per cable as indicated on the engineers drawings. Color-coded fibers and color-coded tubes. Fillers shall be provided in place of tubes, depending on fiber count, for round overall cable.
    b. Maximum optical attenuation of fibers shall not exceed the following values:
        1) Wavelength Attenuation(dB/km)
            (a) 3.0 @ 850nm
            (b) 1.5 @ 1,300nm
    c. Binder layer with strength member and black medium density of high-density polyethylene outer jacket with rip cord.
    d. Operating temperature range of -40 degrees C to 70 degrees C.
    e. Suitable for continuous submerged application and compatible with fiber optic communications modules used on project and with “LC” type connectors as required.
    f. Termination type to connectors shall be Fusion. Mechanical is not allowed.
    g. Manufactured in lengths so no splices are required.
3. Project Use Areas:

    a. Network circuiting as defined on the cable and conduit schedules
4. Manufacturer:

    a. Belden
    b. OCC
    c. Approved Equal

G. Type D3 - Cat 6 Shielded Ethernet Cable

1. EIA/TIA Category 6, 4-pair, 23 AWG, and a 600V rating

2. FEP Teflon plenum rated premise wiring cable where required.

3. Characteristics:

    a. Industrial grade PO insulation
    b. Minimum of 100% overall foil shielding coverage
    c. PVC inner and out jackets
    d. Outdoor rated
4. Category 6 cables shall be terminated in eight-conductor TIA-568-B CAT6, RJ-45 compliant snagless modular connectors.

5. Note: Category 6 Cable shall be used for process control related purposes including connections to VFDs, starters, other MCC mounted components, connections to control panels, and the like shall utilize this cable type

6. The cable jacket and RJ45 terminator color shall be:

    a. SCADA Network: Black
    b. Admin Network: Black

7. Project Use Areas:

    a. Network circuiting as defined on the cable and conduit schedule

8. Manufacturer:

    a. Belden 7953A

H. Type D4 - Cat 6 Ethernet Cable

1. EIA/TIA Category 6, 4-pair, 23 AWG, and the voltage rating is application dependent

2. FEP Teflon plenum rated premise wiring cable where required.

3. Category 6 cables shall be terminated in eight-conductor TIA-568-B CAT6, RJ-45 compliant snagless modular connectors.

4. The cable jacket and RJ45 terminator color shall be:

    a. SCADA Network: Black
    b. Admin Network: Black

5. Project Use Areas:

    a. Network circuiting as defined on the cable and conduit schedule

6. Manufacturer:

    a. Belden
    b. Mohawk/CDT

2.02 CORD CONNECTOR GRIPS

A. Manufacturer: Killark “Z” series.

B. Type: Aluminum cord connector, stainless steel mesh grips, straight or 90° as required in eliminating sharp cable bending radii.

C. Use: To support cables/cords from the enclosure at their point of use and/or wherever cables/cords enter or leave the bottom of conduit risers (above grade). Required for cord connections to motors or enclosures.

2.03 BOLTED, PRESSURE TYPE CONNECTORS

A. Manufacturer: Burndy.

B. Use: Connecting conductors to busbars, suitable for copper and aluminum conductors.

C. Size: As required for conductor.

2.04 SOLDERLESS CONNECTORS

A. Manufacturer: 3M "Scotchlok".

B. Type: Twist-on, spring tension.

C. Use: With copper conductors only.

PART 3 EXECUTION

3.01 INSTALLATION

A. Conductors shall be installed within conduit or approved raceway unless noted otherwise.

B. Draw conductors into conduit only after conduit system is complete. Install in a manner so as not to injure insulation.

C. Use stranded, copper conductors only. Solid conductors are not acceptable.

D. Make splices on branch circuit conductors with solderless stapleless, mechanical wire connectors.

E. Tighten bolted, pressure type connectors to manufacturer's recommendations.

F. No. 10 AWG and smaller shall be stranded copper for motor and control circuits. Branch circuits for lighting and convenience outlets shall be solid copper.

G. Branch circuit homeruns greater than 50 feet shall be #10 minimum.

H. Make splices and terminations in control panel by using bolted, pressure type connections. Install according to manufacturer's recommendations.

I. Provide strain relief cord connectors and stainless-steel mesh on cords entering motor termination boxes, junction boxes or conduits.

J. Use factory color coded conductors with separate color for each phase and neutral conductor by integral pigmentation for conductor sizes.

K. Use following codes:

CONDUCTOR SYSTEM VOLTAGE-120/208, THREE PHASE

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-120/240, THREE PHASE

Phase A	Black
Phase B	Orange
Phase C	Blue
Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-120/240, SINGLE PHASE

Phase A	Black
Phase B	Red
Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-277/480, THREE PHASE

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	Gray
Equipment Ground	Green

L. Lace or clip groups of feeder conductors in control panels, pull boxes, and wireways.

M. Use wiring pulling lubricant for pulling No. 4 AWG and larger wire.

N. Splice only in accessible junction or outlet boxes.

O. <u>VFD Output Circuit Requirements:</u>

1. VFD output circuits shall be installed via one of the following methods at the Contractor's option:

    a. Building wire in dedicated rigid steel conduit.
        1) Type P1 cable is not acceptable
        2) Must be one of the following types:
            (a) RHH
            (b) RHW
            (c) RHW-2
            (d) XHH
            (e) XHHW
            (f) XHHW-2
            (g) Other approved types according to NFPA 79 and other applicable standards

    b. Type P4 Specialty shielded VFD cable in Sch.80 PVC conduit below grade, and rigid metal/aluminum conduit above grade as defined on the Electrical Drawings.

2. The ground conductor(s) from the VFD output shall be bonded to the motor frame or motor/equipment ground lug.

3. Each VFD output circuit shall be installed in its own dedicated conduit. No sharing of circuitry with VFD output power conductors in a common conduit or raceway system is allowed.

4. VFD output circuitry shall be installed to minimize their proximity to other power, signal and control circuits. A minimum separation of 6 inches is suggested between exposed VFD output circuits and other circuits in junction boxes, panels, MCCs, etc. Long parallel runs (10 feet or longer) of VFD output conductors with other circuits are not suggested or allowed. Maximum separation (more than 6") and maximum shielding (via metal conduit or shielded output cable) methods of installation shall be utilized wherever possible. Extra costs for installation revisions due to the inadequacy of the installed VFD output circuit separation and shielding will not be considered. It is the Contractor's responsibility to provide a complete and fully functioning VFD system with no output circuit interference, noise, crosstalk, etc.

3.02 CABLE TESTING

A. Type D1 and D2 Cable - Fiber Optic Cable Splicing and Testing

1. Single mode and multimode fiber strands shall be tested end to end for bidirectional attenuation in compliance with EIA/TIA-526-14 or OFSTP 14, Method B, according to the manufacturer's instructions for the test set being utilized. Provide test equipment, labor and materials for testing project fibers. Submit cable test records for each fiber, identifying:

   a. Date and time of test.
   b. Name of test technician and company.
   c. Name of test witnesses.
   d. Location of test.
   e. Location of fiber ends.
   f. Recorded test results:
      1) Fiber distance (measured using test instrumentation).
      2) Loss (attenuation) in dB at 850nm, 1300nm wavelengths for multimode and 1310nm and 1550nm for singlemode.
      3) Reflection in dB at 850nm, 1300nm wavelengths.
   g. Submit photographs and screen traces where applicable.

2. Tests shall ensure that the measured link loss for each strand does not exceed the "worst case" allowable loss defined as the sum of the connector loss and the optical loss.

   a. After termination, each fiber shall be tested with an ODTR for length, transmission anomalies and end-to-end attenuation.

b. After termination and bulkhead mounting, each terminated fiber shall be tested for end-to-end loss with a power meter/light source.

3. Maximum optical attenuation of fibers shall not exceed the following values:

Fiber Type	Wavelength (nm)	Attenuation (dB/km)
Multimode (50/125 micron)	850	3.0
Multimode (50/125 micron)	1300	0.9
Singlemode (8.3/125 micron)	1310	0.35 (outside plant)
Singlemode (8.3/125 micron)	1310	1.0 (inside plant)
Singlemode (8.3/125 micron)	1550	0.2 (outside plant)
Singlemode (8.3/125 micron)	1550	1.0 (inside plant)

4. Type ‘LC’ connectors shall meet or exceed at 1300nm wavelength:

   a. Loss - less than 0.20dB
   b. Reflection - less than -25dB

5. Splices (if required) shall be made using a precision fusion splicer resulting in splice performance that meets or exceeds:

   a. Loss - less than 0.03dB
   b. Reflection - less than -60dB

6. Fibers having test results that do not meet the requirements shall be retested and/or replaced with new fiber. Fiber shall be retested until the fiber meets requirements. Minimum requirements shall be determined by adding total allowable losses and reflectance's for the number of splices (if any) and 'LC' connectors in each run.

B. Type D4 Cable - LAN Category 6 Cable Testing

1. Perform end to end tests of each data cable installed as follows:

   a. Pair/conductor for proper pinouts and continuity.
   b. Ground fault.
   c. Proper termination, shorts and crossed pairs.
   d. Channel attenuation per ANSI/TIA/EIA-568-A-5 and TSB-95.
   e. Channel bidirectional worst case near end cross talk (NEXT) at frequencies up to 100 MHZ, per the standards listed in Item 4.
   f. Measured and documented effective cable run length for each circuit.
   g. Submit record of test results to Owner and Engineer.

END OF SECTION 26 05 19

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Grounding system for electrical equipment and for each antenna mast. Provide quipotential ground loop around perimeter of building(s) and bond to main service equipment. Provide ground bars and ground test wells at locations indicated on the Drawings.

1.02 DESCRIPTION OF SYSTEM

A. Bond electrical equipment, control panels, panelboards, etc. to the metallic conduit system through conduit connectors or bonding jumpers, as required, to provide effective electrical continuity.

1.03 QUALITY ASSURANCE

A. NFPA 70, Article 250 National Electrical Code (NEC).

1.04 SUBMITTALS

A. Submit shop drawings in accordance with Specification Section 01 33 00 - Submittal Procedures.

PART 2 PRODUCTS

2.01 GROUNDING CONDUCTORS

A. Copper, with green identification as specified in Section 26 05 19 - Power and Instrumentation Cable - Less Than 600V.

2.02 GROUND FITTINGS AND LUGS (EXPOSED)

A. Manufacturer: Burndy Company.

2.03 GROUND LUG

A. Located in electrical equipment.

PART 3 EXECUTION

3.01 POWER SYSTEM GROUNDING

A. Distribution System

1. Install grounding bars and grounding studs at locations indicated within the facility, distribution centers, pull boxes and panelboards. Bond metallic conduit systems and metallic piping with metallic clamps and bonding conductor for ground continuity.

B. Provide a properly sized copper grounding conductor in branch circuit and feeder conduits. Size the conductor according to Table 250-122 of the National Electric Code. Connect the grounding connector to grounding points (grounding bars, ground studs, etc.) in electrical enclosures, electrical equipment, junction boxes, and outlet boxes.

C. Ground and bond in accordance with National Electric Code, Article 250.

END OF SECTION 26 05 26

SECTION 26 05 34
CONDUIT

PART 1 GENERAL

1.01 SUMMARY

A. Conduit system for conductors. Low voltage control conductors and fiber optic cabling shall be installed within conduit.

1.02 REFERENCE STANDARDS

A. UL 6 - Rigid metal conduit.

B. UL 360 - Liquid-tight flexible steel conduit.

C. UL 651 - Rigid non-metallic conduit.

D. UL 1203 - Explosion-Proof Electrical Equipment for use in Hazardous Locations

E. UL 1684 - Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

F. UL 2515 - Above Ground Thermosetting Resin Conduit (RTRC) and fittings.

G. UL 2420 - Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

H. NEMA Standard Publication TC-2 - Rigid PVC for underground installations.

I. NEMA Standard Publication RN 1-2005 – PVC coated rigid steel conduit.

1.03 DELIVERY, STORAGE AND HANDLING

A. Store in a dry area, protected from the weather.

1.04 SUBMITTALS

A. Submit product data and shop drawings in accordance with Specification Section 01 33 00 - Submittal Procedures.

PART 2 PRODUCTS

2.01 RIGID METAL CONDUIT (ALUMINUM)

A. Manufacturer: Equal to the Wheatland Steel Company

B. Type: 6063 aluminum alloy, T-1 temper, marine grade.

C. Manufactured in accordance with ANSI C80.5, UL 6A.

2.02 PVC COATED RIGID CONDUIT

A. Manufacturer: Plasti-Bond.

B. Type:

1. PVC externally coated, galvanized steel.

C. The PVC coated galvanized rigid conduit shall be ETL-verified to the Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure for 200 hours. The PVC coated galvanized rigid conduit shall bear the ETL-verified PVC-001 label to signify compliance to the adhesion performance standard.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturer: Equal to Alflex

B. Type: Steel

C. Weatherproof covering

2.04 NON-METALLIC CONDUIT - PVC (HEAVY WALL)

A. Manufacturer: Carlon.

B. Type: Schedule 80 polyvinyl chloride, except where Schedule 40 is specifically called for.

2.05 EXPANSION FITTINGS

A. Manufacturer: OZ Electrical Manufacturing Company.

B. Material type shall match conduit.

2.06 HANGERS AND SUPPORTS

A. Manufacturer: B-Line Products.

2.07 CONDUIT SEALS

A. Manufacturer: Appleton.

B. Provide listed seal offs throughout Class I, Division 1, Group D or Class I, Division 2, Group D areas per NEC Articles 500 and 501.

C. Seals shall be field marked when poured.

2.08 NON-METALLIC EXPANSION FITTINGS

A. Manufacturer: Carlon.

B. Type: Suitable for use with nonmetallic conduit.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Size conduits as shown on the Drawings or as required by National Electrical Code (whichever is larger) for number and size of conductors installed. Minimum trade size is 3/4-inch; other sizes as required by NEC based on quantity of conductors.

B. Contractor shall not exceed 270 degrees of bend in any single conduit run without an additional pull point.

C. Raceways shall have an equipment ground conductor installed. The raceway shall not be utilized as an EGC.

D. Support conduits from structural system, independent of ductwork, ceiling system supports and main runners. Do not support conduit from conduit. Tie wires to hang or strap conduits are not permitted.

E. Cut conduit joints square and ream smooth. Make bends with a bender or utilize standard conduit elbows.

F. For buildings where walls are concrete or concrete blocks, Contractor shall core drill walls or coordinate reinforced, boxed out areas as required to install conduit in a neat and workmanlike manner. Contractor shall patch wall penetrations and prepare the surface for final paint.

G. Contractor shall provide sleeves or reinforced concrete boxed out openings through footings for underground conduits.

H. Securely fasten conduit and raceways with malleable iron clamps (hot dipped galvanized, with clamp backs), or galvanized unistrut and hangers with suitable fastenings for indoor dry applications. Utilize stainless steel unistrut and clamps for exterior applications, indoor damp/corrosive areas, and areas as noted on the Drawings. The intent is to keep an air gap between conduit and finished wall surfaces to reduce the potential of moisture induced corrosion. Anchors shall be lead, expansion type with stainless steel hardware. Route conduits parallel to and at right angles to building lines. Conduits mounted directly in contact with wall surface are not acceptable.

I. Route conduit continuous from outlet to outlet, outlet to cabinets, outlet to pull or junction boxes. Secure conduit to boxes with locknuts and bushings in such a manner that each system is electrically continuous throughout.

J. Surface mount conduit in areas, unless noted otherwise. Conduits and outlet boxes on the building exterior shall be flush mounted where possible. If not, install conduits within the building and then penetrate the wall directly into the back of light/outlet/etc. Intent is to eliminate/minimize the usage of surface mounted conduit on the exterior face of the building.

K. Cap ends of conduit to prevent entrance of foreign materials during construction.

L. Locate conduits poured in concrete entirely in the middle 1/3 of the concrete member.

M. Provide a 4-inch-high watertight barrier for conduits that pass vertically through a floor with a metal sleeve or concrete curb.

N. Provide “link seal” around conduits penetrating exterior walls/foundations and wet wells. Nuts on the link seal shall remain accessible from inside the building once

link seal is installed. Non shrinking grout is acceptable for penetrations above finished grade.

O. Below grade non-metallic conduit shall be transitioned to PVC Coated Rigid Steel before exposing above grade. Transition shall be made via below grade transition couplings to PVC Coated Rigid Steel elbows/sweeps.

P. Provide watertight installation where conduits pass through roof, wall, or waterproofing membranes.

Q. Conduit systems shall be installed completely before conductors are pulled in.

R. Repair damage to insulation or interior vapor barrier where conduit enters air plenums.

S. Fill conduits which can admit air to or release air from air plenums through the connecting conduit system with sealing compound.

T. Provide firestopping around conduits penetrating fire rated walls.

3.02 RIGID METAL CONDUIT (ALUMINUM)

A. Rigid aluminum conduit is required for all exposed conduits and shall not come in contact with soil or concrete wall surfaces.

B. Install on fiberglass strut stand offs such that it doesn't come in contact with concrete. When passing through a slab, ensure conduit is properly wrapped per conduit supplier recommendations.

C. Fittings type to be threaded. Use threaded hubs (equal to Myers hub) where rigid conduit is connected to a thread less box or enclosure for indoor and outdoor applications. Lock nut with O-Ring is not an acceptable alternative. fittings that come in contact with stainless steel shall be galvanized steel per NEC 344.14.

3.03 PVC EXTERNALLY COATED RIGID CONDUIT

A. Clamping, cutting, threading, bending, and assembly instructions listed in the manufacturer’s installation guide shall be followed.

3.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Use rain tight flexible metal conduit with rain tight fittings for final connections to motors (non-hazardous areas), and field instrumentation (non-hazardous areas) that do not come with factory installed cords. Minimum trade size is 1/2-inch.

B. LFMC with seal-off may be used in Class 1 Division 2 & Class 2 occupancies where permitted per NEC 501.10 (B)(2) & 502.10 (A) (2). Flexible metal conduit used in Class I, Division 1 occupancies require explosion proof listing (metal braided) with listed fittings for final connections to motors (hazardous areas), and fixed control devices (hazardous areas). Minimum trade size is 3/4-inch.

C. Length shall be limited to trade size: 3/4" or less = 36"; 1" or larger = 48". Minimum 12". Use permitted only to avoid transmission of vibration or noise and where flexibility to entry is required. All other uses shall be approved by the Engineer.

D. Engineer reserves the right to request re-work of all flexible metal conduit exceeding lengths exceeding specified or installed where not permitted as noted above.

E. Flexible Metal Conduit shall not be used to transition through walls under any circumstance.

3.05 NON-METALLIC CONDUIT - PVC (HEAVY WALL)

A. Use rigid non-metallic, Schedule 80 PVC conduit for direct burial and exposed wet, caustic, or corrosive installations unless specifically noted otherwise on Drawings.

B. Cut conduit square with round edges removed from ends to protect the wires from abrasion. Make connections by solvent welding. Install fittings in accordance with the manufacturer's recommended procedures. Elbows 2” and larger shall be rigid metal conduit. Provide expansion joints where there are long runs of conduit and/or a wide temperature differential exists. Use PVC coated RMC sweeps when penetrating through concrete floors.

C. Provide grounding conductor in control circuits, branch circuits, and feeder conduits.

D. Typical applications include underground and in chemical or caustic areas.

3.06 CAST IN PLACE CONDUIT INSTALLATION REQUIREMENTS

A. Conduits installed under the concrete floor within the extents of the building footprint are not acceptable.

B. Structures with deep basements and foundation systems consisting of piles/screwed piers with grade beams and void forms shall have no conduits under the concrete floor.

C. Where conduits transition from below the concrete floor to above, vertically oriented couplings installed below slab shall be with threaded PVC coated rigid type. Other conduit types shall have no vertical couplings and be seamless and continuous from horizontal coupling to above concrete floor.

1. Do not route conduits through wet wells, clearwells, underground tanks, etc. unless required to feed equipment located within the same. Use PVC coated RMC sweeps whenever penetrating concrete floors or through below grade footings, etc. Schedule 80 PVC or RTRC type conduits shall be used under or cast into concrete floor slabs.

D. Schedule 40 PVC or Schedule 80 PVC conduit shall be used in concrete encased ductbanks.

E. Signal Circuits and Control Circuits shall always be installed in rigid conduit, unless specifically noted otherwise on the Drawings.

F. Signal Circuits and Control Circuits shall be installed in PVC conduit and utilize shielded VFD cable and shielded signal cable, respectively.

G. Contractor shall submit a cast-in-place conduit routing plan showing conduit routes, sizes and quantity to Structural Engineer prior to any cast-in-place installation taking place.

3.07 CONDUIT TYPES PERMITTED BY APPLICATION

A. Ensure all conduits and installations comply with the NEC, are certified and listed for their intended use, and are suitable for the environmental and operational demands of the application. Depending on the specific application, additional precautions may be required, such as applying corrosion-resistant coatings, special paint, or protective coverings to ensure durability and compliance in wet or corrosive environments. For installations in hazardous locations, the conduit shall also meet the specific requirements for classified areas, including explosion-proof ratings.

1. General interior areas: RMC (Aluminum)

2. Outdoor/Wet Environment: RMC (Aluminum) and PVC Coated Steel

3. Caustic/Corrosive Environment: PVC (Sch. 80)

4. Buried in Earth: PVC (Sch. 80)

5. C1D1 areas: PVC Coated Steel

6. C1D2 areas: PVC Coated Steel

END OF SECTION 26 05 34

SECTION 26 05 37
BOXES

PART 1 GENERAL

1.01 SUMMARY

A. All outlet boxes, junction boxes and pull boxes.

1.02 SUBMITTALS

A. Submit shop drawings and product data in accordance with Specification Section 01 33 00 - Submittal Procedures.

1.03 DELIVERY, STORAGE AND HANDLING:

A. Store materials in a dry area, protected from the weather.

PART 2 PRODUCTS

2.01 PULL BOXES

A. Manufacturer: Hoffman.

B. Type: Metal construction, conforming to National Electrical Code, with screw on or hinged cover.

C. NEMA 12, 4, 4X, or 7.

D. Overlapping covers with flush head cover retaining screws, prime coated for flush mounted pull boxes.

2.02 SURFACE MOUNTED OUTLETS

A. Manufacturer:

1. Crouse Hinds.

2. Appleton.

B. Type: FS or FD Condulet Cast Device Boxes (# gangs as required).

C. Matching iron alloy (Feraloy) covers as required for device(s) used.

D. Outlets, boxes, and fittings in Class I, Division 1, Group D, or Class I, Division 2, Group D areas shall be listed for use in those respective areas.

PART 3 EXECUTION

3.01 INSTALLATION

A. Avoid potential obstructions within dedicated equipment spaces and work clearances as defined in the NEC.

B. Clean interior of boxes to remove dirt, debris, and other foreign materials.

C. Do not use sectional or handy boxes.

D. Protect outlet boxes from entrance of foreign materials, including paint.

E. Surface mount all interior outlet boxes.

F. Provide seal offs per NEC Articles 500, and 501 as required.

G. Install outlets at the heights and approximate designated positions as shown on the Drawings unless specifically noted otherwise.

H. Locate outlets to clear piping, access hatches, and other obstructions.

I. Install switch outlets on latch side of door except where type of construction dictates otherwise.

J. Mounting heights indicated on Drawings are to center line of outlet unless indicated otherwise.

K. Pull boxes and junction boxes are not indicated on Drawings except for special requirements. Install pull boxes or junction boxes as required to facilitate pulling wire. Size pull boxes and junction boxes as required by the National Electrical Code.

L. Mount receptacles in the equipment rooms and in other unfinished areas at 48 inches unless noted otherwise. Match mounting heights of similar existing devices in the immediate area if present.

M. Conduits entering pull boxes shall have the conduit ID as shown on the cable and conduit schedule clearly labeled on the inside of the pull box using permanent marker.

N. Provide ventilated skirt under junction boxes where indicated.

END OF SECTION 26 05 37

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Identification of panelboards, disconnects, transformers, relays, contactors, system control panels, separately mounted control stations, pilot lights, control switches, and wires and terminations.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code (NEC).

B. OSHA.

PART 2 PRODUCTS

2.01 INSTRUCTION SIGNS

A. Plastic sandwich-type acrylic based construction of contrasting colors - Rowmark. Engraving through the top layer exposes inner layer.

B. Color: Black with white letters.

C. Letters: 1/8-inch height, standard block type.

D. Punched or drilled for mechanical fasteners. Fasteners shall be self-tapping stainless-steel screws with nuts and flat lock washers.

2.02 EQUIPMENT IDENTIFICATION LABELS

A. Adhered, engraved, laminated acrylic or melamine label.

B. Color: Black with white letters.

C. Letters: 3/8-inch minimum height, standard block type.

D. Punched or drilled for mechanical fasteners. Fasteners shall be self-tapping stainless-steel screws with nuts and flat lock washers.

2.03 WIRE MARKERS

A. Wires requiring circuit indication shall be permanently fastened type written. Handwritten labels are not permitted.

B. Wire markers shall be Shrink Tube or Self Laminating type.

C. Shrink Tubing type wire markers:

1. Shrink tube type markers shall be type written with circuit indication.

2. 3:1 heat-shrinking type

3. Resistant to chemicals, grease, oil and cleaning agents.

4. Material shall be Polyolefin with smudge-proof finish.

5. Material shall be cold resistant and flame-retardant

6. Temperature range: -67 to 275 degrees Fahrenheit.

7. Manufacturer: Brady.

D. Self-laminating type wire markers:

1. Self-laminating type markers shall be type written with circuit indication

2. Vinyl label with acrylic adhesive

3. Label shall have overlaminate included sized appropriately to wrap cable one and a half times or completely cover printed area, whichever is greater.

4. Label shall be rated for indoor and outdoor use.

5. Temperature range: -94 to 140 degrees Fahrenheit.

6. Material shall be flame-retardant.

7. Resistant to chemicals, humidity, oil, water and weather.

8. Manufacturer: Brady.

2.04 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and OSHA 29 CFR 1910.145.

B. Self-adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated. Weather resistant, non-fading, metal backed or baked enamel signs shall be used for outdoor installations.

2.05 POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES

A. Self-adhered label, installed on the front cover, door, or other access to equipment and devices unless otherwise indicated. Weather resistant, non-fading, metal backed or baked enamel signs to be used for outdoor installations.

B. Self-adhesive labels shall be manufactured by Brady.

C. Apply to panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Clean surface before installation of self-adhered labels.

B. Identify with black acrylic based placard with white engraved letters mounted with drive pins.

3.02 DISCONNECTS AND STARTER ENCLOSURES

A. Use the following for identifying disconnects or starter enclosures per NEC 110.22 (A).

1. EXAMPLE: Raw Wastewater Pump #1

480 volt, 3 phase, 300 H.P.

Fed from: DP-X, Pole Position XX

3.03 SWITCHBOARDS, MCC & PANELBOARD LABELING

A. Label per NEC Article 408.4 (A) & (B) and with the following information: Panel name, voltage, phase and amperage/type of main.

1. EXAMPLE:

Panel L: Fed From: DP-X

120/208 volt

Three phase

225 amp Main Circuit Breaker

B. Provide each panelboard with a neatly typed directory, with clear plastic cover, of circuits describing loads served.

C. Markings shall be plainly visible, fit over the insulation of the conductor and begin 1/8” from where the insulation begins.

D. Wire markers shall be placed on both ends of wires prior to termination.

E. Wiring shall be checked for circuit completeness to verify correct circuiting, identification and labeling at the terminals. Terminal markings and wire markings shall match record schematics.

F. Hand lettering of identification not permitted. Completely remove temporary labels used during construction and repaint surfaces if required.

3.04 POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES

A. Provide a mechanically fastened power source label at equipment and devices with the following information:

1. EXAMPLE: LPA-11 or LPA-13,15 or DPA-1,3,5.

B. Equipment and devices such as panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment shall include an adhesive backed label that indicates the power source.

3.05 CONDUIT AND CIRCUIT LABELING AT POINT OF ENTRY TO LARGE ENCLOSURES

A. Use a black permanent marker and hand label conduits and circuits at the point of entry to large enclosures (control panels, pullboxes, junction boxes, motor control centers, etc.) with the conduit/circuit number from the cable and conduit schedule.

B. Labeling shall be on the interior of the enclosure or on the floor near each conduit/circuit, or on the conduit. Conduits/circuits that enter enclosures shall be labeled.

C. Labeling with a permanent marker shall be in addition to circuit tags installed around the cables themselves.

3.06 GROUNDED (NEUTRAL) CONDUCTOR IDENTIFICATION

A. Follow NEC 200.6. In addition to the part (D) identification requirements for the grounded conductor when different systems are in close proximity - Example: Non-Emergency UPS and Utility power sharing a common junction box or multi-channel raceway. Where broken, to prevent crossing of grounded/neutral conductors, the non-utility system's neutral wires shall have wire markers identifying it as the system to which it belongs.

END OF SECTION 26 05 53

SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

1.01 SUMMARY

A. Circuit breaker type panelboards for branch circuit distribution to lighting, general receptacle, and small motor loads.

1.02 QUALITY ASSURANCE

A. NEMA PB-1

B. UL listed.

1.03 SUBMITTALS

A. For each panelboard: amperage and phase of main bus, amperage of main circuit breaker, wire size and quantity of main lugs, grounding bar location, neutral bar location, quantity, arrangement and amperage of branch circuit breakers, quantity of spaces, physical dimension of enclosure, weight, directory card location and type, type of lock, flush or surface cover, short circuit withstand rating in R.M.S. amperes.

1.04 DELIVERY, STORAGE AND HANDLING

A. Box, crate, or otherwise completely enclose and protect equipment during shipment, handling, and storage.

B. Protect equipment from exposure to elements and keep items thoroughly dry at all times.

C. Store in a dry area, protected from the weather.

D. Painted Surfaces: Protect against impact, abrasion, discoloration, and damage.

PART 2 PRODUCTS

2.01 DISTRIBUTION OR “HIGH” PANELS (277/480V OR 480V) (400A OR LESS)

A. Smaller, 3 phase mechanical and process equipment loads and 277V lighting systems utilize distribution panels (denoted by DP or H prefix) for 480 volt or 277/480V, 3 phase operation as indicated on the Drawings. Install bolt-on, thermal magnetic circuit breakers with a minimum interrupting rating of 22,000 amperes R.M.S. (minimum) unless noted otherwise on Drawings.

B. Circuit breakers shall have a trip indication different from the "off" or "on" position.

C. Install in a NEMA 1 surface mount enclosure, unless indicated otherwise on the drawings.

D. Install common trip multi-pole circuit breakers. Handle ties are not permitted.

E. Full cabinet height bussing includes active, spare and blank breaker locations with sizes, branches, mounting, main circuit breakers, etc., as shown in Schedule on the Drawings.

F. Provide adequate wiring space according to the National Electrical Code.

G. Provide surface mount panels with a flush hinged door with lock. Key locks alike.

H. Isolated neutral bar and ground bar in panelboards where indicated.

I. Provide distributed phase bussing.

J. Metal framed circuit directory and card with plastic covering located on the inside.

K. Tin-plated copper bussing, SPD protection and additional requirements as noted on Panelboard “L” Schedule on Drawings.

L. Provide a integral SPD per Section 26 43 00 - Surge Protective Devices on panelboards where defined on the Drawings. SPD shall have disconnect sized per manufacturer recommendations.

2.02 MANUFACTURERS

A. 480V Small Distribution Panels (DP or H Prefix):

1. Square D Type NF

2. General Electric

3. Siemens

4. Cutler Hammer

2.03 CABLE TIES

A. Thomas and Betts "TY-RAP".

PART 3 EXECUTION

3.01 INSTALLATION

A. Install panelboards plumb with top at 72” above the finished floor.

B. Type circuit directory with spare positions left blank. Hand lettering not acceptable.

C. Carefully clean panelboard to remove wire scraps, dirt and dust.

D. Neatly dress conductors and bundle with nylon cable ties.

E. Tighten lugs and bolts to manufacturer's recommendations.

F. Use touch up paint, as recommended by the manufacturer, to repair scratches and other surface defects.

G. Install SPD as recommended by the manufacturer at each project panelboard. Install with leads as short as possible so that SPD indicating lights are visible.

END OF SECTION 26 24 16

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SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Wiring devices and device plates.

1.02 QUALITY ASSURANCE

A. NEMA

B. UL Listed.

C. NFPA 70 - National Electrical Code.

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with Specification Section 01 33 00 - Submittal Procedures. Clearly indicate device type, voltage, amperage, NEMA configuration, color.

1.04 DELIVERY, STORAGE AND HANDLING

A. Store in a dry area, protected from the weather.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Specification Section 01 78 23 - Operation and Maintenance Data, a list of all devices used, including manufacturer and type.

PART 2 PRODUCTS

2.01 DUPLEX RECEPTACLES: (SURFACE MOUNTED IN FINISHED AREAS)

A. Manufacturer: Hubbell #5352 Series, Bryant #5352, Leviton #5352, P&S CR Series, or P&S #5362 Series duplex.

B. Type:

1. Specification grade

2. Gray in color (normal applications); Blue for UPS applications.

3. 20 Ampere

4. 120 Volt

5. 3 Wire Grounding

2.02 GROUND FAULT RECEPTACLE

A. Manufacturer: P&S 1597 Series, Eaton SGF15, Leviton

1. 15 A Capacity

2. Gray

3. 120 Volt with 5 milliampere trip

B. Manufacturer: P&S 2097 Series, Eaton SGF20, Leviton.

1. 20 A Capacity

2. Gray

3. 120 Volt with 5 milliampere trip

2.03 TOGGLE SWITCHES

A. Manufacturer: P&S #20AC, Eagle 2221.

B. Type:

1. Specification grade

2. Gray in color

3. 20 Ampere

4. 120/277 Volt

5. Quiet operation, keyed switch where indicated, single pole unless noted otherwise.

2.04 DEVICE PLATES

A. Provide device wall plates per Specification Section 26 05 37 - Boxes and as required by NEC.

2.05 WEATHERPROOF COVERS

A. Provide weatherproof device covers on exterior devices, wet area devices, chemical room devices and in other areas indicated on the Drawings and as required by the NEC.

B. Unless indicated otherwise, covers shall be of the “weather protected while in use” variety and shall consist of the following:

1. Exterior Applications: cast aluminum, lockable, sized as required for the application. Manufacturer/Model: Intermatic / Type #WP10.

2. Wet, Chemical or Caustic Interior Areas: clear plastic or PVC construction, Carlon, Intermatic WP5100 Series.

2.06 CLASS I, DIVISION I, GROUP D OR CLASS I, DIVISION 2, GROUP D AREAS

A. Located in areas that are noted as Class I, Division 1, Group D or Class I, Division 2, Group D shall be UL listed for use in the respective classified areas. Electrical equipment within Wet Wells shall be Explosion proof and wired per NEC 500 and NEC 501.

B. Toggle Switches:

1. Manufacturer: Appleton EDS Series by Crouse Hinds or Killark.

2. Type:

a. 20 Ampere
b. 120/277 VAC
c. Self-sealing, or provide listed seal offs
d. Class I, Div. 2, Groups B, C, D.

C. Ground Fault Receptacles:

1. Manufacturer: Killark UGFI20C2 Ark-Gard by Crouse Hinds, or U-Line by Appleton.

2. Type:

a. GFCI protected
b. 20 Ampere
c. Class I, Div. 2, Groups B, C, D.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install devices and device plates.

B. Receptacles and switches listed shall be installed with the ground side down.

C. Provide blank plates for unused openings.

3.02 CLEANING

A. Clean exposed surfaces to remove dirt, paint, and other foreign material and restore to match factory finish.

3.03 PROTECTION

A. Protect installed products from subsequent construction operations.

END OF SECTION 26 27 26

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SECTION 26 28 18
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SUMMARY

A. Disconnects for motors and equipment as required by National Electrical Code for personnel protection and electrical isolation of equipment.

1.02 QUALITY ASSURANCE

A. UL Listed, heavy duty type.

1.03 SUBMITTALS

A. Clearly indicate voltage, amperage, quantity of poles, dimensions, fuse clip type, horsepower rating, enclosure type, handle description, required clearances.

1.04 DELIVERY, STORAGE AND HANDLING

A. Store in a dry area, protected from the weather.

PART 2 PRODUCTS

2.01 DISCONNECTS

A. General Requirements

1. Heavy duty type, horsepower rated
2. Quick make, quick break operation
3. Non fused, unless noted fused on the Drawings.
4. 250 VAC or 600 VAC as required per the load they serve.

B. Type

1. NEMA 12 for disconnects located in controlled atmosphere, general areas, unless indicated otherwise. NEMA 12 shall be considered the default enclosure rating for interior disconnects in non-caustic, wet or corrosive areas, unless indicated otherwise.
2. NEMA 4X for disconnects located in wet, caustic, or corrosive areas, unless indicated otherwise. The disconnects shall be stainless steel or non-metallic as defined on the Drawings.
3. NEMA 3R for disconnects located outside building or subject to damp or wet areas, unless specifically noted otherwise.

4. NEMA 7 Explosion proof (listed for use in Class I, Division 1, Group D or Class I, Division 2, Group D classified areas as noted on the Drawings) where required.

5. Rotary Type Disconnects: Compact, heavy duty, NEMA 4X, metallic or non-metallic case, rotary type disconnect switches may be used for smaller HVAC and process loads (such as electric valve actuators, condensing units, fans, etc.) and shall be of the fused or non-fused type as indicated on the Drawings.

6. Where indicated on the Drawings, provide disconnect switches used on VFD outputs with an auxiliary contact that opens prior to the respective “phase” contacts. The auxiliary contact shall be wired to the respective "enable input" of the VFD to shut down and disable the VFD prior to the phase conductor's opening.

C. Manufacturer

1. Square-D

2. Cutler Hammer

3. Siemens

PART 3 EXECUTION

3.01 INSTALLATION

A. Securely mount safety switches plumb and level.

B. Comply with accessibility, clearance and mounting height requirements as listed in the National Electrical Code.

C. Tighten conductor connections according to manufacturer's recommendations.

3.02 CLEANING

A. Clean dirt and debris from switch enclosure and components according to manufacturer's instruction.

B. Repair scratched or damaged exterior surface to original factory finish.

END OF SECTION 26 28 18

SECTION 26 29 23
VARIABLE FREQUENCY MOTOR CONTROLLERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. **The site elevation is approximately 4900' feet above sea level. All equipment as noted within the Contract Documents shall carry a rating as indicated at this noted site elevation. The equipment manufacturers shall be responsible for applying all necessary altitude de-rating factors.**

2. Furnish and install adjustable frequency drive controllers (VFDs) for all motors as shown on the Drawings.

3. Supply of VFDs in the following applications as indicated on the Drawings:

a. "Clean Power" VFDs"
1) "Clean Power" VFDs shall utilize one of the input circuitry types listed below:
(a) 6-pulse rectifiers with integral incoming harmonic filter as specified below.

b. 6-pulse VFDs:
1) VFD input circuitry (each VFD) shall include series line reactors or DC chokes (3% to 5% nominal as recommended by the VFD Supplier) and 6 pulse rectifier circuitry, standard so that input voltage characteristics shall have total harmonic distortion (THD) through the twenty fifth (25th) harmonic of not more than 3% per IEEE Standard 519.

4. Provide local control devices as indicated on the Drawings.

5. Provide VFD output dV/dT filters as indicated on the Drawings.

6. Provide incoming harmonic filters as indicated on the Drawings.

7. Provide local disconnect switches with auxiliary contact as indicated on the Drawings.

1.02 QUALITY ASSURANCE

A. NEMA U.L. Listed

1. UL 508C Motor Drives

a. Applies to drives designed prior to 2016 only

2. UL 61800-5-1 Adjustable Speed Electrical Power Drive Systems

B. National Fire Protection Association (NFPA)

1. NFPA 70 National Electrical Code (NEC), current adopted Edition

C. National Electrical Manufacturer's Association (NEMA)

1. NEMA ICS 1 - General Standards for Industrial Control and Systems

2. NEMA ICS 2 - Industrial Control Devices, Controllers and Assemblies

3. NEMA 250 - Enclosures for Electrical Equipment

4. NEMA CP-1 - Capacitors

1.03 WORK FURNISHED AND INSTALLED BY OTHERS

A. VFDs shall be integrated into the control system and provided with Type II-B control drawings.

1.04 SUBMITTALS

A. Clearly indicate VFD nameplate ratings, dimensions, schematic wiring diagrams, accessories.

1.05 OPERATION AND MAINTENANCE DATA

A. Include a VFD setting sheet that lists the final settings of each VFD as coordinated with the Contractor and the equipment supplier(s).

PART 2 PRODUCTS

2.01 VARIABLE FREQUENCY DRIVES

A. Variable frequency drive (VFD) unit shall be pulse width modulated (PWM) type incorporating volts per Hertz control. Unit shall bear the U.L. label. Refer to the Drawings for specific details.

B. Input characteristics and requirements:

1. 480 volt (nominal) +/- 10%, three phase, 60 Hz +/- 1.0 Hz.

2. Enclosure shall have main disconnecting means with external operating handle and padlock off provisions. Enclosure shall include a 480V:120V control power transformer (CPT) to convert the incoming 480 VAC line power to 120 VAC to power lights, controls, solenoids, etc. The VFD will not be supplied with an auxiliary or separate source of 120 VAC power.

3. Efficiency, 97.0% at full speed, input to output; input line pf, 0.95 minimum.

4. Drive shall automatically shut down on input power abnormalities and shall automatically restart upon restoration of "normal" power.

5. Incoming line surge protection, arresters, and surge capacitors shall be provided at a minimum.

6. Current limiting SCR fuses shall be applied where applicable or otherwise required by VFD manufacturer.

7. 6-Pulse VFD Input Equipment Requirements

   a. VFD input circuitry (each VFD) shall include series line reactors (3% to 5% nominal as recommended by the VFD Supplier) and 6 pulse rectifier circuitry, standard so that input voltage characteristics shall have total harmonic distortion (THD) through the twenty fifth (25th) harmonic of not more than 3% per IEEE Standard 519-1992.

C. Ambient conditions:

1. Temperature: 0-40°C.

2. Humidity: 5-95% non-condensing.

D. Output conditions:

1. 480 volt, 3 phase.

2. Operate 480 volt, nominal 3 phase, Design B, motor with NEMA Code G locked rotor characteristics unless indicated otherwise. Size VFD for not less than motor nameplate full load ampacity. Pay particular attention to the full load amp ratings of non-NEMA motors such as submersible pumps, etc.

3. Rated for 110% of drive amperage rating overload for one minute, minimum.

4. Variable Torque – Standard duty VFD applications such as centrifugal fans and pumps shall be provided with variable torque VFD ratings.

5. Constant Torque - Heavy duty VFD applications such as augers, rotary lobe pumps, mixers, etc. shall be provided with constant torque VFD ratings. See the Drawings for additional information.

6. The Contractor shall be responsible for furnishing and installing all auxiliary equipment recommended by the drive manufacturer to prevent equipment damage and excessive noise. This auxiliary equipment shall include, but not be limited to, line reactors, shielded cable, motor terminators, dV/dT filters and increased cable insulation. Such devices

shall reduce ripple in the rectifier output and reduce harmonic distortion reflected into incoming power feeders to acceptable levels. These output series devices shall also protect the motor from damaging overvoltage resulting from reflected higher order frequencies.

7. General guidelines for VFD output accessory devices shall be as follows unless specifically otherwise noted on the one line Drawings, based on motor lead lengths, but should be confirmed with the specific VFD manufacturer before implementation:

    a. Output Leads 50 Feet or Less: No output accessories required, unless recommended by the VFD supplier.
    b. Output Leads 50 to 150 Feet: Provide line reactor or motor attenuator as recommended by the VFD supplier. See the Drawings for additional requirements.
    c. Output Leads more than 150 Feet: Provide dV/dT filter

8. Maximum peak voltage of PWM VFD output pulse of 1000 volts, with pulse rise time of not greater than 2 microseconds. Maximum frequency of PWM VFD output pulse (carrier) frequency of 3000 Hz. Should magnitudes of these characteristics be more stressful to motor insulation than specified values, furnish filter network on VFD output to protect motors.

    a. Coordinate with the VFD manufacturer, which devices are required and will be supplied based on estimated motor lead lengths from the drive to the motor and VFD manufacturer recommendations. The application of filtering equipment shall be designed and approved by VFD manufacturer and built into the VFD enclosure.
    b. As part of the shop drawing submittals, submit a VFD performance study for each VFD installation which provides documentation justifying the use of devices which show conformance to the VFD manufacturer's recommendations on motor lead lengths and other noise/motor damage prevention requirements. This study shall include anticipated peak voltage to the motor, anticipated pulse rise time, and the PWM output pulse frequency setting based on anticipated lead lengths from the drive to the motor for each installation.
    c. Reset PWM pulse output frequency from the factory default to the lowest possible setting (2000 to 3000 Hz), nominal.
    d. Coordinate minimum equipment rotating speed, skip frequencies and ramp rates with the process and mechanical equipment suppliers, and program the VFD accordingly.

E. Features:

1. VFD's for installation within waste water facilities or lift stations, harsh environments, or areas exposed to chemical exposure shall have circuit boards conformally coated for increased corrosion resistance protection.

2. Front door mounted microprocessor based unit with digital programming panel. Panel shall have programming keys and alphanumeric display to allow operator to view and modify drive parameters, alarms, and operating conditions.

3. Programmable parameters:

    a. Acceleration time
    b. Deceleration time
    c. Frequency range
    d. Skip frequency ranges
    e. Number of restart attempts

4. Overload protection (Confirm full load rating w/motor manufacturer and program VFD to limit speed such that motor is not overloaded.)

5. Programmable displays:

    a. Frequency
    b. Voltage
    c. Percent load
    d. Percent power

6. Protection features (with separate indications for each event):

    a. Undervoltage trip
    b. Overvoltage trip
    c. Drive overcurrent trip
    d. Drive overtemp trip
    e. Motor overcurrent trip
    f. Motor overtemp trip (monitor normally closed thermal switch in motor)
    g. Output ground fault trip

F. Front Panel Components and Control Configuration:

1. Six digit, non-resettable running time meter. Record running time in hours and tenths.

2. Speed potentiometer shall be used to control the speed of the drive while the selector switch is in "Hand".

3. Generate 4-20 mAdc isolated signal proportional with drive speed from 0 to 100%.

4. Lockout/Disable - Where shown, prevent drive operation when remote contacts such as “motor overtemperature” or “local disconnect switch open” are open.

5. Auxiliary Contacts - Provide isolated SPDT contacts for remote monitoring as indicated on the Drawings. Provide interposing relays within the VFD enclosure to provide the contacts as required. Contacts typically include, but are not limited to the following:

    a. “Running” (two sets of SPDT contacts)
    b. “Alarm/Fault” (any alarm condition)
    c. “Motor Disabled (local disc sw open)”
    d. “Motor Overtemp”
    e. “HOA in AUTO Position”
    f. Additional contacts as indicated on the Drawings.

6. Provide additional internal components, relay logic, front panel components, interfaces to field devices, and input/output signals as shown on Drawings and as described in the functional descriptions in this Section.

7. Ramp Up / Ramp Down Settings

    a. Coordinate, confirm, and document all VFD settings including, but not limited to, ramp rate, minimum speed, and maximum speed with the process equipment supplier during startup. Field test and adjust all settings in cooperation with the process equipment supplier.
    b. It is anticipated that each VFD will be set to ramp up to a pre-determined speed set at the VFD over an adjustable time period (20 seconds nominal - confirm).
    c. It is anticipated that each VFD will ramp down upon stop command over an adjustable time period (20 seconds nominal - confirm). On pumps, the VFD should stop at approximately the same time that the pump check valve closes - if applicable. Adjust this feature to approximate time required to minimize water hammer.
    d. Coordinate exact requirements with individual equipment suppliers and program specialty ramps (such as dual slope ramps to submersible well motors to protect the Kingsbury bearings) as required to maintain equipment warranty.

8. Ethernet I/P Control Module - Able to see and modify drive parameters as listed on the drawings over the Ethernet I/P network via the manufacturers Ethernet I/P communications card.

9. All control devices including, but not limited to, selector switches, pushbutton switches, limit switches and indicating lights shall be of the 30mm heavy duty, oil tight type. The contacts shall meet NEMA rating

designation A600. All time clocks, timers, switches, relays, etc., shall be permanently labeled.

10. Front Panel Push-to-Test Indicating Lights – Provide push-to-test indicating lights with LED lamps as follows:

    a. Green - "Running"
    b. Red - "Alarm/Fault"
    c. Amber - "High Temp" (Motor Thermal)
    d. Red - "Disconnect Open"

11. Front panel selector switch shall have the following functions:

    a. "Hand" (Speed Select 1) - Start up and run based on the speed potentiometer.
        1) "Off" - Drive does not operate under any condition.
        2) "Auto" (Speed Select 2) - Drive runs when remote “required” contacts are closed. Drive speed shall be based on a 4-20 mA speed signal from the PLC.

G. Enclosure

1. Provide removable mesh foil filters on all VFD ventilation openings.

H. Manufacturer/Model

All project drives furnished shall be provided from the same manufacturer

1. AllenBradley Powerflex

2. Square D equivalent

3. Or prior approved equivalent.

2.02 VFD OUTPUT FILTERING

A. It is the Contractor’s responsibility to appropriately size the dV/dT filters for the connected load. The continuous ampere rating of the dV/dT filter shall be equal to or greater than the full load ampere output rating of the associated VFD at the given site elevation.

B. dV/dT filters shall be installed in UL listed, NEMA 12 enclosures if provided outside the overall VFD enclosure and shall be the responsibility of the Contractor to install and completely connect with cable and conduit at no additional cost to the Owner. The preferred method of dV/dT filter supply is for them to be provided as an integral part of the overall VFD system (internal to the overall VFD enclosure). Overall assembly shall be UL listed to UL-508A.

C. Manufacturer/Model:

1. MTE / Series A dV/dT Filter

2. TCI Equal

3. Or prior approved equivalent

2.03 CONTROL DEVICES

A. Where required the Contractor shall supply all control devices including, but not limited to, selector switches, push button switches, limit switches, and indicating lights. All control devices shall be of the heavy duty, oil tight type. The contacts shall meet NEMA rating designation A600. Each control device shall be supplied complete with escutcheon and nameplate. Each control device shall have its function permanently marked on the escutcheon. Raised letters on plastic adhesive tape is not acceptable.

B. Furnish and install engraved plastic type label designating equipment served. Embossed raised letter type labels shall not be acceptable. Letters shall be ¼" high and white in color on a black background.

C. Control Power Transformers (CPT) are to be installed within VFD enclosures as shown on drawings for use with control devices and accessories. CPT's are to be sized with 25% spare capacity minimum and provided with primary and secondary fused protection.

2.04 LOCAL DISCONNECT SWITCHES

A. Where indicated on the Drawings, provide heavy duty, non-fused or fusible local disconnect switches with NEMA 1 enclosures minimum for interior applications not in wet or corrosive environments. If the disconnect switch is to be mounted outdoors or in areas subject to rain or falling water, NEMA-3R enclosure shall be provided. If the disconnect switch is to be mounted in a wet and/or caustic or corrosive environment, NEMA 4X stainless steel enclosures shall be provided. Refer to the Drawings for additional requirements.

B. All local disconnect switches applied on VFD output circuits shall include an auxiliary contact that opens prior to the associated “phase” contacts. The auxiliary contact shall be wired to the respective “enable input” of the VFD to shutdown and disable the VFD prior to the opening of the “phase” contacts.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide all VFDs with variable torque or constant torque ratings as required for the driven equipment, continuous full load ampere ratings and overload settings equal to or greater than the nameplate rating on the installed motor.

B. The Contractor (in conjunction with the process or mechanical equipment supplier and the VFD supplier) shall fully test and adjust the variable frequency drive to allow control of each system to maximum efficiency, including lockout

frequencies. The final arrived at settings for each VFD system shall be submitted to the Engineer and included in the O&M manuals.

3.02 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.

1. All printed circuit boards shall be functionally tested via automatic test equipment prior to unit installation.

B. The manufacturer shall provide three (3) certified copies of complete VFD final test reports.

3.03 TRAINING

A. Training on the project VFD's shall be for eight (8) hours, minimum on site. The training sessions shall consist of two (2) separate, four (4) hour sessions at Site. The Owner may record the training sessions.

B. All training sessions shall be at times that are prior approved with the Owner. Two week prior approval of all training sessions is required.

3.04 SUPPLIES

A. At Final Completion, Contractor shall furnish the following expendable items:

1. Twenty (20) percent spare fuses and lamps of each type furnished under this Section, but not less than two (2) of each type.

2. The following spare parts shall be provided:

a. Main Control Board - One (1) per VFD Frame size on the project to which they are compatible with.
b. HIM - One (1) of each type provided on the project
c. Communication Card - One (1) per VFD Frame size to which they are compatible with.
d. Fans - One (1) per VFD Frame size provided on the project to which they are compatible with.

END OF SECTION 26 29 23

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SECTION 26 43 00
SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Surge Protective Devices (SPDs).

1.02 REFERENCES AND QUALITY ASSURANCE:

A. IEEE C62.41, C62.45-2002, and C62.62.

B. National Electrical Manufacturers Association (NEMA LS1)

C. National Fire Protection Association (NFPA 70)

D. Underwriters' Laboratories (UL 1449 and 1283).

1.03 SUBMITTALS

A. Product Data Sheets in NEMA LS-1 format - Publication for Low Voltage Surge Protection Devices (SPDs).

B. Electrical/mechanical drawings showing unit dimensions, weights, installation instructions details, and wiring configuration.

C. UL 1449 Edition 3 Listing Certificate.

D. UL 1449 Edition 3 Suppressed Voltage Ratings.

E. Independent let through voltage test results to ANSI IEEE C62.41 Cat C3 high energy impulse(20kV,10kA), B3 ring wave(6kV, 3kA).

F. Warranty statement establishing the terms and conditions.

G. Noise Rejection testing as outlined in NEMA LS1-1992 (R2000) Section 3.11. Noise rejection shall be measured between 50kHZ and 100MHz verifying the devices noise attenuation. Testing shall show multiple attenuation levels over a range of frequencies.

H. Independent certification shall be provided proving that the SPD meets a single shot surge rating of at least 120kA 8/20µs per mode, without failure of the fuse, disconnect or surge module. Bypassing of fusing/disconnects for purpose of this test is not acceptable.

I. For a lighting panel SPD (UL type 2), independent certification shall be provided proving that the SPD meets a single shot surge rating of at least 60kA 8/20µs per mode, without failure of the fuse, disconnect or surge module. Bypassing fusing/disconnects for purpose of this test is not acceptable.

1.04 MANUFACTURES QUALIFICATIONS

A. Manufacturers shall be ISO9000 certified.

B. Manufacturers shall have been engaged in the design and manufacturing of such devices for at least ten (10) years.

C. SPD shall be UL 1449 current edition listed, 20kA In Type 1 or Type 2 for use in UL 896A systems.

D. The following manufacturers:

1. ERICO Inc.

2. Eaton

3. Square D

4. ABB

5. Siemens

1.05 WARRANTY

A. The manufacture shall warrant the SPD against defects in material and workmanship for period of 10 years.

PART 2 PRODUCTS

2.01 GENERAL ELECTRICAL REQUIREMENTS

A. Unit operating voltage- Refer to drawings for operating system voltage.

B. Maximum continuous operating voltage (MCOV)- the MCOV shall not be less than 115% of the nominal system operating voltage.

C. The suppression system shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create environmental hazards. End of life mode shall be open circuit. Unit with end of life short-circuit mode is not permitted.

D. SPD shall include L-G, L-N, and N-G modes of protection for wye systems at minimum. Delta power systems shall include L-L and L-G modes of protection at minimum.

E. Nominal Discharge Current (In) - SPDs applied to the distribution system shall have a 20kA In rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage.

F. Electrical Noise Filter - Each Type 2 unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up

to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method.

1. Type 2 units with filtering shall conform to UL 1283 5th Edition

2. Type 1 units shall not contain filtering or have a UL 1283 5th Edition Listing.

G. Internal Connections - No plug-in single-mode modules or printed circuit boards shall be used as surge current conductors. Internal components shall be soldered and hardwired with connections utilizing low impedance conductors.

H. Remote Status Monitor- The SPD shall include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition. A reduction in capacity below the manufacturer's predetermined level shall operate an alarm contact.

I. Surge Counter- The SPD shall be equipped with an LCD display that indicates how many surges have occurred at the location. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of 50 ± 20A occurs.

1. The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve functionality.

J. The SPD shall have a maximum continuous operating voltage (MCOV) of:

POWER SYSTEM	**MCOV (L-N)**
Single phase (3W+G) 120/240 WYE	150V
Three phase (4W+G) 120/208 WYE	150V
Three phase (4W+G) 220/380 WYE	320V
Three phase (4W+G) 277/480 WYE	320V
Three phase (4W+G) 347/600 WYE	485V
Three phase (3W +/-G) 240V Delta	270V L-L
Three phase (3W +/-G) 480V Delta	550V

K. The following Voltage Protection Rating (VPR) L-N, L-L For Delta, shall not be exceeded by the SPD:

Impulse Standard	120/240V	120/208V	220/380V	277/480V	240V Delta
ANSI/IEEE C62.41	<650V	<650V	<1000V	<1000V	<1000V

Cat B3	6kV	6kV	6kV	6kV	6kV
ANSI/IEEE C62.41	<1400V	<1400V	<1800V	<1800V	<1800V
Cat C3	20kV	20kV	20kV	20kV	20kV

2.02 NON SERVICE DISTRIBUTION PANELS (UL TYPE 2)

A. Hard wired MOV type SPD shall be installed at all distribution panels, MCC's and/or as otherwise shown on the drawings. Installation on new equipment shall be integrated into the panel to reduce lead length.

B. SPD shall be constructed with replaceable modules. However, they shall not utilize pluggable connection, due to the possibility of such devices to "weld" in place at higher surge currents.

C. SPD shall incorporate 120kA 8/20µs aggregate surge current per mode, min.

D. Independent certification shall be provided proving that the SPD meets a single shot surge rating of at least 120kA 8/20µs per mode, without failure of the fuse, disconnect or surge module. Bypassing of fusing/disconnects for purpose of this test is not acceptable.

E. Each mode of the SPD shall be rated to exceed the life cycle testing of ANSI/IEEE C62.45 by withstanding at least 10,000 operations at 3kA 8/20µs without failure.

F. SPD shall be internally line fused and be UL Listed for use on circuits with short circuit fault current rating (SCCR) of 200 kA. These fuses to be field replaceable with indication to warn if fuse has ruptured. Unit shall not require external fuses/breaker for connection.

G. SPD shall be capable of withstanding multiple temporary over voltages per latest adopted UL 1449 eddition without failure or need to reset or replace modules/fuses.

PART 3 EXECUTION

3.01 INSTALLATION

A. SPDs shall be factory installed within the equipment.

END OF SECTION 26 43 00

SECTION 31 05 13

SOILS FOR EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Subsoil materials.
2. Topsoil materials.

B. Related Sections include:

1. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to work of this section.
2. Division 01 - General Requirements.
3. Division 31 - Earthwork.
4. Division 32 - Exterior Improvements.

1.02 SUBMITTALS FOR REVIEW

A. See Section 01 33 00 - Submittal Procedures.

B. Samples: In accordance with Section 01 45 00 - Quality Control.

1.03 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PART 2 PRODUCTS

2.01 SUBSOIL MATERIALS

A. Subsoil: Uncontaminated excavated on-site material or imported borrow material. Graded free of lumps larger than 3 inches, rocks larger than 2 inches, and debris; non-plastic and inorganic material.

1. Type S1: Fine sand and gravel, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Conforming to ASTM D2487 Group Symbol GM, GC, SM, SC, SP, SW, or dual symbol groups.
2. Type S2: Silt, silty-clay, inorganic clays, and silts of low to medium plasticity and a maximum liquid limit of 40. Conforming to ASTM D2487 Group Symbol CL, ML, or dual symbols thereof.
3. Type S3: Plastic to highly plastic clays and clay-silt materials of medium to high plasticity Conforming to ASTM D2487 Group Symbol CH, and MH or dual symbols thereof.

4. Unsuitable soils: All frozen material, vegetation, trash, rocks, and concrete and bituminous chunks having a dimension exceeding 3 inches and otherwise not meeting the specifications of soil materials.

2.02 TOPSOIL MATERIALS

A. Topsoil: Uncontaminated excavated on-site material or imported borrow material; Graded free of roots, rocks larger than ½ inches, subsoil, debris, large weeds, and foreign matter.

1. Type S4: Imported or Re-used; Friable loam. Acidity range (pH) of 5.5 to 6.5 containing a minimum of 4 percent and a maximum of 25 percent organic matter. Conforming to ASTM D2487 Group Symbol OL and OH.

2.03 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Testing and analysis of soil material.

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698 and ASTM D6938.

C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D2487.

D. Provide materials of each type from same source throughout the Work.

E. Owner to obtain and pay for services of soil classification technician from an independent geotechnical laboratory to monitor soils installed. Contractor is responsible for scheduling and complying with geotechnical requirements.

PART 3 EXECUTION

NOT USED.

END OF SECTION 31 05 13

SECTION 31 23 13

SUBGRADE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Scarifying, compacting, and shaping the earth subgrade below pavements, soil cement, and structures.
2. Perform subgrade preparation on all areas to receive structures (including foundation rock), concrete pavement, aggregate base course, and/or aggregate surface course.

B. Related Sections:

1. Drawings and general provisions of Contract, including General Conditions, apply to work of this section.
2. Division 01 - General Requirements.
3. Division 31 - Earthwork.

PART 2 PRODUCTS

2.01 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval of the Engineer.

B. Suitable Soil Materials: On-Site excavated material or imported material meeting subsoil classification Type S1, S2, or S3 as defined in Section 31 05 13, free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

PART 3 EXECUTION

3.01 GENERAL

A. Subgrade Preparation shall consist of producing a firm and stable subgrade prior to placement of the surface or base course.

3.02 SUBGRADE PREPARATION

A. The Contractor shall compact and shape the subgrade for its full width as may be necessary to produce, at the time the base course is placed, the required density in the upper 12-inches of the base and the required grade and cross-section.

B. The pavement subgrade shall be prepared by test-rolling the pavement subgrade soil and correcting any ruts deeper than 1 inch (25 mm), by removing and replacing the soils with suitable soil materials. All soil materials shall be compacted according to Section 01 45 00. Subgrade preparation shall extend deeper until the Engineer believes that additional

subgrade preparation is necessary to support construction. Rollers shall conform to Sections 151 of the NDDOT Standard Specifications for Road and Bridge Construction.

C. All subgrades below structures shall be cut to the final depth with a smooth-edged backhoe or other equipment that will minimize disturbance to the subgrades.

D. Subgrades below structures shall not be scarified or re-compacted. All disturbed clay soils must be removed and replaced with Type S1 soils.

E. If areas are encountered that cannot be compacted, sub-excavate unstable materials and replace with Type S1 or S2 soil materials.

F. Contractor shall be responsible for drying the subgrade soil or applying water as may be necessary to obtain the required density. Contractor shall also be responsible for grading the Work area and providing drainage so that accumulating water will drain away from the subgrade.

G. The finished subgrade surface shall be smooth and uniform and shall not rut, shove, flex, or displace when any construction equipment is placed on it.

H. The required grade and cross-section for subgrades shall consist of a smooth subgrade surface that conforms to the prescribed elevations for the particular subgrade being prepared, prior to constructing an additional course thereon. The required grade and cross-section for rough graded surfaces shall consist of a smooth graded surface that conforms to the prescribed elevations for that particular rough grade being prepared. The prescribed elevation for any point on the subgrade or rough graded surfaces shall be as determined from the grades staked by the Engineer.

I. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations, vehicular traffic, or weather conditions.

J. Surface or base course and embankment fill shall not be placed on subgrades until the subgrade has been tested and Contractor has proven that the requirements specified herein have been met. Upon completion of a successful test, Contractor shall maintain the subgrade and repair any damage prior to placing subsequent materials.

K. Subgrade preparation shall apply to all pipe trenches, concrete manholes, concrete slabs, pond areas, paved and graveled areas, including roads, driveways, parking areas, sidewalks, and ramps.

L. Testing requirements for subgrade preparation shall be as follows:

1. Shall conform to requirements of Section 01 45 00.

3.03 TOLERANCES

A. Finish subgrade or rough graded surfaces shall not deviate by more than 1 inch from the required section and grade.

END OF SECTION 31 23 13

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Requirements for Excavation.
2. Common Excavation.
3. Structural Excavation.
4. Estimated Excavation Quantities.
5. Disposal.

B. Related Sections:

1. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.
2. Division 01 - General Requirements.
3. Division 31 - Earthwork.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM).

B. Utah Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00:

1. Test Results: Prior to start of work, submit written reports for each material sampled and tested. Include project identification, date of report, name of contractor, name of testing laboratory, source of material, manufacturer and brand name for manufactured products, specification requirements for each material, and corresponding test results.
    a. Tests must have been taken no more than 180 calendar days before Notice to Proceed.
2. Product Data: Information on manufactured products indicating compliance with requirements of this Section.

1.04 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

B. Structures: Existing and new construction, including slabs, buildings, and structural elements and systems.

C. Acceptable Materials: Material that will provide for the indicated soil bearing capacity, soil densities, material requirements and that, in the opinion of soil testing laboratory, will not be subject to future decomposition, settlement, subsidence, expansion and are otherwise of the required soil type.

D. Unsuitable Materials: Material that will not provide for the indicated soil bearing capacity and soil densities and that in the opinion of the soil testing laboratory will be subject to future decomposition, settlement, subsidence, expansion, and are otherwise not of the required soil type.

E. Soil Testing Laboratory: Refers to professional soils engineering firm with soil sampling and testing services and that is independent from the Contractor. The soil testing laboratory's engineer shall be licensed in the State of Utah.

F. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, topsoil removal, excavation to grade, and scarification and compaction of subgrade.

1.05 SITE CONDITIONS

A. Contractor shall determine to Contractor's own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.

B. Contractor may perform test borings or other exploratory operations at Contractor's own expense. Contractor shall make arrangements for any soils investigation with Owner.

1.06 QUALITY ASSURANCE

A. Source Quality Control Testing: Retain the services of an independent soil testing laboratory for Source Quality Control sampling and testing.

B. Materials and installed work may require testing and retesting, as required by Engineer, at any time during progress of work.

C. Allow free access of testing laboratory to material stockpiles and facilities at all times.

D. Tests including retesting of rejected materials and installed work shall be at Contractor's own expense unless otherwise indicated.

E. See Section 01 45 00 for additional requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stockpile delivered materials and excavated materials at locations approved by Owner until required for backfill or fill. Place, grade, and shape stockpiles for drainage.

B. Store materials in manner that will not impose additional loading and soil pressure on excavation limits and structures.

1.08 PAYMENT

A. All earth rock, peat, muck and all other excavation, removal and disposal required; erosion control, sheeting, shoring and bracing; fill and backfill; placement compaction, grading, source quality control testing, and all other work required under this Section shall be considered incidental to the Project and no claim for compensation or extra work will be accepted.

B. No claim for additional payment will be accepted for excavation and fill for all structures required for removal of unsuitable material of up to three (3) feet below bottom of foundation or two (2) feet below noted structural fill or backfill or two (2) feet below minimum excavation limit as noted on Drawings, whichever results in the greater excavation and fill.

C. Excavation and fill required for removal of unsuitable material deeper than the above limits will be paid for on a time and materials basis, agreed to prior to work being completed.

D. No claim for additional payment will be accepted for repairs made to subgrade due to weather related problems.

1.09 FIELD MEASUREMENTS

A. Survey benchmarks, control points, and intended elevations for the Work are as shown on the Drawings or will be provided by the Engineer.

1.10 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

C. Contractor shall excavate for structures, pipe, and utilities at grades shown on the Drawings. Careful consideration shall be given to whether elevations shown are invert elevations or centerline elevations, Contractor shall make appropriate adjustment depending on elevation shown.

PART 2 PRODUCTS

2.01 EXCAVATION MATERIALS

A. See Section 31 05 13 for materials specifications.

2.02 SOURCE QUALITY CONTROL

A. See Section 31 23 23 and Section 01 45 00 for material quality testing requirements.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine project site and conditions under which work of this Section is to be performed.

B. Contractor shall verify which native materials are suitable for reuse at the site. Provide testing data as required and keep materials separated.

C. Notify Engineer of any unsuitable materials.

D. Do not over excavate without authorization from Engineer.

3.02 PREPARATION

A. An OSHA approved competent person shall review the above mentioned soil classification in the field. Excavations shall comply with the requirements of OSHA 29 CFR, Part 2926, Subpart P, “Excavations and Trenches.” Excavation safety is the responsibility of the Contractor. All excavations greater than 20 feet in depth shall be designed by a registered Professional Engineer.

B. Dry subgrade: Add water, then mix to make moisture content uniform throughout.

C. Wet subgrade: Aerate material by blading, disking, harrowing, or other methods to hasten drying process.

3.03 PROTECTION

A. Locate existing utilities in areas of work. Protect utilities that are to remain.

B. Protect structures from damage and from damage caused by groundwater, surface water, flood or floatation forces, lateral movement, settlement, undermining, washout, and other undesirable conditions created by the work.

1. Maintain drainage when drainage ways are obstructed by earthwork and related operations.

C. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when allowed by utility owner and then only after acceptable temporary utility services have been provided.

1. Provide temporary services, complying with Federal, State and local laws and regulations, and as acceptable to Owner, during any interruptions.

D. Protect areas that have been finish graded from subsequent construction operations, traffic, and erosion.

1. Install erosion control protection along perimeter of unfinished areas.

E. Maintain full access to structure exits and entrances, fire hydrants, street crossings, sidewalks, and other points designated by Owner to prevent significant interruption of accessibility.

F. Do not bring explosives on site or use in work.

G. Maintain excavations and stockpiles to prevent caving, heaving, slides, and increased soil pressures on adjacent and underlying structures.

H. Repair disturbed areas and compact to required density prior to further work.

I. Remove material contaminated by erosion and runoff, provide new material and compact.

3.04 COMMON EXCAVATION

A. Excavate designated areas to the proposed subgrade elevations indicated on the Drawings.

B. Contractor shall advise Engineer immediately if any unsuitable materials are encountered during excavation. Unsuitable materials shall be reasonably separated from suitable materials and shall be considered surplus material at no additional cost to the Owner.

C. If Contractor encounters excess excavation materials which meet the requirements of common fill as specified herein, Contractor may use those materials as common fill. Contractor shall verify with soils testing laboratory suitability of the use of on-site material.

D. Dewatering during excavating shall be done in accordance with Section 31 23 19.

3.05 STRUCTURAL EXCAVATION

A. Remove unsuitable materials in accordance to the depth recommended by soils testing laboratory beneath structures to obtain the design bearing capacity.

1. Do not bear any structure partially on bedrock and partially on more compressible soils. Remove bedrock materials and replace them with clean compacted sand or gravel in accordance to the Geotechnical Report. The minimum depth of compacted sand or gravel is 6-inches.

2. Do not bear any structure on wet silt material. Over-excavate a minimum 2-feet below the bottom of footing and replace with compacted granular fill (As Indicated on the Construction Drawings) compacted to the requirements in Section 01 45 00.

3. Dewater excavations for special inspector to observe and determine excavation limits.

4. When bottoms of excavations are approved by soils testing laboratory, but are slightly unstable only in relation to Contractor operations or convenience, Contractor may provide a compacted gravel course utilizing materials acceptable to the soil testing laboratory. Such work shall be considered for the Contractor's convenience and at Contractor's own expense.

B. Slope sides of excavations as required to provide stability and to comply with Federal, State and local laws and regulations. Shore and brace excavation when required by project conditions.

1. Utilize cofferdams, steel sheet piling, shoring, underpinning, and other systems required to prevent damage to existing structures, settlement, slope stability problems, and undermining.

2. Remove construction related protection systems after their need is complete, in a manner that will not loosen or damage soils, create slope stability problems, and otherwise damage existing and new structures.

a. Leave construction-related protection systems in place when their removal would create potential for damage to the soil conditions or to structures.

C. Excavate to required elevations and dimensions within a tolerance of plus or minus 1 inch, and extending a sufficient distance as required to provide for the work, completion of the structures, observation, and testing.

1. When excavating for footings and foundations, do not disturb soil materials at and below excavation limits. Excavate by hand when necessary to prevent damage to soil materials that will remain.

2. Trim bottoms to required lines and grades to leave solid dense base of required bearing capacity.

3. Final removal limits shall be approved by soil testing laboratory prior to concrete placement.

D. Removal of materials beyond required subgrade elevations or dimensions without specific approval of soils testing laboratory as well as backfilling, compaction and remedial work recommended by soils testing laboratory at the over-excavated area shall be at Contractor's own expense.

1. Under structures and their components fill unauthorized excavation utilizing one of the following systems:

a. Extend indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation.
b. Install lean concrete fill to bring elevations to required position.

c. Fill and compact unauthorized excavations with soil materials and to required density.

2. Elsewhere, backfill and compact unauthorized excavations as indicated for authorized excavations of same classification.

E. Protect excavation bottoms from freezing. Remove frozen materials and provide unfrozen compacted materials prior to placement of materials on them.

F. Excavations of structures shall be widened one foot horizontally beyond the outer edges of the building perimeter footings for each foot the excavations extend below bottom-of-footing elevations.

G. It is possible that the excavation bottom for any structure mayl consist of fat clay. These clays shall be maintained within the prescribed moisture content range until successive layers are placed over them. Thus, if the placement of backfill and fill is slowed or delayed during dry or wet weather, re-conditioning of the placed backfill, fill and natural soils may be necessary.

H. Prior to the placement of engineered fill or construction of structures, any loosened granular materials shall be surface compacted using a vibratory plate compactor. In areas where groundwater is within 3 foot of the subgrade this requirement may be waived in the field by the Engineer if it is found the compaction is pumping up water or creating a temporary “quick” condition and the soils are otherwise suitable for support of the foundations. Areas that yield or pump during surface compaction may require additional subcutting.

END OF SECTION 31 23 16

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SECTION 31 23 23

FILL AND BACKFILL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for site grading including, but not limited to, the following:

1. Filling, Backfilling, and Compacting.
2. Related Sections include, but are not limited to:
   a. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.
   b. Division 01 - General Requirements.
   c. Division 31 - Earthwork.

1.02 REFERENCES

A. American Public Works Association (APWA) Utah Chapter Manual of Standard Specifications, latest Edition.

1.03 DESCRIPTION

A. Placement of fill shall not be allowed outside the boundary shown on the Drawings.

B. Materials may be temporarily stockpiled on the site within the limits of construction or where shown on the Drawings.

C. Excess materials shall be stockpiled on site at locations authorized by Owner.

D. Protect benchmarks and existing structures that are to remain from damage or displacement.

1.04 DEFINITIONS

A. Suitable Material: Material that will provide the indicated required soil bearing capacity, soil densities, material requirements or, in the opinion of the soils testing laboratory, will not be subject to future decomposition, subsidence, settlement, or expansion.

B. Structures: Existing and new construction, including slabs, buildings, footings, tanks, and other structural elements.

C. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
2. Optimum Moisture Content:
   a. Determined in accordance with ASTM standard specified to determine maximum dry density for relative compaction.
   b. Determine field moisture content on basis of fraction passing ¾-inch sieve.

3. Complete Course: A course or layer that is ready for next layer or next phase of Work.
4. Lift: Loose (uncompacted) layer of material.
5. Well-Graded:
    a. A mixture of particle sizes with not specific concentration or lack thereof of one or more sizes.
    b. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
    c. Use to define material type that, when compacted, produces a strong and relative incompressible soil mass free of detrimental voids.
6. Influence Area: Are within planes sloped downward and outward at 60-degree angle from horizontal measured from:
    a. 1 foot outside outermost edge at base of foundations or slabs.
    b. 1 foot outside outermost edge at surface of roadways or shoulder.
    c. 0.5 foot outside exterior of spring line of pipes.
7. Borrow material: Material from required excavations or from Contractor furnished borrow areas.
8. Select Backfill Material: Contractor furnished materials suitable for intended use.
9. Imported Material: Materials obtained and paid for by Contractor from sources offsite, suitable for specified use.

1.05 SITE CONDITIONS

A. Contractor shall determine to Contractor's own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.

B. Contractor may perform test borings or other exploratory operations at Contractor's own expense. Contractor shall make arrangements for any soils investigation with Owner.

1.06 SEQUENCING AND SCHEDULING

A. Backfill against concrete structures only after concrete has attained required compressive strength. Obtain Engineer's acceptance of concrete work and attained strength prior to placing backfill.

1.07 FIELD MEASUREMENTS

A. Verify that survey benchmark, control point, and intended elevations for the Work are as shown on Drawings or will be provided by the Engineer.

1.08 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Field inspection and testing.

B. Compaction testing will be performed in accordance with ASTM D698 and ASTM D6938.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.

1.09 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

C. Contractor shall excavate for piping and utilities at grades shown on the Drawings. Careful consideration shall be given to whether elevations shown are invert elevations or centerline elevations, Contractor shall make appropriate adjustment depending on elevation shown.

PART 2 PRODUCTS

2.01 MATERIALS

A. Backfill around Structures: Backfill shall be as indicated on the Construction Drawings. Structures shall utilize Type S1 materials as specified in Section 31 05 13 within and under all structures unless otherwise indicated as granular materials which are specified in Section 31 05 16.

B. Controlled Density Fill shall meet the specifications of Paragraph 2.02.

2.02 CONTROLLED DENSITY FILL (FLOWABLE FILL)

A. Contractor shall furnish and provide Controlled Density Fill (CDF) material to be used at locations shown on drawings and where more stable bedding and backfill material is needed where settlement must be minimized.

B. CDF material shall be a blend of cement, water, pozzolanic materials, and fillers. The material shall be fluid during placement and absent of voids. The material shall be able to support normal loads after six hours and shall have a compressive strength range of 75 psi to 250 psi at 28 days. The material once cured shall be easily removed with a tractor backhoe.

C. Contractor shall provide mix design and compression strength test results of the material to Engineer for approval prior to placement. Mix design may be altered to decrease flowability to enable forming of CDF material where needed.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Notify utility company to locate utilities.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities that are to remain.

F. Contractor shall verify which native materials are suitable for reuse as backfill material at the site. Provide testing data as required and keep materials separated.

G. Notify Engineer of any unsuitable materials or poor subgrade conditions.

H. Dewater excavations during backfilling.

I. Dewater and dry saturated materials suitable for backfill.

J. Compact subgrade to density requirements for subsequent backfill materials.

K. Cut out soft areas of subgrade not capable of compaction in-place. Backfill with Type S1 fill and compact to density equal to or greater than requirements for subsequent fill material.

L. Identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.02 STOCKPILING OF MATERIALS

A. Stockpile according to Section 31 14 13.

3.03 FILLING, BACKFILLING, AND COMPACTING

A. Prepare subgrades according to specification 31 23 13 prior to installing fill material.

B. Backfill areas to contours and elevations with unfrozen materials.

C. Proof roll subgrade areas below pavements, or where specifically noted with, as a minimum, a tandem axle dump truck loaded to at least 25 ton weight. Loose or soft soils shall be defined as soils exhibiting “excessive rutting” from the truck tires (approximately one (1) inch wheel rut depth. Rollers shall conform to Sections 151 of the UDDOT Standard Specifications for Road and Bridge Construction.

D. Systematically backfill to allow maximum time for natural settlement. Do not place material on loose, wet, muddy, spongy or frozen ground or on materials containing frost or ice.

E. Slope grade away from structures minimum 2 inches in 10 feet, unless noted otherwise.

F. Do not proceed with backfilling of excavations until completion of the following:

1. Observation, testing, approval, and recording of locations of underground utilities.
2. Removal of unsuitable materials, construction related debris, and excess materials.
3. Placement and Compaction
    a. Place materials in compacted layers of thickness required to obtain specified soil densities. Layers shall not exceed 9 inches in loose depth for cohesive and cohesionless soil material compacted by heavy compaction equipment and not more than 6 inches in loose depth for

cohesive and cohesionless soil materials compacted by hand operated tampers.

b. Place material in lifts uniformly to the same approximate elevation, not exceeding the final grade height, in manner required to prevent creation of unbalanced soil lateral pressures, wedging action of materials and soil pressures that exceed the design lateral soil conditions and to prevent damage to the structure.

c. Moisten or aerate each layer to the extent required to obtain the moisture content required for the indicated compaction density. Prevent free water from appearing on surface during or subsequent to compaction operations.

d. Remove and replace with acceptable material, or scarify and air dry otherwise acceptable soil material that is too wet to obtain specified soil density. Assist drying by disking, harrowing, or pulverizing, until moisture content is reduced to value required for compaction.

e. Compact each layer to the required density specified for each area classification. Hand tamp or utilize hand operated vibratory equipment when required to compact material placed in confined areas.

f. Do not place additional layers until density of each layer in place complies with compaction requirements. Perform corrective work as required to obtain required density.

3.04 COMPACTION REQUIREMENTS

A. Compact materials as required in Section 01 45 00 and Paragraph 3.08 below.

B. Recompact and retest all areas represented by failed density tests at Contractor expense.

3.05 TOLERANCES

A. Finished Grade:

1. Plus or minus 3 inches, upon completion of settlement in cultivated areas, but not to exceed 6 inches above finished grade prior to settlement.
2. Plus or minus 1 inch, upon completion of settlement in ditches, berms, and lawn areas, but not to exceed 3 inches above finished grade prior to settlement.
3. Plus or minus 1 inch upon completion of settlement in roadways and driveways, but not to exceed 3 inches above finished grade prior to settlement.
4. All areas that receive fill or backfill shall be kept within settlement tolerances through the warranty period.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 50 00.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.07 SETTLEMENT

A. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the Engineer or Owner, or sooner if required by Engineer or Owner, depending on the critical nature of the settlement.

3.08 SCHEDULE

A. Utility Bedding in Areas of Over Excavation or Trench Bottom is in Bedrock, Hardpan, or Boulders:

1. Bed with Fill Type S1 or A3, to required thickness to obtain specified utility cover compacted to 95 percent minimum. Specified backfill tolerances shall be maintained.

B. Utility Bedding in High Ground Water Table or Flowing Water:

1. Bed with Fill Type A1, 6 inches thick, compacted to 95 percent.

C. Final Backfill:

1. Cultivated Areas; Fill Type S1 or S2, from bedding to subgrade, compacted to 90 percent.
2. Ditches, Berms and Lawn Areas; Fill Type S1 or S2, from bedding to subgrade, compacted to 90 percent.
3. Roadways and Driveways; Fill Type S1 or S2, from bedding to subgrade, compacted to 95 percent.

D. Fill Under Cast-In-Place Structures, Floors, and Manholes:

1. Fill Type A3, to 12 inches, compacted to 97 percent.

E. Topsoil Fill:

1. See Section 31 05 13.

END OF SECTION 31 23 23

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Excavating trenches for utilities.
2. Compacted bedding and fill of utilities to subgrade elevations.
3. Backfilling and compaction requirements for trenches.

B. Related Sections include, but are not limited to:

1. Section 01 45 00 - Quality Control.
2. Section 01 50 00 - Temporary Facilities and Controls.
3. Section 31 11 00 - Clearing and Grubbing.
4. Section 31 05 13 - Soil for Earthwork.
5. Section 31 05 16 - Aggregate for Earthwork.
6. Section 32 90 00 - Landscape Grading.

1.02 REFERENCES

A. Reference Standards include:

1. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
3. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.04 FIELD MEASUREMENTS

A. Verify that survey benchmark, control point, and intended elevations for the Work are as shown on Drawings.

1.05 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Subsoil Fill: As specified in Section 31 05 13.

B. Aggregate Fill: As specified in Section 31 05 16.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Notify utility company to locate utilities.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities that are to remain.

F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Subsoil Type S1 or S2 and compact to density equal to or greater than requirements for subsequent backfill material.

3.02 EXCAVATING

A. Excavate topsoil in accordance with Section 31 14 13.

B. Excavate subsoil required for installation of utilities to required depths in accordance with Section 31 23 13.

C. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

D. Do not interfere with 45 degree bearing splay of foundations. Underpin adjacent structures, as necessary, to prevent damage by excavation Work.

E. Hand trim for bell and spigot pipe joints. Remove loose matter.

F. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard, measured by volume.

G. Stockpile excavated material in an orderly manner, at sufficient distance from the trench to avoid overloading, to prevent slides and cave-ins. Remove excess material not being used from site.

H. In the event of shrinkage of excavated soils, resulting in a shrinkage of backfill along trenches, Contractor shall provide, haul, place, and compact suitable Subsoil Type S1 or S2 from an acceptable source at no cost to Owner.

I. Provide drainage surrounding trench continually. Water shall not be permitted to accumulate in the excavation.

J. Shore as required to protect workmen, banks, adjacent structures, and facilities.

K. Provide uniform bearing support for each pipe section along its entire length.

L. Excavate all unsuitable material from trench.

M. Excavate to an over-depth of a minimum of 6 inches below pipe in areas of bedrock or other extensive rock formations by jack hammer, blasting, or other approved method. Trench width shall be 1.25 times the outside diameter of the pipe.

3.03 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Aggregate Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

D. Soil Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.

E. Employ a placement method that does not disturb or damage utilities in trench. Prevent floatation of pipe.

F. Maintain optimum moisture content of fill materials to attain required compaction density. Use vibratory or special compaction equipment when required.

G. Remove surplus fill materials from site.

H. Leave fill material stockpile areas completely free of excess fill materials. Contractor shall have the responsibility to load, haul, and spread all excess fill off-site.

3.04 TOLERANCES

A. As specified in Section 31 23 23 - Fill and Backfill.

3.05 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Field inspection and testing.

B. Compaction testing will be performed in accordance with ASTM D698 and ASTM D6938.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.

D. Frequency of Tests: Testing shall only be required if tolerances are not being met.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 50 00.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.07 SCHEDULE

A. As specified in Section 31 23 23 - Fill and Backfill.

END OF SECTION 31 23 33

SECTION 32 01 00.91

PAVEMENT REMOVAL, REPAIR AND SURFACING

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Bituminous surfaced streets.
2. Asphalt and concrete pavement removal.

1.02 ADDITIONAL REQUIREMENTS

A. Submittal Procedures: Section 01 33 00.

B. Construction Waste Management and Disposal: Section 01 74 00.

C. Gravel Sub-Base, Base Course and Surfacing: Section 32 11 27.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-in-Place Concrete: Section 03 30 00.

1.04 QUALITY ASSURANCE

A. Allowable Tolerances:

1. Asphalt Concrete:
   a. Thickness: ± ½".
   b. Smoothness:
      1) ¼" per ft. from nearest contact point when checked with 10' straightedge.
      2) No depressions which will pond water.

B. Source Quality Control:

1. Asphalt Concrete: Furnish job mix formula and laboratory tests demonstrating compliance with specified criteria.

C. Codes and Standards:

1. All asphalt concrete resurfacing work in State or County highway right-of-way shall conform to the requirements of SDDOT "Specifications for Open Cut Method for Repair of Asphalt Pavement," as included hereinafter in this specification, unless a more restrictive procedure is required by these specifications.
2. Work shall generally conform to South Dakota Department of Transportation Standard Specifications for Roads and Bridges, Current Edition Section 320, unless a more restrictive procedure is required by these specifications.

1.05 JOB CONDITIONS

A. Weather Limitations:

1. Do not lay gravel surfacing, base course or asphalt surfacing when the underlying surface is muddy, frozen or wet.
2. Asphalt work permitted only at atmospheric temperatures above 45 degrees F.

B. The Contractor shall maintain a clean work area by removing excavated material and debris from the roadway areas in a thorough and timely manner.

1.06 MEASUREMENT AND PAYMENT

A. Unit Price Contract.

1. Measurement of asphaltic surfacing materials shall be on the basis of weight, in tons, of materials actually furnished for use on the project for authorized repair resurfacing work. Measurement of asphalt concrete will include the weight of the asphalt cement.
2. Payment will be at the contract unit price per ton.
3. Payment will include full compensation for materials, hauling, placing and compacting surfacing materials. Payment for asphalt concrete materials will be on a composite basis, where the cost of the asphalt cement is included in the contract price of the mixture.
4. No payment will be made for surfacing materials needed to repair roadways where such repairs are necessitated by Contractor's carelessness or as a result of damage to pavements by Contractor's work forces outside of the project areas. Unless prior authorization of the Engineer is obtained, the estimated width of authorized asphalt pavement repair as shown on the plans shall be used as payment limits. If trenching conditions require additional width, approval must be obtained from Engineer. Widths in excess of 10 feet for open cut trenches will not be acceptable unless authorized by the Engineer.

B. Pavement Removal, Sawcutting and Tack.

1. Pavement sawing will not be measured but shall be absorbed into the item to which it relates.
2. Concrete curb and gutter and concrete gutter removal will be measured in linear feet to the nearest linear foot. Payment will be at the contract unit price per linear foot.
3. Concrete pavement removal will be measured in square feet to the nearest one square foot. Payment will be at the contract unit price per square foot.
4. Asphalt for tack will not be paid for directly.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate for Asphalt Concrete: Sound angular crushed stone or crushed gravel (ASTM D-692).

B. Asphalt Cement: 58-28 or 64-22.

C. Tack Coat: Emulsified asphalt, SS-lh or CSS-lh; ASTM D-977.

2.02 ASPHALT CONCRETE DESIGN MIX

A. Class G or E, Type I gradation per Section 880, South Dakota Department of Transportation “Standard Specifications for Roads and Bridges,” Current Edition.

B. Asphalt content between 4.5% to 6.0% by weight.

C. Recycled asphalt composite mix allowed per SDDOT specifications.

PART 3 EXECUTION

3.01 ASPHALT SURFACING

A. Preparation:

1. Sawcut full-depth, both edges of the trench line or repair area on parallel lines a distance of approximately 9" outside of the limits of the previous pavement removal limits during trenching operations. The pavement removal limits shown on the drawings are the final limits unless a change is approved by the Engineer.
2. Remove all material to the sub-grade depth to provide neat vertical lines at the pavement edges.
3. Compact the sub-grade to the required density per Specification 31 23 33.
4. Tack coat vertical contact surfaces of existing pavement immediately prior to placing asphalt concrete.

B. Placing Asphalt Concrete:

1. Place asphalt concrete in not less than two distinct lifts of not more than 3" loose thickness.
2. Asphalt tack not required when asphalt concrete placed in successive lifts.
3. Spread, tamp and finish mixture by machine spreading where possible and by hand in areas where machine placement is impractical. The contractor may use hand placement only in irregular shaped areas with approval by the Engineer.
4. Maintain minimum temperature of 225 degree F.
5. Compact mixture by rollers, or by vibrating plate compactors in non-accessible areas.
6. Perform finish rolling with steel faced, self-propelled type rollers, of sufficient weight and size to produce a properly compacted and smooth surface finish.
7. Check surface smoothness and crown slope with a straightedge while the mix is warm enough for adjustments, and rake, loosen and add mixture as necessary to achieve a smooth uniform surface free of roller marks, water puddles or other irregularities.

C. Asphalt Surfacing Thickness: Thickness of asphalt surfacing shall be as shown on the plans or as directed by the Engineer. The Engineer may direct placement of asphalt surfacing at thicknesses greater or less than that of existing surfacing at the time of construction.

D. Scheduling Surfacing Repairs:

1. Asphalt surfacing replacement shall be completed as soon as is practical after completion of trenching and backfilling operations.

2. Gravel surfacing at asphalt repair areas is permitted on an interim basis only when construction areas must be opened to traffic in advance of permanent pavement repair.
3. The Contractor shall maintain temporary surfacings in a smooth and well-compacted condition at all times.
4. The Contractor shall be responsible for coordinating traffic control during pavement repair. The Contractor is solely responsible for determining closure length for asphalt surfacing and routing traffic to alternate routes until the pavement is opened to traffic.

3.02 PAVEMENT SAWING

A. Description: This work shall consist of sawcutting existing concrete or bituminous pavements with power driven pavement sawing equipment to facilitate pavement removal.

B. Sawing shall be performed on those lines marked in the field by the Engineer or on lines designated on plans where paved surfaces are to be removed. Sawing shall extend to the full depth of the pavement, or to a sufficient depth to insure a clean break from the paved surface to remain in place, but in no case less than 3 inches.

C. Pavements shall be pulverized and broken in place, if necessary, to ensure that paving to remain will not be damaged by removal effort.

D. Sawing shall be done on neat straight lines insofar as possible unless otherwise directed.

E. The Contractor may elect to sawcut pavement prior to the trenching work and prior to the pavement repair, but sawcutting will be measured only prior to the pavement replacement.

F. The Contractor shall sawcut and remove any damaged asphalt edge due to Contractor negligence at no additional cost.

3.03 CURB AND GUTTER REMOVAL

A. Existing concrete curb and gutter shall be removed where shown on the plans or directed by the Engineer. Removal shall be facilitated by sawing the curb and gutter section to a depth of at least ½ of the total depth of the section.

B. Curb and gutter shall be broken in place into pieces which can be conveniently handled without damage to adjacent curb or pavement sections.

C. Removed concrete shall be disposed of at approved waste disposal areas designated in the specifications or by the Owner.

3.04 PAVEMENT REMOVAL

A. Description: This work shall consist of removal and disposal of concrete pavements, bituminous pavements, driveway, sidewalk, valley gutters and all other similar concrete work which is not classified as curb and gutter.

B. Concrete and bituminous pavements shall be removed and disposed of in accordance with the Section 01 74 19. Removal shall be facilitated by sawing a neat line at least 3 inches deep into the section to confine breakage to the desired location. Limits of removal shall be confined to existing contraction joints where possible.

3.05 TRAFFIC CONTROL

A. Signing and safety devices shall be utilized in accordance with requirements of Part VI of the Manual on Uniform Traffic Control Devices.

3.06 EXCAVATION

A. All unstable material, as determined by the Engineer, shall be removed and disposed of by the Contractor.

END OF SECTION 32 01 00.91

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SECTION 32 05 16
AGGREGATES FOR EXTERIOR IMPROVEMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Aggregate materials.

B. Related Sections include, but are not limited to:

1. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.

2. Division 01 – General Requirements Specification Sections.

3. Division 31 – Earthwork Specification Sections.

4. Division 32 – Exterior Improvements Specification Sections.

1.02 REFERENCE STANDARDS

A. Reference standards include, but are not limited to:

1. Utah Department of Transportation Standard Specifications for Road and Bridge Construction - Latest Edition.

1.03 SUBMITTALS FOR REVIEW

A. Refer to Section 01 33 00 - Submittals: Procedures for submittals.

B. Product data:

C. Samples: Submit, in air-tight containers, 40 pound sample of each type of aggregate to testing laboratory. Submit Laboratory Results to Engineer.

1.04 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PART 2 PRODUCTS

2.01 AGGREGATE MATERIALS

A. Coarse Aggregate (Type A1): Well graded crushed stone or gravel conforming to the requirements of ASTM C33, Gradation 67.

B. Coarse Aggregate (3/4-inch Minus Aggregate Surface Course and Type A2): Gravel; angular crushed, or natural stone; free of shale, clay, friable material and debris; with gradation within the following limits:

Sieve Size	Percent Passing (%)
3/4-in.	100
No. 4	40 to 70
No. 10	25 to 55
No. 200	2 to 8

C. Sand (Type A3) Friable river or bank aggregate, free of loam and organic matter. Graded as follows:

Sieve Size	Percent Passing (%)
3/8-in.	100
No. 100	1 to 100

D. Fine Aggregate (Granular Bedding, Granular Encasement and Type A5):

1. Imported Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic material shall be sand and silty sands conforming to ASTM D2487 Group Symbol SP or SP-SM and graded in accordance with the following table, when tested in accordance with ASTM C117 and C136. When metallic pipe, valves, or fittings are used, the material shall also be free of sharp angular particles which may damage coatings or other corrosion protection materials.

Sieve Size	Percent Passing (%)
3/4-in.	95 to 100
3/8-in.	75 to 100
No. 4	38 to 95
No. 200	0 to 9

2. Imported Bedding Material shall be used to bed all pipe, fittings, hydrants, couplings, or valves.

3. The Imported Bedding Material aggregate shall be free from all organic matter, lumps or balls of clay, frozen material. The PI of bedding shall be non-plastic (NP) or the fines shall be classified as silt (ML) based on the PI.

4. Where metallic pipe, valves, or fittings are used, the material shall have an electrical resistivity greater than 900 ohm-cm in accordance with ASTM G57 (to ensure pipe is surrounded in material that is not corrosive). No clays shall be mixed with the material in the pipe-zone (to ensure water cannot be trapped in the pipe-zone). This requirement includes metal valves and fittings.

E. Base Coarse: Base course material should be comprised of Untreated Base Course Aggregate Class "B" per Section 02721 of the Utah Department of Transportation Standard Specifications.

F. Structural Fill: Fine sand and gravel, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Conforming to ASTM D2487 Group Symbol GM, GC, SM, SC, SP, SW, or dual symbol groups with gradation within the following limits.

Gradiation Requirements	
Standard Sieve Size	Percent Passing (%)
4-in.	100
3/4-in.	70 to 100
No. 4	50 max
No. 200	20 max*
Plasticity Requirements of Fines (Atterberg Limits)	
Plasticity Index	6 or Less
*Fill with more than 20 percent fines may be acceptable as approved by Geotechnical Engineer.	

1. The Geotechnical Report anticipates that the on site granular fill soil may be suitable for re-use as structural fill. However, it should be noted that these soils contain a higher percentage of fine-grained material, which may be more difficult to moisture condition and compact, particularly in wet weather conditions.

G. Granular Foundation Rock: Mixture of crushed and uncrushed rock, with at least 35% of the rock fraction having 1 or more natural or manufactured fractured faces, meeting ASTM C33 1” nominal size aggregate sizes #4 through #57.

2.02 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control.

B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136 and ASTM D698.

C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136 and ASTM D698.

D. If tests indicate materials do not meet specified requirements, change material or material source and retest.

E. Provide materials of each type of aggregate from the same source throughout the Work.

PART 3 EXECUTION

3.01 STOCKPILING

A. Contractor may stockpile materials in accordance with Section 31 14 13 – Soil Stripping and Stockpiling.

3.02 STOCKPILE CLEANUP

A. Cleanup stockpiles in accordance with Section 31 14 13 – Soil Stripping and Stockpiling.

END OF SECTION 32 05 16

SECTION 32 11 23
AGGREGATE BASE COURSES

PART 2 PRODUCTS

1.01 MATERIALS

END OF SECTION 32 11 23

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SECTION 32 11 27

GRAVEL SUB-BASE, BASE COURSE AND SURFACING

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Aggregate base course and gravel surfacing for use in pavement construction.
2. Aggregate Sub-base for use in soil stabilization and roadway construction.
3. Gravel surfacing for roadways and driveways.

1.02 QUALITY ASSURANCE

A. Allowance Tolerances:

1. Gravel Base Course:
   a. Thickness: Specified Thickness ± ½".
2. Gravel Sub-base:
   a. Thickness: Specified Thickness ± ½".
3. Gravel Surfacing:
   a. Thickness: Specified Thickness ± ½".
   b. Smoothness: No depressions which will pond water.

B. Source Quality Control:

1. Gravel Base Course, Sub-base and Surfacing: Furnish source description of each product and laboratory sieve analysis (ASTM C-136).

1.03 JOB CONDITIONS

A. Weather Limitation:

1. Do not lay gravel base when underlying surface is muddy, frozen or wet, or during periods of precipitation.

1.04 METHOD OF MEASUREMENT

A. Unit Price Contract.

1. Measurement of aggregate base course and aggregate sub-base materials shall be on the basis of weight, in tons (TON), of materials actually furnished for use on the project for authorized repair of resurfacing work.
2. Payment will be at the contract unit price per ton (TON).
3. Payment will include full compensation for materials, hauling, placing and compacting surfacing materials.
4. No payment will be made for the aggregate materials needed to repair areas where such repairs are necessitated by Contractor's carelessness or as a result of damage to pavements by Contractor's work forces outside of project areas.

PART 2 PRODUCTS

2.01 MATERIALS

A. Gravel Base and Surfacing:

1. Sound angular crushed stone from limestone or ledge-rock sources or crushed gravel from alluvial sources.
2. Gradation:

SIEVE SIZE	TOTAL AND PASSING (PERCENT BY WEIGHT)
1"	100
¾"	80 – 100
½"	68 – 91
NO. 4	46 – 70
NO. 8	34 – 58
NO. 40	13 – 35
NO. 200	3 - 12

a. The fraction passing the No. 200 sieve shall not be greater than 2/3 of the fraction passing the No. 40 sieve.

3. Plasticity index: 0-6.
4. L.A. Abrasion Test Loss: 40 (max.).

B. Gravel Sub-base

1. Sound angular crushed stone or gravel.
2. Gradation:

SIEVE SIZE	TOTAL AND PASSING (PERCENT BY WEIGHT)
3"	100
1"	0 -15
½"	0 - 5

PART 3 EXECUTION

3.01 GRAVEL BASE COURSE AND SURFACING

A. Preparation:

1. Prepare sub-grade of all roadway and driveways to density requirements specified in this specification for areas in roadways.
2. Remove loose and foreign material from disturbed areas.
3. Shape sub-grade to the plan cross-section, and to an elevation which will allow placement of the required compacted thickness of Sub-base, base course and surfacing.

B. Placing Base Course and Surfacing.

1. Spread gravel uniformly over the prepared sub-grade in loose lifts of 4” or less and water and compact.
2. Compact to not less than 95% of maximum density per Modified Proctor (ASTM D-1557) using pneumatic-tired, vibratory, steel faced or other suitable equipment.
3. Shape the finished base to the lines and grade called for on the plans.
4. For surfacing layer, finish grade for uniform texture and free draining surfaces.

C. Placing Sub-base.

1. Sub-base for this project will be required when directed by the Engineer. If no bid item is provided for Gravel Sub-base, then the sub-base will be paid for at the same contract unit price as for gravel surfacing.
2. Place sub-base in lifts of 5” or less and compact by rolling with pneumatic tired, vibratory, steel-faced or other suitable equipment.
3. Density requirements are not specified, but a uniform stable surface shall be attained.

D. Base Course Over Engineering Fabric.

1. Gravel base to be placed over engineering fabric shall be placed such that the fabric is not damaged, shoved, kinked or wrinkled. Placement depth shall be as directed by the Engineer. Watering and rolling may be waived by the Engineer, dependent upon subgrade conditions. A steel faced roller shall be used in place of a rubber-tired roller to compact the gravel.
2. Density requirements are not specified, but a uniform, stable surface shall be maintained.

END OF SECTION 32 11 27

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SECTION 32 12 16
ASPHALT PAVING

PART 2 PRODUCTS

1.01 MATERIALS

1.02 ASPHALT PAVING MIXES AND MIX DESIGN

END OF SECTION 32 12 16

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SECTION 32 16 13

CURBS, GUTTERS, AND SIDEWALKS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Concrete Curb and Gutter.
2. Concrete Walks.
3. Truncated Domes.

B. Related Sections include:

1. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.
2. Division 01 - General Requirements Specification Sections.
3. Division 31 - Earthwork Specification Sections.
4. Division 32 - Exterior Improvements.

1.02 REFERENCES

A. Utah Department of Transportation Standard Specifications for Road and Bridge Construction - Latest Edition.

B. American Public Works Association (APWA) Utah Chapter Manual of Standard Specifications - Latest Edition

1.03 SUBMITTALS

A. Product Data: Furnish data on aggregates, Portland cement, air-entraining agent, admixtures, any other materials, and plant mix design in accordance with Sections 01 33 00 and 01 45 00 at least 7 days prior to beginning paving operations. Engineer must approve mix formula prior to its use on Project.

B. Samples for Verifications: For each type of exposed color, pattern, or texture indicated.

1.04 REFER TO APWA SPECIFICATION SECTION 32 16 13 - CONCRETE DRIVEWAY, SIDEWALK, CURB, GUTTER FOR FURTHER REQUIREMENTS ON PART 1, PART 2 AND PART 3 OF THIS SPECIFICATION.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 – EXECUTION

3.01 NOT USED

END OF SECTION 32 16 13

SECTION 32 97 00
RESTORATION OF DISTURBED AREAS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Restoration of all areas disturbed during construction.

2. Restoration of all items not specifically identified for restoration, but damaged through construction.

B. Related Sections include:

1. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.

2. Division 01 – General Requirements Specification Sections.

3. Division 31 – Earthwork Specification Sections.

4. Division 32 – Exterior Improvements.

1.02 REFERENCES

A. Reference Standards include:

1. North Dakota State Highway Department Standard Specifications for Road and Bridge Construction, latest edition.

PART 2 PRODUCTS

2.01 MATERIALS

A. Material Sections include:

1. Aggregate Materials: Per Section 32 11 23.

2. Seed: Per Section 32 92 19.

PART 3 EXECUTION

3.01 EXECUTION

A. Observe all surface features requiring protection, removal and replacement, and/or restoration prior to construction.

B. The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land

monuments and property marks until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

C. The Contractor shall be responsible for all damage or injury to property of any character during the prosecution of the Work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the Work, or at any time due to defective Work or materials, and said responsibility will not be released until the Project shall have been completed and accepted.

D. When any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to the condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding, or otherwise restoring as may be directed or he shall make good such damage or injury in an acceptable manner.

3.02 RESTORATION

A. Restore all areas disturbed by construction to a condition equal to or better than existed prior to construction.

B. Replace, restore, repair, or otherwise make good any damage done to any tree, bush, or shrub that is not specifically designated for removal.

C. Restore items such as culverts, road signs, power poles, sodding, fences, driveways, mailboxes, and like, whether or not specifically identified on the Drawings, to a condition equal to or better than existed before construction.

D. Replace or repair all concrete or asphalt roads or driveways, removed or damaged during construction with equal or better materials. Replace or repair to match existing conditions.

E. Stabilize subgrade sufficiently to prevent mixing of granular material with subgrade prior to application of base material.

F. Place topsoil per Section 31 05 13 and seed areas disturbed by construction in grassed areas per Section 32 90 00.

G. All damage to streets, driveways, berms, etc. due to the Contractor’s construction techniques and equipment shall be repaired at the Contractor’s expense prior to final payment.

H. Remove all excess dirt, concrete, and other debris from work area immediately upon completion of Work and deposit on-site in a disposal area designated by Owner. Contractor shall be required to clean site to the condition prior to the start of construction before final payment will be made.

I. All restoration shall be completed prior to opening any section of Work.

END OF SECTION 32 97 00

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SECTION 33 05 26
UTILITY IDENTIFICATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. GPS Mapping
2. Tracer Wire for Non-Metallic Pipe.
3. Tracer Wire Access Box.
4. Detector Tape

B. Related Sections include, but are not limited to:

1. Section 01 33 00 – Submittals.
2. Section 31 23 33 – Trenching and Backfilling for Pipelines.
3. Section 33 31 00 – Sanitary Utility Sewerage Piping

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals.

B. Shop Drawings: Submit manufacturer's data on materials furnished indicating compliance with the specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tracer Wire Materials

1. Approved Manufacturers:

a. Copper Clad Steel (CCS) Trace Wire
- 1) Open Trench
  - (a) Copperhead #12 High Strength part # 1230-HS
  - (b) Approved Equivalent
- 2) Directional Drilling/Bore
  - (a) Copperhead Extra High Strength part # 1245*EHS
  - (b) Approved Equivalent
- 3) Connectors
  - (a) DryConn 3-way Direct Bury Lug: Copperhead Part # 3WB-01
  - (b) Copperhead 3-way locking connector part # LSC1230*

(c) Approved Equivalent

4) Termination/Access

(a) Non-Roadway access boxes applications: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP
Approved Equivalent

(b) Concrete/Driveway access box applications: Trace wire access boxes Grade level Copperhead Part # CD14*TP 14"
Approved Equivalent

(c) Fire hydrant trace wire access box applications: Above ground two terminal with 1" conduit. Copperhead part # T3-75-F (Cobra T3 Test Station, denoting "F" includes mounting flange)
Approved Equivalent

5) Grounding

(a) Drive in Megnesium Anode: Copperhead Part # ANO-1005 (1.5 lb)

(b) Approved Equivalent

2. Tracer Wire

a. Direct bury wire. Installed on all underground utilities such as water and sewer pipes.

b. Trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

c. Open Trench Trace wire - Trace wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.

d. Directional Drilling/Boring Trace wire - Trace wire shall be #10 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.

3. Tees

a. All mainline trace wires shall be interconnected in intersections, at mainline tees and mainline crosses.

1) Tees: the three wires shall be joined using a single 3-way lockable connector.

b. Crosses: the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

1) Non-locking friction fit, twist on or taped connectors are prohibited.

4. Trace Wire Termination/Access

a. All trace wire termination points shall utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.

b. All grade level/in-ground access boxes shall be appropriately identified with “water” cast into the cap and be color coded.

c. A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.

d. All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
e. Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.
f. Service Laterals on public property – Trace wire must terminate at an approved grade level/inground trace wire access box, located at the edge of the road right-of-way, and out of the roadway at all fire hydrants, curb stops, and service laterals.
g. Service Laterals on private property – Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.
h. Hydrants – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable)
i. Long-runs, in excess of 500 linear feet without service laterals or hydrants – Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a minimum 48” polyethylene marker post, color coded per APWA standard for the specific utility being marked.

5. Trace Wire Grounding

a. Trace wire must be properly grounded at all dead ends/stubs
b. Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.
c. When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
d. When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.

e. Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

6. Prohibited Products and Methods

   a. Un-insulated trace wire

7. Trace wire insulations other than HDPE

   a. Non locking, friction fit, twist on or taped connectors
   b. Brass or copper ground rods
   c. Wire connections utilizing taping or spray-on waterproofing
   d. Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
   e. Trace wire wrapped around the corresponding utility
   f. Brass fittings with trace wire connection lugs
   g. Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
   h. Connecting trace wire to existing conductive utilities

B. Detector Tape:

1. "Terra Tape" as manufactured by REEF Industries, Inc., or Omega Marking Company.

2. Size: 3".

3. Detector Tape Schedule and Warning Notice:

Pipeline	Warning Notice	Color
Sanitary Sewer BD / PRS / DS / EAE / EAI / FCI / FTR / INF / ODE / ODI / PDN / TDS / TTI	Caution Buried Sewer Line Below	Green
Force Main AIR / CHM / DGS / EFF / FMDS / RAS / SCM / SPG / TINF / TRAS / TTTI / TWAS / WAS	Caution Buried Force Main Below	Green
Storm Sewer STS	Caution Buried Storm Drain Below	Green
Potable Water Main PW	Caution Water Line Buried Below	Blue
Reclaimed Water PWS / EHE / EWS	Caution Reclaimed Water Line Buried Below	Purple
Electric	Caution Electric Line Buried Below	Red
Gas	Caution Gas Line Buried Below	Yellow

PART 3 EXECUTION

3.01 DETECTOR TAPE INSTALLATION

A. Install the detector tape 24-inches below finished grade directly above and parallel with pipelines. Detector tape shall be installed for all site piping outlined in Section 33 11 00 – Water Utility Distribution Piping, Section 33 11 13 – Steel

Water Utility Transmission Piping, and the Piping Schedule and shall be labeled in accordance with this section.

B. At each manhole, bring the detector tape up to the manhole to a point approximately 24-inches below finished grade. Drill through the manhole and pull the detector tape through the manhole and label the loose end with a plastic marker. Grout hole with non-shrink grout or water stop material.

3.02 TRACER WIRE INSTALLATION

A. At each buried appurtenance, bring the tracer wire up to ground level to a point of easy connection for testing and appropriately mounted.

B. Tracer wire, access boxes, and accessories shall be incidental to the pipe installation cost.

END OF SECTION 33 05 26

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SECTION 33 05 61
CONCRETE MANHOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage, and accessories.

PART 2 PRODUCTS

END OF SECTION 33 05 61

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SECTION 33 31 19
SITE PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Piping Materials and Fittings.
2. Polyethylene Encasement.
3. Reaction Backing (Thrust Blocking).
4. Bedding and Backfilling.
5. Valves.
6. Appurtenances.
7. Trench Insulation.
8. Pipe Installation..
9. Pipe Thrust Restraint.
10. Testing Gravity Lines.
11. Testing Pressure Mains.

B. Related Sections include, but are not limited to:

1. Section 01 31 13 – Project Coordination.
2. Section 01 31 19 – Project Meetings.
3. Section 01 33 00 – Submittal Procedures.
4. Section 01 45 00 – Quality Control.
5. Section 01 61 00 – Common Product Requirements.
6. Section 31 05 13 – Soils for Earthwork.
7. Section 31 23 33 – Trenching and Backfilling.
8. Section 32 05 16 – Aggregates for Exterior Improvements.
9. Section 43 05 10 – Disinfection of Water Systems.

1.02 REFERENCES

A. Reference Standards include, but are not limited to:

1. ASTM A536 - Ductile Iron Castings.

2. ASTM B88 - Seamless Copper Water Pipe.

3. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

4. ANSI/AWWA C104/A21.4 - Cement-Mortar Lining for Gray-Iron and Ductile-Iron Pipe and Fittings for Water.

5. ANSI/AWWA C105/A21.5 - Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids.

6. ANSI/AWWA C110/A21.10 - Gray-Iron and Ductile-Iron Fittings, 3-Inch through 48-Inch, for Water and Other Liquids.

7. ANSI/AWWA C111/A21.11 - Rubber Gasket Joints for Gray-Iron and Ductile-Iron Pressure Pipe and Fittings.

8. AWWA C116-/A21.16-22 Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.

9. ANSI/AWWA C150/A21.50 - American National Standard for Thickness Design of Ductile-Iron Pipe.

10. ANSI/AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.

11. ANSI/AWWA C153/A21.53 - Ductile-Iron Compact Fittings, 3-Inch through 12-Inch, for Water and Other Liquids.

12. AWWA C509 - Resilient-Seated Gate Valves, 3 through 12 NPS, for Water and Sewage Systems.

13. AWWA C550 - Standard for Protective Epoxy Interior Coating for Valves and Hydrants.

14. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

15. AWWA C605 - Underground Installation of PVC Pressure Pipe and Fittings.

16. AWWA C800 - Standard for Underground Service Line, Valves, and Fittings.

17. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In., for Water.

18. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. through 48 In., for Water Transmission and Distribution.

19. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In., for water distribution.

20. ASTM D1784 - Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds.

21. ASTM D1785 - Poly (Vinyl Chloride) Plastic Pipe, Schedules 40, 80, and 120.

22. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).

23. ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe fittings, Schedule 80.

24. ASTM F2306 – 12 to 60in. Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.

25. ASTM F2648 – 2 to 60in. Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications.

26. ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe

27. ASTM D3212 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

28. NSF Standard No. 14, 60, and 61 - National Sanitation Foundation.

29. WW-T-779c – Federal Specifications

1.03 SUBMITTALS

A. Submit Shop Drawings per Section 01 33 00 for all pipe and fittings indicating: Name of Manufacturer, Materials, Standard Dimensions, References, Joint Data, maximum loadings, and thrust restraints.

B. Provide a list of materials and corresponding suppliers.

C. Submit Affidavit of Compliance certifying that materials furnished have been tested and are in compliance with specification requirements.

1. Submit design calculations for structural design of pipe thickness where pipe class or thickness is not specifically called out.

D. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

E. Manufacturer's Instructions: For valves, hydrants, and specialties, furnish in accordance with Sections 01 61 00 and 01 77 00 manufacturer's printed instruction for delivery, handling, storage, assembly, installation, adjustment, special tool requirements, and maintenance requirements.

F. In accordance with Section 01 77 00, provide records of measured depths of water mains, service leads, valves, connections, transition couplings, adapters, and thrust blocking; horizontal and vertical locations of underground utilities and appurtenances referenced to permanent surface improvements; locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the Work; and field changes of dimension and detail.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with Section 01 45 00.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.05 FIELD MEASUREMENTS

A. The Drawings indicate required pipe sizes and the general arrangement for major piping. Locations shall be verified in the field by the Contractor. Valves, fittings, and appurtenances shall be of such dimensions to allow for the installation of piping as shown on the Drawings. In the event it should become necessary to change the location of any of the work due to interference with other work, Contractor shall consult with the Engineer prior to making any changes and all such changes shall be made at no additional cost to the Owner.

B. Prior to roughing in any facilities or installation of piping and equipment, consult all related drawings including general, mechanical, electrical, etc., and become informed of materials, locations of structures, pipes, duct banks, electrical conduits, etc., which may impact the installation.

C. Discrepancies discovered before or after work has started shall be brought to the attention of the Engineer immediately. The Engineer reserves the right to require minor changes in the work to eliminate such discrepancies.

D. Pipe connections to equipment shall be subject to approval of Engineer and coordinated to meet the manufacturer's recommendations and requirements.

E. No work that connects directly to equipment shall be installed before complete shop drawings of said equipment have been reviewed and approved by the Engineer.

1.06 PROJECT CONDITIONS

A. Verify all dimensions of and between existing structures and locations of existing piping and equipment required for the proper installation of all new piping and equipment.

B. Contractor shall be responsible for verification of location of all existing piping and structures. Potholing and/or excavation to expose existing piping, conduits, etc. may be required prior to installation of new piping or connection to existing piping. Adjustments to the locations of new piping may be required due to locations of existing piping and sequencing of construction that will be required. Adjustments required shall be at no additional cost to the Owner.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivered materials shall be stockpiled and stored at locations approved by the Owner until required for installation. Materials shall be transported, delivered, stored, and handled in accordance with Manufacturer's instructions and the requirements of Section 01 61 00.

B. Contractor shall inspect materials upon delivery for loss or damage in transit. Contractor shall be responsible for the replacement of damaged materials; damaged materials shall be removed from the Site.

1.08 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PART 2 PRODUCTS

2.01 DUCTILE IRON PIPE (DIP) AND FITTINGS

A. The pipe and fittings furnished shall be of the Ductile Iron type as specified for each particular use or installation and shall be minimum Pressure Class 150 for pipe 14 inches and greater, unless otherwise noted.

B. Materials:

1. Ductile iron pipe shall conform to the requirements of AWWA C151/ANSI A21.51 with mechanical joints.

2. Mechanical or push-on joints shall conform to the requirements of AWWA C111/ANSI A21.11.

3. The weight, class, or nominal thickness and casing period shall be shown on each pipe. The manufacturer's mark, year produced, and letters "DI" or "Ductile" shall be cast or stamped on the pipe.

4. Mechanical joint fittings shall conform to the requirements of AWWA C110/ANSI 21.10 or AWWA C153/ANSI 21.53 rated at 250 psi or 350 psi for piping larger than 16-inches in diameter, and AWWA C110/ANSI 21.10 or AWWA C153/ANSI 21.53 rated at 350 psi for sizes up to and including 16-inches in diameter. No plain end fittings shall be allowed.

5. Rubber gaskets shall conform to the requirements of AWWA C111. Gaskets used for air piping shall be EPDM.

6. All pipe joints and fittings shall have conductive gaskets with copper inserts or copper strap welded to the pipe and connected with "Cor-Blue" bolts by NSS industries, or equal. The conductors shall be rated at 600 amps sustained current.

7. The nuts and bolts shall be constructed of corrosion resistant, high-strength, low-alloy steel with a ceramic filled, baked on fluorocarbon resin. The nuts and bolts shall be in compliance with ANSI/AWWA C111/A21.11 and shall be "Cor-Blue" bolts by NSS industries, or equal.

8. All ductile iron pipe and fittings shall be lined with cement mortar in accordance with AWWA C104/ANSI A21.4, unless otherwise noted. Ductile iron pipe and fittings used for air piping shall not be cement lined.

9. All watermain materials furnished and installed under this contract shall be furnished by a manufacturer having notable reputation within the industry.

10. All ductile iron pipe and fittings shall be encased with enhanced V-BIO polyethylene encasement in accordance with AWWA C105.

C. All exterior surfaces of pipe and fittings shall have a tar or bituminous seal coating at least one (1) mil thick conforming to AWWA C151. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection of the materials.

D. Retainer glands for restrained joints shall be American, US Pipe, or EBAA Iron, Inc. Mega Lug type, ductile iron, and be designed to meet or exceed the pressure classification of the corresponding pipe. Restraint glands for mechanical joint pipe shall be EBAA Iron, Inc. Megalug, Series 1100, or equal. Push joint pipe shall be restrained using restraint harnesses EBAA Iron, Inc. Megalug, Series 1700, or equal. Joint restraint systems shall be rated for at a minimum the design pressure of the pipe with a 2 to 1 safety factor.

E. Restrained joint pipe may be used in lieu of joint restraint systems for push on and mechanical joint pipe. Restrained joint pipe shall be US Pipe TR Flex or American Flex Ring pipe, or equal.

F. Nuts, bolts, and tie rod restraints shall be 304 stainless steel. Tee bolts for mechanical joints and fittings shall be “Cor-Blue” by NSS industries, or equal.

2.02 POLYETHYLENE ENCASEMENT

A. Conform to and install per ANSI/AWWA C105/A21.5.

B. Install on all underground metallic items, including: ductile iron pipe, ductile iron fittings, metal body valves, other metal pipe and fittings, fire hydrants, stainless steel couplings, transition couplings, and service and testing tapping saddles.

2.03 REACTION BACKING (THRUST BLOCKS)

A. Conform to details shown on Drawings for bends, tees, fire hydrants, dead end plug, and service tap connections.

2.04 BEDDING AND BACKFILLING

A. Refer to Section 31 23 33 Trenching and Backfilling

B. Refer to Section 32 05 16 Aggregates for Exterior Improvements

2.05 DUCTILE IRON PIPE AND FITTINGS

A. Approved Manufacturers:

1. McWayne Ductile.

2. US Pipe.

3. Engineer-Approved Equal.

B. Pipe

1. Pipe shall be in accordance with AWWA/ANSI C111/A21.11, AWWA/ANSI C150/A21.15, and AWWA/ANSI C151/A21.51.

2. Pipe spool shall have a lay length that complies with the drawings.

3. Minimum Pressure Class of 150 psi.

C. Fittings

1. Mechanical Joints

a. Comply with AWWA/ANSI C111/A21.11.

2. Drop in Grate: Nyloplast, 24”.

2.06 APPURTENANCES

A. Service and Tapping Saddles:

1. All stainless steel tapped outlet, band clamps, nuts, bolts, and washers.

2. Heavy gauge type 304 stainless steel shell construction, passivated welds, double bolt type with minimum band width of 6 inches, and rubber “O”-ring gasket pad meeting ASTM D2000.

3. Meet or exceed the ANSI/AWWA C800 standards, 200 psig.

4. Approved manufacturers:

a. Romac Industries, Inc.
b. Dresser Industries.
c. The Ford Meter Box Company.
d. Approved equivalent.

B. Tapping Sleeve:

1. Stainless steel full wrap around body.

2. All stainless steel tapped outlet, nuts, bolts, washers.

3. Gasket to provide seal around full circumference of pipe.

4. Approved manufacturers:

a. Romac Industries, Inc.
b. The Ford Meter Box Company.
c. Approved equivalent.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall verify location of piping and piping systems as shown on the Drawings.

B. Contractor shall be aware that it may be necessary to move a piping run a reasonable amount or shift it slightly up or down to avoid an existing obstruction or other piping runs. Contractor shall not receive additional compensation due to slight shift or movement of piping runs.

C. Not all fittings may be shown on the Drawings, the fittings shown are meant to give a graphical representation only. Additional fittings required for differences in vertical and/or horizontal alignment may be required. Contractor shall not receive additional compensation due to additional fittings required to meet vertical and horizontal alignments.

D. The Drawings show a two (2) dimensional graphical representation of the piping systems, Contractor shall note that there may need to be additional pipe length due to the vertical elevation differences that have not been represented on the drawings.

E. All buried piping with less than eight (8) feet of cover shall be insulated. Trench insulation shall be provided above the pipe with a minimum thickness of four (4) inches at the width shown on the drawings for all storm sewer crossing of pressure piping.

F. Contractor shall provide Owner with a minimum 48 hour notice on all requests to take a watermain out of service and shall be only at off-peak times.

G. Contractor has ability to modify the inverts of the potable water, plant water system, and effluent heat exchanger pressure systems to avoid pipe conflicts. All three of these systems have been set constant elevations throughout the site. Contractor shall have the ability to modify invert elevations as long as eight (8) feet of cover has been maintained.

H. All joints shall be properly restrained in accordance with these specifications.

I. Contractor shall provide dewatering as necessary, piping shall not be laid in water or wet conditions.

J. See Section 31 23 33 for all trench excavation and backfill requirements, and piping system bedding requirements.

K. See Division 40 for all exposed process piping and valves.

3.02 PREPARATION AND STORAGE

A. Store pipe on-site on flat surface so barrel is evenly supported. Do not stack higher than 6 feet. Cover pipe with opaque material for extended storage.

B. Remove scale and dirt on inside and outside before assembly. Inspect for damage to pipe and other materials before installation.

3.03 INSTALLATION – PIPE, VALVES, AND APPURTENANCES

A. The type, kind, and class of pipe to be used shall be as shown on the Drawings. All pipes shall be laid to the required line and grades.

B. Install all pipe and appurtenances in strict accordance with manufacturer's recommendations.

1. For Reinforced Concrete Pipe storm sewer, tie bolts shall be placed on the last three barrel sections and flared end section. Grout tie bolts using non-shrink masonry cement.

C. All foreign material or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench and it shall be kept clean by approved means during and after laying.

D. Pipe materials shall be handled carefully. Damage to protective coatings, linings, and joint fittings shall be cause for rejection of the materials. Prior to installation of each pipe section, fitting, or valve shall be thoroughly inspected by the Contractor to detect damage or defects. Contractor shall inform Engineer of such damage or defects. Any defective, damaged, or gravity piping which has had its grade or joint disturbed after layer shall be replaced.

E. Cut pipe in a neat and precise manner without damaging the pipe. Cutting of pipe for connections or pipe run lengths or inserting of fittings and valves shall be done in accordance with pipe manufacturer recommendations. Rough edges shall be removed and where rubber gasket joints are used, the outer edge shall be beveled by grinding or filing to produce a smooth fit.

F. Trench preparation shall proceed in advance of pipe installation only so far as can be backfilled the same day, or as permitted by the Owners specifications.

G. Excavate and backfill excavations and trenches in accordance with Section 31 23 33.

H. Keep trenches free from surface and ground water until pipe jointing is complete.

I. All fittings shall be set on cast in place or precast concrete blocks in order to prevent the weight from being transmitted to the pipe. Before concrete is placed around fittings and appurtenances, the appurtenance and pipe shall be wrapped with polyethylene to completely isolate the concrete from the water main construction.

J. Form and place concrete for thrust blocking at each bend, tee, or change of direction. Thrust blocks shall bear on undisturbed earth.

K. Securely close open ends of pipe and fittings when Work is not in progress.

L. Pipe Installation:

1. Install piping to lines, grades, and dimensions shown on Drawings.

2. Take up and relay any pipe disturbed from its required grade or alignment.

3. Install pipe to allow for expansion and contraction without stressing pipe.

4. Install pipe such that maximum deflections from straight line or grade do not exceed manufacturer's specifications. Install bend fittings where maximum deflections are exceeded.

5. Notify Engineer and Owner at least 48 hours in advance of service disruptions and connections.

M. Prior to pipe placement the bedding conditions shall be such as to provide uniform and continuous support for the pipe. For belled pipe, bell holes shall be excavated as necessary to make the joint connections and provide proper support. Pipe shall not be laid in water or unsuitable bedding conditions. See Section 31 23 33 for bedding requirements.

N. Piping shall be carefully lowered into laying position by the use of suitable restraining devices. The pipe shall not be dropped or dumped into the trench. All foreign matter or dirt shall be removed from the inside of the pipe and fittings before they are placed into position. Pipe joints shall be kept clean prior to and during installation. The joint surface shall be inspected prior to placement to ensure that there is no foreign matter, coating blisters, projections, rough edges, or damaged gaskets that may impact the integrity of the joint connection.

O. As each length of pipe is placed in laying position the pipe shall be secured in place with approved backfill material and the appropriate compaction as specified in Section 31 23 33.

P. Bell and spigot piping shall be laid with the bell ends facing upgrade and the laying shall start at the downgrade end and proceed upgrade, unless otherwise permitted by the Engineer.

Q. When pipe laying is not in progress the open ends shall be closed by watertight plugs or other approved means. In the presence of water, the pipe end shall remain sealed until the trench has been properly drained or dewatered.

R. At connections to existing piping, Contractor shall remove all dirt and debris that is allowed to enter the existing lines.

S. Inspection: Do not cover pipe and fittings until all bedding, joints, and polyethylene wrap have been inspected.

T. Replace any pipe, fittings, or appurtenances found defective after installation has been completed.

U. PVC pipe used for force main and water main shall be installed in accordance with AWWA C605, AWWA Standard for Underground Installation of PVC Pressure Pipe and Fittings for Water.

V. Flanged Tapping Sleeve for PCCP Installation;

1. The sleeve shall have a separate gland, which allows the sleeve to be installed, and the annular space between the pipe and the sleeve to be grouted, prior to cutting the prestressed wires.

2. Foam or rubber grout gaskets and hard rubber spacers shall be used to provide an annular space between the pipe and the sleeve. Grout horns shall be furnished to facilitate grouting of the annular space.

3. The annular space shall be grouted with a suitable Portland cement grout. The grout shall be allowed to set prior to cutting any prestressing wires. Any accelerant used in the grout shall not be deleterious to prestressing wire.

4. The pressure plate shall be adequately braced to eliminate vibration & flexing of the plate while the tapping machine is operating.

5. The machined gasket groove on the pressure plate must be consistently positioned about throat of tapping gland waterway. However, ID of the gasket groove must be set back a minimum of 1" from the waterway to allow dispersal of forces generated by gasket compression. Gasket grooves machined in a circle and then rolled to an elliptical shape will not be allowed.

6. All waterway welds shall be dye-penetrant inspected or hydrostatically shop tested for water tightness.

7. The gland shall be equipped with load bearing set screws to transfer thrust loads from the branch piping to the sleeve.

8. A three-flange configuration shall be used on all outlets above twelve-inch to allow for valve bypass.

9. Welding the gland to the steel cylinder of the pipe to provide a watertight seal shall not be permitted.

10. The sleeve shall be encased in a minimum of one inch of Portland cement mortar or concrete for corrosion protection after the tap.

3.04 PIPE THRUST RESTRAINT

A. Provide all crosses, tees, bends, caps, and other thrust points in the piping system with suitable means of overcoming thrust.

B. Concrete reaction blocking and/or retainer glands or tie rods may be used subject to the Engineer’s approval. All rods, nuts, bolts, and hardware shall be stainless steel. At tees, 90 degree bends, and dead ends both mechanical type joint restraint and concrete reaction blocking shall be required.

C. Concrete reaction blocking shall be placed so that pipe and fitting joints are accessible for repair, and in such a manner as to provide bearing against undisturbed earth. Pressure testing shall not proceed until concrete reaction

blocking has reached its design strength. High early strength concrete may be used.

D. The following table is based upon the results of the Ductile Iron Pipe Research Association thrust restraint design program for a test pressure of 150 psig, backfill soil density of 90 pounds per cubic foot, and polyethylene wrapped pipe. The table shows the minimum length of pipe to be restrained for various types of fittings where joint retainer glands are used. The minimum concrete reaction block size is shown in parentheses under the minimum length.

Pipe Diameter (inches)	Dead End Tee Branch 90 Degree Bend	Wye 45 Degree Bends or Less
4	26 LF (3.1 SF)	11 LF (2.0 SF)
6	26 LF (3.1 SF)	11 LF (2.0 SF)
8	34 LF (5.3 SF)	14 LF (3.0 SF)
10	42 LF (8.1 SF)	17 LF (4.4 SF)
12	50 LF (13.4 SF)	20 LF (6.6 SF)
14	58 LF (17.2 SF)	23 LF (9.2 SF)
16	64 LF (21.4 SF)	27 LF (11.6 SF)
18	71 LF (25.2 SF)	30 LF (15.2 SF)
20	79 LF (30.2 SF)	33 LF (18.1 SF)
24	93 LF (38.5 SF)	39 LF (26.1 SF)
30	112 LF (52.5 SF)	46 LF (34.5 SF)
36	132 LF (65.4 SF)	56 LF (40 SF)
42	167 LF (82.5 SF)	70 LF (49 SF)

3.05 POLYETHYLENE ENCASEMENT

A. Where required, all piping, fittings, valves, and appurtenances shall be fully encased in polyethylene film tubing.

B. The polyethylene tubing shall be of appropriate size for the size of pipe being installed. Install polyethylene tubing prior to lowering pipe into trench.

C. Tubing length shall be long enough to provide a minimum of one (1) foot overlap at all joints, fittings, and appurtenances. After completing the pipe jointing and positioning the tubing material, the overlap shall be secured into place with plastic adhesive tape wrapped circumferentially around the pipe at least three (3) full turns.

D. The fit shall be snug over the pipe with no excess or bunched up material. Repair all rips, punctures, or other damage with taping and overlapping patching.

3.06 TESTING GRAVITY LINES

A. Gravity lines, including service connections, shall be substantially watertight and shall be tested for excessive leakage upon completion and before connections

are made to the service. Each test section of the sewer shall be subjected to exfiltration testing, either by hydrostatic or air test method as described below and at the Contractor's option. The requirements set forth for maximum leakage shall be met as a condition for acceptance of the gravity line section represented by the test.

B. If the ground water level is greater than three feet above the pipe invert elevation of the upper manhole and the Engineer so approves, infiltration testing may be allowed in lieu of the exfiltration testing, in which case the allowable leakage shall be the same as would be allowed for the Hydrostatic Test.

C. Testing shall be performed by the Contractor without any direct compensation being made therefore, and the Contractor shall provide necessary equipment and materials, including plugs and standpipes as required.

D. Air Test Method

1. Air testing shall conform to ASTM C 924 for concrete pipe and ASTM F 1417 for plastic pipe and ductile iron.

2. The pipeline shall be sealed with a plug with a sealing length greater than the diameter of the pipe, constructed in such a nature that it will not require external blocking or bracing and will maintain a seal against the line's test pressure.

3. Wyes, tees, outlets or ends of laterals shall be suitably capped and braced to withstand the internal pressures. Such caps or plugs shall be easily removable.

4. One plug shall be tapped for the air supply hose and the return air pressure hose. The air supply hose, connected from the compressor to the plug shall have a throttling valve, bleeding valve and shut off valve for control. The air pressure tap shall have a sensitive pressure gauge, 0 to 10 psi range, protected by a gauge cock and a pressure relief valve set at 10 psi.

5. In performing the test, air is added slowly to the pipeline until pressure inside the pipeline reaches 4.0 psi. If air is added too rapidly, the test accuracy will decrease because a change in temperature also has an effect on the change in pressure. When the air pressure inside the pipeline reaches 4.0 psig above external hydrostatic pressure, the supply air is stopped. A minimum two-minute time interval is allowed for the temperature difference to stabilize before the actual test is performed. If the air pressure drops below 3.5 psig during this time interval, more air will be supplied to the pipeline and throttled to maintain a pressure

between 3.5 psig and 4.0 psig for a minimum of two minutes after which time the supply air will be shut off.

6. The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.0015 cfm per square foot (for PVC) or 0.003 cfm per square foot (for RCP) per internal pipe end area at an average pressure of 3.0 psig greater than any back pressure exerted by groundwater that may be over the pipe at the time of test.

7. The test shall be accomplished by determining the time in minutes for the pressure to decrease from 3.5 psig to 3.0 psig greater than the average groundwater pressure that may be over the pipe. That time shall not be less than the time shown on the given diameter in the following table:

Gravity Line Diameter (Inches)	Minutes for PVC	Minutes for RCP	Minutes for DIP
4	1.9	1.0	1.9
6	2.8	1.4	2.8
8	3.8	1.9	3.8
10	4.7	2.4	4.7
12	5.7	2.9	5.7
15	7.1	3.4	7.1
18	8.5	4.3	8.5
21	9.9	5.0	9.9
24	11.3	5.7	11.3
27	12.8	6.4	12.8
30	14.2	7.1	14.2
33	15.6	7.8	15.6
36	17.0	8.5	17.0
42	19.8	9.9	19.8

8. For pipe lengths exceeding 100 feet, the following table of times shall be used per every 100 feet of pipe. All other testing parameters and requirements shall remain:

Gravity Line Diameter (Inches)	Minutes for PVC	Minutes for RCP	Minutes for DIP
4	1.9	1.0	1.9
6	2.8	1.4	2.8
8	3.8	1.9	3.8
10	4.8	2.4	4.8
12	5.7	2.85	5.7

15	7.1	3.55	7.1
18	9.7	4.85	9.7
21	13.1	6.55	13.1
24	11.4	5.7	11.4
27	14.5	7.25	14.5
30	17.8	8.9	17.8
33	21.6	10.8	21.6
36	25.7	12.85	25.7
42	28.5	14.25	28.5

9. If the pipeline fails to meet the requirement of the test, the Contractor shall, at Contractor's own expense, determine the source of leakage and then repair or replace all defective material and work.

10. In determining the pressure greater than the average groundwater, the groundwater height in feet above the pipeline must be measured.

11. When the water elevation has been established, the height in feet above the pipeline shall be divided by 2.31 and that pressure added to gauge pressure of test.

E. HYDROSTATIC TEST METHOD

1. After bulkheading the test section, the pipe shall be subjected to a hydrostatic pressure produced by a head of water at a depth of three feet above the invert elevation of the gravity line at the manhole of the test section. In areas where ground water exists, this head of water shall be three feet above the existing water table.

2. The water head shall be maintained for a period of one hour during which time it will be presumed that full absorption of the pipe body has taken place, and thereafter for an extended period of one hour the water head shall be maintained as the test period. During the one hour test period, the measured water loss within the test section, including service stubs, shall not exceed the Maximum Allowable Loss (in Gallons Per Hour per 100 Feet of Pipe) given below for the applicable Gravity Line Diameter.

Gravity Line Diameter (In Inches)	Maximum Allowable Loss* (In Gallons Per Hour Per 100 Feet)
6	0.5
8	0.6
10	0.8
12	1.0

15	1.2
18	1.4
21	1.7
24 & Larger	1.9

3. * Based on 100 Gallons Per Day Per Pipe Diameter Inch Per Mile

4. If measurements indicate exfiltration within a test action section is not greater than the allowable maximum, the section will be accepted as passing the test.

F. TEST FAILURE AND REMEDY

1. In the event of test failure on any test section, testing shall be continued until all leakage has been detected and corrected to meet the requirements. Repair work shall be subject to approval of the Engineer. Introduction of sealant substances by means of the test water will not be permitted.

2. Unsatisfactory repairs or test results may result in an order to remove and replace pipe as the Engineer considers necessary for test conformance. All repair and replacement work shall be at the Contractor' expense.

G. DEFLECTION TEST

1. Deflection tests shall be performed on all plastic gravity lines. The test shall be conducted after the trench has been backfilled to the desired finished grade and has been in place for 30 days.

2. The deflection test shall be performed by pulling a rigid ball or nine-point mandrel through the pipe without the aid of mechanical pulling devices. The ball or mandrel shall have a minimum diameter equal to 95% of the actual inside diameter of the pipe. The maximum allowable deflection shall not exceed five percent of the pipe's internal diameter. The line will be considered acceptable if the mandrel can progress through the line without binding. The time of the test, method of testing, and the equipment to be used for the test shall be subject to the approval of the Engineer.

3. All testing shall be performed by the Contractor at Contractor’s expense without any direct compensation being made therefore, and Contractor shall furnish necessary equipment and materials required.

4. In the event of test failure on any test section, the section shall be replaced, with repair work subject to approval of the Engineer. The replaced section shall be retested for leakage and deflection in

conformance with the specifications contained herein. Repairs, replacement, and retesting shall be at the Contractor's expense.

H. TELEVISING

1. Sanitary sewer and storm sewer lines shall be televised after all utility work is complete and before the final roadway surfacing is installed. All televising is to be done prior to the installation of the final bituminous wear course or any seeding/restoration in non-paved areas. The inspection report and video shall be given to the Owner for review. All televising media shall be given to the City on DVD media, flash drive or hard drive.

3.07 TESTING PRESSURE MAINS

A. Hydrostatic Testing of Pressure Mains

1. After the pipe has been laid, including fittings and valves and blocking, all newly-laid pipe or any valved section thereof, unless directed otherwise by the Engineer, shall be subject to hydrostatic pressure of 150 pounds per square inch. The duration of each such test shall be at least two hours.

2. Each section of pipe to be tested shall be filled with water and all air expelled at the highest point. The required taps to expel air or to fill the water main shall be supplied and installed by the Contractor and shall be 3/4 inch and shall include an approved service saddle when required.

3. The test apparatus shall be applied at the lowest elevation on the section to be tested. The apparatus shall be connected to the line at a service tap or special tap location.

4. The pressure gauge shall be a standard pressure gauge. The dial shall register from 0 - 200 psi and have a dial size of 4 1/2 inches with 1 psi increments.

5. The hydrostatic test, pressure requirement for an acceptable test shall be a maximum pressure drop of 2 psi during the last hour of the two hour pressure test. If this test requirement cannot be met, the Contractor shall investigate the cause, make corrections, and retest until the pressure drop requirement can be met at no cost to Owner.

6. Where existing valves must be hydrostatically tested against after the water main installation, such valves shall be tested before any extension is made to determine any defective sealing or non-testability. The existing condition of the valve shall be reported to the Engineer and a determination will be made as to whether it shall be replaced, tested against with allowances provided, or a temporary test plug installed for

purposes of the hydrostatic test, with a sleeved connection made after testing is completed.

7. A pressure gauge attached to a fire hydrant to monitor pressure for pressure testing shall not be allowed. A corporation stop shall be installed on the test section of water main with copper piping extending to grade to allow the monitoring of pressure with a pressure gauge. After the pressure test is complete the copper piping shall be removed and the corporation stop shall be abandoned in place. All materials, labor, and equipment required to monitor pressure shall be considered incidental to the installation of the water main.

8. Pressure testing gauges shall have a reflective backing for eyeing proper alignment and measuring of the testing gauge.

B. Electrical Conductivity Test

1. The Contractor shall perform a conductivity test within one week after completion of pressure testing of the main on all watermains to ensure continuous conductivity for the purpose of tracing watermain for utility location. Sufficient conductivity shall be provided to allow for the location of watermain, services, hydrant leads, and laterals for mainline segments at least 1,200 linear feet in length.

2. A conductivity test of 350-amperest for 5 minutes shall be performed on all watermains.

3. Defects found as a result of the tests shall be corrected by the Contractor with material and in a manner acceptable to the Engineer at no cost to the Owner. Following such corrective measures, the portion of the project found defective shall be retested until proven satisfactory.

C. Operational Inspection

1. Before substantial completion of the work and in the presence of the Engineer and the Contractor, representatives of the Owner shall operate all valves and hydrants to ascertain that the entire facility is in good working order; that all valve boxes are centered and valves are opened; that all hydrants operate and drain properly; that all curb boxes are plumb and centered.

3.08 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control.

3.09 DATA FOR AS-BUILT RECORDS

A. Record stationing and/or ties of all fittings, valves, and other underground appurtenances installed on sheets provided for such purposes by the Engineer. Include invert or centerline elevations.

END OF SECTION 33 31 19

SECTION 40 27 00
PROCESS PIPING - GENERAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:

1. Pipe, fittings, wall pipes, and connections associated with interior Work.

1.02 RELATED SECTION

A. Related sections include:

1. Section 01 11 00 – Summary of Work
2. Section 01 33 00 – Submittal Procedures
3. Section 01 45 00 – Quality Control
4. Section 01 61 00 – Common Product Requirements
5. Section 09 90 02 - High Performance Painting and Coating
6. Section 40 27 05 - Process Piping Support Systems
7. Section 40 27 10 - Process Piping Specialties
8. Section 40 27 20 - Process Valves
9. Section 40 42 80 - Process Pipe Leakage Testing
10. Section 40 71 00 - Flow Measurement
11. Section 40 73 00 - Pressure, Strain, and Force Measurement

1.03 REFERENCES

A. Reference Standards include:

1. American National Standards Institute (ANSI)
2. American Society of Mechanical Engineers (ASME)
3. American Society for Testing Materials (ASTM)
4. American Water Works Association (AWWA)
5. American Welding Society (AWS)

6. National Sanitation Foundation (NSF)

7. ANSI/AWWA C104/A21.4: Cement-Mortar Lining for Gray-Iron and Ductile-Iron Pipe and Fittings for water.

8. ANSI/AWWA C105/A21.5: Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for water and other liquids.

9. ANSI/AWWA C110/A21.10: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm through 1,219 mm), for Water.

10. ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

11. ANSI/AWWA C115/A21.15: Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.

12. ANSI/AWWA C150/A21.50: Thickness Design of Ductile-Iron Pipe.

13. ANSI/AWWA C151/A21.51: Ductile-Iron Pipe, Centrifugally Cast In Metal Molds or Sand Lined Molds for water or other liquids.

14. ANSI/AWWA C200: Steel Water Pipe, 6 In. (150 mm) and Larger.

15. ANSI/AWWA C206: Field Welding of Steel Pipe.

16. ANSI/AWWA C207: Steel Pipe Flanges for Waterworks Service, Sizes 4 In. through 144 In. (100 mm Through 3,600 mm).

17. ANSI/AWWA C208: Dimensions for Fabricated Steel Water Pipe Fittings.

18. ASME B16.18: Cast Copper Alloy Solder Joint Pressure Fittings.

19. ASME B16.22: Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

20. ASME B16.26: Cast Copper Alloy Fittings for Flared Copper Tubes.

21. ASTM A312/A312M: Seamless and Welded Austenitic Stainless Steel Pipes

22. ASTM A536: Standard Specification for Ductile Iron Castings.

23. ASTM B 88: Seamless Copper Water Tube.

24. ASTM D-1784: Rigid Poly(Vinyl Chloride) Compounds and Chlorinated

25. Poly (Vinyl Chloride) Compounds.

26. ASTM D-1785: Poly (Vinyl Chloride) (PVC) Plastic Pipe, schedules 40, 80, 120.

27. ASTM D-2464: Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

28. ASTM D-2467: Socket Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

29. ASTM D-2564: Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

30. ASTM D-2855: Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

31. AWWA C600: Installation of Ductile-Iron Water Mains and Their Appurtenances.

32. AWWA C606-11: Grooved and shouldered type joints.

33. AWWA C651-05: Standard for Disinfecting Water Mains.

34. AWWA C653-03: Disinfection of Water Treatment Plants.

35. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In., for Water.

36. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. through 48 In., for Water Transmission and Distribution.

37. NSF Standards No. 60, 600, and 372 – National Sanitation Foundation.

38. AWS D.1.: Structural Welding Code – Steel.

1.04 QUALITY ASSURANCE

A. Welding Materials and Procedures: Conform to ANSI/AWS D.1.1.

B. Employ certified welders.

C. Piping modifications subject to Engineer's review. No additional compensation allowed for modifications required to suit equipment furnished by Contractor.

1.05 SUBMITTALS

A. Submit Shop Drawings in accordance with Section 01 33 00 – Submittal Procedures for all pipe and fittings indicating: Name of Manufacturer, Materials, Standard Dimensions, References, and Joint Data.

B. Submit Affidavit of Compliance for ductile iron pipe and fittings.

C. Submit design calculations for structural design of pipe thickness where pipe class or thickness is not specifically called out.

D. Submit detailed piping layout drawings showing piping and connections to equipment and appurtenances.

1.06 COATING AND IDENTIFICATION SYSTEMS

A. All material and equipment in this section shall be factory primed. Primer shall be compatible with finish coats of paint provided under Section 09 90 02 - High Performance Painting and Coating.

B. The Contractor shall refinish and restore to the original appearance all equipment that has sustained damage to the manufacturer's finish or prime coats of paint or enamel.

C. Finish painting of all materials and equipment in this Section shall be the responsibility of the Contractor, and shall be as described Section 09 90 02 - High Performance Painting and Coating, unless otherwise specifically indicated.

1.07 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet ANSI/NSF International Standards 60, 600, and 372, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PART 2 - PRODUCTS

2.01 PIPE SCHEDULE

A. Process Piping:

1. Ductile Iron.

2. Stainless Steel.

2.02 DUCTILE IRON PIPE AND FITTINGS

A. Approved Manufacturers:

1. American Cast Iron Pipe Company.

2. U.S. Pipe.

3. Or approved equivalent.

B. General

1. Minimum Pressure Class (Pounds per Square Inch – PSI):

a. Interior and exterior exposed, flanged:

1) 12-inch diameter and smaller: 350 PSI.
2) 14-inch diameter and larger: 250 PSI.

2. Onsite inspection of all materials by Contractor.

3. Pipe coating:

a. Buried and submerged: bituminous coating (asphalt coating).
b. Interior and exposed: prime coat.

4. Pipe lining:

a. All pipelines except air line: cement-mortar.
b. Ductile iron pipe for air lines shall be unlined.

5. Bolts and nuts:

a. Buried exposed and submerged: stainless steel.
b. Interior and exposed: stainless steel.

6. Submit design calculation for structural design of pipe thickness where pipe thickness or class is not specifically called out.

7. Pipe and fittings to match face and drill of valves.

8. All flanges shall be full-faced flanges.

9. All materials to be new and unused.

10. Pipe and fitting material: ductile iron.

C. Pipe: ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51.

D. Flanged Pipe: ANSI/AWWA C115/A21.15.

1. Minimum Class: Class 53.

E. Fittings:

1. Flanged fittings:

a. Conform to ANSI/AWWA C110/A21.10.
b. Full face gaskets, bolts, and nuts: AWWA C110, Appendix A.
c. Material: ductile iron.

2. All reducers shall be concentric pattern unless noted otherwise on the Project Drawings.

F. Coatings and Linings:

1. Asphaltic: ANSI/AWWA C110/A21.10 and ANSI/AWWA C151/A21.51.

2. Cement lining: ANSI/AWWA C104/A21.4.

3. Prime coat: Per Section 09 90 02 - High Performance Painting and Coating.

G. Joints - Pipe and Fittings:

1. Flanged: ANSI/AWWA C110/A21.10 and ANSI/AWWA C115/A21.15. Gaskets used for air piping shall be Silicone.

2. Provide type of joint as indicated on Project Drawings.

3. Use of grooved and shouldered joints is acceptable where approved by Engineer.

   a. Conform to AWWA C606.

4. The Engineer will only accept Uni-Flanges or approved equivalent at locations that receive prior approval.

H. Wall sleeves: Wall sleeve shall be provided where ductile iron pipe passes through concrete walls unless a wall pipe is used.

2.03 STAINLESS STEEL PIPE

A. WATER Service

1. ASTM A-312 stainless steel pipe.

   a. Sizes 2-inch through 6-inch: Schedule 40, Type316 stainless steel with stainless steel drilled flanges, rated for 300 psi minimum.
   b. Sizes 8-inch through 12-inch: Schedule 80, Type 316 stainless steel with stainless steel drilled flanges.
   c. Onsite inspection by Contractor of all materials.
   d. Bolts and nuts: stainless steel.
   e. Pipe and fittings to match face and drill of valves.
   f. All materials to be new and unused.

B. AIR Service

1. ASTM A-312 stainless steel pipe, Schedule 10, Type 316 with stainless steel drilled flanges, rated for 300 psi minimum.

   a. Onsite inspection by Contractor of all materials.
   b. Bolts and nuts: stainless steel
   c. Pipe and fittings to match face and drill of valves.
   d. All materials to be new and unused.

2.04 PIPE CORROSION PROTECTION

A. Coatings: See Section 09 90 02 - High Performance Painting and Coating, for details of coating requirements.

B. Heat Shrink Wrap:

1. Type: Cross-linked polyolefin wrap or sleeve with mastic sealant.

2. Manufacturer and Product: Raychem; WPC or TPS, or equal.

2.05 FLANGE INSULATING GASKET KITS

A. Approved Manufacturer:

1. Advance Products & Systems.

2. Approved Equivalent.

B. Size: per diameter of flange.

C. Pressure rating: meet minimum pressure rating of attached piping.

D. Provide to meet either full-faced or raised faced portion of flange.

1. Full-Faced Gasket

a. Type E gaskets.
b. Precision cut bolt holes.
c. Material: plain face or Neoprene face phenolic.

2. Raised Face Portion

a. Type F gaskets.
b. Inside diameter of the bolt hole circle should be slightly smaller than the outside diameter of the gasket, assuring an exact, automatic positioning of the gasket.
c. Material: plain face or Neoprene face phenolic.

E. Provide insulating sleeve and washer with the single insulation sets.

1. Material: high density polyethylene (HDPE), phenolic, and Mylar.

2. Provide with each set a 1/8” thick S.A.E. electro-plated steel washer.

2.06 COUPLINGS, TAPS, AND MISCELLANEOUS JOINTS

A. Tapping saddles and tapping sleeves shall be Mueller, or equal.

B. Provide pipe repair clamps where indicated on the Drawings. Pipe repair clamps shall be suitable for potable water service with all type 304 stainless steel bolts and hardware. Contractor shall verify pipe outside diameter and necessary length before placing clamp. Pipe repair clamps shall be Mueller Series 510 XTRA-RANGE Full Seal type, or equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Make necessary field measurements to determine pipe laying lengths; fabricate pipe; deliver pipe to site; store pipe with ends capped to prevent contamination and damage to interior; prepare pipe for installation; work pipe into place without forcing or springing.

B. Do not store or ship small diameter pipe inside larger diameter pipe.

C. Ream pipe and tube ends. Remove burrs. Repair lining at pipe cuts.

D. Remove scale and dirt, inside and outside, before assembly.

E. Remove welding slag or foreign material from pipe and fitting materials.

F. Remove temporary preservative coatings from valves, fittings, and appurtenances prior to installation.

G. Clean, repair, or replace equipment malfunctioning due to presence of foreign material left in piping during installation or entering piping after installation due to Contractor's work at no cost to Owner.

3.02 DUCTILE IRON PIPE AND FITTINGS

A. Joints:

1. Interior submerged: flanged.

2. Interior exposed: flanged, grooved and shouldered if approved by Engineer, except where indicated otherwise on the Project Drawings.

B. Flanged Joints:

1. Pipe shall extend completely through screwed-on flanges. The pipe end and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe centerline.

2. Care shall be taken to avoid restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or would cause unnecessary stress in the flanges when bolting flanged joints.

3. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be gradually tightened and at a uniform rate, to ensure uniform compression of the gasket.

4. Special care shall be taken when connecting piping to pumping equipment to ensure that piping stresses are not transmitted to the pump flanges. All connecting piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of the flanges is obtained before any bolts are installed in the flanges.

5. Seal annular space between Pipe OD and flange ID to prevent oxidation. Use silicon bead around circumference of flange to pipe connection.

C. Penetrations:

1. Install pipe straight through concrete walls or floors.

2. Provide wall sleeves where ductile iron pipe passes through concrete walls and floors, unless specified otherwise on Project Drawings.

3. Install wall pipes or sleeves as shown on Project Drawings.

4. Install embedded wall flange in center of wall or floor and grout in place when embedded wall pipe flange shown on Project Drawings.

5. Fabricate wall pipes to dimensions required.

D. Support pipe at fittings with rods; anchor and support in accordance with Section 40 27 05 - Process Piping Support Systems.

E. Pipe and fittings to match face and drill of valves and appurtenances.

3.03 COMPRESSION JOINTS

A. Ends of tubing shall be cut square and all burrs shall be removed. The tubing end shall be fully inserted into the compression fitting and the nut shall be tightened not less than 1-1/4 turns and not more than 1-1/2 turns past fingertight, or as recommended by the fitting manufacturer, to produce a leaktight, torque-free connection.

3.04 DISSIMILAR PIPE CONNECTIONS

A. Provide non-conducting connections or flange insulating gasket kits wherever jointing dissimilar metals in open systems.

3.05 VENTS AND DRAINS

A. Vents and drains at high and low points in piping required for completed system may or may not be shown. Install vents on high points and drains on low points of pipelines as shown.

3.06 INSULATION

A. See Section 40 42 13 - Process Piping Insulation.

3.07 TESTING

A. Hydrostatically test each entire line in accordance with AWWA C600-99.

3.08 FIELD PREPARATION AND PAINTING

A. All material and equipment in this section shall be factory primed, excluding PVC and copper, and field finish coated. Factory coatings shall be compatible with materials provided under Section 09 90 02 - High Performance Painting and Coating.

3.09 LEAKAGE

A. See Section 40 42 80 - Process Pipe Leakage Testing.

B. All joints shall be watertight and free from leaks. All leaks shall be repaired by Contractor in a timely manner and at no expense to the Owner.

C. All pipe, fittings, valves, pipe joints, and other materials which are found to be defective shall be removed and replaced with new and acceptable materials, and the affected portion of the piping retested by and at the expense of the Contractor.

END OF SECTION 40 27 00

SECTION 40 27 05
PROCESS PIPING SUPPORT SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Items within this Section are subject to the "American Iron and Steel" (AIS) requirement of the Consolidated Appropriations Act of 2014. Refer to Section 00 73 40 - Funding Agency Requirements.

B. Section includes:

1. Pipe and equipment hangers, supports, and associated anchors.

2. Sleeves and seals.

C. Related Sections include:

1. Section 01 33 00 – Submittal Procedures

2. Section 09 90 02 - High Performance Painting and Coating

3. Section 40 27 00 - Process Piping - General

4. Section 40 27 10 - Process Piping Specialties

1.02 REFERENCES

A. Reference Standards include:

1. AIS: American Iron and Steel

2. ANSI B 31.10: Pipe Supports.

3. ANSI/AWS D.1.1

4. ANSI/MSS SP-69: Pipe Hangers and Supports.

5. ASTM A36: Structural Steel.

6. ASTM A325: High Strength Bolts for Structural Steel Joints.

1.03 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00. Indicate name of manufacturer, materials, standard dimensions, references, maximum loadings, and thrust restraints for all pipe support systems.

B. Provide a list of materials and corresponding suppliers.

C. Provide pipe support location and details with piping layout drawings for piping systems 4-inches and larger.

D. Submit Affidavit of Compliance certifying that materials furnished have been tested and are in compliance with specification requirements.

E. Pipe support system calculations shall be signed by a registered Professional Engineer.

1.04 QUALITY ASSURANCE

A. Welding Materials and Procedures: Conform to ANSI/AWS D.1.1.

B. Employ certified welders as necessary to complete Work.

1.05 FIELD MEASUREMENTS

A. The Drawings indicate required pipe sizes and the general arrangement for major piping. Locations shall be verified in the field by the Contractor. Valves, fittings, and appurtenances shall be of such dimensions to allow for the installation of this piping and supports substantially as shown on the Drawings. In the event it should become necessary to change the location of any of the work due to interference with other work, Contractor shall consult with the Engineer prior to making any changes and all such changes shall be made at no additional cost to the Owner.

B. Prior to roughing in any facilities or installation of piping and equipment, consult all related drawings including general, mechanical, electrical, etc., and inform self of materials, locations of structures, pipes, ducts, electrical conduits, etc., which may impact the installation of supports.

C. Discrepancies discovered before or after work has started, shall be brought to the attention of the Engineer immediately, and the Engineer reserves the right to require minor changes in the work to eliminate such discrepancies.

PART 2 PRODUCTS

2.01 GENERAL

A. In certain locations, pipe supports, anchors and expansion joints have been indicated on the Drawings, but no attempt has been made to indicate every restraint, anchor, and expansion joint. It shall be the Contractor’s responsibility to provide a complete system of pipe supports, to provide expansion joints, and to anchor all piping in accordance with the requirements set forth herein. Additional pipe supports may be required adjacent to expansion joints, couplings, or valves.

B. Concrete and fabricated steel supports shall be as indicated on the Drawings, as specified in other Sections, or, in the absence of such requirements, as permitted by the Engineer.

C. All piping shall be rigidly supported and anchored so that there is no movement or visible sagging between supports.

D. All submerged or immersed pipe support systems chall be Type 316 stainless steel or steel coated per Section 09 90 02.

2.02 PIPE HANGER SUPPORTS

A. Materials

1. Unless otherwise specified, all pipe supports shall comply with ANSI/MSS SP-58 and MSS SP-69. Materials of construction for fabricated steel supports are covered in the structural and miscellaneous metals section. All pipe support materials shall be packaged as necessary to ensure delivery in satisfactory condition.

2. Unless otherwise specified or indicated on the Drawings, pipe supports shall be fabricated of manufacturer's standard materials and provided with galvanized finish or be fabricated of stainless steel.

3. Design loads for inserts, brackets, clamps, and other support items shall not exceed the manufacturer's recommended loads.

4. Pipe supports shall be manufactured for the sizes and types of pipe to which they are applied. Strap hangers will not be acceptable. Threaded rods shall have sufficient threading to permit the maximum adjustment available in the support item.

5. Unless otherwise acceptable to the Engineer, the use of supports that rely on stressed thermoplastic components to support the pipe will not be acceptable.

6. Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Supports for brass or copper pipe or tubing shall be copper plated. Portions of pipe supports which come into contact with other metals that are dissimilar shall be rubber or vinyl coated.

7. Concrete inserts or L-shaped anchor bolts shall be used to support piping from new cast-in-place concrete. Expansion anchors shall be used to fasten supports to existing concrete and masonry.

8. Anchorage shall be provided to resist thrust due to temperature changes, changes in diameter or direction, or dead-ending. Anchors shall be located as required to force expansion and contraction movement to occur at expansion joints, loops, or elbows, and as required to prevent excessive bending stresses and opening of mechanical couplings. Anchorage for temperature changes shall be centered between elbows and mechanical joints used as expansion joints.

B. Manufacturer and Type:

1. Anvil International, Catalog PH-5.10, or approved equivalent.

a. Light welded steel bracket: Figure 194.
b. Medium welded steel bracket: Figure 195
c. Heavy welded steel bracket: Figure 199
d. Concrete Inserts: Figure 281.
e. Offset Pipe Clamp: Figure 103.
f. Adjustable Clevis Hanger: Figure 260.
g. Stainless Steel Hanger Rods.

2.03 FLOOR PIPE SUPPORTS

A. Approved Manufacturer and Type:

1. Anvil International, adjustable pipe saddle support: Figure 264.

2. Standon Model S92 Saddle Support.

3. PHD Manufacturing Inc., adjustable pipe saddle support. Figure 875

4. Or Approved Equivalent.

B. Minimum vertical adjustment: 4½ inch.

C. Provide complete with riser pipe and flange bolts for floor mounting.

D. Provide precast concrete or grout base a minimum of 1” above floor.

E. Provide as per recommended spacing, at minimum. Contractor shall install a minimum of one floor pipe support per pump discharge piping prior to the header piping.

F. Contractor may also be required to construct concrete saddle pipe supports for floor piping as indicated on the Drawings. Contractor to provide all materials, formwork, and labor to construct as detailed on Drawings.

2.04 WALL SUPPORTS

A. Steel brackets shall conform to MSS Type 31 for light duty, MSS Type 32 for heavy duty, and MSS Type 33 for heavy duty. Brackets shall be sized accordingly for full size and weight of piping system. All mounting hardware shall be stainless steel.

B. Submerged piping shall be supported with Type 316 stainless steel hangers or steel bracket supports coated with two coats of bitumastic paint.

2.05 VERTICAL PIPE SUPPORTS

A. Two bolt riser clamps shall be MSS SP 69 Type 8 galvanized or plastic coated.

B. Four bolt riser clamps shall be MSS SP 69 Type 42 galvanized or plastic coated.

2.06 SADDLES AND SHIELDS

A. Protection saddles shall be MSS SP 69 Type 39.

B. Protection shields shall be MSS SP 69 Type 40.

C. Wood insulation saddle shall be Elcen Metal Products Company, or equal.

2.07 PREFABRICATED OR FABRICATED PIPE SUPPORTS

A. Pre-engineered support systems constructed of steel products factory fabricated by firms regularly engaged in the manufacture of these items shall be used for this work. Steel pipe support systems shall be blasted to a white clean condition after fabrication and hot-dip galvanized in accordance with ASTM 123, unless support is specified to be fabricated of stainless steel.

B. Free-standing pipe connections to equipment shall be firmly attached to fabricated steel frames made of angles, channels, or I-beams. Frames shall be anchored to the structure.

C. Exterior, free-standing overhead piping shall be supported by fabricated pipe stands, made of pipe columns anchored to concrete footings, with horizontal, welded steel angles and U-bolts or clamps securing the pipes.

D. Special pipe supports for vertical and horizontal movement shall be as detailed on the drawings. Supports shall be fabricated by firms regularly engaged in the manufacture of these items.

2.08 SLEEVES AND SEALS

A. Wall pipes shall connect piping to concrete structure. Wall pipes shall be ductile iron meeting the requirements of AWWA C115. Provide wall pipes where indicated on Drawings.

B. Wall sleeves shall be ductile iron meeting the requirements of AWWA C151. Sleeves shall have cast waterstop collar. Cast waterstop collar shall have an outside diameter a minimum of four inches greater than the outside diameter of the wall sleeve.

C. Approved Manufacturers:

1. Sleeves for pipes through walls and floors:

    a. Ductile Iron Water-Stop wall pipe.
    b. Or Approved Equivalent.

2. Bolted rubber annular seal:

    a. Link Seal manufactured by Thunderline Corp.
    b. Or Approved Equivalent.

2.09 ANCHORS

A. Hollow Concrete Block and Brick Anchors:

1. Acceptable Manufacturer and Type:

    a. HIT S 12/A Combi Fastener manufactured by Hilti Corporation.
    b. Approved Equivalent.

2. Accessories: HY20 Adhesive with screen tube insert.

B. Use Type 316 stainless steel epoxy adhesive anchor bolts, Hilti 150 injection adhesive anchors, or equal, for building or structure attachments. Provide continuous concrete inserts, Unistrut P3200 series, or equal, where applicable.

C. Mechanical anchor and powder-actuated drive-pin fasteners shall be used only with prior approval from the Engineer.

2.10 FABRICATION

A. Size sleeves large enough to allow for installation of annular seal.

B. Design hangers to support piping without disconnection of pipe.

2.11 FINISH

A. Factory coat steel hangers and supports as specified in Section 09 90 02 - High Performance Painting and Coating.

B. Touch up finish on exposed steel hangers and supports in accordance with Section 09 90 02 - High Performance Painting and Coating.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall verify location of piping and piping systems as shown on the Drawings.

B. Pipes shall be attached to structural members when possible. When necessary to frame structural members between existing members, such members shall be provided by the Contractor at no additional cost to Owner. Structural members shall be in accordance with the building code and the guidelines of the AISC.

C. Install hangers, supports, clamps, and attachments as required to properly support piping in all operating conditions, including thrust, water hammer and surge conditions. Supports shall allow for free expansion and contraction of the piping, and shall prevent stress on equipment. Hangers shall have a means of vertical adjustment after installation. Hangers shall be designed so that movement of the supported pipe cannot cause them to disengage. Hanger rods shall be subject to tensile loading, only.

D. No attempt has been made to show all required pipe supports in all locations, either on the Drawings or in the details. The absence of pipe supports on the Drawings shall not relieve the Contractor of the responsibility of providing supports as required.

E. Connections to structural framing shall not induction twisting, torsion, or later bending in the framing members. Provide supplementary steel as required.

F. Adjust support and hanger sizes to account for pipe insulation.

G. Meters, valves, equipment, and other point load items shall be independently supported to prevent pipe stress. Piping shall support no meters, valves, equipment or other point load items.

H. Space supports within maximum piping span length indicated in MSS SP-69, as indicated on the Drawings, or as recommended by the pipe manufacturer, whichever spacing is less. Install additional supports at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping.

I. Supports, hangers, anchors, and guides shall be designed and provided to prevent excess heat transfer to the structure or equipment, where applicable.

J. Risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping, when possible.

K. Do not support piping with wire, either temporarily or permanently. Do not support piping from other piping.

L. Piping shall be supported in such a manner that neither the insulation nor the vapor/weather barrier is compromised by the support or the effects of the support.

M. Embedded pipe supports or inserts shall be in place prior to placement of cast-in-place concrete. Continuous inserts shall be furnished with end caps and cardboard closure strips. Locate and space building attachments so that the total load and the point loads due to the pipe hanger and supports do not exceed the design capacity of the supporting structure.

N. Where it is necessary to anchor supports to hardened concrete or completed masonry use stainless steel adhesive anchors.

O. For precast concrete slabs, drill through concrete slab from below and provide stainless steel through bolts with square steel plates and stainless steel bolts. Plate shall bear directly upon the top surface of the precast concrete slab. All toppings or insulation as required shall be applied after installation of all support plate assemblies.

P. Attach to structural steel with beam clamps.

Q. Mechanical anchor and powder-actuated drive-pin fasteners shall be installed in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer’s written instructions. Non-adhesive anchors shall be only used with prior approval from the Engineer.

R. Piping shall be supported at least one and one-half inch out from the face of walls and at least three inches below ceilings and above finished grade, unless otherwise noted.

S. Pedestal supports shall be used where indicated on the drawings or when piping is installed at or near the floor level, and shall consist of galvanized floor flange, pipe, and saddle. Provide stainless steel anchor bolts. All pedestal supports shall be adjustable, and place up off of the floor with minimum 1-inch grout.

3.02 INSERTS

A. Provide and install inserts for placement in concrete formwork.

B. Provide and install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams and walls.

C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.

3.03 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as follows:

PIPE SIZE	MAX HANGER/ SUPPORT SPACING	MIN HANGER/SUPPORT ROD DIAMETER
½ to 1-1/4 inch	6’-6”	3/8”
1-1/2 to 2 inch	10’-0”	3/8”
2-1/2 to 3 inch	10’-0”	1/2”
4 to 6 inch	10’-0”	5/8”
8 to 12 inch	10’-0”	7/8”
14 to 18 inch	10’-0”	1”
20 to 30 inch	10’-0”	1-1/2”
30 to 36 inch	10’-0”	1-3/4”
PVC (All Sizes)	5’-0”	1/2"

B. Install supports free standing or suspended to provide minimum ½ inch space between support and adjacent Work.

C. Place a hanger/support within 12 inches of each horizontal fitting and on each side of valves.

D. Use hangers with 1½-inch minimum vertical adjustment.

E. Support riser piping independently of connected horizontal piping.

3.04 THRUST ANCHORS AND GUIDES

A. For suspended piping, center thrust anchors as closely as possible between expansion joints and between elbows and expansion joints. Anchors shall hold pipe securely and shall be sufficiently rigid to force expansion and contraction

movement to take place at expansion joints and/or elbows and to preclude separation of joints.

B. Provide thrust anchors as required to resist thrust due to changes in diameter or direction or dead end of pipelines. The design of all anchors shall be subject to approval by Engineer. Anchorage shall be required wherever bending stresses exceed allowable for pipe. Wall pipes may be used as thrust anchors.

C. Pipe guides shall be provided adjacent to sliding expansion joints in accordance with the recommendations of the National Association of Expansion Joint Manufacturers.

3.05 INSERTS AND ANCHORS

A. Furnish and install inserts or anchors for placement in concrete.

B. Furnish and install inserts or anchors for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams and walls.

C. Utilize support assemblies designed for the appropriate loads. Contractor shall verify design conditions of each piping system.

D. Mechanical anchor and powder-actuated drive-pin fasteners shall be installed in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Non-adhesive anchors shall be only used with prior approval from the Engineer.

3.06 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Extend sleeves through floor three inches above finished floor level.

C. Where piping penetrates floor, ceiling, or wall, close off space between pipe and sleeve with link seal.

D. Wall sleeves and wall pipes shall be securely supported by form work to prevent contact with reinforcing steel and tie wires. Sleeves shall be set in formwork prior to pouring concrete.

E. For precast concrete panels openings shall be provided of such size to allow at least three inches clearance around the outside of the sleeve. After installation of sleeve, grout shall be tamped into place making a watertight joint.

3.07 COATING

A. Prime coat non-galvanized steel or non-stainless steel hangers and supports.

B. Finish coat all hangers and supports, except galvanized and stainless steel hangers and supports, under provisions of Section 09 90 02 - High Performance Painting and Coating.

END OF SECTION 40 27 05

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SECTION 40 27 10
PROCESS PIPING SPECIALTIES

PART 1 GENERAL

1.01 SUMMARY

A. Items within this Section are subject to the "American Iron and Steel" (AIS) requirement of the Consolidated Appropriations Act of 2014. Refer to Section 00 73 40 - Funding Agency Requirements.

B. Section Includes:

1. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:

a. Mechanical Couplings
b. Quick Connect Couplings
c. Flanged Coupling Adapters
d. Buried Flange Adapters
e. Mechanical Joint Restraint Gland
f. Filler Flanges
g. Tapping Saddles and Tapping Sleeves
h. Pipe Repair Clamps
i. Rubber Expansion Joints
j. Flexible PVC Wire Reinforced Hose
k. Wye Strainers
l. Metal Bellows Expansion Joints/Pump Connectors
m. Fire Hose
n. Fire Hose Spray Nozzle
o. Rubber Garden Hose
p. Bolted Link Type Seal

C. Related Sections include:

1. Section 01 10 00 – Summary of Work

2. Section 09 90 02 - High Performance Painting and Coating

3. Section 40 27 00 - Process Piping - General

4. Section 40 27 05 - Process Piping Support Systems

5. Section 40 27 20 - Process Valves

1.02 SUBMITTALS

A. Shop Drawings and Product Data: Submit, Under Provisions of Section 01 33 00, on all materials and products specified in this Section.

B. Provide a list of materials and corresponding suppliers.

C. Submit Affidavit of Compliance certifying that materials furnished have been tested and are in compliance with specification requirements.

PART 2 PRODUCTS

2.01 SPECIALTIES CONNECTIONS

A. Provide pipe specialties suitable to connect to adjoining pipes as specified for pipe fittings. Diameter to match adjacent and adjoining piping. Contractor to coordinate and provide special pipe connections as required.

2.02 WORKING PRESSURE

A. Working pressure of pipe specialties to be equal to working pressure of connecting pipes, unless specified otherwise.

2.03 GENERAL REQUIREMENTS

A. Mechanical Couplings

1. Bolted, sleeve type: AWWA C219-17
2. Followers: Ductile iron ATMS A536
3. Middle ring: ASTM A513, ASTM A536 or ASME SA675 GR60
4. Bolts: AWWA C111/ANSI A21.11
5. Gasket: Nitrile (Buna N)
6. Coating: Fusion-bonded epoxy
7. Working pressure: Up to 250 PSI.
8. Manufacturer and Type:

    a. Dresser “Style 38”.
    b. Smith-Blair “441 or 411 Flexible Coupling”.
    c. Romac “Style 501” Coupling.

B. Quick Connect Couplings

1. Cam and groove design, twin arms
2. Gaskets: Nitrile (Buna N)
3. Body: 316 Stainless Steel.
4. Manufacturer and type:

    a. OPW, Kamlock.
    b. Ryan Herco, 1300 series.

C. Flanged Coupling Adapters

1. Fully restrained joint capability

2. Body: Ductile Iron ASTM A536

3. Gasket: Nitrile (Buna N)

4. O-ring: Nitrile (Buna N)

5. Bolts and Nuts: Carbon steel ASTM A307 electro-galvanized with di-chromate seal.

6. Tees and Cross bolts: Ductile iron

7. Coating: Fusion-bonded epoxy

8. Working pressure: Up to 250 PSI.

9. Manufacturer and type:

a. MegaFlange Series 2100 by EBAA Iron, Inc.
b. Smith Blair 912

D. Buried Flange Adapters

1. Manufacturers:

a. Megaflange Series 2100 by EBAA Iron, Inc.
b. Approved Equivalent

E. Buried Mechanical Joint Restraint Glands

1. Manufacturers:

a. MegaFlange Series 1100 by EBAA Iron, Inc.
b. Approved Equivalent

F. Filler Flanges

G. Tapping Saddles and Tapping Sleeves

1. Band shall conform to OD size ranges

2. Stainless steel, in compliance with ASTM A240.

3. Gasket shall provide 360-degree sealing surface, watertight.

4. High strength bolts and nuts.

5. Manufacturer:

a. Mueller
b. Approved Equal

H. Pipe Repair Clamps

I. Rubber Expansion Joints

1. Single wide filled arch rubber expansion joints.

2. High strength limit rods and control rod plates

3. Working pressure: Up to 150 PSI

4. Manufacturers and types:

a. Series 230, Style 231 with limit rods and compression sleeves by Proco Products, Inc.
b. Invincible Style 501 with control rod assembly by Mercer Rubber Co.

J. Flexible PVC Wire Reinforcement Hose

K. Wye Strainers, Water Service, 2 inches and Smaller:

L. Metal Bellows Expansion Joint/Pump Connectors

1. 2-ply low corrugation stainless steel bellows

2. 300-pound class

3. Stainless steel control rods

4. Flanged ends

5. Manufacturer:

a. Metraflex
b. Approved Equivalent

M. Orifice Restriction Plate

1. Flanged connections, size as shown on Drawings

2. Flow Coefficient (C_v): 3400

3. Plate Thickness: 5/8"

4. Body: 316 SS

5. Manufacturer:

a. ECMO
b. USA INDUSTRIES
c. Or Approved Equivalent

N. Fire Hose

O. Fire Hose Spray Nozzle

P. Rubber Garden Hose

Q. Bolted Link Type Seal

1. Standard or Fire-rated style as shown on Drawings.

2. Manufacturer:

a. Thunderline Corporation
b. Approved Equivalent

PART 3 EXECUTION

5.01 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Install equipment in locations shown on the Drawings.

5.02 MECHANICAL COUPLINGS

A. A space of at least ¼-inch, but not more than 1-inch, shall be left between the pipe ends.

B. Pipe and coupling surfaces in contact with gaskets shall be clean and free of dirt and other foreign matter during assembly.

C. All assembly bolts shall be gradually tightened and at a uniform rate, so that the coupling is free from leaks and all parts of the coupling are square and symmetrical with the pipe.

D. The interior surfaces of the middle rings shall be prepared for coating in accordance with the instructions of the coating manufacturer and shall then be coated with liquid epoxy in accordance with ANSI/AWWA C210. The remaining components shall be cleaned and shop primed with universal primer.

E. Repair and damaged areas of shop coatings on the pipe and coupling to the satisfaction of the Engineer.

F. Provide steel tie-bolts, diametrically opposite, which extend across the joint from lugs welded to the pipe on either side of the joint to provide restraint.

5.03 FLANGED COUPLING ADAPTERS

A. After the pipe is in place and bolted tight, the proper locations of holes for anchor studs or lock pins shall be determined and the pipe shall be field-drilled.

B. The inner surfaces of the couplings shall be prepared for coating in accordance with the instructions of the coating manufacturer and shall then be coated with liquid epoxy in accordance with ANSI/AWWA C210. The remaining surfaces, except the flange mating surfaces, shall be cleaned and shop primed with universal primer.

5.04 FILLER FLANGES

5.05 RUBBER EXPANSION JOINTS

END OF SECTION 40 27 10

SECTION 40 27 20
PROCESS VALVES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.

a. Actuators.
b. Plug Valves.
c. Check Valves - Swing.
d. Ball Valves.
e. Air Release Valves.
f. Combination Air Valves.
g. Solenoid Valves.
h. Telescoping Valves
i. Corporation Stops.

B. Related Sections include:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 45 00 – Quality Control

3. Section 01 61 00 – Common Product Requirements

4. Section 01 77 00 –Closeout Procedures

5. Section 01 78 23 – Operations and Maintenance Data

6. Section 09 90 02 – High Performance Painting and Coating

7. Section 40 27 00 – Process Piping - General

8. Section 40 27 15 – Process Piping Support Systems

9. Section 40 27 21 – Process Electric Actuators

10. Division 26 – Electrical

1.02 REFERENCES

A. Reference Standards include:

1. AWWA C504: Rubber-Seated Butterfly Valves.

2. AWWA C509: Resilient-Seated Gate Valves for Waterworks Service, 2 inches through 24 inches NPS.

3. AWWA C512: Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.

4. AWWA C540: Power-Actuating Devices for Valves and Sluice Gates.

5. AWWA C550: Protective Epoxy Interior Coatings for Valves and Hydrants.

6. AWWA C800: Underground Service Line Valves and Fittings.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 01 33 00, detailed specifications, drawings, and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for the complete operational system. Include name of Manufacturer, references, and any additional relevant information.

B. Operations and Maintenance Data: Submit in accordance with Section 01 78 23 on all parts, devices, equipment and other accessories forming each complete operational system. Include a complete write-up of how the system is to operate and how to make adjustments.

1.04 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60, 600, and 372, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

B. Unless otherwise indicated, use valves suitable for 150 psi minimum working pressure.

2.02 VALVE CONNECTIONS

A. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use full-port size valves unless otherwise specified.

B. Thread pipe sizes 1-1/2 inches and smaller unless indicated otherwise.

C. Flange pipe sizes 2 inches and larger unless indicated otherwise.

2.03 ACTUATORS

A. Manual Geared Actuators:

1. Type: Gear with cast iron housing. Provide chain-wheel on all valves with centerline located 6 feet and higher. Provide hand-wheel on all others requiring a manual operator.

2. Equip with adjustable open and closed position stops.

3. Provide manual gear/hand wheel actuator on all valves unless indicated otherwise on the Drawings or the valve schedule. The direction of rotation of the wheel, wrench nut, or lever to open the valve shall be to the left (counterclockwise). Each valve body shall have cast thereon the word “OPEN” and an arrow indicating the direction to open.

4. Provide riser stem and floor mounted base as indicated on the Drawings.

5. Provide position indicator.

6. Hand wheels:

   a. Hand wheels shall be cast iron.
   b. Maximum wheel diameter shall be 12 inches.
   c. Maximum hand wheel pull shall be 80 pounds.

7. Chain wheels:

   a. Chain wheels shall be galvanized, shrouded pocket hand wheels.
   b. Provide sherardized chains.
   c. Maximum wheel diameter shall be 12 inches.
   d. Bolt to hand wheel type chain wheels will not be acceptable.
   e. Maximum chain wheel pull shall be 80 pounds.
   f. Each chain wheel operated valve shall be equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Suitable extensions shall be provided, if necessary, to prevent interference of the chain with adjacent piping or equipment. Operating chains shall be looped to extend within 4 feet of the floor below the valve.

8. Hand Levers:

   a. Provide hand levers where indicated on the Drawings, or in these specifications.
   b. Hand levers shall be directly connected to the shaft and rotate 90 degrees from full closed to full open.
   c. Levers shall be provided with a locking device to assure positive position in full open, full closed and a minimum of five intermediate positions around the 90 degrees of rotation. Indication of valve position shall be provided.

d. In any building or structure containing lever operated valves, at least two operating levers shall be provided for each size and type of lever operated valve.

9. Manual Nut Operators:

a. Provide 2-inch AWWA-certified operating nut where indicated on the Drawings, or in these specifications.

10. The housing of traveling-nut type actuators shall be fitted with a removable cover which shall permit inspection and maintenance of the operating mechanism without removing the actuator from the valve. Travel limiting devices shall be provided inside the actuator for the open and closed positions. Travel limiting stop nuts or collars installed on the reach rod of traveling-nut type operating mechanisms shall be field adjustable and shall be locked in position by means of a removable roll pin, cotter pin, or other positive locking device. The use of stop nuts or adjustable shaft collars which rely on clamping force or setscrews to prevent rotation of the nut or collar on the reach rod will not be acceptable.

11. Manufacturers:

a. Pratt
b. DeZurik
c. Clow
d. Or Approved Equal

B. Electric Motor Actuators:

1. See Section 40 27 21 for electric actuator requirements.

2.04 PLUG VALVES

A. Body: Flanged, ASTM A126, Class B cast iron body. Bolted bonnet. Flanged valve shall be fully faced and drilled in accordance with ANSI B16.1, Class 125.

1. Exterior Coating: Red oxide primer. Finish coat per Section 09 90 02 – High Performance Painting and Coating.

2. Interior Coating: Epoxy suitable for potable water service or fully neoprene rubber lined.

B. Minimum Valve Classification:

1. 12-Inch and Smaller: 175 psi, C.W.P., non-shock working pressure rating.

2. 14 Inch and Larger: 150 psi, C.W.P, non-shock working pressure rating.

C. When plug valve is in the full open position, plug geometry and body waterway contours shall provide port area equal to 100 percent 80 percentof the adjacent pipe nominal diameter and no cavities where debris can collect.

D. Resilient Plug Facing: Neoprene. Provide dead-tight shutoff pressure in either direction.

E. Seat: One piece welded nickel, or AISI 304L Stainless Steel.

F. Stem Seal Packing: Nitrile-butadiene (Buna) filled PTFE U-ring seal or meet AWWA C504.

G. Bearings: Stainless steel, permanently lubricated radial bearings. Non-adjustable thrust bearings.

H. Manual Actuators:

1. Type: Hand wheel, or gear with cast iron housing.

2. Provide chain wheel on all valves located with centerline 6 feet and higher.

3. Equip with adjustable open memory stop.

4. Provide position indicator.

I. Manufacturers:

1. DeZurik

2. Milliken

3. Clow

4. Pratt

5. Or Approved Equal

2.05 CHECK VALVES - SWING

A. Service Type: Liquid:

1. Design: Full body, flanged type, ASTM A536 ductile iron, rated for 250 PSI CWP, full waterway design.

2. Body seat shall be type 304 stainless steel. All external fasteners shall be type 304 stainless steel.

3. Disc and disc arm shall be ASTM A536 ductile iron. Disc shall be attached to the disc arm with a Type 304 stainless steel nut.

4. Disc seat shall be NBR or EPDM and securely held in place by stainless steel screws. Disc seat shall be replaceable and provide drip tight shutoff.

5. Shaft shall be one-piece Type 304 stainless steel. Pivot shaft shall be keyed and protrude through both sides of the body.

6. Valve shall include closure assist using Lever and weight arm with adjustable counterweight. Lever, arm and weight are to be carbon steel.

7. Provide totally enclosed bronze air cushion with stainless steel hardware. Air cushion shall be adjustable by means of a flow control valve and piston sleeve.

8. Valve shall meet or exceed latest revision of AWWA standard C508.

2.06 BALL CHECK VALVES

A. Smaller than 4-inches

1. ASTM D1784 Type I, Grade 1.

2. Body: Polyvinyl Chloride with dual union socket weld ends.

3. Rating: 150 psi at 73 degrees Fahrenheit.

4. Seat and Seal: Viton.

5. Installation: Valve shall be suitable for vertical up or horizontal flow as indicated on Construction Drawings.

6. Approved Manufacturers:

a. Hayward – TC Series True Union Ball Check
b. Spears – True Union
c. Nibco – Chemtrol Tru Union
d. ASAHI/America

B. 4-Inches and Larger

1. Body: Iron with flanged ends and cleanout and vulcanized nitrile rubber exterior.

2. Flanges: ASME B16.1, Class 125, Rated 150 pound working pressure.

3. Ball: Sinking type hollow steel.

4. Installation: Valve shall be suitable for vertical up or horizontal flow as indicated on Construction Drawings.

5. Approved Manufacturers:

a. FLGYT Corporation
b. Flomatic Corporation

C. In addition to meeting required specifications, ball check valves shall be suitable for individual applications and shall take into consideration immediate connected piping material.

2.07 BALL VALVES

A. Manual ball valves for use with metallic pipe systems:

1. Manufacturer and type: Series B-6000 ball valve as manufactured by Watts Regulator Company, or approved equivalent.

a. Body: Bronze.
b. Ball: AISI Stainless Steel.
c. Stem: AISI Stainless Steel.
d. Valve Seats: Durafill.
e. Connection: Threaded.

B. Manual ball valves for use with PVC pipe systems:

1. Manufacturer and type:

a. Watts Regulator Company.
b. Hayward.
c. Spears.
d. George Fisher Inc (GF).

2. Material: Schedule 80 PVC

3. Seats: Teflon.

4. Seals: Viton “O” rings.

5. Stem: Blow out proof.

6. Connector: True union design with socket end connections.

C. Pneumatic ball valves for ductile iron pipe systems, 4” to 54”

1. Approved Manufacturers and Type:

a. Valmatic - EnerG Ball Valve
b. Or Approved Equal

2. The valves shall be designed, manufactured and tested in accordance with ANSI/AWWA C507.

3. The valve port shall be a 100% clear bore equal to the nominal valve size with no seat hardware in the flow stream when fully open. The ball shall be self-flushing when in intermediate positions for wastewater service.

4. Valve shall be pneumatically actuated. Actuators shall be traveling nut design with characterized closure sized to position the valve with an air supply pressure built in accordance with AWWA C541.

5. Design:

   a. The valve shall be rated for 300 psi and with end flanges in full conformance with ANSI B16.1 Class 250.
   b. Body: Ductile Iron.
   c. Seats: EPDM.
   d. Body Seat: Stainless Steel
   e. Ball: Ductile Iron
   f. Packing: Buna-N
   g. Sleeve Bearing: Teflon Lined

2.08 PINCH VALVES

A. Valves shall be of the full cast ductile iron metal body, mechanical pinch type with flange joint ends. The valve length shall be as given in ISA S75.08. The flanges shall be drilled and tapped to mate with ANSI B16.1, Class 125 / ANSI B16.5, Class 150 flanges.

B. The sleeve trim shall be one piece construction with integral flanges drilled to be retained by the flange bolts. The sleeve trim shall be reinforced with calendared polyester fabric to match service conditions. The sleeve trim shall be connected to the pinch bar by tabs embedded in the sleeve trim reinforcing ply. All internal valve metal parts are to be completely isolated from the process fluid by the sleeve trim.

   1. For full port and reduced port sleeves, the port areas shall be 100 percent of the full pipe area at the valve ends.

   2. For cone and variable orifice sleeves, the port area at the inlet shall be 100 percent of the full pipe area, reducing to a smaller port size at the outlet.

C. The solid steel pinch mechanism shall be single acting, closing the sleeve from the top only. The mechanism shall be supported in the valve body. There shall be no cast parts in the operating mechanism.

   1. The mechanism shall be connected to the electrically actuated actuator through an ACME thread stem. The electric actuator shall be as specified. The pinch mechanism shall be adjustable for stroke without removing the valve from the line.

D. The sleeve material shall be Buna-N.

E. All valves shall be Red Valve, Type A, Series 5200E, or equal.

F. Manufacturers:

1. Red Valve

2. Cla Val

3. RF Technologies. INC.

4. Or Approved Equal

2.09 AIR RELEASE VALVES (ARV)

A. Air release valves shall allow entrained air in pipelines to escape through an air release orifice. After releasing entrained air, the orifice shall close by a needle mounted upon a compound lever mechanism actuated by a float. The orifice shall remain closed until more air accumulates and the cycle is repeated.

B. Valves for sewage or sludge shall contain flushing and drain connections.

C. Manufacturers:

1. Water valves shall be:

a. Apco
b. Crispin
c. Val-Matic
d. Or Approved Equal

2. Sewage or sludge valves shall be:

a. Apco
b. Crispin
c. Val-Matic
d. Or Approved Equal

2.10 COMBINATION AIR VALVES

A. Type: Dual body combination air/vacuum/air release valve.

B. Standard: AWWA C512.

C. Material:

1. Body and Cover: Ductile or Cast iron.

2. Float: Stainless steel.

3. Seat: Buna-N.

4. Linkage: Stainless steel.

5. Needle: Stainless steel.

6. Other Internal Parts: Stainless steel.

D. Function: Valve shall perform the following functions of both air release and air/vacuum valves:

1. Exhaust large quantities of air during the filling of a piping system and close upon liquid entry.

2. Open during draining or if a negative pressure occurs.

3. Release accumulated air from a piping system while the system is in operation and under pressure.

E. Valve shall be provided with an inlet shut-off ball valve.

F. Manufacturers:

1. Apco

2. Val-Matic

3. Or Approved Equal

2.11 SOLENOID VALVES

A. Two-Way Solenoid Valves:

1. Manufacturers:

a. ASCO Series 8210 two-way solenoid valve manufactured by Automatic Switch Company
b. Or Approved Equal

2. Type:

a. Body: Brass, Bronze, or Stainless Steel.
b. Seals and Discs: Teflon.
c. Core Tube, Core Plugnut, Springs: Stainless steel.
d. Shading Coil: Copper.
e. Solenoid Enclosure: Watertight (NEMA 4X).
f. Electrical: 120 Volt/1P, compatible with intended application as specified in Division 26.
g. Provide normally open or normally closed function as coordinated with Engineer.

2.12 TELESCOPING VALVES

A. Approved Manufacturers

1. Whipps, Inc. Series 310

2. Golden Harvest

3. Troy Valves

4. Trumbull

5. Approved equal

B. General

1. Telescoping valve shall be suitable for service in the indicated locations

2. Telescoping valves shall be as specified herein and have the characteristics and dimensions shown on the Contract Drawings

3. The vaslves shall utilize a low friction seal to mount to engage the slip and mount to theflange of the receiving pipe

4. All welds shall be performed by welders with AWS certification.

5. Finish: Mill finish on stainless steel. Welds shall be sandblasted to remove weld burn and scale

6. Materials:

a. Slip Tube and Bail: Stainless Steel, Type 316L, ASTM A240 (304L, ASTM A240)
b. Stem: Stainless Steel, Type 316, ASTM A276
c. Fasteners, Nuts, and Bolts: Stainless Steel, Type 316, ASTM A276
d. Seal: Urethane or Neoprene
e. Lift Nuts: Bronze ASTM B584
f. Pedestals and Wall Brackets: Stainless Steel, Type 316L, ASTM A276
g. Operating Housing: Cast Aluminum

C. Slip Tube and Bail

1. The slip tube shall be constructed of Schedule 10 minimum thickness stainless steel pipe. V-notched weirs, scum baffles and/or funnel tops shall be provided as shown on the Contract Drawings.

2. The bail shall be constructed of stainless steel and shall be bolted to the stem and welded to the slip tube

D. Seal

1. The telescoping valve shall be provided with ta self-adjusting seal system to restrict leakage between the slip tube and the receiving pipe.

2. The seal shall be a one-piece molded urethane seal with an upper lip type seal and an integral companion flange

3. If a neoprene seal and separate companions flange is provided, the neoprene seal shall have a minimum thickness of ½-inch and the

companion flange shall be stainless steel and shall have a minimum thickness of 3/8-inch.

4. The companion flange shall be provided with a bolt pattern suitable for the attachment to the flange on the receiving pipe

E. Stem

1. A threaded operating stem shall be utilized to connect the operating mechanism to the bail which I turn is attached to the slip tube. On rising stem valves, the threaded portion shall engage the operating nut in the manual operator motor actuator. On non-rising stem valves, the threaded portion shall engage the nut attached to the bail.

    a. The threaded portion of the stem shall have a minimum outside diameter of 1-1/2 inches. Stem extension pipes are not acceptable.
    b. The stem shall be constructed of solid stainless steel bat for the entire length, the metal having a tensile strength of not less than 90,000 psi .
    c. Maximum L/R ratio for the unsupported part of the stem shall not exceed 200.
    d. In compression, the stem shall be designed for a critical buckling load caused by a 40 lb effort on the crank with a safety factor of 2, using the Euler column formula.
    e. The stem shall be designed to withstand the tension load caused by the application of a 40 lb effort on the crank or hand wheel without exceeding 1/5 of the ultimate tensile strength of the stem material.
    f. The threaded portion of the stem shall have a mechine rolled double lead threads of the full ACME type with a 16 microinch finish or better. Stub threads are not acceptable.
    g. Stems of more than one section shall be joined by stainless steel or bronze couplings. The coupling shall be pinned and bloted to the stems.
    h. Stems, on manually operated valves, shall be provided with adjustable stop collars to prevent over travel.

F. Stem Guides

1. Stem Guide shall be provided when necessary to ensure that the maximum L/R ratio for the unsupported part of the stem is 200 or less.

    a. Stem guide brackets shall be fabricated of stainless steel and shall be outfitted with UHMW or bronze bushings.
    b. Adjustable in two directions.

G. Manual Operators

1. Valves shall be operated by manual crank-operated gearbox. The operator shall be mounted on a pedestal.

    a. The valve manufacturer shall select the proper gear ratio to ensure that the valve can be operated with no more than a 40 lb effort.
    b. An arrow with the word “OPEN” shall be permanently attached or cast onto the operator to indicate the direction or rotation to open the valve.
    c. Crank-operated gearboxes shall be fully enclosed and shall have a cast aluminum housing.
        1) Gearboxes shall have either single or double gear reduction depending upon the lifting capacity required.
        2) Gearboxes shall be provided with a threaded cast bronze lift nut to engage the operating stem.
        3) Bearing shall be provided above and below the flange on the operating nut to support both opening and closing thrusts
        4) Gears shall be steel with machined cut teeth designed for smooth operation.
        5) Pinion shaft shall be stainless steel and shall be supported on ball or tapered roller bearings.
        6) Positive mechanical seals shall be provided on the operating nut and the pinion shafts to exclude moisture and dirt and prevent leakage of lubricant out of the hoist.
        7) The crank shall be cast aluminum with a revolving nylon grip.
        8) The crank shall be removable.
    d. Pedestals shall be constructed of stainless steel.
        1) The pedestal height shall be such that the pinion shaft on the crank-operated gearbox is located approximately 36 in above the operating floor.
        2) Wall brackets shall be used to support floor stands where shown on the Drawings and shall be constructed of stainless steel
        3) Wall brackets shall be reinforced to withstand the maximum operating loads mentioned herein.
        4) The design and detail of the brackets and anchor bolts shall be provided by the valve manufacturer and shall be approved by the Engineer. The valve manufacturer shall supply the bracket, anchor bolts and accessories as part of the valve assembly.
    e. Operators shall be equipped with fracture-resistant clear butyrate or Lexan plastic stem covers.
        1) The top of the stem cover shall be closed.
        2) The bottom end of the stem cover shall be mounted in a housing or adapter for easy field mounting.
        3) Stem Covers shall be complete with indicator marking to indicate valve position.

H. Anchor bolts shall be provided by the valve manufacturer for mounting the pedestal and appurtenances.

1. Quantity and location shall be determined by the valve manufacturer.

2. If epoxy-type anchor bolts are provided, the valve manufacturer shall provide the studs and nuts.

3. Anchor bolts shall have a minimum diameter of 1/-inch

2.13 CORPORATION STOPS

A. Bronze, Brass, or Stainless steel construction, inlet and outlet openings same size as the valve.

B. AWWA ball valve type.

C. Insta-tite or compression connections.

D. Meet or exceed the ANSI/AWWA C800 standards, 150 psi.

E. Approved Manufacturers:

1. A.Y. McDonald Manufacturing

2. Mueller

3. Fork Meter Box

4. Or Approved Equal

PART 3 EXECUTION

3.01 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted (does not apply to plug valves).

B. Install valves in the locations and configurations shown on Drawings.

C. Provide adequate structural support of installed valves as required.

D. Install valves per manufacturer's recommendations.

3.02 STARTING AND ADJUSTING

A. Furnish Owner and Engineer with a written report prepared by equipment supplier certifying that equipment:

1. Has been properly installed.

2. Is in accurate alignment.

3. Is free from an undue stress imposed by connecting piping, anchor bolts, etc.

4. Has been operated through at least two complete open/close cycles.

5. Checked for leakage

3.03 CLASSROOM AND DEMONSTRATION TRAINING

A. Provide minimum four (4) hours classroom and demonstration training on the proper operation and maintenance of equipment. Training to be completed after completion of starting and adjusting.

3.04 PAINTING

A. All material and equipment in this section shall be factory primed. Primer shall be compatible with finish coats of paint provided under Section 09 90 02 – High Performance Painting and Coating.

B. Finish painting of all materials and equipment in this Section that are not concealed shall be the responsibility of the General Contractor, and shall be as described in Section 09 90 02 – High Performance Painting and Coating, unless otherwise specifically indicated. The Contractor shall, however, refinish and restore to the original appearance, all equipment that has sustained damage to the manufacturer's finish or prime coats of paint or enamel.

END OF SECTION 40 27 20

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SECTION 40 27 21
PROCESS ELECTRIC ACTUATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.

   a. Electric Actuators.

2. Related Sections include:

   a. Section 01 33 00 - Submittal Procedures
   b. Section 01 45 00 - Quality Control
   c. Section 01 61 00 - Common Product Requirements
   d. Section 01 75 00 - Starting and Adjusting
   e. Section 01 77 00 - Closeout Procedures
   f. Section 01 78 23 - Operation and Maintenance Data
   g. Section 09 90 02 - High Performance Painting and Coating
   h. Section 40 27 00 - Process Piping - General
   i. Section 40 27 05 - Process Piping Support Systems
   j. Section 40 27 20 - Process Valves
   k. Division 26 – Electrical

1.02 REFERENCES

A. Reference Standards include:

1. AWWA C542: Power-Actuating Devices for Valves and Slide Gates.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 01 33 00, detailed specifications, drawings, and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for the complete operational system.

1. Electric Motor

2. Manufacturer’s installation instructions.

3. Electric actuator installation drawings including wiring diagrams

B. Manufacturer’s Instructions: Furnish under provisions of Section 01 33 00.

1. Operations and Maintenance Data: Submit in accordance with Section 01 78 23 on all parts, devices, equipment and other accessories forming each complete operational system. Include a complete write-up of how the system is to operate and how to make adjustments.

1.04 QUALITY CONTROL

A. To ensure quality, conformance, and reliability with regard to the manufacturing and production of the equipment, the Manufacturer shall meet all requirements listed hereafter:

B. Manufacturer shall have a minimum of fifteen (15) years of experience producing equipment substantially similar to that required and shall be able to submit documentation of at least fifteen (15) independent installations using the same size or larger equipment as detailed in the below. Each installation must have been in satisfactory operation for at least five (5) years.

C. Electric actuators, and all other specified accessories and appurtenances shall be furnished by a single manufacturer or supplier to ensure compatibility and integrity of the individual components, and provide the specified warranty for all components.

D. Equipment shall meet additional quality assurance requirements as specified in Section 46 05 01.

E. Manufacturers shall meet additional qualification requirements as specified in Section 46 05 01.

1.05 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall transport, deliver, store, and handle as specified in Section 01 61 00.

B. Contractor shall inspect materials upon delivery for loss or damage in transit. Contractor shall be responsible for the replacement of damaged materials; damaged materials shall be removed from the Site.

1.07 WARRANTY

A. The Manufacturer shall warrant that all equipment shall be free of defects caused by faulty material or workmanship and shall replace those parts for at least a period of two (2) years from the date of start-up.

B. Multiple warranties for individual components shall not be acceptable.

PART 2 PRODUCTS

2.01 GENERAL

A. Actuators shall be non-intrusive, intelligent multi-turn type, suitable for use on a nominal 480 volt, 3-phase, 60 Hertz power supply, and are to incorporate motor, internal motor heater, integral reversing starter, local control facilities, and terminals for remote control and indication connections.

1. Diagnostic information shall be available from both an integrally mounted display window and through non-intrusive means of reading and writing data to the actuator.

2. All actuators provided on this project shall be the product of a single manufacturer.

2.02 ELECTRIC ACTUATORS:

A. General

1. Provide electric actuators where indicated on Drawings, or in these specifications.

2. Complete with motor, gearing, integral reversing starters, local control facilities, local position indicator, NEMA 6 or NEMA 7 non-intrusive enclosure (based on space rating shown on Drawings) NEMA enclosure, and a separately sealed terminal compartment with terminals for remote control and indication connections for indoor applications. Units shall be appropriately selected based on the rating of the room in which the unit and appurtenances are located.

3. NEMA enclosures shall be of the following non-intrusive type, with space ratings defined in the Electrical Drawings:

   a. NEMA 7 in Class 1 Division 1 rated spaces.
   b. NEMA 6 in all other spaces.

4. Actuator calibration shall be by integral pushbuttons and selector switch.

5. Diagnostic information shall be available from an integrally mounted display window.

6. Provide externally adjustable mechanical stops to prevent over travel.

7. Designed to automatically actuate valve requiring one quarter turn between fully opened and fully closed positions.

8. Designed for modulated position operation with solid state starter.

9. Designed with torque limiting feature which prevents valve or actuator damage if any obstruction interferes with normal valve rotation, in either direction.

10. Provide padlockable manual override to enable the valve to be manually operated. The override shall have clutch to disengage the motor before manual operator can be engaged. Motor operation shall automatically disengage manual drive. Engagement or disengagement of the manual drive shall be possible without damaging the actuator or valve, even with the motor running.

11. Equip with limit switches to indicate open and closed positions.

12. The actuator shall have an internal 24 VDC power supply for remote control functions. The internal supplies shall be protected against overcurrent and short circuit faults. Terminals shall be included to connect the electronic controls package.

13. Modulating service operators shall be equipped with a solid-state servo positioner which accepts a 4-20 mA DC signal and positions the valve in proportion to the input signal. A 4-20mA position feedback signal shall also be provided.

14. Provide with automatic phase correction, single phase protection, instant motor reversal protection, torque switch hammer protection, and voltage spike protection.

15. Actuators are to be connected to the facility SCADA control system to enable the selection of local or remote control. See Control Loop Descriptions.

    a. Local Position: Valve controlled by local control station supplied with valve.
    b. Auto Position: Valve accepts positioning signal from plant control system.

16. Furnish and install manufactured base plate for each actuator.

17. Position indicators shall be provided and shall transmit a signal to the plant control system.

18. Upon loss of power, actuator and gate or valve shall remain in the position at time of power loss. Fail-safe position is not required.

19. Actuator Sizing:

    a. Actuator shall be sized to guarantee valve/gate closure at the specified torque requirement indicated by the valve/gate

manufacturer. Actuator must be adequately sized to provide the torque required to operate the valve/gate at 90% of the nominal voltage with the option of operation at up to -10% under voltage conditions.

b. For valve service, the operating speed shall be 30 seconds (+/- 15 seconds) for open/close service and 60 seconds (+/- 15 seconds) for modulating service, unless otherwise approved by Engineer.

c. For gates or other modulating service requiring multiturn actuators, Manufacturer shall provide operating speed for Engineer review and approval during the submittal process.

B. Approved Manufacturers:

1. Flowserve Limitorque MX or QX

2. Rotork IQ Series

3. Auma SQ or SQR Series

4. Approved Equivalent

C. Motors:

1. Motors shall be capable of the following cycles per hour without overload or damage:

   a. Open/Close Service: 60 cycles per hour
   b. Modulating Service: 1,200 cycles per hour

2. Motor type(s) allowed:

   a. AC electric motor specifically designed for valve actuator service characterized by high starting torque, low stall torque and low inertia
   b. 24-Volt permanent magnet motor

3. The motor shall be 15-minute duty, Class F insulated.

4. The motor shall be able to produce up to 150% of rated torque. The motor control shall restrict the amount of current to prevent damage to the motor, integral switching devices, or toroid transformer. A 20A fuse in the transformer secondary circuit and anti-surge fuse in the primary circuit shall provide further protection.

5. Electrical disconnection of the motor shall be possible without loss of lubricant. The actuator must include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel regardless of the connection sequence of the power supply.

6. The actuator shall not require recalibration when motor is changed or replaced.

7. The following criteria shall be provided for motor protection:

    a. The motor shall be de-energized without damage in the event of a stall condition when attempting to move a jammed valve.
    b. The motor shall be de-energized in the event of an over-torque condition.
    c. Thermal devices (one for each phase of power) shall be imbedded in the motor windings to de-energize the motor in case of overheating.
    d. Lost phase protection.

D. Temperature:

1. Actuators shall be suitable for indoor and outdoor use. The actuator shall be capable of functioning in an ambient temperature ranging from 0° F to 100° F.

E. Enclosure:

1. Actuators shall be O-ring sealed, watertight to NEMA 4X/6 and submersible to IP 68-8 (26 feet for 96 hours) in accordance with EN 60529. All external fasteners shall be of stainless steel. An anti-condensation heater shall be installed inside the actuator, suitable for continuous operation.

F. Internal Wiring:

1. For ease of maintenance and repair, all internal wiring shall be terminated at a plug and socket connector.

G. External Wiring:

1. External wiring shall terminate in a removable plug and socket head, which allows easy disconnection of all power and control voltages. Actuators furnished without plug and socket terminal connections must have power and control disconnect switches for ease of maintenance and safety.

H. Gearing:

1. The actuator gearing shall be totally enclosed in a grease-filled cast iron gear case suitable for operation in any orientation. Gearing shall be hardened steel with alloy bronze worm wheel. Where required per application, electric actuators will be provided with worm gearboxes. The worm gearboxes shall be supplied with end-of-travel mechanical stops.

I. Manual Operation:

1. Manual operation shall be by handwheel, which shall be removable and which shall not rotate during motor operation. The declutching from

motor operation shall be at the motor shaft to minimize declutching effort. The amount of force required to declutch the actuator shall be the same regardless of size of the actuator. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation.

J. Valve Position and Torque Calibration:

1. Position and torque shall be sensed by absolute encoder using hall effect sensors. Position and torque settings will be stored in permanent non-volatile memory.

2. Torque adjustment shall be adjustable between 40% and 100 % or rated torque.

3. Torque switch bypass to be provided for the torque sensing system to inhibit torque switch trip during unseating or during starting in mid-travel against high inertia loads.

K. Actuator Controls:

1. Actuator Status Indication:

   a. Six contacts shall be provided. The contacts shall have a minimum rating of 5A, 250VAC.
   b. One contact dedicated for collective fault (e.g., phase failure, motor protection tripped, torque fault).
   c. Five additional indication contacts selectable from a list of parameters including, but not limited to: end position CLOSED, end position OPEN, selector switch in REMOTE mode, torque fault in CLOSED direction, and torque fault in OPEN direction.

L. Integral Starter and Transformer:

1. Starter shall be suitable for the following starts per hour:

   a. Up to 60 starts per hour for open/close service
   b. Up to 1,200 starts per hour for modulating service

2. All modulating actuators shall be equipped with a solid state starter.

3. Control power shall be provided from an integral 24 VDC supply unless a separate power source is shown on the Electrical drawings.

M. Control Module:

1. A control module shall be provided for position modulating type service. The control module shall be mounted within the valve actuator limit switch housing. The module shall accept a standard 4-20 mA dc analog input signal with load impedance of not greater than 400 ohms. The control module shall contain adjustments for span, zero, gain, and deadband.

2. The actuator shall include local Open/Stop/Close pushbuttons and a Local/Off/Remote selector switch lockable in any of the three positions.

3. It shall be possible to select maintained or non-maintained control independently for either the local or remote modes.

    a. When the actuator selector switch is in the “remote” position, the valve shall be capable of being positioned remotely using an integral comparator circuit and a 4-20 mA input signal from a remote source.
    b. When the selector switch is in the “local” position, the valve shall be capable of being positioned locally using the integral pushbutton.

4. It shall be possible to program the output direction of the actuator (clockwise or counterclockwise to close) without removal of any covers.

5. It shall be possible to re-orient local pushbutton controls in 90° increments.

N. Control Performance:

1. For any operating torque within the specified range of the valve actuator, the valve and actuator shall perform within these specified limits:

    a. Linearity: Linearity of actual valve position as compared to demand signal shall be within plus or minus 4.0 percent of span over the entire operating range.
    b. Repeatability: For any repeated demand signal to the valve actuator, the actual valve position shall be repeated within 0.5 percent of span.
    c. Deadband: Deadband of the valve actuator shall be adjustable from 1.0 to 10 percent of span.
    d. Hysteresis: For any repeated demand signal to the valve actuator, from either an increasing or a decreasing direction, the actual valve position shall be repeated within 1 degree of valve shaft rotation.

O. Control Capabilities (Contact Closure / Discrete Signals):

1. The following control capabilities must be available:

    a. Input remote control signals for:
        1) Open/Stop/Close (maintained contacts) or emergency
        2) Open/Close ‘push to run’ (momentary)
        3) Programmable emergency input for fail to any intermediate or end of travel positions when required

2. Programmable electronic torque switch bypass initialized in end and intermediate positions.

3. Separate open and close direction pulse timer (stepping mode) circuits capable of initializing at any position (open, close or intermediate).

4. It shall be possible to reverse valve travel without the necessity of stopping the actuator.

P. Control Capabilities (Analog Signals):

1. The following control capabilities must be available:

   a. Provide controls for an analog input (4-20mA) percent position, and provide an output with a 4-20mA percent feedback.
   b. Provide programmable emergency input for fail to any intermediate or end of travel positions when required.

Q. Non-Intrusive Capability:

1. In order to maintain the integrity of the enclosure, setting of all actuator parameters including the torque levels, position limits, configuration of the indication contacts and positioner functionality shall be accomplished without removing covers from the actuator control assemblies or housing. Settings shall be made by entering the set up mode and following menu prompts appearing in the LCD window. Set up shall be accomplished by using the actuator integral selector switch and pushbuttons or with a hand-held setting device. Actuator parameters may also be set by means of laptop computer via a two-way information infrared interface or laptop via Bluetooth® interface.

R. Electric motor actuators for use on PVC true union ball valves:

1. Motor Rotation: Reversing.

2. NEMA Rating: NEMA 4 enclosure with ½" NPT connection

3. Provide with standard:

   a. Thermal overload protection.
   b. Manual override.
   c. Position indicator.
   d. 316 stainless steel hardware.

4. Cycle Time:

   a. ½" – 2" 2.5 seconds.
   b. 2 ½" – 3" 5.0 seconds.
   c. 4" 10.0 seconds.

5. Duty Cycle:

   a. ½" – 2" 75%.
   b. 2 ½" – 4" 25%.

6. Limit Switch: 2, SPDT.

7. Aluminum Housing with powder coated finish.

8. Lubrication: Permanent.

9. Voltage: 115 VAC, 60 Hz.

10. Approved Manufacturers:

    a. Hayward
    b. Limitorque LTQ
    c. Approved Equal

S. Electric motor actuators for use on metal ball valves:

1. Motor Rotation: Reversing.

2. NEMA Rating: NEMA 4 enclosure with ½" NPT connection

3. Provide with standard:

    a. Thermal overload protection.
    b. Manual override.
    c. Position indicator.
    d. 316 stainless steel hardware.

4. Cycle Time: 6.0 seconds.

5. Duty Cycle: 100%.

6. Limit Switch: Standard auxiliary SPDT, fully adjustable.

7. Die Cast Aluminum Housing.

8. Lubrication: Permanent.

9. Voltage: 115 VAC, 60 Hz.

10. Output Torque: 550 in./lbs.

11. Approved Manufacturers:

    a. Hayward
    b. Watts ER550 Reversing Electric Actuator for Quarter-Turn Ball Valves, Watts Regulator Company.
    c. Limitorque

PART 3 EXECUTION

3.01 INSTALLATION

A. Install actuator on gate or valve per manufacturer's recommendations.

B. Install actuators in the locations shown on Drawings. Verify configuration with Owner and Engineer.

C. Provide adequate structural support of installed actuators and valves as required.

D. Valve tags to be installed so as not to interfere with valve or actuator operation.

3.02 PAINTING

A. All material and equipment in this section shall be factory primed. Primer shall be compatible with finish coats of paint provided under Section 09 90 02 - High Performance Painting and Coating.

B. Finish painting of all materials and equipment in this Section that are not concealed shall be the responsibility of the General Contractor, and shall be as described in Section 09 90 02 - High Performance Painting and Coating. Painting, unless otherwise specifically indicated. The Contractor shall, however, refinish and restore to the original appearance, all equipment that has sustained damage to the manufacturer's finish or prime coats of paint or enamel.

3.03 STARTUP AND ADJUSTING

A. Provide services of an Experienced, Competent and Authorized Representative of Manufacturer for a minimum of eight (8) hours:

1. Inspect equipment covered by these Specifications.

2. Supervise any adjustments and installation checks.

3. Conduct start-up of equipment and perform operation checks and tests.

4. Reference Sections 01 45 00 and 01 75 00 for additional requirements.

B. Furnish Owner and Engineer with a written report prepared by equipment supplier certifying that equipment:

1. Has been properly installed.

2. Is in accurate alignment.

3. Is free from an undue stress imposed by connecting piping, anchor bolts, etc.

4. Has been operated through at least two complete open/close cycles.

C. Each actuator must be tested and individual test certificates shall be supplied free-of-charge. The test equipment should simulate a typical valve load and the following parameters should be recorded:

1. Current at maximum torque setting

2. Torque at maximum torque setting

3. Actuator Output Speed or Operating Time

D. In addition, the test certificate should record details of specification, such as gear ratios for both manual and automatic drive, closing direction, and wiring diagram.

E. Contractor shall perform testing, startup, and adjustments as specified in Section 01 75 00.

3.04 COMMISSIONING

A. Provide commissioning plan and meet additional requirements of Section 01 91 00. Contractor shall be responsible for providing any additional services of manufacturer's representative for functional and performance and operation testing if necessary for commissioning.

3.05 CLASSROOM AND DEMONSTRATION TRAINING

A. Follow the requirements in Section 01 79 00.

1. Provide minimum four (4) hour of classroom training and four (4) hours of demonstration training by a qualified manufacturer's representative.

B. Contractor shall record training via digital video camera so Owner can use again in the future.

3.06 SPARE PARTS

A. Furnish lubricating materials to allow for one year of operation. Lubricating materials shall be as recommended by the manufacturer.

END OF SECTION 40 27 21

SECTION 40 27 60
PROCESS IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Pipe markers.

2. Equipment, valve, gate, flow meter, and instrument markers.

3. The methods and materials specified herein apply to all piping and equipment in Divisions 40 and Division 46.

B. Related Sections include:

1. Section 01 33 00 - Submittal Procedures

2. Section 09 90 02 - High Performance Painting and Coating

3. Division 46 – Equipment.

4. Division 23 – HVAC

5. Division 26 – Electrical

1.02 REFERENCES

A. Reference Standards include:

1. Ten States Standards for Wastewater - 54.5 Piping Color Recommendations.

2. State of Utah Department of Environmental Quality, R309-525-8: Color Coding and Pipe Marking.

3. ANSI A13.1 - 1981: Schemes for Identification of Piping Systems.

1.03 SUBMITTALS

A. Submit location drawing and shop drawings on markers under provisions of Section 01 33 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Pipe Marker Manufacturers:

1. W.H. Brady Co.

2. Seton Nameplate Corp.

3. Chemelex Div., Raychem Corp.

4. John P. Nissen Jr. Co.

5. Zippertubing Co.

6. Emedco.

2.02 PIPE MARKERS

A. All pipes, regardless of material, shall receive pipe markers.

B. Process piping containing corrosive or hazardous chemicals shall have labels every ten feet with a minimum of two labels in each room, closet, or pipe-chase.

C. Pipe Size ¾ inch through 6 inch Diameter:

1. One piece, snap around and completely encircle pipe with substantial overlap and permanent tension to grip pipe firmly without adhesives.

2. Provide with flow arrows.

3. Clearly indicate pipe size and service code on line.

a. Example: 4-WAS

4. Size of Legend Letters and Numbers:

Outside Diameter of Pipe or Pipe Covering	Size of Legend Letters and Numerals
3/4" to 1-1/4"	1/2"
1-1/2" to 2"	3/4"
2-1/2" to 6"	1-1/4"

5. Comply with ANSI Standard A13.1 – 1996.

6. Material: Pre-formed acrylic/vinyl plastic.

7. Working printed in a “repeat and reverse” pattern.

8. Adhesive markers will not be allowed.

D. Pipe Size 8 inch Diameter and Larger:

1. After process pipe has been finish coated per Section 09 90 02 - High Performance Painting and Coating, apply pipe name with painted on stenciling.

2. Clearly indicate pipe size and service code in stencil.

   a. Example: 8-RAS

3. Provide each label with flow arrow adjacent to text.

4. Size of Legend Letters and Numbers:

Outside Diameter of Pipe or Pipe Covering	Size of Legend Letters and Numerals
8" to 10"	2"
over 10"	3"

E. Paint on each pipe at 120 or 180 degree intervals based on pipe size and location. Arrange so labeling of similar pipe runs are spaced and oriented the same. Coordinate label placement with Owner and Engineer.

F. Stack stencil wording were applicable. Center flow arrow between words in vertical direction.

G. Coordinate and maintain consistent spacing and stencil locations from filter to filter, between flanges, and within plant walls and penetrations for neat appearance.

H. Stencil paint color to be selected by Engineer to provide required contrast between process pipe coating and stencil identification.

2.03 CONTROL DEVICE MARKERS

A. After process pipe, equipment, valves, flow meters, and other appurtenances have been finish coated per Section 09 90 02 - High Performance Painting and Coating, apply metal nametag for all pieces of equipment, valves, gates, flow meters, and instruments.

1. Metal tag shall include the full tag including building following the examples below and the schedules provided in the drawings:

   a. OXD-IMLR-P1-CV1
   b. OXD-EFF-P1-PV1
   c. OXD-EFF-FE1

B. Material: Stainless Steel.

C. Size: 3 inch diameter, round shape, 0.025-inch thickness

D. Provide with holes for hanging.

E. Stamp tag with appropriate name or number. See the equipment schedule, valve schedule, and instrument schedule in the construction drawings for equipment, valves, flow meters, gates, and instruments.

F. Provide metal tags as required. Contractor shall verify number of valves, flow meters, equipment, and instruments requiring tags.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All process piping 1/2” or greater shall be scheduled for painting and identification. Marker colors shall be yellow with black lettering unless indicated otherwise.

B. Pipe Markers:

1. Install on all piping systems at the following locations or at Engineer's direction:

   a. Adjacent to each valve.
   b. Each branch and riser at take-off.
   c. At each pipe passage through wall or floor.
   d. At not more than 20 feet spacing on straight pipe runs.
   e. At each change in direction.

2. Provide number and copy indicated in schedule below.

C. Painting:

1. Finish painting of all materials and equipment shall be the responsibility of the General Contractor, and shall be as described in Section 09 90 02 - High Performance Painting and Coating.

2. Colors: As coordinated with Engineer.

   a. Owner and Engineer reserve the right to change color selections during shop drawing review based on available color chart options. Where applicable, Contractor shall field verify and match existing pipe colors.

3. Provide 2-inch bands at 30 inch intervals where banding is required. Provide 2-inch width with straight edges and neat appearance. Contractor also has the option to use colored electric tape for identification banding in lieu of painting bands.

D. Control Device Markers

1. Attach with a corrosion resistant material.

2. Attach at all process valves, flow meters, equipment, pressure transducers, and ultrasonic level transducers.

3.02 PIPE COLOR CODE SCHEDULE

A. Contractor shall confirm all color selections for piping with Owner and Engineer.

END OF SECTION 40 27 60

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SECTION 40 27 97
PROCESS GAUGES

DIAPART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:

a. Pressure Gauges.

B. Related Sections include:

1. Section 01 33 00 – Submittal Procedures
2. Section 01 45 00 – Quality Control
3. Section 01 61 00 – Common Product Requirements
4. Section 01 75 00 – Starting and Adjusting
5. Section 01 77 00 – Closeout Procedures
6. Section 01 78 23 – Operations and Maintenance Data
7. Section 40 05 19 - Ductile Iron Process Pipe
8. Section 40 27 10 - Process Piping Specialties
9. Section 40 27 20 - Process Valves
10. Section 40 27 30 - Process Gates
11. Section 40 27 60 - Process Identification

1.02 SUBMITTALS

A. Shop Drawings and Product Data: Submit, Under Provisions of Section 01 33 00, on all materials and products specified in this Section.

1.03 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PART 2 PRODUCTS

2.01 GENERAL

A. All pumps shall have pressure gauges on suction and discharge pipes.

2.02 WORKING PRESSURE

A. Working pressure of pipe specialties to be equal to working pressure of connecting pipes, unless specified otherwise.

2.03 APPROVED MANUFACTURERS

A. Pressure Gauges:

1. Trerice 450 Series (Grade 2A accuracy 0.5%)
2. Trerice 700 Series (Grade 1A accuracy 1.0%)
3. Trerice 500X Series (Grade 2A accuracy 0.5%, doesnt have liquid filled option)
4. Ashcroft 1279 Duragauge (Grade 2A accuracy 0.5%)
5. Wika 111.10DW ((Grade B accuracy 3.0%, doesnt have liquid filled option)
6. Wika 213.53DW (Grade A accuracy 2.0%) 2.5" Diameter Only
7. Wika 233.54 (Grade 1A accuracy 1.0%)
8. Prior approved equivalent.

2.04 PRESSURE GAUGES

A. Lower stem mounted, 4-1/2" size, fiberglass reinforced polypropylene case with phosphor bronze tube. Gauges shall be selected so that normal operating pressures fall at approximately mid scale and so that continuous operation does not exceed 75% of full scale.

B. Provide with dial having white background and black figures and graduations. Pointer shall be micro-adjustable.

C. Install brass tee handle cock on each pressure gauge.

D. Fill gauge with glycerin.

E. Taps and bends: As required for proper positioning of gauge for reading and maintenance.

F. Accuracy shall be ASME Grade 2A per ANSI B40.1 1980.

G. Stopcocks: Trerice Series 865L gauge cock. Provide required brass nipples and associated piping accessories for a complete and functional installation.

H. Pressure Impulse Dampeners: Trerice Series 870 suitable for water service.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install gauges with shut off cocks in straight runs of piping so that they may be read from floor.

B. Provide extension necks on pressure taps in insulated piping, vessels, and equipment.

C. Provide isolating seal complete with bleed/fill screw where process media are injurious to gauge internals or otherwise required.

D. Install pressure gauges at all locations indicated on the Process Flow Schematic and the Drawings.

END OF SECTION 40 27 97

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SECTION 40 27 98
PROCESS PIPE IDENTIFICATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pipe Markers.
2. Valve Tags.
3. Pump Tags.
4. The methods and materials specified herein apply to all piping, valves and pumps furnished in the related sections listed in paragraph 1.01.C unless otherwise specified.

B. Work By Others:

1. Color code schedule.

C. Related Sections Include:

1. Section 01 33 00 – Submittal Procedures.
2. Section 01 45 00 – Quality Control.
3. Section 09 96 10 – Protective Coating Systems.
4. Section 40 05 19 - Ductile Iron Process Pipe.
5. Section 40 05 23 - Stainless Steel Process Pipe and Tubing.
6. Section 40 05 31 - Polyvinyl Chloride Process Pipe.
7. Section 40 05 58 - Process Valves.
8. Section 43 21 13 - Vertical Turbine Pumps.
9. Section 43 21 14 - Submersible Well Pumps
10. Section 43 21 15 - HORIZONTAL END SUCTION CENTRIFUGAL PUMPS.

1.02 REFERENCES

A. Reference Standards Include:

1. Recommended Standards for Water Works, 2022 Edition - 2.16 Piping Color Code.

2. ANSI A13.1 - 2020: Schemes for Identification of Piping Systems.

1.03 QUALITY ASSURANCE

A. Standards: Comply with standards specified herein and in accordance with Section 01 45 00.

B. Qualifications of Manufacturer: Provide Products specified in this Section from manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Engineer.

C. Qualifications of Installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

1.04 SUBMITTALS

A. Submit color schedule under provisions of Sections 01 33 00 and 09 96 10.

B. Submit location drawing and shop drawings on markers under provisions of Section 01 33 00.

PART 2 PRODUCTS

2.01 PIPE MARKERS

A. Pipe Size ¾ inch through 6 inch Diameter:

1. One (1) piece, snap around and completely encircle pipe with substantial overlap and permanent tension to grip pipe firmly without adhesives.

2. Provide with flow arrows.

3. Clearly indicate “name” of line.

4. Size of Legend Letters and Numbers:

Outside Diameter of Pipe or Pipe Covering	Size of Legend Letters and Numerals
3/4" to 1-1/4"	1/2"
1-1/2" to 2"	3/4"
2-1/2" to 6"	1-1/4"

5. Material: Pre-formed acrylic/vinyl plastic.

6. Working printed in a “repeat and reverse” pattern.

7. Adhesive markers will not be allowed.

B. Pipe Size 8 inch Diameter and Larger:

1. After process pipe has been finish coated per Section 09 96 10, apply pipe name with painted on stenciling.

2. Provide each label with flow arrow adjacent to text.

3. Size of Legend Letters and Numbers:

Outside Diameter of Pipe or Pipe Covering	Size of Legend Letters and Numerals
8" to 10"	2"
Over 10"	3"

4. Paint on each pipe at 120 or 180 degree intervals based on pipe size and location. Arrange so labeling of similar pipe runs are spaced and oriented the same. Coordinate label placement with Owner and Engineer.

5. Stack stencil wording where applicable. Paint flow arrow at end of wording in direction of flow. Center flow arrow between words in vertical direction.

6. Coordinate and maintain consistent spacing and stencil locations from filter to filter, between flanges, and within plant walls and penetrations for neat appearance.

7. Stencil paint color shall be Black to provide required contrast between process pipe coating and stencil identification.

2.02 VALVE TAGS

A. Furnish brass valve tags for all exposed process valves size 4-inch or larger. Tags to consist of 2-inch round, black-filled numbering of valves as indicated on the Drawings. Tags to be attached to valve operators or bodies with brass jackets.

2.03 PUMP TAGS

A. Provide engraved label pump tags adheared to the base of each pump via double sided taped. Labels shall be white background with black lettering engraved labels. Letter shall be a minimum of 1-1/4" tall with both the pump tag and pump description provided.

PART 3 EXECUTION

3.01 INSTALLATION

A. Pipe Markers:

1. Install on all piping systems at the following locations or at Engineer's direction:

a. Adjacent to each valve.
b. Each branch and riser at take-off.
c. At each pipe passage through wall or floor.
d. At not more than 20 feet spacing on straight pipe runs.
e. At each change in direction.

B. Painting:

1. Finish painting of all materials and equipment shall be the responsibility of the Contractor, and shall be as described in Section 09 96 00 - High Performance Coatings.

2. Colors: As indicated in schedule.

C. Provide 6 inch bands at 30 inch intervals where banding is required.

D. Valve tags to be installed so as not to interfere with valve operation.

3.02 PIPE COLOR CODE SCHEDULE

A. Color code piping in accordance with the schedule presented in Section 09 96 00 - High Performance Coatings .

END OF SECTION 40 27 98

SECTION 40 42 80
PROCESS PIPING LEAKAGE TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Performing of the following, as indicated, in accordance with the provision of the Contract Documents:

a. Leakage testing of process piping.

B. Related Sections include:

1. Section 01 33 00 – Submittals.
2. Section 01 45 00 – Quality Control.
3. Section 01 61 00 – Common Product Requirements.
4. Section 01 75 00 – Starting and Adjusting.
5. Section 01 77 00 – Closeout Procedures.
6. Section 01 78 23 – Operations and Maintenance Data.
7. Section 40 27 00 – Process Piping - General.
8. Section 40 27 05 – Process Piping Support Systems.
9. Section 40 27 20 – Process Valves.

1.02 SUBMITTALS

A. Informational Submittals:

1. Testing Plan: Submit prior to testing and include at least the information that follows.

a. Testing dates.
b. Piping systems and section(s) to be tested.
c. Test type.
d. Method of isolation.
e. Calculation of maximum allowable leakage for piping section(s) to be tested.

2. Certifications of Calibration: Testing equipment.
3. Certified test report.

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Chlorine Institute (2001 L Street N.W., Washington D.C. 28036): Pamphlet 6, Piping Systems for Dry Chlorine.

2. AWWA C600-99.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.

B. Hydrostatically test in accordance with AWWA C600-99 and AWWA C605.

C. Pressure Piping:

1. Install temporary thrust blocking or other restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.

2. Wait 5 days minimum after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.

3. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.

4. Chemical Piping: Test, dry, and clean in accordance with requirements of Chlorine Institute Pamphlet 6.

5. New Piping Connected to Existing Piping:

a. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to Engineer.
b. Test joint between new piping and existing piping by methods that do not place entire existing system under test load, as approved by Engineer.

6. Items that do not require testing include: Piping between wet wells and wet well isolation valves, Equipment seal drains, tank overflows to atmospheric vented drains and tank atmospheric vents.

7. Test Pressure: As specified in specifications or as specified by equipment manufacturer.

D. Test section may be filled with water and allowed to stand under low pressure prior to testing.

E. Gravity Piping:

1. Perform testing after service connections, manholes, and backfilling have been completed between stations to be tested.

2. Determine groundwater level at time of testing by exploratory holes or other method acceptable to Engineer.

3. Pipe 42 Inches Diameter and Larger: Joint testing device may be used to isolate and test individual joints.

3.02 HYDROSTATIC TEST FOR PRESSURE PIPING

A. Fluid: Clean water of such quality to prevent corrosion of materials in piping system.

B. Exposed Piping:

1. Perform testing on installed piping prior to application of insulation.

2. Maximum Filling Velocity: 0.25 foot per second, applied over full area of pipe.

3. Vent piping during filling. Open vents at high points of piping system or loosen flanges, using at least four bolts, or use equipment vents to purge air pockets.

4. Maintain hydrostatic test pressure continuously for two (2) hours, minimum, and for such additional time as necessary to conduct examinations for leakage.

5. Examine joints and connections for leakage.

6. Correct visible leakage and retest as specified.

7. Empty pipe of water prior to final cleaning or disinfection.

3.03 HYDROSTATIC TEST FOR GRAVITY PIPING

A. Testing Equipment Accuracy: Plus or minus 1/2 -gallon water leakage under specified conditions.

B. Maximum Allowable Leakage: 0.16 gallons per hour per inch diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.

C. Gravity Sanitary and Roof Drain Piping: Test with 15 feet of water to include highest horizontal vent in filled piping. Where vertical drain and vent systems

exceed 15 feet in height, test systems in 15-foot vertical sections as piping is installed.

D. Exfiltration Test:

1. Hydrostatic Head:

a. At least 6 feet above maximum estimated groundwater level in section being tested.
b. No less than 6 feet above inside top of highest section of pipe in test section, including service connections.

2. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 30 feet of water column.

E. Infiltration Test:

1. Groundwater Level: At least 6 feet above inside top of highest section of pipe in test section, including service connections.

F. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.

G. Defective Piping Sections: Replace or test and seal individual joints, and retest as specified.

3.04 PNEUMATIC TEST FOR PRESSURE PIPING

A. Do not perform on:

1. PVC or CPVC pipe.

2. Piping larger than 18 inches.

3. Buried and other non-exposed piping.

B. Fluid: Oil-free, dry air.

C. Procedure:

1. Apply preliminary pneumatic test pressure of 25 psig maximum to piping system prior to final leak testing, to locate visible leaks. Apply soap bubble mixture to joints and connections; examine for leakage.

2. Correct visible leaks and repeat preliminary test until visible leaks are corrected.

3. Gradually increase pressure in system to half of specified test pressure. Thereafter, increase pressure in steps of approximately one-tenth of specified test pressure until required test pressure is reached.

4. Maintain pneumatic test pressure continuously for minimum of 10 minutes and for such additional time as necessary to conduct soap bubble examination for leakage.

5. Correct visible leakage and retest as specified.

D. Allowable Leakage: Piping system, exclusive of possible localized instances at pump or valve packing, shall show no visual evidence of leakage.

E. After testing and final cleaning, purge with nitrogen those lines that will carry flammable gases to assure no explosive mixtures will be present in system during filling process.

3.05 PNEUMATIC TEST FOR GRAVITY PIPING

A. Equipment:

1. Calibrate gauges with standardized test gauge provided by Contractor at start of each testing day. Engineer will witness calibration.

2. Install gauges, air piping manifolds, and valves at ground surface.

3. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 6 psi or less.

4. Restrain plugs used to close sewer lines to prevent blowoff.

B. Procedure:

1. Require that no person enter manhole where pipe is under pressure.

2. Slowly introduce air into pipe section until internal air pressure reaches 4 psi greater than average back pressure of groundwater submerging pipe.

3. Allow 2 minutes minimum for air temperature to stabilize.

C. Allowable Leakage: Test section will be considered defective when time required for pressure to decrease from 3.5 to 2.5 psi greater than average back pressure of groundwater submerging pipe is less than that computed utilizing values from following table:

TABLE 1*					
A	**B**	**C**	**D**	**E**	**F**
PIPE DIAMETER (INCHES)	**TIME PER FOOT UP TO LENGTH IN COL C (SECONDS)**	**TEST LENGTH (FEET)**	**TEST TIME FOR ANY LENGTH BETWEEN COL C & E (MIN: SEC)**	**LENGTH AT WHICH TIME IN COL F APPLIES (FEET)**	**TIME PER FOOT FOR TOTAL LENGTH (SECONDS)**

4	**0.18**	**636**	**1:54**	**1,114**	**0.10**
6	**0.40**	**424**	**2:50**	**743**	**0.23**
8	**0.71**	**318**	**3:47**	**557**	**0.41**
10	**1.11**	**255**	**4:43**	**446**	**0.63**
12	**1.60**	**212**	**5:40**	**371**	**0.91**
15	**2.50**	**170**	**7:05**	**297**	**1.42**
18	**3.62**	**141**	**8:30**	**248**	**2.06**
21	**4.92**	**121**	**9:55**	**212**	**2.81**
24	**6.42**	**106**	**11:20**	**187**	**3.67**

EXAMPLE: 15-INCH DIAMETER PIPE:

FOR 150 FEET, T = 2.50 SEC (COL B) X 150 FT = 375 SEC = 6:15

FOR 250 FEET, T = 7:05 (COL D)

FOR 500 FEET, T = 1.42 SEC (COL F) X 500 FT = 710 SEC = 11:50

***BASED ON 0.003 CFM PER SQUARE FOOT WITH A MINIMUM SIGNIFICANT LOSS OF 2 CFM AND A MAXIMUM LOSS OF 3.5 CFM.**

D. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.

E. Defective Piping Sections: Replace or test and seal individual joints, and retest as specified.

3.06 FIELD QUALITY CONTROL

A. Test Report Documentation:

1. Test date.

2. Description and identification of piping tested.

3. Test fluid.

4. Test pressure.

5. Remarks, including:

   a. Leaks (type, location).
   b. Repair/replacement performed to remedy excessive leakage.

6. Signed by Contractor and Owner's Representative to represent that test has been satisfactorily completed.

END OF SECTION {CH#61273} 40 42 80

SECTION 40 61 13
PROCESS CONTROL SYSTEM GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Basic requirements for complete instrumentation system for process control.

2. Requirement for Contractor to subcontract the Process Control System portion of the work to a “Hardware System Integrator.” See specifications contained within.

3. “Software System Integrator” services will be provided as part of the "Hardware System Integrator" scope and shall be included as part of the construction contract. See specifications contained within.

4. PLC and HMI programming and associated programming startup services are required from the contractor as part of contractors bid. See specifications contained within.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. The International Society of Automation (ISA):

   a. 7.0.01 - Quality Standard for Instrument Air.
   b. S5.1 - Instrumentation Symbols and Identification.
   c. S5.3 - Graphic Symbols for Distributed Control/Shared Display Instrumentation, Logic and Computer Systems.
   d. S20 - Standard Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
   e. 62443-3-3 - Security for Industrial Automation and Control Systems, Part 3-3: System Security Requirements and Security Levels

2. National Electrical Manufacturers Association (NEMA):

   a. 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

3. National Fire Protection Association (NFPA):

   a. 70 - National Electrical Code (NEC).

4. Underwriters Laboratories, Inc. (UL):

   a. 913 - Standard for Safety, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations.

5. National Institute of Standards and Technology (NIST)

a. SP 800-82 - Guide to Industrial Control Systems (ICS) Security

B. Qualifications:

1. Hardware System Integrator (HSI):

a. A single manufacturer who is skilled and experienced in the production of control systems shall furnish the automatic control system equipment. The manufacturer shall have the following experience:
   1) Have satisfactorily provided control system integration for a minimum of five projects of similar magnitude and function.
   2) Motor Control Centers.
   3) Level, flow, and pressure controls.
   4) Wastewater treatment, pumping facilities, and distribution systems.
   5) Ethernet Based Network Telemetry systems.

b. Certification:
   1) UL508A Certification
   2) UL698A Certification

c. Qualification:
   1) Regularly engaged in the design and the installation of process control and instrumentation systems and their associated subsystems as they are applied to the municipal wastewater industry.
   2) Maintains a permanent, fully staffed and equipped service facility with full time employees capable of designing, documenting, fabricating, installing, calibrating, providing training services, and testing the systems specified herein.
   3) Capable of responding to on-site problems within 24 hours of notice. Provide an on-site response within 12 hours of notification starting at two months before scheduled startup to two months after startup completion.

C. Miscellaneous:

1. Comply with electrical classifications and NEMA enclosure types shown on Drawings.

1.03 DEFINITIONS

A. Calibrate: To standardize a device so that it provides a specified response to known inputs.

B. Hazardous Areas: Class I, II or III areas as defined in NFPA 70.

C. Highly Corrosive and Corrosive Areas: Rooms or areas identified on the Drawings where there is a varying degree of spillage or splashing of corrosive materials such as water, wastewater or chemical solutions; or chronic exposure

to corrosive, caustic or acidic agents, chemicals, chemical fumes or chemical mixtures.

D. Intrinsically Safe Circuit: A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under test conditions as prescribed in UL 913.

1.04 SYSTEM DESCRIPTION

A. Control System Requirements

1. This Specification Section provides the general requirements for the control system.

2. The control system consists of all primary elements, transmitters, switches, controllers, computers, communication devices, recorders, indicators, panels, signal converters, signal boosters, amplifiers, special power supplies, special or shielded cable, special grounding or isolation, auxiliaries, software, wiring, and other devices required to provide complete control of the plant as specified in the Contract Documents.

3. The control system shall be the result of the combined efforts of the Hardware System Integrator, Software System Integrator, and Electrical Contractor. Descriptions are provided as follows:

a. Hardware System Integrator (HSI)
   1) The equipment and instrumentation provided by the HSI as specified herein shall be provided through the Division 26 electrical Contractor

b. The Hardware System Integrator shall be responsible for the following:
   1) The design of all equipment required by these specifications and as indicated within the Engineer's drawings.
   2) Testing of all equipment required by these specifications and as indicated within the Engineer's drawings.
   3) All control panels, control panel components, network racks, network control panels, junction boxes, control stations and materials furnished in the control panels as identified by the following specifications and as indicated in the Engineer's drawings:
      Section 40 63 13 - Process Control Panels and Hardware
      Section 40 63 14 - Junction Boxes and Control Stations
      Section 40 63 43 - Programmable Logic Controllers
   4) Each control panel component shall be factory mounted, wired, inspected, and factory tested as a complete system.
   5) Purchasing all PLC panel materials and construction of PLC panels.

6) Provide hardware testing of all control panels, network racks, and local control stations as listed in Section 40 61 21 - Process Control System Testing
7) The Hardware System Integrator shall provide their own PLC programming software for use in testing the hardware and communications.
8) Overseeing and verifying the communications cabling, fiber optic cabling, and all communications terminations required for operation of the PLC control system including Process Equipment PLC panels supplied in other sections.
9) Furnish all Motor Control Centers and VFDs shown within the Engineer's Drawings unless noted otherwise.
   (a) Provide hardware testing of all Motor Control Centers, Freestanding VFDs, and Motor Control Panels as listed in Section 40 61 21 - Process Control System Testing.
10) Provide the following primary process measurement devices / instrumentation as defined by 40 70 01 - Instrumentation General Requirements:
    Section 40 71 00 - Flow Measurement
    Section 40 72 00 - Level Measurement
    Section 40 75 00 - Process Liquid Analytical Measurement
    The hardware system integrator shall be responsible for overseeing the installation and field calibration of all items supplied. Refer to 40 61 21 - Process Control System Testing for additional testing requirements.
11) Work with Software System Integrator and Electrical Contractor to install an Ethernet Network as shown and indicated in the Engineering's drawings.
12) Overseeing and verifying the field connections and functionality of all sensors and devices provided in other sections of the specifications that are connected to the PLC system.
13) Assisting the Software System Integrator in the start-up and field verification of the various control loops in the system.
14) Generate the Hardware and Software O&M Manuals regarding all equipment supplied for the PLC control system. See specification Section 01 78 23 for Operation and Maintenance
15) The Hardware System Integrator shall **NOT** be responsible for the following:
   (a) PLC control panels supplied by process equipment vendors.

c. Acceptable Hardware System Integrators are:
   1) SKM Engineering
      (a) Location: Bountiful, UT
      (b) Phone: (801) 677-0011
   2) No Exceptions

d. Software System Integrator (SSI) - The Software System Integrator shall be the same company as the Hardware System Manufacturer and provide programming and start-up services for the Programmable Logic Controllers (PLCs), Operator Interfaces (OITs), Human Machine Interfaces (HMIs), Network System Configuration, Server Setup and Configuration, and Computer Workstation Setup and Configuration. This does not include PLC and/or OIT programming by OEM vendors.
    1) The Software System Integrator shall provide technical assistance to the Hardware System Integrator during the PLC panel hardware design.
    2) Coordinate with Process Equipment PLC panels supplied by equipment vendors on the project.
    3) Define and refine the control loop requirements with the Engineer.
    4) Develop and test PLC programs for the PLC Control System.
    5) Develop HMI software interface screens and reports.
    6) Work with the Hardware System Integrator in the start-up phase for field verification of all control loops in the system. This shall exclude OEM based control loops.
    7) Generate the Software O&M Manuals for the HMI system
    8) Software System Integrator shall coordinate data communication between all OEM vendors.

e. Electrical Contractor — The Electrical Contractor shall provide for the installation and wiring of the PLC Control System. All of the control wiring, signal wiring, and communication wiring and terminations will be provided by the Electrical Contractor.
    1) Work with Hardware System Integrator to install an Ethernet Network as shown and indicated in the Engineering's drawings.
    2) Electrical Contractor shall be responsible for providing and installing all conduit and wire as shown on the Electrical Instrumentation and Control One Line Diagram series.
    3) It shall be the responsibility of the Electrical Contractor to provide a complete, fully operating and acceptable system. Drawings and Specification are intended to describe a complete installation for the purpose specified and to detail the scope of work for the Contractor.
    4) The Electrical Contractor shall be responsible for all detail that may be necessary to properly provide, and place in operation, the complete installation. The Contractor shall assume full responsibility for additional cost that may result from unauthorized deviation from the project documents.

f. The Hardware System Integrator, Software System Integrator, and Electrical Contractor shall conduct a minimum of one meeting in person with the Engineer prior to the start of construction to go through the above responsibilities and submittal process for the project.

PART 2 PRODUCTS

2.01 NEMA TYPE REQUIREMENTS

A. Provide enclosures/housing for control system components in accordance with the area designations provided on the Drawings.

1. Areas designated as wet: NEMA Type 4.

2. Areas designated as wet and/or corrosive: NEMA Type 4X.

3. Areas designated as Class I hazardous, Groups A, B, C, or D as defined in NFPA 70:

a. NEMA Type 7 unless all electrical components within enclosure utilize intrinsically safe circuitry.
1) Utilize intrinsically safe circuits to the maximum extent practical and as depicted in the Contract Documents.

4. Areas designated as Class II hazardous, Groups E, F, or G as defined in NFPA 70:

a. NEMA Type 9 unless all electrical components within enclosure utilize intrinsically safe circuitry.
1) Utilize intrinsically safe circuits to the maximum extent practical and as depicted in the Contract Documents.

5. Either architecturally or non-architecturally finished areas designated as dry, noncorrosive, and nonhazardous: NEMA Type 12.

6. Areas designated to be subject to temporary submersion: NEMA 6P.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

A. Unless stated otherwise, system operating criteria are as follows:

1. Stability: After controls have taken corrective action, as result of a change in the controlled variable or a change in setpoint, oscillation of final control element shall not exceed two cycles per minute or a magnitude of movement of 0.5% full travel.

2. Response: Any change in setpoint or change in controlled variable shall produce a corresponding corrective change in position of final control element and become stabilized within 30 seconds.

3. Agreement: Setpoint indication of controlled variable and measured indication of controlled variable shall agree within 3% of full scale over a 6:1 operating range.

4. Repeatability: For any repeated magnitude of control signal, from either an increasing or decreasing direction, the final control element shall take

a repeated position within 0.5 % of full travel regardless of force required to position final element.

5. Sensitivity: Controls shall respond to setpoint deviations and measured variable deviations within 1.0% of full scale.

6. Performance: All instruments and control devices shall perform in accordance with manufacturer's specifications.

2.03 ACCESSORIES

A. Provide identification devices for instrumentation system components in accordance with Specification Section 26 05 53 - Identification for Electrical Systems.

B. Provide corrosion resistant spacers to maintain 1/4 IN separation between equipment and mounting surface in wet areas, on below grade walls and on walls of liquid containment or processing areas such as Clarifiers, Digesters, Reservoirs, etc.

PART 3 EXECUTION

3.01 **FIELD QUALITY CONTROL**

A. Maintain accurate daily log of all startup activities, calibration functions, and final setpoint adjustments.

B. Instrumentation Calibration:

1. Verify and document that all instruments and control devices are calibrated to provide the performance required by the Contract Documents.

2. Factory furnished calibration certifications are acceptable for the following:

   a. Flow meters.
   b. Pressure sensors utilized with annular sleeve.
   c. Temperature sensors.

3. On-site calibration verification is required for all other instruments, including “smart” transmitters that have been factory calibrated.

   a. Provide calibration checks at 0 PCT, 25 PCT, 50 PCT, 75 PCT and 100 PCT of span for pressure transmitters and gages.
      1) Check for both increasing and decreasing input signals to detect hysteresis.
   b. In addition to factory calibration certification, temperature sensors and gages shall be checked at a single point for conformance to required accuracy.

c. Level transducers/transmitters shall be checked at two points in addition to zero.
d. Analytical sensors shall be calibrated in accordance with manufacturer's recommendations.
e. Check operation of all switches to verify actuation occurs in accordance with manufacturer's specified accuracy.
f. Replace any instrument which cannot be properly adjusted.
g. Stroke pneumatic control valves with clean dry air to verify control action, positioner settings, and solenoid functions.

4. Calibration equipment shall be certified by an independent agency with traceability to NIST.

a. Certification shall be up-to-date.
b. Use of equipment with expired certifications shall not be permitted.

5. Calibration equipment shall be at least three times more accurate as the device being calibrated.

C. Loop Check-Out Requirements are as Follows:

1. Work closely with the Owner to check control signal generation, transmission, reception and response for all control loops under simulated operating conditions by imposing a signal on the loop at the instrument connections. Loop check-out work shall verify proper operation of the installed equipment and the Owner's PLC and HMI programming.

a. Use actual signals where available.
b. Closely observe controllers, indicators, transmitters, HMI displays, recorders, alarm and trip units, remote setpoints, ratio systems, and other control components.
1) Verify that readings at all loop components are in agreement.
2) Make corrections as required.
(a) Following any corrections, retest the loop as before.

D. Stroke all control valves, cylinders, drives and connecting linkages from the local control station and from the control room operator interface.

1. Check all interlocks to the maximum extent possible.

2. In addition to any other As-Recorded Documents, record all setpoint and calibration changes on all affected Contract Documents and turn over to the Owner.

END OF SECTION 40 61 13

SECTION 40 61 96
PROCESS CONTROL DESCRIPTIONS

PART 1 GENERAL

1.01 SUMMARY

A. This Section is intended to describe the functional and operational requirements of the process being monitored and controlled by the process control system, and to define the Contractor's responsibilities related to the work described herein.

B. Section Includes:

1. Document Maintenance and Content Requirements.

2. Process Control Description content and structure.

a. Process Control Description for each system includes:
1) Reference Documents.
2) Major Equipment and Field Instruments.
3) Overview Description.
4) Detailed Process Control Descriptions.
5) Response to Instrument or Equipment Failures.
6) Displays at HMI/OIT.
7) Report Descriptions.

C. General Requirements:

1. The Process Control Descriptions describe the operational interface and functional requirements of the Process Control System (PCS) and of the control loops and other PCS functions represented in the Contract Documents.

2. The Process Control Descriptions do not necessarily address every PCS point or alarm point associated with the process or equipment. Provide and incorporate all hard-wired, networked and internal equipment alarms as shown on the P&IDs, the I/O Lists, the Instrument Lists, or elsewhere within the Contract Documents, as well as other points required to meet the intent of the system control.

3. The process control descriptions are not intended to be an inclusive listing of all elements and appurtenances required to execute loop functions but are rather intended to supplement and complement the Drawings and other Specification Sections.

4. The Process Control Descriptions shall not be considered equal to a bill of materials.

5. Provide instrumentation hardware and software as necessary to perform control functions specified herein and shown on Drawings.

6. Unless otherwise specified, the following general requirements apply to all process control descriptions.

    a. Analog control loops shall operate based on a standard PID controller, with the controller faceplate incorporated on the PCS HMI graphic display. The PID controller faceplate includes (but is not limited to) the following functions:
        1) Bar graphs for setpoint, process variable and percent output, poke point buttons for Auto/Manual Mode selection, and a numeric entry field with popup keypad for Operator entered values.
            (a) Auto/Manual Mode selection: In Auto Mode, the output of the controller is based on the PID controller calculation. In Manual Mode, the output of the controller is operator adjustable. Switching between the PID controller's operational modes shall be configured with setpoint tracking and bump-less transfer.
            (b) Compound Mode, where applicable: In Compound Mode, the setpoint is trimmed by a remote setpoint input. This mode is used in applications requiring a cascade control loop such as level/flow.
        2) When in Automatic Mode, PID algorithms shall monitor the margin of error between the setpoint value and the actual process variable. A deviation of +/- 10% between setpoint and process variable generates a Deviation Alarm notifying the operator of the condition. The % of deviation is an adjustable value.
    b. All motors (constant and variable speed) must be monitored for the associated Run, Stop, and Fail status. When the PCS initiates a run command output, the PCS logic monitors the running status feedback from the motor (starter or variable speed drive) and produces a "Fail to Run" or "Fail to Stop" alarm (as applicable) if the motor feedback does not correspond with the status of the PCS initiated command output. A PCS internal delay timer with typical preset of 15 SEC (individually adjustable) shall be configured for each logic statement to allow the motor control adequate time to comply with the output command.
        1) The PCS output command is de-energized subsequent to the expiration of the alarm delay time period, i.e. a timed-out command.
    c. Valves or gates with limit switch functions for position feedback: when the PCS initiates an Open/Close command output, the PCS logic monitors the position feedback and produces a "Failure to Open" or Failure to Close" Alarm (as applicable) if the valve/gate feedback does not correspond with the status of the PCS initiated

command output. A PCS internal delay timer preset of 60 SEC (operator adjustable to match actual valve actuator speed) is configured for each logic statement allowing the valve/gate actuator time to comply with the output command. The timer preset requires adjustment at startup depending on the type of valve or gate and the full open to close travel time for each.

1) The PCS output command is de-energized subsequent to the expiration of the alarm delay time period, i.e. a timed-out command.

d. Analog inputs shall have a signal Out Of Range Alarm generated via a PCS internal timer when the PCS input is < 3.8 mADC or > 20.5 mADC. The alarm delay timer preset is initially set at 20 SEC. The delay preset value is operator adjustable.

e. All flow inputs shall be totalized (integrated) and logged on the PCS historian. All totalized values are displayed on the PCS HMI graphic display in the appropriate engineering units as required. Provide daily flow totals for all measured flows.

f. All equipment run times shall be totalized, displayed and logged on to the PCS historian. Run times shall have a resolution of one minute and be displayed in hours and tenths of hours on the appropriate PCS HMI graphic display.

g. For each piece of process equipment controllable by the PCS, an equipment “ready” or control mode permissive signal is needed to indicate to the PCS control logic PCS control is allowed. The PCS shall monitor the Local Control Panel mounted L/R mode selector switch and control the equipment that is in the Remote mode.

h. Non-modulating motorized valves or gates shall be controllable via Open-Stop-Close buttons on HMI and OIT faceplates. The valves/gates shall be controlled in the Open and Close directions by separate PCS control signals. The PCS shall stop the Open or Close command to the actuator when the actuator reaches the respective end of travel.

i. I/O points shown on the P&IDs, I/O List or elsewhere within the Contract Documents shall be incorporated into the PCS HMI and OIT graphic displays as indicated by their function.

j. Operator entry of setpoints shall be limited to values within upper and lower operating limits corresponding to the valid operating range of the equipment. An operator-entered setpoint outside the valid range must be rejected by the PCS and the original setpoint shall be maintained until a valid value is entered. When an invalid setpoint is entered into the system, an Invalid Value message shall appear in the setpoint entry faceplate, alerting the operator to the condition. The upper and lower range limits are adjustable.

k. In addition to the requirements specifically stated within each Process Control Description, all control software and hardware shall be provided as required to ensure the safe and reliable operation of all controlled equipment.

l. All "soft" alarms on analog signal shall reside in the PLC logic with de-bounce timers. Provide the capability to modify the soft setpoints through the HMI system with appropriate security.
m. All alarm and trip time delays shall be adjustable from the HMI system by an operator with appropriate security.
n. All process values, ranges, and setpoints described herein shall be considered "Initial values" and may be changed during installation and start-up.
o. All measured analog values shall be logged and available for trending via Operator selection at the HMI.

1.02 SUBMITTALS

A. Contract Closeout Information:

1. Operation and Maintenance Data:

a. See Specification Section 01 78 23 Operation and Maintenance Data for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

1.03 TYPICAL PUMP / MOTOR

A. Pumps / Motors on VFDs

1. Displays at HMI/OIT

a. Indicators
1) In Auto
2) Running
3) Speed Feedback
4) Runtime
5) Start Count
6) Current
b. Controls
1) Hand-Off-Auto Switch
2) Hand Start / Stop Pushbuttons
3) Motor Alarm Reset
4) Hand Speed Command
c. Setpoints
1) Low Current Alarm Setpoint
2) High Current Alarm Setpoint
d. Timers
1) Low Current Alarm Timer
2) High Current Alarm Timer
e. Alarms
1) Failed to Start
2) VFD Faulted
3) Disconnect Open
4) Thermal
5) Low Current Alarm
6) High Current Alarm

f. Trends
1) Running trend.
2) Speed Feedback Trend
3) Speed Command Output Trend
4) Current Trend

B. Pumps / Motors on Motor Starters

1. Displays at HMI/OIT

a. Indicators
1) In Auto
2) Running
3) Runtime
4) Start Count
5) Current
b. Controls
1) Hand-Off-Auto Switch
2) Hand Start / Stop Pushbuttons
c. Alarms
1) Failed to Start
2) Starter Overload
3) Disconnect Open
d. Trends
1) Running trend.

1.04 TYPICAL INSTRUMENTATION

A. Actual HMI and OIT requirements for each instrument shall be determined by the Software System Integrator. Each instrument display requirements shall be determined based on criticality to the function and protection of the system.

1. Indicators

a. Instrument Analog Value
2. Setpoints

a. Low Alarm Setpoint
b. High Alarm Setpoint
3. Timers

a. Low Alarm Timer
b. High Alarm Timer
c. OOR Alarm Timer
4. Alarms

a. Low Alarm
b. High Alarm
c. OOR Alarm
5. Trends

a. Instrument Analog Value Rate

B. Report Descriptions

1. Provided as beneficial to the process

a. Ex. Totalized Daily Flow

PART 2 EXECUTION

2.01 PROCESS CONTROL DESCRIPTIONS

A. The following Appendices to this Section contain the process control descriptions that define the PCS procedural and operational requirements of the processes included in the Work:

1. 40 61 96.111 - Oxidation Ditch Pump and Valving Process Control Descriptions

2. 40 61 96.112 - Oxidation Swing Zone Aeration Mixer Process Control Descriptions

3. 40 61 96.113 - Tertiary Treatment Facility Process Control Descriptions

END OF SECTION 40 61 96

SECTION 40 61 96.111
OXIDATION DITCH PUMP AND VALVING PROCESS CONTROL DESCRIPTIONS

PART 1 GENERAL

1.01 REFERENCE DOCUMENTS

A. Process & Instrument Diagrams, P&IDs:

1. OXD IC101

B. Section:

1. Section 40 27 20 – Process Valves.
2. Section 40 63 13 – Process Control Panels and Hardware
3. Section 40 71 00 – Flow Measurement.
4. Section 43 23 31 – Vertical Turbine Solids Handling Pumps.

1.02 MAJOR EQUIPMENT AND FIELD INSTRUMENTS

A. Major Relevant Equipment:

1. Vertical Turbine IMLR/Oxidation Swing Zone Transfer Pump 1 (OXD-IRSW-P1).
2. Vertical Turbine IMLR/Oxidation Swing Zone Transfer Pump 2 (OXD-IRSW-P2).
3. Vertical Turbine IMLR/Oxidation Swing Zone Transfer Pump 3 (OXD-IRSW-P3).
4. IMLR Plug Valve (OXD-IMLR-PV1).
5. OSWT Plug Valve (OXD-OSWT-PV1).

B. Major Relevant Field Instruments:

1. Oxidation Ditch Train Influent Flow Meter (Existing) (FIT-101).
2. Oxidation Ditch Level Indicating Transmitter (OXD-LIT1).
3. IMLR/OSWT Pump Discharge Flow Meter (OXD-IRSW-FIT1).
4. Oxidation Swing Zone Influent Flow Meter (OSW-OSWT-FIT1).
5. Oxidation Swing Zone Level Indicating Transmitter (OSW-LIT1).

1.03 OVERVIEW DESCRIPTION

A. The Internal Mixed-Liquor Recirculation/Oxidation Swing Zone Transfer (IRSW) Pumps convey the contents of the aerobic zone to a discharge pipe that can direct flow (via valving) either to the anaerobic zone of the Orbal oxidation ditch for additional nitrate removal, or transfer process water to the external Oxidation Swing Zone tank for additional nutrient removal. The three pumps are designed to convey three to five times the oxidation ditch influent flow (1Q to the OSW and 2Q to 4Q to the anaerobic zone for IMLR processes, where 1Q is equivalent to the Oxidation Ditch train influent flow).

B. Definitions

1. Speed Control (Operation): Control of the 4-20 mA speed reference or the Proportional/Integral/Derivative (PID) Setpoint

2. Speed Indication (Status): Real-time feedback of the VFD output frequency (Hz).

3. PID Setpoint (Operation): The target flow (GPM) or level (ft) the system is trying to maintain.

4. Sleep Mode (Status): A state where the pump stops at 0 Hz because the flow is met.

5. LCS: Local Control Station

6. PCS: Plant Control System

7. HMI: Human Machine Interface - SCADA Screen

8. OIT: Operator Interface Terminal – Local CP Screen

1.04 DETAILED PROCESS CONTROL DESCRIPTIONS

A. IRSW Pumps (OXD-IRSW-P1, OXD-IRSW-P2, OXD-IRSW-P3)

1. Local Control:

a. Local pump control is provided via a HAND/OFF/REMOTE (HOR) selector switch located at the Local Control Station (LCS) (OXD-IRSW-P1-LCS1, OXD-IRSW-P2-LCS1, and OXD-IRSW-P3-LCS1).
b. When the selector switch is in the HAND position, the pump operates based on local inputs. Motor speed is adjusted manually at the VFD keypad or via a local potentiometer.
c. When the selector switch is in the OFF position, the pump will not operate.

d. When the selector switch is in the REMOTE position, pump operation is controlled by the PLC in accordance with operator selections made at the SCADA/PCS interface.

2. Auto Control (Remote Mode):

a. HAND mode selected at operator interface (PCS):
   1) When START is selected at the operator interface, the pump will start.
   2) When STOP is selected at the operator interface, the pump will stop.
   3) Motor speed (“X” percent) can be entered at the operator interface, and the VFD will adjust to a fixed speed accordingly, bypassing the facility influent flow meter (FIT-101) flow control logic.

b. AUTO mode selected at operator interface (PCS):
   1) AUTO mode is intended for constant flow control within the IRSW line.
   2) The pumps will start and stop based on process enable signals (e.g., system “Ready” status).
   3) Pump speed shall automatically modulate via a PID control loop to maintain a user-defined flow rate setpoint (X gpm, determined at startup), based on feedback from the Oxidation Ditch facility influent flow meter (FIT-101) and the Swing Zone influent flow meter (OSW-OSWT-FIT1).
      (a) The combined pump discharge flow rate setpoint (as measured by OXD-IRSW-FIT1) is expected to be three to six times the flow rate of the Oxidation Ditch train influent flow meter.
      (b) The discharge pipe plug valve to manage IMLR flow (OXD-IMLR-PV1) shall modulate as needed to meet the desired flow setpoint for OSWT processes (1390 gpm to 3470 gpm, roughly 1Q to 2Q of the oxidation ditch train influent flow).
      (c) High Flow Rate: If OSW-OSWT-FIT1 rises above the high flow setpoint (X gpm, determined at startup), OXD-IMLRT-PV1 shall modulate to increase flow diverted to the IMLR system.
      (d) High Tank Level: If swing zone tank level from OSW-LIT1 exceeds the high-level setpoint, the pumps shall slow down to prevent tank overflow.
      (e) High-High Tank Level: If swing zone tank level from OSW-LIT1 exceeds the high-high level setpoint, OXD-OSWT-PV1 shall close and OXD-IMLR-PV1 shall fully open to route all water to IMLR processes and prevent tank overflow.
      (f) Low Tank Level: If swing zone tank level from OSW-LIT1 drops below the low-level setpoint, the pumps shall speed up to prevent tank drainage and

OXD-IMLR-PV1 will restrict to direct flow to the OSW tank.

3. Status and Alarms:

   a. Run Status: “Pump Running” indication shall be provided at the operator interface when the VFD is active.
   b. Speed Indication: Real-time motor speed (Hz) shall be displayed at the VFD interface and the operator interface.
   c. Alarms and Shutdowns:
      1) Emergency Stop: Activation of the local E-Stop shall immediately stop the pump and generate a critical alarm at the operator interface.
      2) High-High Level: If swing zone tank level from OSW-LIT1 exceeds the high-high level setpoint and the level from the outer oxidation ditch channel exceeds the high-high level setpoint, the pumps shall shut down to prevent tank overflow.
      3) Motor Overtemperature: Upon detection of high motor temperature, the VFD shall trip and stop the pump until manually reset. (OXD-IRSW-P1-TSH1, OXD-IRSW-P2-TSH1, and OXD-IRSW-P3-TSH1)
   d. Reset:
      1) Following a fault condition (motor overtemperature, high-high level trip, or VFD fault), the system shall require a manual reset at the VFD or operator control station prior to resuming operation.

B. Open/Close Valve (OXD-OSWT-PV1):

1. The operator will select local or remote control via the LOCAL/REMOTE (L/R) selector switch located at the LCS.

   a. When the L/R selector switch is in LOCAL, the valve is controlled by selections made at the local control station.
      1) Local valve control is provided via the OPEN/STOP/CLOSE (OSC) selector switch located at the local control station.
         (a) When the selector switch is in the OPEN position, the valve will open.
         (b) When the selector switch is in the STOP position, the valve will stop.
         (c) When the selector switch is in the CLOSE position, the valve will close.
   b. When the L/R selector switch is in REMOTE, the valve is controlled by the plant PLC in accordance with selections made by the operator.
      1) When an open command is selected at the operator interface or determined automatically in the PLC, the valve will open.

2) When a close command is selected at the operator interface or determined automatically in the PLC, the valve will close.

C. Modulating Valve (OXD-IMLR-PV1):

1. The operator will select local or remote control via the LOCAL/REMOTE (L/R) selector switch located at the LCS.

a. When the L/R selector switch is in LOCAL, the valve is controlled by selections made at the local control station.
1) Local valve control is provided via the actuator interface located at the local control station.
(a) When a position command is selected at the actuator interface, the valve will modulate to that position.

b. When the L/R selector switch is in REMOTE, the valve is controlled by the plant PLC in accordance with selections made by the operator.
1) When a position command is selected at the operator interface or determined automatically in the PLC, the valve will modulate to that position.

1.05 RESPONSE TO INSTRUMENT OR EQUIPMENT FAILURES

A. All pumps running at the time of a power outage will automatically restart upon resumption of power.

1.06 DISPLAYS AT HUMAN MACHINE INTERFACE (HMI) / OPERATOR INTERFACE TERMINAL (OIT)

A. IRSW Pumps, typical of three (3):

1. Pump in auto indication.

2. Pump running indication.

3. Pump fault indication.

4. Pump disconnect open indication.

5. Pump start command.

6. Pump stop command.

7. Pump speed command.

8. Pump speed indication.

9. Motor temperature high alarm.

B. Electrically Actuated Valves, typical of two (2):

1. Valve in remote indication.

2. Valve position command.

3. Valve position indication.

4. Valve fail to open/close alarm.

C. Flow Elements:

1. Existing Oxidation Ditch Train influent flow indication (FIT-101).

   a. Oxidation ditch train influent flow alarms (high, low).

2. IRSW pump discharge flow indication (OXD-IRSW-FIT1).

   a. IRSW pump discharge flow alarms (high, low).

3. Swing zone influent flow indication (OSW-OSWT-FIT1).

   a. Swing zone influent flow alarms (high, low).

D. Level Indicating Transmitter (OSW-LIT1 and OXD-LIT1):

1. Swing zone tank level indication.

2. Swing zone tank level alarms (high, high-high, low).

3. Swing zone tank volume indication.

1.07 REPORT DESCRIPTIONS

A. Provide daily report containing the following:

1. IRSW Pump 1 total runtime.

2. IRSW Pump 2 total runtime.

3. IRSW Pump 3 total runtime.

4. Swing Zone Tank totalized daily flow.

B. Other reports as determined at the Report Configuration Workshop(s).

END OF SECTION 40 61 96.111

SECTION 40 61 96.112
OXIDATION SWING ZONE AERATION MIXER PROCESS CONTROL DESCRIPTIONS

PART 1 GENERAL

1.01 REFERENCE DOCUMENTS

A. Process & Instrument Diagrams, P&IDs:

1. OSW IC101

B. Section:

1. Section 40 27 20 – Valves.

2. Section 40 63 13 – Process Control Panels and Hardware

3. Section 40 72 00 – Level Measurement.

4. Section 40 75 00 – Process Liquid Analytical Measurement.

1.02 MAJOR EQUIPMENT AND FIELD INSTRUMENTS

A. Major Equipment:

1. Aerator 1 Mixer 1 (OSW- AER1-MXR1)

2. Aerator 2 Mixer 1 (OSW- AER2-MXR1)

3. Aerator 1 Blower 1 (OSW- AER1-BLW1)

4. Aerator 2 Blower 1 (OSW- AER2-BLW1)

B. Major Field Instruments:

1. Oxidation Swing Tank Analyzer Indicating Transmitter (OSW-AIT1)

2. Oxidation Swing Tank Analyzer Element – Dissolved Oxygen (OSW-AIT1-AE1)

3. Oxidation Swing Tank Analyzer Element – Oxidation Reduction Potential (OSW-AIT1-AE2)

4. Oxidation Swing Tank Analyzer Indicating Transmitter (OSW-AIT2)

5. Oxidation Swing Tank Analyzer Element – Nitrate (OSW-AIT2-AE1)

6. Oxidation Swing Tank Level Indicating Transmitter (OSW-LIT1)

1.03 OVERVIEW DESCRIPTION

A. The Aerators (typical of 2) are used to mix and supply process air to the Oxidation Swing Tank. Power disconnects allow for each Aerator Blower to be taken offline for maintenance.

1.04 DETAILED PROCESS CONTROL DESCRIPTIONS

A. Aerators (OSW-AER1 and OSW-AER2):

1. Local Control:

a. Local aerator control is provided via HOA selector switches located at the Aerator Control Panel (OSW-AER1-CP1 and OSW-AER2-CP1). Each control panel has a dedicated HOA switch for the mixer and a dedicated HOA switch for the blower.
b. When the selector switch is in the HAND position, the selected motor runs.
c. When the selector switch is in the OFF position, the selected motor will not operate.
d. When the selector switch is in the AUTO position, the selected motor will operate based on commands from the PLC.
e. There is a hardwired interlock that prevents the blower motor from running without the mixer motor running. The mixer motor can run on its own, and both the mixer motor and blower motor can run at the same time, but the blower motor cannot run on its own.

2. Automatic Control (Remote): Aeration motors only utilize START/STOP control and do not modulate or operate with a VFD.

a. SCADA Automatic controls shall include a MIXING MODE (mixer only running) and an AERATION MODE (both mixer and blower running).
b. MIXING MODE
1) The mixer on each aerator will run continuously and the blower on each aerator will remain off. The Dissolved Oxygen (DO) low alarm setpoint is entered by the operator. If the DO value falls below the DO low alarm setpoint, an alarm will be activated on SCADA. Operators then have the choice to place the aerators in AERATION MODE in order to raise the DO value.
c. AERATION MODE
1) Dissolved Oxygen (DO) high and low setpoints are entered by the operator. The PLC will automatically start and stop the aerator mixer and aerator blower to maintain a DO value between the DO high setpoint and the DO low setpoint. If the DO value falls below the DO low setpoint for a preset time, the aerator mixer and aerator blower on each aerator will start. Each aerator mixer and aerator blower will continue to run as long as the DO value is between the DO high setpoint and the DO low setpoint. If the DO value rises above the DO high setpoint for a preset

time, the aerator mixer and aerator blower on each aerator will stop. Each aerator mixer and aerator blower will not start again until the DO value falls below the DO low setpoint for a preset time.

2) The mixer motor shall always start before the blower motor. If both motors are called to run simultaneously, a 10-second delay shall occur between the starting of the mixer motor and the starting of the blower motor.

3) The blower motor shall always stop before the mixer motor. If both motors are called to stop simultaneously, a 10-second delay shall occur between the stopping of the blower motor and the stopping of the mixer motor.

3. Status and Alarms

a. ON/OFF Indication: ON/OFF status shall be displayed at the control panel and on SCADA.

b. Alarms and Shutdowns:

1) Aerator Mixer Fault

2) Aerator Blower Overload

1.05 RESPONSE TO INSTRUMENT OR EQUIPMENT FAILURES

A. Upon loss of signal from the Aerator Control Panel, SCADA will generate an alarm and the Aeration motors will continue running at the last selected operational mode.

B. All Aeration motors running at the time of a power outage will automatically restart upon resumption of power at the last selected operational mode.

1.06 DISPLAYS AT HUMAN MACHINE INTERFACE (HMI) / OPERATOR INTERFACE (OIT)

A. Aerators, typical of 2:

1. Mixer in auto indication.

2. Mixer running indication.

3. Mixer fault indication.

4. Mixer disconnect open condition.

5. Mixer start command.

6. Blower in auto indication.

7. Blower running indication.

8. Blower overload indication.

9. Blower disconnect open condition.

10. Blower start command.

B. Instruments:

1. Oxidation Swing Tank Analyzer Indicating Transmitter (OSW-AIT1).

   a. DO Indication (OSW-AIT1-AE1).
      1) DO alarms (low, high).
   b. ORP Indication (OSW-AIT1-AE2).

2. Oxidation Swing Tank Analyzer Indicating Transmitter (OSW-AIT2).

   a. Nitrate Indication (OSW-AIT2-AE1).

3. Oxidation Swing Tank Level Indicating Transmitter (OSW-LIT1).

   a. Level Indication.
   b. Level alarms (high, high-high, low).
   c. Tank Volume indication.

1.07 REPORT DESCRIPTIONS

A. Provide daily report containing the following:

1. Aerator Mixer and Blower total runtime (typical of 2)

2. Average daily total measured dissolved oxygen.

3. Average daily total measured dissolved oxidation potential reduction.

4. Average daily total measured dissolved nitrate.

1.08 DETAILED PROCESS CONTROL DESCRIPTIONS

A. Other reports as determined at the Report Configuration Workshop(s).

END OF SECTION 40 61 96.112

SECTION 40 61 96.113
TERTIARY TREATMENT FACILITY PROCESS CONTROL DESCRIPTIONS

PART 1 GENERAL

1.01 REFERENCE DOCUMENTS

A. Attached Sections from the 2025 Eagle Mountain Tertiary Treatment Project Manual :

1. Division 1 – General Requirements
2. Division 26 – Electrical
3. Section 46 61 41 – Cloth Disc Filters.
4. Section 46 66 00 – Ultraviolet Disinfection Equipment
5. Section 40 27 20 – Process Valves
6. Section 40 27 21 – Process Electrical Actuators
7. Section 40 91 00 – Instrumentation and Field Mounted Devices

B. Attached Drawings and Process & Instrument Diagrams, P&ID's from the 2025 Eagle Mountain Tertiary Treatment Project:

1. C03 – Site Piping – Water Piping Plan
2. P102 – Tertiary Treatment Facility – Plan View – Grade Level
3. P301 - Tertiary Treatment Facility – Process Sections
4. P601 - Tertiary Treatment Facility – Process Schedules
5. E101 - Tertiary Treatment Facility – Gravel Level Process Electrical Plan
6. E601 - Tertiary Treatment Facility – One – Line Diagram
7. E602 - Tertiary Treatment Facility – UV System One – Line Diagram
8. IC002 – Effluent Pump Station – Existing Effluent Pump Station
9. IC003 -Tertiary Treatment Facility – Disc Filter
10. IC004 – Tertiary Treatment Facility – UV Disinfection

1.02 MAJOR EQUIPMENT AND FIELD INSTRUMENTS

A. Major Facility Equipment:

1. Cloth Disk Filter (TTF-CDF1).

2. Ultraviolet Channel 1 Bank 1 (TTF-UV1-BNK1).

3. Ultraviolet Channel 1 Sluice Gate (TTF-UV1-SG1).

4. Ultraviolet Channel 1 Downward Opening Weir Gate (TTF-UV1-WG1).

5. Ultraviolet Channel 2 Sluice Gate (TTF-UV2-SG2).

6. Ultraviolet Channel 2 Downward Opening Weir Gate (TTF-UV2-WG2).

B. Major Facility Valves:

1. Cloth Disc Filter Effluent Butterfly Valve (TTF-CDF1-BFV1)

2. Cloth Disc Filter Influent Plug Valve (TTF-CDF1-PV1)

3. Cloth Disc Filter Back Wash Plug Valve (TTF-CDF1-PV2)

4. Cloth Disc Filter Influent Yard Plug Valve (TTF-PV1)

C. Major Facility Instruments:

1. Influent Magnetic Flow Meter (TTF-FE-FIT1)

2. Water Quality Station (TTF-EFF-WQS1)

D. Major Facility Pumps:

1. Effluent Sampling Pump (TTF-EFF-P1)

2. Effluent Disposal Vertical Turbine Pumps (PSH-701, -702, -703)

1.03 OVERVIEW DESCRIPTION

A. The Tertiary Treatment Facility receives treated effluent from the effluent pump station. The facility contains, in order of process flow, a cloth disc filter and a UV treatment bank. Both the Cloth Disc Filter and the UV Treatment Bank are controlled by vendor provided local control panels. The control panels will communicate with the Plant's SCADA System. The Plant PLC sends the local control panels information giving the operator the ability to change entries and control the equipment remotely.

B. A flow meter at the influent of the Cloth Disc filter takes instantaneous flow measurements and is utilized to control valving in order to accommodate flow splitting

C. Analyzers in the effluent side of the UV Channel 1 monitor turbidity in the effluent water concentration in the filtrate.

D. The TTF is designed for 1 MGD, flow from the effluent pump station can either be sent to the TTF or the existing Effluent Storage Pond.

1.04 DETAILED PROCESS CONTROL DESCRIPTIONS

A. Cloth Disk Filter (TTF-CDF1).

1. Local Disk Filter control is provided via the HAND/OFF/AUTO (HOA) selector switch located on the Freestanding VFD.

2. When the HOA selector switch is in the HAND position the Disc Filter will operate. Speed control is adjusted locally with a VFD within the supplier control panel displayed on the Human Machine Interface (HMI) touch screen.

   a. When the HOA selector switch is in the OFF position the mix will not operate.
   b. When the HOA selector switch is in the AUTO position, control of the filter is by Cloth Disc Filter system supplier.

3. Auto Control:

   a. Auto controls for the Cloth Disc Filter are provided under Section 46 61 41 – Cloth Disc Filters. Comply with that section for requirements. Plant SCADA PLC is in direct control of the motor, communicated data between the Plant SCADA PLC and the Cloth Disc Filter PLC shall be utilized for automatic control.

4. Back Wash Control

   a. Back Wash Controls and level Sensors operations are provided under Section 46 61 41 – Cloth Disc Filters.
   b. Hardwired Interlocks:
      1) Motor Thermal Switch (SHP-TSW-010b, -020b, -030b, -040b).
      2) Motor Disconnect Switch (SHP-DIS-010b, -020b, -030b, -040b).

B. Ultraviolet Disinfection Bank and Flow Control Weir (TTF-UV1-BNK1, TTF-UV1-WG1).

1. Dose pacing and control program is monitored and controlled by the System Control Center (SCC).

   a. The SCC and dose pacing is an automatic function based on an effluent parameter-based program. See effluent parameters in Section 46 66 00 – Ultraviolet Disinfection Equipment
   b. The UV Bank is controlled by the SCC via an HMI Screen. The PDC must be in Remote for Control of the UV bank at the SCC.

2. Local UV Bank control is provided via OFF/REMOTE/LOCAL selector switch located on the Power Distribution Center (PDC).

   a. When selector is in Local mode the PDC is set to 100% and not controlled by the System Control Center (SCC) or SCADA.

b. When selector is in Remote mode the PDC output is controlled by the SCC or SCADA.
c. Controls for the UV Bank and Weir Gate are provided in Section 46 66 00 – Ultraviolet Disinfection equipment. The UV Bank and Weir gate are operated at the SCC
1) The Wier gate has Manual and Automatic Operations
(a) Manual operations are controlled at the SCC.
(b) Automatic operations are controlled by the SCADA system.

3. Turbidity meter and sample pump are to be operated manually as needed by operators.

4. Wiper Operation and lifting and lowering of the UV bank are controlled by the Hydraulic System Center (HCS)

a. The sleeve cleaning system utilizes internal wiper and a cleaning solution located in the quartz sleeves.
b. SCC provides overview of the HCS and Wiper System via the HMI Screen.

C. Isolation Valves, typical of 3 (TTF-CDF1-PV1, -PV2, -BFV1):

1. Isolation valves are manually controlled via handwheels provided by the valve manufacturer.

a. Visual indicators on the valves will display the extent of opening or closing of the valves.

D. Effluent Pump Station and Yard Valves

1. The Effluent Pumps (Typ. 3) are provided with a HAND/OFF/AUTO selector switch.

a. When the HOA selector switch is in the HAND position the Pumps will operate. Speed control is adjusted locally with a VFD within the supplier control panel displayed on the Human Machine Interface (HMI) touch screen.
b. When the HOA selector switch is in the OFF position the mix will not operate.
c. When the HOA selector switch is in the AUTO position, control of the filter is by Cloth Disc Filter system supplier.

2. The Tertiary treatment facility is currently designed for a capacity of 1 MGD. Future flows coming from the Effluent Pump Station are approximately 4.8 MGD.

E. The following software interlocks shall be provided from the Owner's PLC to the Screw Press Control System to provide an organized shutdown of the screw presses:

1) When the HOA selector switch is in the HAND position the Disc Filter will operate. Speed control is adjusted locally

with a VFD within the supplier control panel displayed on the Human Machine Interface (HMI) touch screen.

2) When the HOA selector switch is in the OFF position the mix will not operate.

3) When the HOA selector switch is in the AUTO position, control of the filter is by Cloth Disc Filter system supplier.

1.05 RESPONSE TO INSTRUMENT OR EQUIPMENT FAILURES

A. Cloth Disc Filter

1. At the time of a power outage, the Cloth Disc Filter will automatically restart upon resumption of power.

B. UV Treatment Bank

1. At the time of a power outage, the UV Bank, system PLC, and control systems will have an uninterruptable power supply (UPS). The UPS will provide backup power unit the emergency Generator or main power are re-established.

1.06 DISPLAYS AT HMI/OIT

A. Effluent Pumps at Effluent Pump Station (Typ. 3)

1. Indicators

a. In Auto
b. Running

2. Controls

a. HOA Selector Switch
b. Start / Stop Pushbuttons

3. Alarms

a. VFD Fault
b. Thermal Overtemp
c. Maintenance Required

B. Cloth Disc Filter

1. Indicators

a. Backwash Pump in Auto
b. Backwash Pump Running
c. Drum Drive in Auto
d. Drum Drive Running

2. Controls

a. HOA Backwash Pump
b. HOA Drum Drive
c. Local/off Remote ACS (Future)

3. Alarms

    a. Level Low
    b. Backwash Required
    c. Backwash Pump Vault
    d. Drum Drive Fault
    e. Drum Drive Required
    f. ACS Unit Fault (Future)
    g. ACS Unit Required (Future)
    h. High Level
    i. High High Level

C. UV Treatment Bank

1. Indicators

    a. UV Transmittance
    b. UV Channel No.1 Level

2. Controls

    a. Start / Stop Pushbuttons
    b. Alarm Reset
    c. Intensity Command
    d. Cleaning Operation Local Sequence Switch
    e. Lift Operation (up/down) Switch

3. Setpoints

    a. Automatic Dose Pacing Based on Effluent Parameters

4. Alarms

    a. High Water Level
    b. Multiple Lamp Failure
    c. Low UV Intensity
    d. Module Communication Alarm
    e. Maintenance Failure (wiper malfunction)
    f. Low level

5. Trends

    a. UV Transmittance Record

D. UV Channel No.1 Effluent Slide Gate

1. Indicators

    a. Position Indication.
    b. In Auto
    c. Ready

2. Controls

    a. Position Command
    b. Open
    c. Close

d. Local/Remote Switch

3. Setpoints

a. See Section 46 66 00 – Ultraviolet Disinfection Equipment for equipment set points based on Effluent parameters.

4. Alarms

a. Equipment Fault

1.07 REPORT DESCRIPTIONS

A. Provide daily report containing the following:

1. Screw Press Flocculator Tank Mixer total runtime (typical of 4)

2. Screw Press total runtime (typical of 4).

3. Screw Press Sludge Feed average daily total solids (typical of 4).

4. Screw Press Sludge Feed maximum daily total solids (typical of 4).

5. Screw Press Sludge Feed minimum daily total solids (typical of 4).

6. Screw Press Filtrate average daily total suspended solids (typical of 4).

7. Screw Press Filtrate maximum daily total suspended solids (typical of 4).

8. Screw Press Filtrate minimum daily total suspended solids (typical of 4).

9. Screw Press average daily headbox level (typical of 4).

10. Screw Press maximum daily headbox level (typical of 4).

11. Screw Press minimum daily headbox level (typical of 4).

B. Other reports as determined at the Report Configuration Workshop(s).

END OF APPENDIX S

END OF SECTION 40 61 96.113

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SECTION 40 63 13
PROCESS CONTROL PANELS AND HARDWARE

PART 1 GENERAL

1.01 SUMMARY

NOTE, THE HARDWARE SYSTEM INTEGRATOR AS SPECIFIED HEREIN SHALL PROVIDE THE EQUIPMENT LISTED IN THE 'PART 2' SECTIONS BELOW THROUGH THE DIVISION 26 ELECTRICAL CONTRACTOR.

A. Description

1. Complete PLC based control system with Supervisory Control and Data Acquisition (SCADA) functions.

2. This section is intended to cover all work necessary for the procurement of the wastewater system facility process control and instrumentation equipment. This includes all specified and required equipment installed and place into acceptable operation as herein described.

B. Responsibility and Coordination

1. It shall be the responsibility of the Contractor to provide a complete, fully operating and acceptable system. Drawings and Specification are intended to describe a complete installation for the purpose specified and to detail the scope of work for the Contractor.

2. The Contractor shall be responsible for all detail that may be necessary to properly provide, and place in operation, the complete installation. The Contractor shall assume full responsibility for additional cost that may result from unauthorized deviation from the project documents.

C. Approved Equal(s)

1. Hardware or Equipment

a. The naming of a manufacturer of equipment in this Specification is not intended to eliminate competition or prohibit qualified manufacturers from offering equipment. Rather, the intent is to establish a minimum standard of quality, and to indicate a principle of operation desired for this project. Other manufacturers of similar system controls are encouraged to submit for prior approval.

b. No hardware system integrator, or their agent or supplier, shall submit for approval without the full understanding on the part of that the hardware system integrator, Contractor, agent or supplier, may be rejected, and that the Engineer will use his own judgment; and that his decision is final. In the event of adverse decision, no

claim of any sort or kind shall be made against the Owner or Engineer.

D. Testing Agency Certification

1. All new panels and control system junction boxes furnished under this Section shall be constructed in accordance with Underwriter's Laboratories (UL) Standard 508 - "Industrial Control Equipment" or Underwriter's Laboratories (UL) Standard 698 - "Industrial Control Equipment for Use in Hazardous (Classified) Locations".

2. Each panel shall be shop-inspected by UL or constructed in a UL-recognized facility. Each completed panel shall bear a serialized UL label indicating acceptance under Standard UL 508A or UL 698A.

E. Delivery, Storage, and Handling

1. Do not remove shipping blocks, plugs, caps, and desiccant dryers installed to protect the instrumentation during shipment until the instruments are installed and permanent connections are made.

F. Work Items Specified Under This Section

1. General Control System Scope.

2. System Control Panels.

3. Control Panel Components.

4. Hardware System Integrator Required Services.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with Specification Section 01 33 00 - Submittal Procedures. The following information shall be included within each submittal as required by the type of equipment or instrumentation that is being submitted on by the system manufacturer. The following information is not required to be in this order. All submittals are required to have the following information if applicable or will be subject to rejection.

1. PDF Bookmarks for Ease of Submittal Navigation

2. Equipment Cut Sheets

a. Cut sheets detailing all relevant information shall be provided for all equipment/components that will be used.
1) Physical limitations of components including high and low temperature limits shall be identified.
b. All cut sheets shall be clearly highlighted indicating specific part number buildout for all equipment and components.

3. Bill of Materials

    a. Bill of materials shall be provided for each enclosure provided detailing equipment and components being utilized.

4. Power Calculations

    a. Power calculations shall be provided for the following if they are present:
        1) Control Panel incoming power per phase
        2) 24VDC Power Supply
        3) UPS
        4) MCC CPT

5. Heat Calculations

    a. Heat calculations shall be provided for the following if they are present:
        1) Outdoor Enclosures with Sensitive Electronics
        2) MCC buckets
        3) Indoor Enclosures with Heat Emitting Equipment in or Near the Enclosure

6. I/O Schedules

    a. An I/O schedule shall be provided for each control panel.

7. Control Panel, Junction Box, Network Rack, and MCC Bucket Details and Layouts

    a. NEMA ratings of all equipment shall be clearly identified.
    b. Identify electrical power requirements of each assembled
    c. Provide detailed layouts of all equipment. Identify overall dimensions and provide estimated weight of assembled equipment.
    d. Nameplate layout drawings shall be provided.

8. Loop Control Drawings

    a. Loop control drawings shall be provided that detail all electrical connections to/from and inside the CP, NWP, or MCC. This includes but is not limited to the following:
        1) Tag Names
        2) Terminal Block Numbering
        3) Conductor Type
        4) Conductor Quantity
        5) Conductor Jacket Color
        6) Hard Wired Logic (Relays, Switches, etc…)

9. Provide drawings and layouts in both PDF and AutoCAD electronic formats.

1.03 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's data in accordance with Specification Section 01 35 16.01 - LEED 2009 Material Cost Summary Form.

PART 2 PRODUCTS

2.01 GENERAL

A. The system controls, alarms, and telemetry shall be constructed as shown on drawings and herein described.

2.02 PROCESS CONTROL PANEL

A. Control Panel Enclosures

1. The control panels shall include the following

a. Enclosure with back panel and mounting provisions.
b. Enclosures shall be stainless steel type 304 for general use. Type 316 stainless steel shall be utilized in caustic environments.
c. Interior light activated by door switch provided for each door of the enclosure.
d. Transient and surge suppression for power and control input/output.
e. Linear regulated DC power supplies. Power supplies shall be UL listed for use in type 508A or 698A Industrial Control Panels as required: AC power input fusing AC power transient protection current Limiting AC “power on” indication.
f. Separate terminal blocks for inputs and outputs.
g. GFCI receptacle outlet (120V).
h. Programmable logic controller with I/O modules as required.
i. Lockable door handle.
j. Inner door pocket for storing wiring diagrams.
k. Door stop kit.
l. 18”x18” fold up programming shelf on all free standing enclosures.
m. White "POWER ON" indication light on the external front door of enclosure.
n. Enclosure size shall be selected based off of equipment as shown in the E Drawings and within this specification. Any enclosure sizing shown within the drawings are to be used as a minimum size. It is up to the hardware system integrator to increase the size of any enclosure to ensure all equipment fits with reasonable space remaining.

2. Enclosure Schedule:

a. Control Panel Enclosure(s) shall be furnished and installed for the following application(s):
1) NEMA Type 12 Painted Steel - Free Standing
(a) OXD-SCP1
(b) TTF-SCP1

3. Manufacturer/Model:

a. Hoffman
b. SCE
c. Prior Approved Equal

2.03 PROCESS CONTROL PANEL COMPONENTS

A. Miniature Circuit Breakers

1. General Specifications:

a. UL489 Branch Protection
b. Trip Curves
   1) C Trip Curve: Low/Medium Inrush Applications
   2) D Trip Curve: High Inrush Applications (Motors)
c. SCCR (Minimum): 10kAIC
d. Breaker Status Indicator
e. Utilize 1-pole, 2-pole, and 3-pole breakers within the control panels as indicated below and as specifically indicated on the E Drawings
f. Miniature Breaker Schedule:
   1) Shall be furnished and installed for the following applications:
      (a) 1-Pole
      (b) Incoming Power Feed
      (c) Internal Panel Components
      (d) Flow Measurement Transmitters
      (e) Analytical Transmitters
g. Manufacturer/Model:
   1) Allen Bradley
   2) Phoenix Contact TMC 8 Series
   3) Eaton FAZ
   4) SquareD Multi 9
   5) Prior Approved Equal

B. Fused Terminals

1. General Specifications:

a. DIN rail mounted, touch safe, modular type
b. Minimum Rated Voltage: 250V RMS
c. Rated Current: As required per application
d. Physical Dimensions: ¼" x 1 ¼" Standard Fuses
e. Blown fuse indicator light
f. Manufacturer/Model:
   1) Allen Bradley
   2) Phoenix Contact UT 6-HESILA
   3) Weidmuller
   4) Prior Approved Equal

C. Terminal Blocks

1. General Specifications:

a. DIN rail mounted, touch safe, modular type.
b. Minimum Rated Voltage: 600V RMS

c. Minimum Rated Current: 24 amps or higher as required per application
d. Connector metal body material: Copper alloy, min 85% copper with nickel or tin plating
e. Terminal screw material: Bronze with tin plating
f. Terminal Block Characteristics:
    1) It shall terminate wires without additional preparation: i.e. tinning of wire ends, application of ferrules, etc.
    2) All shall have a nominal conductor termination acceptance of 4mm^2. The one exception is that 2.5mm^2 shall be allowed for use within the MCC control circuitry as long as the required conductor and ampacity ratings are met.
    3) The insulation housing shall have primary entry funnels to facilitate insertion of wires.
    4) The insulation housing shall prevent stray strands from shorting to adjacent terminal blocks.
    5) Terminal screws shall be captive in the metal body or via the insulation housing.
    6) Once tightened the terminal screws shall be locked in place to prevent loosening due to shock and vibration.
    7) The terminal block shall be useable with accessories such as center or insertion bridges, test sockets, separating plates, end covers, etc. The accessories used shall also be touch safe.
    8) For wire identification, the terminal block shall provide space for marking with pre-marked labels. Handwritten labels shall not be allowed.
g. Manufacturer/Model:
    1) Allen Bradley 1492-J4
    2) Phoenix Contact UT 4
    3) Weidmuller WDU 4
    4) ABB Equal
    5) Prior Approved Equal

D. Control Relays

1. General Specifications:

    a. Blade plug-in type with dust cover and socket.
    b. Coil (Continuous Operation):
        1) Voltage (Unless Noted Otherwise): 120VAC ±10%
    c. Contacts:
        1) DPDT Minimum
        2) Voltage: 240VAC
        3) Current: 10A
            (a) Lower current rated contacts shall be allowed as long as the circuit passing through the contacts has adequate overcurrent protection.
    d. Operating Time:
        1) Energization (Nominal): 35 milliseconds

2) De-energization (Nominal): 100 milliseconds
e. Mechanical Life: 10^6 operations
f. Operating Temperature: 0°C to 70°C
g. Relay clip shall be provided and installed for all control relays.

2. Manufacturer/Model:

a. Allen-Bradley
b. Phoenix Contact RIF-4-RSC-LV-120AC/3x21
c. Idec
d. Prior Approved Equal

E. Surge Suppressor

1. 120VAC Control Power

a. General Specifications:
1) 120 VAC In-Line Device
2) Max Continuous Voltage: 150 V
3) Max Continuous Current: 25 A
4) Measured Limiting Voltage: 760 V
5) Nominal Discharge Current: 3 kA
6) Response Time: < 25ns
7) Connection Type: Screw
8) Mounting: DIN Rail
9) Style: Plug w/ Base
10) Dry Contact Status Indicator
b. Surge Suppressor Schedule:
1) Shall be furnished and installed for the following applications:
(a) On any control panel being supplied with 120VAC as power.
c. Manufacturer/Model:
1) Phoenix Contact - 2910356
2) Citel DS72US-120S/G
3) Critec Equal
4) Prior Approved Equal

2. 120VAC Digital I/O

a. General Specifications:
1) Max Continuous Voltage: 150 V
2) Max Continuous Current: 10 A
3) Nominal Discharge Current: 2.5 kA
4) Response Time: < 25ns
5) Connection Type: Screw
6) Mounting: DIN Rail
b. Surge Suppressor Schedule:
1) Shall be furnished and installed for the following applications:
(a) On any 120VAC digital I/O signal that goes outside of a building or control panel underground.

c. Manufacturer/Model:
1) Phoenix Contact - TermiTrab TTC-6-MOV-C-120AC-UT-I
2) Prior Approved Equal

3. VDC Analog I/O

a. General Specifications:
1) Max Continuous Voltage: 28 V
2) Max Continuous Current: 450 mA
3) Nominal Discharge Current: 10 kA
4) Response Time: < 1ns
5) Connection Type: Screw
6) Mounting: DIN Rail
7) Style: Plug w/ Direct Grounding Base

b. Surge Suppressor Schedule:
1) Shall be furnished and installed for the following applications:
(a) On any analog I/O signal that goes outside of a building underground.

c. Manufacturer/Model:
1) Phoenix Contact - TermiTrab TTC-6P-1x2-24DC-UT-I
2) Prior Approved Equal

F. Intrinsically Safe Barriers

1. VDC Isolators

a. General Specifications:
1) Power Input Voltage: 24VDC
2) Maximum Input Voltage: 27.2VDC
3) Maximum Input Current: 50mA
4) Operating Temperature: -20°C to +60°C
5) Two-Channel with line fault detection and phase reversal
6) Two relays with changeover contacts
7) Din rail mounted
8) UL labeled unit suitable for using non rated devices in NEC Class 1, Division 1 Group D explosive area
9) Standards: NAMUR/DIN 19234

b. Intrinsically Safe Barrier Schedule:
1) Shall be furnished and installed for the following applications:
(a) Each Analog or Digital signal within a C1D1 rated control panel or from a C1D1 location.

c. Manufacturer/Model:
1) PR Electronics
(a) Analog PN: 5104B
(b) Analog (HART) PN: 9106B
(c) Discrete PN: 5202B
2) Eaton
(a) Analog PN: MTL7787+
(b) Discrete PN: MTL5018

3) Prior Approved Equal

G. Uninterruptible Power Supply (UPS)

1. General Specifications:

a. UPS shall be wired as the first device receiving power.
b. Provide a UPS bypass relay for maintenance purposes.
c. UPS shall be sized appropriately to handle the full load connected to them including the control panel and any other required external devices, instrumentation, analytical devices.
1) Provide an additional 50% spare operating capacity
2) Power calculations showing the required load with additional spare capacity shall be provided during the submittal phase
d. Reliable, true online, high frequency, double conversion type with batteries for critical type applications in high harmonic and/or noisy electrical installations.
e. Input / Output Voltage: 120 VAC
f. True sine wave AC output.
g. Outlets (Minimum): Five (5)
h. Battery:
1) Type: Sealed Lead Acid Battery
2) Voltage:12VDC
3) Capacity (Minimum): 5.5Ah
4) Operating Temperature: 32°F to 122°F
5) Provide Extended Battery Modules (EBM) as Indicated in the E Drawings
6) Manufacturer/Model:
(a) Eaton P/N: 9SXEBM48
(b) Prior Approved Equal
i. Shall have a programable relay for notifying the PLC.

2. Uninterruptible Power Supply (UPS) Schedule:

a. Shall be furnished and installed for the following application(s):
1) OXD-SCP1
2) TTF-SCP1

3. Manufacturer/Model:

a. Eaton 9SX
b. Prior Approved Equal

H. DC Power Supply

1. Linear regulated DC power supplies.

2. Power supplies shall be U.L. listed for the use in type 508 or 698 Industrial Control Panels as required and abide to the following requirements:

a. 120 VAC power input.

b. Fusing (circuit protection) on AC power.
c. Transient protection.
d. Current Limiting.
e. AC “power on” indication.
f. DIN rail mountable.

3. Power supplies shall be sized appropriately to handle the full load connected to them.

a. Provide an additional 50% spare capacity.
b. Power calculations showing the required load with additional spare capacity shall be provided during the submittal phase.

4. Manufacturer/Model:

a. Allen-Bradley
1) 1606-XLE Essential Series (24VDC)
b. Phoenix Contact
1) QUINT4-PS Series (24VDC)
c. PULS
1) CP10.241-R2 Dimension Series (24VDC)
d. Prior Approved Equal

I. Programmable Logic Controllers (PLC)

1. See 40 63 43 - Programmable Logic Controllers.

J. Operator Interface Terminals (OIT)

1. General Specifications:

a. Screen:
1) Size: As Defined Below
2) Type: Color TFT
3) Input Type: Touch
b. Communications:
1) Dual Ethernet Ports (10/100 Mbps, Modbus TCP/IP compatible)
c. Memory:
1) On board memory
2) USB Port for Data storage and application backup
d. Power: 24VDC

2. Operator Interface Terminals (OIT) Schedule:

a. Shall be furnished and installed in the following application(s):
1) Size: 12.0-inch
(a) OXD-SCP1
(b) TTF-SCP1
b. Manufacturer/Model:
1) Schneider Electric Harmony ST6
2) Prior Approved Equal

K. Control Switches

1. Electronic Circuits:

    a. General Specifications:
        1) Type (As Required):
            (a) Selector
            (b) Momentary Selector
            (c) Momentary Pushbutton
        2) Contacts (As Required):
            (a) Heavy Duty
            (b) Oil Tight
        3) Contacts:
            (a) Gold Flashed
            (b) Resistance: 0.01 Ohms
            (c) Rated Voltage: 120VAC
            (d) Rated Current: 0.5A
2. Control Circuits:

    a. General Specifications:
        1) Type (As Required):
            (a) Selector
            (b) Momentary Selector
            (c) Momentary Pushbutton
        2) Contacts (As Required):
            (a) Heavy Duty
            (b) Oil Tight
        3) Contact Rating: NEMA A-600
3. Manufacturer/Model:

    a. Allen-Bradley Bulletin 800T/H
    b. Prior Approved Equal

L. Indicator Lights

1. General Specifications:

    a. Nominal Package Diameter: 30mm
    b. Lamp Type: LED
        1) Lamp shall be easily replaceable
    c. Type: Push to Test
    d. Lens Color: As Shown on Drawings
    e. Contacts (As Required):
        1) Heavy Duty
        2) Oil Tight
    f. Ratings: NEMA 4
2. Manufacturer/Model:

    a. Allen-Bradley Bulletin 800T/H
    b. Prior Approved Equal

M. Managed Ethernet Switches

Note, Managed Ethernet Switches noted here is also to provide a reference for OEM control panels being furnished as part of Division 41 and Division 46 in addition to all system integrator provided control panels. This is an effort to set a standard of quality and continuity throughout the entire project.

1. General Specifications:

    a. Performance:
        1) Managed
        2) Store & Forward
        3) Wire Speed Switching
        4) All IEEE 802.3 Ethernet protocols supported
    b. Input Power Voltage: 12-48VDC
    c. Environmental Conditions:
        1) Operating Temperature: -40°C to 60°C
        2) Storage Temperature: -40°C to 85°C
        3) Humidity (non-condensing): 5% to 95% RH
    d. Mounting: Din Rail
    e. Software: Full Version, Layer 2 Firmware
    f. SFP Ports:
        1) Quantity: (2 Gigabit SFP Ports)
        2) Data Rate: 1000 BaseTX
        3) Fiber Type:
            (a) Compatible with fiber specified within Div. 26 and the defined within the Engineers Drawings
2. Managed Ethernet Switch Schedule:

    a. Shall be furnished and installed for the following applications:
        1) 16 RJ45 Ports:
            (a) OXD-SCP1
        2) 8 RJ45 Ports:
            (a) CP-2
3. Manufacturer/Model:

    a. Phoenix Contact 2000 Industrial
        1) SFP modules as required
        2)
    b. No Exceptions

N. Fiber Patch Panels

1. General Specifications:

    a. Modules/Connectors:
        1) Fiber Adapter Panels (FAP)
            (a) Leviton SDX P/N: 5F100-2QL
        2) Fiber Fanout/Terminations/Connectors:
            (a) Leviton or Approved Equal

(b) Termination type shall be Fusion. Mechanical is not allowed.
(c) Fiber connector type shall be LC unless connecting to existing fiber patch panel. Then required fiber connector type shall be field confirmed.

b. Physical:
1) Mounting:
(a) DIN Rail
(b) Approved method of backpanel mounting
2) Cable Entry: Cable Entry Grommet

c. Accessories:
1) Install blank modules in any blank ports
2) All miscellaneous Fiber Patch Panel hardware shall be supplied as required to create a complete functioning fiber system per manufacturer's intended final outcome.

2. Fiber Patch Panel Schedule:

a. Shall be furnished and installed for the following application(s):
1) Leviton SDX P/N: 5WSML-02C
(a) TTF-SCP1

O. Fiber and CAT 6 Patch Cables

1. General Specifications:

a. Provide quantity needed for a complete system.
b. Length of each patch cables shall be as needed for each individual application. Excess length of any patch cables shall be minimal.

2. Fiber Patch Cables:

a. Provide ends as required on both ends as needed for each device.
b. Color: Aqua
c. Provide an additional 10 spare fiber patch cables of each color provided within the project.

3. Cat6 Copper Patch Cables:

a. Provide snagless type patch cords.
b. Color: Black
c. Provide an additional 10 spare patch cable of each color for future use.

PART 3 EXECUTION

3.01 FACTORY ACCEPTANCE TESTING

A. Complete factory acceptance testing including (but not limited to) the following equipment:

1. All standalone VFDs as specified in Section 26 29 23.

2. Control Panels as specified in Section 40 63 13.

B. Notify the Engineer and Owner in writing a minimum of 30 calendar days prior to the Factory Tests. Engineer and Owner has the option to witness all required tests.

C. Completion of factory testing procedures shall be documented, signed, and turned over to Engineer and Owner.

D. The Owners representative will provide all necessary network equipment as indicated in the Construction Documents as being Owner furnished to complete a fully functional witness test of the Ethernet based protocol control scheme.

E. The Hardware Systems Integrator shall provide all required cabling and patch cords to fully connect all equipment to the network switches so as to provide a complete and functional system during the factory acceptance test.

F. The Hardware System Integrator shall provide their own PLC programming software used for testing the hardware and communication between equipment.

3.02 INSTALLATION

A. Wherever feasible, use bottom entry for all conduit entry to instruments and junction boxes.

B. Install electrical components per the requirements of the Electrical design.

3.03 INSTALLATION/WORKMANSHIP

A. The workmanship and design of this equipment shall conform to all national, state and local electrical codes and ordinances that apply.

B. The control system manufacturer shall provide complete electrical schematic wiring (factory and field) diagrams showing all components together with a description of system operation. Complete information to adjust and service this equipment shall be included.

C. Wire Labels: All wires both those factory terminated by the Systems Integrator as well as field wiring terminated by the Electrical Contractor to the Control Panel shall be provided with printable heat shrink labels installed on the wire prior to termination. All markers shall be positioned such that they can be clearly read by anyone looking at them without having to adjust the wire positioning.

3.04 HARDWARE SYSTEM INTEGRATOR SERVICES

A. The hardware system integrator shall provide a PLC based control system that incorporates a personal computer to provide a higher level of control, monitoring and reporting required for this project.

B. The hardware system integrator shall provide information to the Contractor on the proper installation of Category 6 Ethernet communications cable.

C. The services of a factory trained qualified service representative that is part of the permanent staff of the hardware system integrator shall be provided to inspect the complete equipment installation to insure that it is installed in accordance with the manufacturers recommendations and for commissioning the project.

D. Provide final calibration of all instrumentation before shipping. Provide coordination necessary for the correction of interface deficiencies between instrumentation, control panels, control equipment, and final control devices. Provide written documentation on the problems found detailing device names and tags, tests conducted, diagnosis, and corrective action to be taken.

E. Perform all control panel wiring terminations and all field device wiring terminations.

F. Configure all instrumentation and control devices supplied, modified, or relocated as part of this project. Configuration shall include:

1. Configuration of transmitters to work with measuring elements.

2. Scaling of transmitters to transmit appropriate analog (4-20 mA) signal based on minimum and maximum operating range of process value being measured. Operating ranges for each device will be provided during construction.

G. Verify that each instrumentation and control device is wired and operating correctly by going “online” with each PLC, testing each field device, and witnessing correct action in the PLC through the programming software.

H. Provide Engineer with a signed certificate for each control panel stating that each device wired to it has been checked out and has been verified to be operating correctly.

I. Assign and configure a temporary IP address to each PLC Ethernet module and touch panel computer and verify that each device can be “pinged” from the corresponding Ethernet switch. Provide verification in writing to the Engineer. IP addresses will be provided by Engineer upon approval of the shop drawings.

3.05 PROGRAMMABLE LOGIC CONTROLLER (PLC) INSTALLATION

A. Refer to Section 40 63 43 for details.

3.06 SUPPLIES AND SPARE PARTS

A. Contractor shall provide all expendable items such as lamps, fuses, etc. for system startup, checkout, and during the acceptance test.

B. At Final Completion, Contractor shall furnish the following expendable items:

1. Twenty (20) percent spare fuses and lamps of each type furnished, but not less than six (6) of each type.

END OF SECTION 40 63 13

SECTION 40 63 14
JUNCTION BOXES AND CONTROL STATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Refer to section 40 63 13 - Process Control Panels and Hardware.

PART 2 PRODUCTS

2.01 CONTROL STATIONS AND JUNCTION BOXES

A. Enclosures for control stations and junction boxes shall meet the following minimum requirements:

1. Stainless steel and NEMA Ratings as noted on drawings.

2. Minimum dimensions as indicated on the Drawings. Increase the size of each panel or junction box to fit equipment as required at no additional cost. Confirm size of each panel and junction box with the submittals.

3. Control stations and junction boxes shall be flanged, corners welded and ground smooth.

4. Stainless Steel enclosures shall not be painted although the surface shall be treated as it normally would to prevent oxidation.

B. All components and terminals labeled per shop drawings.

1. Engraved labels attached with screws or rivets.

C. All wiring terminated on terminal strips per Section 40 63 13. Terminal strips shall be labeled with engraved plastic labels.

1. Labels shall be attached with two-part epoxy adhesive.

2. 600 volt terminal strips.

3. Ring or spade type crimp connectors.

4. Wiring laced using plastic wire ties and plastic wiring troughs.

5. Wiring held down with straps attached to enclosure with screws.

6. Separate power, control, and signal conductors.

7. Control wiring: #16 AWG, stranded, 600V copper minimum.

8. Signal wiring: shielded, 600V, copper minimum.

9. Provide 15 amp, 10000 AIC breaker on power circuits using #14 wire.

10. Connections to instruments via terminal strip or connectors. Soldering wires to terminal strips is not acceptable.

D. Schedule

1. Control stations and junction boxes shall be furnished and installed as per the schedule and locations indicated within the E drawings.

E. The control panel drawings as furnished by the Hardware System Integrator specified in section 40 61 13 - Process Control System General Requirements shall fully incorporate all control stations and junction boxes including exact terminal numbers such that the entire circuit from the control panel to the load including the junction box is fully captured within the control panel drawings.

F. Manufacturer:

1. Hoffman

2. SCE

3. Approved Equal

PART 3 EXECUTION

3.01 SUMMARY

A. Refer to section 40 63 13 - Process Control Panels and Hardware.

END OF SECTION 40 63 14

SECTION 40 63 43
PROGRAMMABLE LOGIC CONTROLLERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes

1. Programmable logic controllers (PLC).
2. Input and Output (I/O) modules.
3. I/O connections and configurations.
4. Spares.

1.02 REFERENCES

A. Reference sections include, but are not limited to:

1. NEMA ICS 1 - General Standards for Industrial Control and Systems.
2. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
3. NEMA ICS 3 - Industrial Systems.
4. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.03 SUBMITTALS - FOR REVIEW / APPROVAL

A. Submit manufacturer’s data in accordance with Specification Section 01 33 00 - Submittal Procedures.

1.04 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's data in accordance with Specification Section 01 35 16.01 - LEED 2009 Material Cost Summary Form including the following:

B. Include bound copies of operating instructions.

C. Include card replacement, adjustments, and preventative maintenance procedures and materials.

D. Accurately record actual locations of controller cabinets and input and output devices connected to system. Include interconnection wiring and cabling information, and terminal block layouts in controller cabinets.

1.05 QUALIFICATIONS

A. The Software System Integrator will be providing all programming. See Section 40 63 13 - Process Control Panels and Hardware for approved control system manufacturers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01 61 00.

B. Store and protect products under provisions of Section 01 61 00.

C. Accept products on site in factory containers and verify damage.

D. Store products in clean, dry area; maintain temperature to NEMA ICS 1.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature above 32 degrees F and below 104 degrees F during and after installation of products.

B. Maintain area free of dirt and dust during and after installation of products.

1.08 MAINTENANCE SERVICE

A. Provide a one (1) year warranty to correct equipment defects from the Date of Substantial Completion.

1.09 FURNISHING PARTY

A. Programmable Logic Controller(s) may only be noted here to provide a reference for OEM control panels being furnished as part of Division 46 in an effort to set a standard of quality throughout the entire project. Other than the spare parts listed in Part 2 of this specification, the Systems Integrator as specified in Section 40 63 13 shall not be providing control panels utilizing PLC's other than listed within the control panel schedules noted within this specification and within the engineer's drawings.

PART 2 PRODUCTS

2.01 PROGRAMMABLE LOGIC CONTROLLER(S)

A. Modicon 580 Platform

1. The PLC system for each control panel listed shall be based on the Schneider Electric Modicon platform. Provide equipment as indicated on the Electrical Drawings and/or specifications.

2. Modicon platform required in all SCADA system control panels.

3. Each PLC system shall consist of a chassis, power supply, processor, communications modules, and I/O modules, as specified on the Electrical Drawings. In the occasion that the specified item is not available, Contractor must submit intent to use an alternate module to Engineer and

receive approval from Engineer prior to installation of the alternate module.

4. Chassis Backplane exact P/N and size shall be application application dependent.

Item:	Mfg.	Part Number
Power Supply	Schneider Electric	BMXCPS3500
Processor	Schneider Electric	M580 (BMEP582020)
Chassis Backplane	Schneider Electric	BMXXBP Series

a. See I/O Schedule within Engineers Drawings for further details.

2.02 CHASSIS-BASED I/O MODULE(S)

A. Modicon 580 I/O

1. Each PLC system shall use the following I/O modules as defined within the I/O schedules of the Engineers Drawings. In the occasion that the specified module is not available, Contractor must submit intent to use an alternate module to Engineer.

Item:	Mfg.	Part Number
Analog Input	Schneider Electric	BMXAMI0810
Analog Output	Schneider Electric	BMXAMO0802
Digital Input	Schneider Electric	BMXDAI1604
Relay Output	Schneider Electric	BMXDRA1605
Slot Filler	Schneider Electric	BMXXEM010

2.03 I/O CONNECTION & CONFIGURATION

A. All I/O points, including spares, must be factory wired to terminals as indicated in the typical wiring diagrams in the Electrical Plans. No field terminations may be made directly to the PLC Modules.

B. All I/O points shall be wired to the points indicated in the I/O schedule found in the Electrical Plans.

C. Programmable Controllers shall be manufactured to NEMA ICS 3 standards, with component circuit boards manufactured to NEMA ICS 2 standards.

D. Service Conditions:

1. Temperature: 0-60C

2. Humidity: 5-95% without condensation

3. Altitude: 5000 feet above sea level

E. Configuration:

1. Processor Unit: Include processor, power supply, and battery backup

2. I/O: Provide by separate expansion units or by modular hardware units

3. I/O Capacity: As required, plus 25% or 4 points for each type whichever is greater

F. Ratings:

1. Scan Rate: 1 milliseconds per KByte

2.04 SPARES

A. The Hardware Systems Integrator as specified in Section 40 61 13 shall provide the following spare PLC equipment. All equipment shall match that specified earlier in this section.

1. Modicon Platform:

a. One (1) – Power Supply
b. One (1) – Processor
c. One (1) – Each I/O module type

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Verify field measurements are as shown on Drawings.

C. Verify that required utilities are available, in proper location, and ready for use.

D. Beginning of installation means installer accepts conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Do not install products until major construction is complete and building interior is enclosed and heated.

C. Connect input and output devices as shown on Drawings.

D. The PLC processor shall be installed in the control panel and all I/O terminations shall be to screw terminals unless otherwise noted.

E. Four (4) copies of all material shall be provided with final shipment. These copies shall be in addition to any required by other sections of these specifications.

F. Provide the necessary time required for field installation and verification of all I/O devices with Electrical Contractor.

3.03 MANUFACTURER'S FIELD SERVICES

A. Prepare and start systems under provisions of Section 01 75 00

B. Provide in writing to Engineer that installation and verification of all I/O devices has been performed.

C. Provide the necessary time required for field I/O testing with Engineer.

3.04 DEMONSTRATION

A. Provide systems demonstration under provisions of Section 01 75 00

B. Demonstrate operation of controller.

3.05 PLC PROGRAMMING

A. All required PLC programming for Control Panels furnished by the Systems Integrator as specified in section 40 61 13 shall be by the Software Systems Integrator and shall be included within this contract.

END OF SECTION 40 63 43

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SECTION 40 70 01
INSTRUMENTATION GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 REFERENCES

A. Reference Standards:

1. NFPA) 70 - National Electrical Code (NEC)

2. National Electrical Manufacturers Association (NEMA)

a. NEMA ICS-2 - Industrial Control Devices, Controllers and Assemblies
b. NEMA 250 - Enclosures for Electrical Equipment

3. Underwriters Laboratories (UL) - 508 Industrial Control Equipment

1.02 SCOPE

A. It is the intent of the Contract Documents that all equipment specified in this Section of the specification be supplied by the same single-source supplier (“Hardware Systems Integrator”) specified in Section 40 61 13 - Process Control System General Requirements unless noted otherwise herein or on engineer's drawings. The supplier shall assume full responsibility along with the Contractor for furnishing, installing and start-up procedures so as to make the system operate per the intent of the Contract Documents.

B. The Work specified in this Section includes furnishing, installing, start-up, testing and adjusting of all required equipment, including instruments, equipment, hardware, software, wiring, accessory equipment, and training to provide a completely operational process instrumentation and control system.

C. It shall be the responsibility of the Contractor to furnish a complete and fully operating system. The Contractor shall be responsible for all details that may be necessary to properly install, adjust and place in operation the complete installation. The Contractor shall assume full responsibility for additional costs that may result from unauthorized deviations from the Contract Documents.

D. It shall be the responsibility of the Contractor and supplier to examine all new equipment that is transmitting a signal to, or receiving a signal from, equipment specified in this Section and the associated instrumentation Sections. The Contractor shall be responsible for providing signal converters, buffer amplifiers, and isolation devices to make signal levels, reference to ground, etc. compatible between devices specified in this Section and existing equipment.

1.03 SUBMITTALS

A. All submittal requirements stated herein shall be in addition to those outlines section 01 33 00 - Submittal Procedures.

B. Shop Drawings:

1. Product technical data including:

    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Equipment catalog cut sheets.
    c. Instrument data sheets:
        1) ISA S20 or approved equal.
        2) Separate data sheet for each instrument type.
    d. Materials of construction.
    e. Minimum and maximum flow ranges.
    f. Pressure loss curves.
    g. Physical limits of components including temperature and pressure limits.
    h. Control panel and junction box drawings including system schematic drawings, terminal numbering, component schematic drawings, dimension drawings, layout drawing and nameplate schedule. Where panels, junction boxes and new Owner-furnished equipment is being utilized, the submittal shall include complete schematics showing all proposed equipment, terminals, terminal numbering, wiring, elevations, and details. It shall be the supplier's responsibility to visit the Site and inspect existing and Owner-furnished equipment to prepare complete system drawings for the Project.
    i. Overall system diagram showing all components, converters, cables, and connectors.

2. Provide a parameter setting summary sheet for each field configurable device.

3. Certifications:

    a. Documentation verifying that calibration equipment is certified with NIST traceability.
    b. Approvals from independent testing laboratories or approval agencies, such as UL, FM or CSA.
        1) Certification documentation is required for all equipment for which the specifications require independent agency approval.

C. Technical data in conformance with Section 01 33 00 - Submittal Procedures and including:

1. All equipment and components indicated on the Drawings and specified in Part 2 of this Section

2. Junction Box Enclosures

D. Manufacturer's Instructions

1. Furnish under provisions of Section 01 35 16.01 - LEED 2009 Material Cost Summary Form.

E. Manufacturer’s Field Service Reports

1. Furnish under provisions of Section 01 35 16.01 - LEED 2009 Material Cost Summary Form. Reports should cover a minimum of startup, demonstration, and operational instructions.

F. Operation and Maintenance data in conformance with Section 01 35 16.01 - LEED 2009 Material Cost Summary Form and including:

1. Panel equipment, junction boxes, field devices and instruments, including "as-built" system schematics. All items requested under Part 2 below should be included in their “as-built” form.

G. Spare Equipment Lists - Provide a list of recommended spare parts and equipment that is considered essential to the operation of the system. Include list of current prices for each item. These lists may be included with the Operation and Maintenance data submittals.

H. All submittals shall be searchable documents in PDF file type. They shall be electronically delivered through the platform/method all parties mutually agreed upon. The submittal shall be broken up into sections and bookmarked to allow for easier navigation throughout the submittal.

1.04 CIRCUIT IDENTIFICATION

A. Each power, control, and signal conductor shall be identified by plastic tags permanently attached to the cable. The tags shall be attached to each cable at each termination and wherever the cable is accessible in junction or pull boxes. Tags shall be marked with printing showing:

1. The circuit number from the cable and conduit schedules.

2. The terminal number as assigned by the equipment manufacturer.

B. The cable marking system shall use transparent tape with a white area where the numbering shall be typed using a typewriter or computer, as manufactured by:

1. Raychem

2. Thomas & Betts

3. Brady

C. Contractor supplied “as-built” schematics and wiring diagrams should reflect this described wire identification.

1.05 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PART 2 PRODUCTS

2.01 REFER TO THE FOLLOWING PRODUCT SECTIONS

A. Flow Measurement - See Section 40 71 00

B. Level Measurement - See Section 40 72 00

C. Process Liquid Analytical Measurement - See Section 40 75 00

PART 3 EXECUTION

3.01 LABELING

A. Label all field mounted control devices, instrumentation, switches, etc., with tag number (if applicable) and item description.

B. Labels shall be engraved laminated plastic with 1/4" high lettering. Labels shall be attached with stainless steel screws to the device or nearby wall.

3.02 CALIBRATION, ADJUSTING AND TESTING

A. Devices requiring field calibration shall be calibrated in the presence of the Engineer's representative and documented.

3.03 PROJECT MANAGEMENT

A. Supplier shall provide engineering and administrative services necessary to fulfill the requirements of this Specification.

B. Supplier shall provide the services of an experienced project manager as the overall coordinator during the course of the project.

3.04 FIELD QUALITY CONTROL

A. Maintain accurate daily log of all startup activities, calibration functions, and final setpoint adjustments.

B. Install all instrumentation and equipment as per manufactuer's requirements. Coordinate with Engineer in Field on final instrument locations per manufacturer requirements.

C. Instrumentation Calibration:

1. Verify and document that all instruments and control devices are calibrated to provide the performance required by the Contract Documents.

2. Factory furnished calibration certifications are acceptable for the following:

    a. Flow meters.
    b. Pressure sensors utilized with annular sleeve.
    c. Temperature sensors.

3. On-site calibration verification is required for all other instruments, including “smart” transmitters that have been factory calibrated.

    a. Provide calibration checks at 0 PCT, 25 PCT, 50 PCT, 75 PCT and 100 PCT of span for pressure transmitters and gages.
        1) Check for both increasing and decreasing input signals to detect hysteresis.
    b. In addition to factory calibration certification, temperature sensors and gages shall be checked at a single point for conformance to required accuracy.
    c. Level transducers/transmitters shall be checked at two points in addition to zero.
    d. Analytical sensors shall be calibrated in accordance with manufacturer’s recommendations.
    e. Check operation of all switches to verify actuation occurs in accordance with manufacturer’s specified accuracy.
    f. Replace any instrument which cannot be properly adjusted.
    g. Stroke pneumatic control valves with clean dry air to verify control action, positioner settings, and solenoid functions.

4. Calibration equipment shall be certified by an independent agency with traceability to NIST.

    a. Certification shall be up-to-date.
    b. Use of equipment with expired certifications shall not be permitted.

5. Calibration equipment shall be at least three times more accurate as the device being calibrated.

D. Loop Check-Out Requirements are as Follows:

1. Work closely with the Owner to check control signal generation, transmission, reception and response for all control loops under simulated operating conditions by imposing a signal on the loop at the instrument connections. Loop check-out work shall verify proper operation of the installed equipment and the Owner’s PLC and HMI programming.

    a. Use actual signals where available.
    b. Closely observe controllers, indicators, transmitters, HMI displays, recorders, alarm and trip units, remote setpoints, ratio systems, and other control components.

1) Verify that readings at all loop components are in agreement.
2) Make corrections as required.
(a) Following any corrections, retest the loop as before.

2. Stroke all control valves, cylinders, drives and connecting linkages from the local control station and from the control room operator interface.

3. Check all interlocks to the maximum extent possible.

4. In addition to any other As-Recorded Documents, record all setpoint and calibration changes on all affected Contract Documents and turn over to the Owner.

3.05 FIELD QUALITY CONTROL - INSTALL, START-UP AND WITNESS TESTING

A. Contractor shall furnish and install raceway and wiring systems for the instrumentation and control system in accordance with manufacturer's requirements and in accordance with Sections 26 05 34 - Conduit. All instrumentation and control system raceways shall be galvanized rigid steel conduit unless specifically indicated otherwise.

B. Supplier shall provide a skilled programmer/instrumentation engineer or technician who shall complete troubleshooting and start-up to place the entire system into satisfactory operation. The engineer or technician shall make the necessary inspection of the completed installation, make the necessary final field adjustments, and make program revisions as required for start-up.

C. Coordinate installation, start-up and testing scheduling with Owner and Engineer.

D. Instruct Owner's personnel at the Site on the operation and maintenance of equipment furnished in this Section.

E. Furnish Owner and Engineer with a written report prepared by Supplier certifying that equipment:

1. Has been properly installed.

2. Is in accurate alignment and calibration and is free from undue stress imposed by interconnecting cable/conduit, etc.

3. Has been operated and witness demonstrated to the Owner under expected conditions and that it operates satisfactorily.

3.06 ON-SITE SERVICES

A. In addition to other services specified, provide a competent instrumentation engineer or technician to perform the following services:

1. Training – one (1), eight (8) hour days on-Site to train Owner's personnel on operation and maintenance of all equipment furnished under this Section.

B. All on-Site service shall be at times approved by the Owner.

END OF SECTION 40 70 01

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SECTION 40 71 00
FLOW MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

PART 2 PRODUCTS

2.01 ELECTROMAGNETIC FLOWMETER

A. General Specifications

1. The flow meter shall be a flanged sensor (by application and instrument schedule) and transmitter which may be mounted integral (compact) to the sensor or remotely.

2. The flow metering system shall be three-stage microprocessor controller and possess a non-volatile memory to store the sensor calibration and transmitter setup information.

3. The electronics shall be interchangeable for meters sizes 1”- 90”.

4. The sensor shall be the proper size to measure the design flow rate of the piping and measure bi-directional flow as a standard

5. The sensor shall consist of a stainless steel flow tube with ANSI B16.5, AWWA C207 carbon steel, or stainless steel flanges.

6. The flanges shall be Class 150 for diameters less than 24” and AWWA Class D for diameters larger than 28” (listed by the application and instrument schedule).

7. Flow Meter Specifications by size

a. Diameter: 1"- 6"
   1) Fixed or rotating lap joint flanges
   2) Hard Rubber or Polyurethane Liner
   3) 0.5% min reference accuracy

b. Diameter: 8"- 12"
   1) Fixed or rotating lap joint flanges
   2) Hard rubber or Polyurethane liner
   3) 0.25% min reference accuracy

c. Diameter: 14"- 90"
   1) Flanges welded to the sensor body
   2) Hard rubber or Polyurethane liner
   3) 0.25% min reference accuracy

8. The sensor tube shall be in accordance with NSF-61 based upon the size of the flow meter and the process media conditions.

9. The sensor shall house minimum of two (2) measuring electrodes and a grounding ring. The electrodes shall be bullet-nosed shaped and Alloy C22 unless otherwise noted on instrument schedule.

10. The sensor liner and electrode material shall be validated to be compatible with the process fluid. All fluids require a minimum conductivity of 5µS/cm (20µS/cm for deionized water).

11. In the event of industrial treatment or corrosive/brackish environments, the flow sensor shall be painted and certified according to ISO-12944 corrosion class. Third party modification or sensor preparations will not be accepted without type test documentation to support the exposure conditions, depth, and duration of resistance.

12. Stainless Steel Tag

13. Grounding rings required on all Flow Meters

14. Transmitter Specifications

    a. The transmitter shall allow local programming that can be operated through the enclosure window without opening the electrical enclosure.
    b. The transmitter shall be integral or remote mounted from the flowtube and sensor as indicated on the Electrical Instrumentation Schedule within the Engineers Drawings.
    c. Diameter: 1"- 90"
        1) Input Voltage: 100-240 VAC
        2) Signal Output: Two (2) Wire 4-20 mA HART
        3) Display shall indicate simultaneous flow rate and total flow with 3 totalizers (forward, reverse and net total) and user-selectable engineering units, readout of diagnostic error messages, and support 12 standard languages.
        4) Transmitter shall safeguard against entering of invalid data for the particular meter size and all programming parameters shall be access-code protected with a minimum requirement of dual passwords according to data sensitivity.
        5) Transmitter output(s) shall be integral to the magnetic flowmeter transmitter electronics; using an external third party signal converter is unacceptable.
        6) There shall be no limitation of transmitter operational capability or diagnostic dependency between integral and compact mounting orientation.

7) Transmitter shall retain all setup parameters and accumulated measurements internally in non-volatile memory in the event of power failure. The memory unit shall be transferrable from a damaged unit or used for a duplicate device with no loss of device parameters or data stored.

8) Transmitter shall be protected against voltage spikes from the power source with internal transient protection. Power consumption shall be no more than 16 VA, independent of meter size.

B. Schedule

1. See instrumentation schedule on the engineers drawings.

C. Manufacturer/Model

1. Endress+Hauser W 400

2. Rosemount 8750W

3. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 71 00

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SECTION 40 72 00
LEVEL MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS .

PART 2 PRODUCTS

2.01 RADAR LEVEL TRANSMITTER

A. General Specifications

1. Range (Configurable): 0-230
2. Accuracy (Minimum): ± 0.04"
3. Pulse Rate: 2 per second
4. Beam Width (Application Dependent): 4.5-22 degree
5. Dead Band (Maximum): 1.0 ft
6. Display Units: Feet
7. Input Voltage: 12-35 VDC Loop Powered
8. Signal Output: Two (2) Wire 4-20 mA HART
9. Display: Graphic with Push Buttons
10. Temperature Range: -40 to 302 degrees F
11. Enclosure Rating: NEMA 4X, IP66/IP67
12. Enclosure Material:
    a. Aluminum
13. Transducer Coating: PTFE or PVDF
14. Process Connection: 1-½ inch NPT
15. Conduit Connection: ½ inch NPT
16. Stainless Steel Tag
17. Wireless Connectivity: Bluetooth (If Available)

B. Radar level transmitters shall be mounted as shown in the Electrical Drawing's Details.

C. Schedule

1. See instrumentation schedule on the within the Engineers Drawings.

D. Manufacturer/Model

1. Endress+Hauser FMR60B

2. Rosemount 3408

3. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 72 00

SECTION 40 75 00
PROCESS LIQUID ANALYTICAL MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

PART 2 PRODUCTS

2.01 ANALYTICAL TRANSMITTER

A. One required for up to two (2) sensors at each location.

1. Shall be a multi-parameter controller.

2. Programmed computations and features resident in nonvolatile memory.

3. Transmitter firmware shall be upgradable in the field by the user or a factory technician, without removing the transmitter from service.

4. Transmitter shall be available in a Nema 4X field housing with integral display or a DIN rail-mount version for cabinet mounting with remote display.

5. Digital communications provides for plug and play for all sensor configurations.

6. Shall be capable of modification for new or extended functions by use of modular components that are easily retrofitted in the field without the aid of tools, and without the need to power down the transmitter or re-boot the system.

7. Simple wiring for all types of digital sensors plus an option for a M12 sensor connector.

8. Digital communications protocols available shall include the following without using an external converter. Digital communication shall be available as a native output from the sampler. Use of an external third-party signal converter is not acceptable.

   a. Modbus TCP with webserver.

9. Transmitter shall have analog outputs in quantity as required per the engineers drawings.

10. Transmitter shall have an option for relay outputs, analog inputs, and discrete input/outputs.

11. Accessories:

a. For all outdoor installations:
1) Sunroof with Visor
2) Mounting Hardware

12. Spares

a. Provide one (1) spare Analytical Transmitter.

13. Manufacturer/Model

a. Hach SC4500
b. Prior Approved Equal

2.02 PH SENSOR

A. Completely encapsulated sensor having no fixed cable and no metallic contacts. Sensor must be galvanically isolated from the transmitter and cable.

B. Sensor does not require replacement parts or electrolyte solutions.

C. Sensors shall work with digital transmitter.

D. pH sensors shall have a built in temperature compensator.

E. Sensor General Specifications:

1. pH Range: 0 - 14

2. Temperature Range: 32 - 230 °F

3. Insertion Length: 58mm + Electrode Guard

4. Approval: As required per application

F. Accessories

1. Stainless Steel Tag

2. Installation:

a. Basin Immersion
1) Stainless Steel Chain Mount
2) Refer to applicable Mounting Detail within Engineers Drawings.
3) Mounting hardware shall be of the same manufacturer as the sensor.

3. Maintenance Kit and buffer solutions for 1 year for each sensor supplied.

G. Schedule:

1. See instrumentation schedule on the "IC" drawings.

H. Transmitter

1. Endress+Hauser CM42B

I. Sensor Manufacturer/Model

1. Endress+Hauser CPF81E

a. C1D1 Rated

2. Prior Approved Equal

2.03 ORP SENSOR

A. Completely encapsulated sensor having no fixed cable and no metallic contacts. Sensor must be galvanically isolated from the transmitter and cable.

B. Sensor does not require electrolyte solutions.

C. Sensors shall work with digital transmitter.

D. ORP sensors shall have a built in ambient process condition compensation.

E. Accessories

1. Stainless Steel Tag

2. Installation:

a. Basin Immersion
1) Stainless Steel Pole Mount
2) Pole extensions as required to remain sensor required distance below the minimum operating level of the basin.
3) Refer to applicable Mounting Detail within Engineers Drawings.
4) Mounting hardware shall be of the same manufacturer as the sensor.

3. Maintenance Kit and replacement parts for 1 year for each sensor supplied.

F. Schedule:

1. See instrumentation schedule in the engineers drawings.

G. Transmitter

1. Refer to Section 2.01A for specific requirements.

H. Sensor Manufacturer/Model

1. Hach DRS5

2. Prior Approved Equal

2.04 DISSOLVED OXYGEN SENSOR/TRANSMITTER

A. Optical fluorescence technology with minimum maintenance and maximum availability.

B. Shall incorporate digital communication based technology with calibration saved in sensor and a high degree of EMC protection.

C. Simple single-point calibration in air, air-saturated water or in medium shall be possible.

D. Extended maintenance intervals and a high degree of long-term stability; intelligent self-monitoring shall guarantee reliable measure values.

E. Fixed, waterproof cable connection at the sensor.

F. Sensor General Specifications:

1. Measurement Range: 0-20 mg/l, 0-200 %SAT, 0-400 hPa

2. Repeatability: ±0.5% of measuring range end

3. Max Measured Error: 0.01 mg/l or ±1 % of measured value (< 12 mg/l) ±2 % of measured value (from 12 to 20 mg/l)

4. Response time (t90): 60 sec.

5. Sensor cap lifetime: >2 years (under reference operating conditions, protected against direct sunlight)

6. Temperature Sensor: NTC temperature sensor, 0-50°C (32-122°F)

G. Accessories

1. Stainless Steel Tag

2. Installation:

a. Basin Immersion
   1) Stainless Steel Pole Mount
   2) Pole extensions as required to remain sensor required distance below the minimum operating level of the basin.
   3) Refer to applicable Mounting Detail within Engineers Drawings.
   4) Mounting hardware shall be of the same manufacturer as the sensor.

3. Maintenance Kit and replacement parts for 1 year for each sensor supplied.

H. Schedule:

1. See instrumentation schedule on the engineers drawings.

2. Transmitter

a. Refer to Section 2.01A for specific requirements.

I. Sensor Manufacturer/Model

1. Hach LDO Probe Model 2

2. Prior Approved Equal.

2.05 NITRATE SENSOR

A. Nitrate immersion sensor using reagentless UV operating principals.

B. Analyzers shall employ reagent-free operation.

C. Suitable for use in wastewater process streams.

D. Digital communication protocol.

E. Sensor shall have the capability to be installed or removed without stopping the transmitter.

F. Sensor General Specifications:

1. Nitrate Range: 0.1 to 90 mg/l NO_3

2. Response time: Less than or equal to 1 minutes.

3. Maximum measured error: ±5% of the measured value ±0.2 mg/l.

4. Repeatability: ±3% of the displayed value.

5. Environment:

a. Ambient temperature range: -4 to 122 °F.
b. Process temperature range: 35.6 to 104 °f.
c. Degree of protection: IP68.

G. Accessories

1. Stainless Steel Tag

2. Installation:

a. Basin Immersion
1) Stainless Steel Pole Mount
2) Pole extensions as required to remain sensor required distance below the minimum operating level of the basin.
3) Refer to applicable Mounting Detail within Engineers Drawings.
4) Mounting hardware shall be of the same manufacturer as the sensor.

3. Maintenance Kit and replacement parts for 1 year for each sensor supplied.

H. Schedule:

1. See instrumentation schedule on the "IC" drawings.

I. Transmitter

1. Refer to Section 2.01A for specific requirements.

J. Sensor Manufacturer/Model

1. Hach NT3100sc

2. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 75 00

SECTION 43 22 70
AUTOMATIC SAMPLER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section includes the furnishing and installation of:

1. Two (2) autosamplers, one installed outdoors by the southeast corner of Headworks 1 (HW1) and one in the Tertiary Treatment Facility (TTF).

B. Related Sections:

1. Division 26 - Electrical

2. Section 40 27 00 - Process Piping - General

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturer's Association (NEMA)

1.03 SUBMITTALS

A. Submittal requirements include the following, but are not limited to:

1. Shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

2. Operation and maintenance data in accordance with Section 01 78 23 – Operation and Maintenance Data.

3. Installation, inspection and start-up report in accordance with Section 01 75 00 – Starting and Adjusting.

4. Name, address, phone number and email address of manufacturer.

5. Name, address, phone number and email address of local service representative.

6. Description literature, bulletins, and general information on sampler including size, model number, and serial number of each sampler.

7. Detailed specifications, dimensions, and weights for each sampler.

8. Full equipment specifications for each sampler with complete bill of materials showing materials of construction, part numbers, etc.

9. Detailed electrical data.

10. Typical installation guides.

11. Technical manuals.

12. Parts list and list of recommended spare parts.

13. Printed warranty.

1.04 SYSTEM DESCRIPTION

A. Provide refrigerated composite automatic samplers complete and operable to collect influent and effluent wastewater samples.

1.05 QUALITY ASSURANCE

A. The equipment supplier must have at least five continuous years of experience in the design, application and manufacture of automatic samplers. All material and equipment shall be new and of the highest quality.

B. In order to assure uniform quality, ease of maintenance and minimal parts storage, it is the intent of these specifications that all automatic samplers and accessories called for under this section shall be supplied by a single manufacturer or authorized sales representative. The equipment manufacturer or authorized sales representative shall, in addition to the Contractor, assume the responsibility for proper installation and functioning of the equipment.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivered materials shall be stockpiled and stored at locations approved by the Owner until required for installation. Materials shall be stored in accordance with manufacturer’s instructions and the requirements of section 01 61 00.

B. Contractor shall inspect materials upon delivery for loss or damage in transit. Contractor shall be responsible for the replacement of damaged materials; damaged materials shall be removed from the Site.

1.07 WARRANTY

A. The equipment manufacturer shall warrant the equipment being supplied to the Owner against defects in workmanship and materials for a period of one (1) years under normal use, operation and service. The warranty shall be in published form and apply to all similar units. A warranty offered by a representative will not be acceptable in lieu of the manufacturer's warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers for automatic sampler:

1. Hach Company – AS950 All Weather Refrigerated Sampler

B. Plan layouts, weights, and pertinent specifications language used in the design have been based upon Teledyne Isco and HACH Company automatic samplers. Modifications required for approved equal manufacturer's equipment may be necessary and shall be included in the Contractor's Guaranteed Maximum Price (GMP) as applicable.

C. All equipment called for in this section shall be supplied by a single manufacturer or authorized sales representative to assure uniform quality, ease of maintenance, and minimal parts storage.

2.02 STATIONARY COMPOSITE SAMPLERS

A. Shall be capable of collecting repeated sample increments and depositing them into a single bottle inside a refrigerated compartment.

B. Provide one (1) 2.5 gallon polyethylene sample container with lid and polypropylene screw cap for each sampler.

C. Provide a mechanism to automatically terminate sampling at a predetermined level. Include an exterior indicator light when full.

D. Refrigerator:

1. Exterior: Rotationally molded polyethylene.

2. Coating: UV-inhibitor and corrosion-inhibitor.

3. Interior: Food-grade ABS plastic.

4. Evaporator plate, refrigeration lines, and condenser coil: Heat treated polyester.

5. Controller Cover: Hinged and lockable.

6. Protected temperature control knob.

7. Lockable door.

8. Door Seal: Magnetic gasket.

9. All other exposed metal components shall be anodized or plated aluminum or stainless steel.

10. Compressor: Minimum 1 / 10 HP.

11. Temperature sensing device connected to microprocessor.

E. Sample Collection:

1. Pump:

a. Peristaltic.
b. Minimum Line Velocity: 3.0 feet per second in a 3/8-inch ID suction line at 13.5 feet vertical head.
c. Capable of producing 28 feet of lift.
d. Pump Body: High strength plastic.

2. Sample Cycle:

a. Pump shall automatically air purge suction line before and after each sample is collected.
b. Sample stream shall not pass through any valves, metering chambers or distribution tubing, unless under pumped flow.

3. Suction Line: 3/8-inch ID flexible vinyl or PTFE, lengths as required, provide 100-feet minimum per sampler.

4. Strainer: Weighted polypropylene or 316 stainless steel and Teflon with debris deflector.

5. Discharge line: Provide 10-feet minimum discharge tubing per sampler.

6. Samplers shall have a detector to sense the pressure of liquid at the inlet to the pump. Detector shall inhibit pump revolution counter from incrementing unit liquid is detected.

7. Provide one tubing coupler per sampler.

F. Controller:

1. Display shall show status of sampler and program information.

2. Display backlit for easy viewing.

3. Keypad allowing program entry and manual control of sampler independent of internal programming.

4. Memory shall maintain program settings, stored programs, and results of last sampling routine in event of power failure.

5. Diagnostics routine capable of determining operational status of sampler and display error conditions detected.

6. Samplers shall be capable of operation in a timed or flow-proportional mode. In timed mode, the interval between samples shall be adjustable in 1-minute intervals up to 9,999 minutes. In the flow-proportional mode, the sampler shall initiate sampling per flow rate sent to sampler from plant control system (signal will be a 4-20mA from flow meter).

7. The sampler shall operate in flow-proportional mode with an input signal from the PLC.

8. Internal Sampler Program:

    a. Shall have the capability to set the number of samples per bottle.
    b. Shall be programmable for up to three sample collection retries if liquid is not detected due to plugging or absence of liquid.
    c. Shall be programmable for up to three suction line rinse cycles before each sample.
    d. Sample volume shall be adjustable from 100 mL to 1 liter, and reproducible within 0.5 percent.

9. Sampler I/O:

    a. Input from plant control system for flow rate of system.
    b. Output to plant control system number of samples.
    c. Provide appropriate multipurpose cable with unterminated leads.

G. Control Box:

1. Watertight control box within the molded frame on top of the refrigerated section.

2. Minimum 1 / 4 – inch thick plastic.

3. Conform to NEMA 4X standards for watertight, dust-tight, and corrosion resistant operation.

4. Conform to NEMA 6: protected from accidental submersion under 6 feet of water for 30 minutes.

5. Mount the distribution assembly inside the control box.

6. Install a desiccator inside the control box.

7. Control box shall be removable.

H. Cables

1. Provide necessary cables for connecting between the sampler and PLC, and to receive the controlling signal from the PLC. Flow meter, PLC and sampler are specified as products from different manufacturers.

I. Pump Revolution Counter

1. Count actual pump revolutions after liquid detection to determine sample volume delivery.

2. Alert operator on sampler display when a pre-selected number of revolutions has been reached indicating a need for pump tubing replacement.

J. Sampler shall have dimensions of approximately 29 inches by 33 inches by 52 inches in height.

K. Sampler shall be insulated with foam thermal insulation.

L. Samplers shall have operating range of 32 degrees F to 120 degrees F.

M. Sampler shall operate on 120 VAC, 60 Hz power.

2.03 SPARE PARTS

A. 3/8-inch x 100-feet of vinyl suction line

B. 10 feet discharge tubing

C. 18 pump tubes

PART 3 EXECUTION

3.01 INSTALLATION

A. Install sampler, sample tubing and strainers in accordance with manufacturer's recommendations.

B. Systems to be installed complete with all necessary connections, valves, pipes, and fittings.

C. Contractor responsible for adequate amount of appurtenances required to provide a complete and functional system.

D. Contractor shall complete all electrical power and control connections as specified in Division 26 and 40.

3.02 STARTING AND ADJUSTING

A. Field test each sampler in the presence of the engineer.

B. Verify sample cycle:

1. Purge

2. Rinse

3. Sample

4. Rinse

C. Verify sample volume.

D. Verify manual sample initiation.

E. Manufacturer’s Service

1. Provide services of an experienced, competent and authorized representative of Manufacturer for a minimum of eight (8)

hours. Additional Manufacturer services for starting and adjusting shall be the responsibility of the Contractor.

2. Reference Sections 01 45 00, 01 75 00, and 46 05 01 for additional requirements.

3.03 CLASSROOM AND DEMONSTRATION TRAINING

A. Provide a minimum four (4) hours of operator training by a qualified manufacturer's representative.

B. Contractor shall record training via digital video camera so Owner can use again in future.

C. Contractor shall meet additional requirements as required in Section 01 79 00.

END OF SECTION 43 22 70

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SECTION 43 23 31
VERTICAL TURBINE SOLIDS HANDLING PUMPS

GENERAL

1.01 REFERENCE STANDARDS

A. AWWA - AWWA C216; 2015.

B. AWWA C210 - Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings; 2015, with Addendum (2020).

C. AWWA E103 - Horizontal Centrifugal and Vertical Line Shaft Pumps; 2021.

D. IEEE 115 - IEEE Guide for Test Procedures for Synchronous Machines Including Acceptance and Performance Testing and Parameter Determination for Dynamic Analysis; 2019.

E. ISO 9000 - Quality management systems -- Fundamentals and vocabulary; 2015.

F. ISO 9001 - Quality Management Systems — Requirements; 2015, with Amendment (2024).

1.02 SUMMARY

A. Section Includes:

1. Vertical Turbine Solids Handling Pumps.

B. Related Sections include, but are not limited to:

1. Section 01 10 00 – Summary of Work.

2. Section 01 33 00 – Submittals.

3. Section 01 45 00 – Quality Control.

4. Section 01 61 00 – Product Requirements

5. Section 01 75 00 – Starting and Adjusting

6. Section 01 77 00 – Closeout Procedures.

7. Section 01 78 23 – Operation and Maintenance Data.

8. Section 01 91 00 – Commissioning.

9. Division 05 – Metals.

10. Section 09 90 02 – High Performance Painting and Coating.

11. Division 26 – Electrical.

12. Section 40 27 00 – Process Piping.

13. Section 40 27 20 – Process Valves.

1.03 REFERENCES

A. Reference Standards:

1. HI – Hydraulic Institute Standards.

2. ASTM – American Society for Testing and Materials.

3. AISI – American Iron and Steel Institute.

4. ANSI – American National Standards Institute.

5. AWWA – American Water Works Association.

6. NEC – National Electric Code.

7. NEMA – National Electrical Manufacturers Association

8. IEEE – Institute of Electrical and Electronic Engineers

9. AGMA – American Gear Manufacturers Association

10. AFBMA – Anti-Friction Bearing Manufacturers Association

11. API – American Petroleum Institute

1.04 SUBMITTALS

A. Shop Drawings: Furnish in accordance with Section 01 33 00. Provide the following information for each pump specified within this Section, if applicable, and identify all other materials or equipment, dimensions, components, properties, and other information required to prove compliance with these specifications.

1. Pumps:

a. Name of manufacturer.
b. Type of model.
c. Design rotative speed.
d. Number of stages.
e. Type of pump bearings.
f. Type of lineshaft bearings.
g. Size of shafting.
h. Size of pump column and length.
i. Size of suction and discharge.
j. Type of impeller.
k. OD of impeller.

l. Weight of complete assembly, including motor.
m. Complete performance curves showing capacity, head, NPSH requirements, efficiency, and bhp requirements.
n. Type of seals.
o. Complete drawings showing dimensions, fabrication, installation, and manufacturers requirements.
p. Materials of component construction.

2. Motors:

a. Name of manufacturer.
b. Type and model.
c. Rated size of motor (hp).
d. Type of bearings.
e. Weight.
f. Service factor.
g. Insulation class.
h. Voltage, cycles, and phase.
i. Nominal and guaranteed efficiencies and power factor.
j. Complete drawings showing dimensions, fabrication, installation, and manufacturers requirements.
k. Contractor shall complete and submit Motor Data Sheet and Pump/Equipment Control Data Sheet for each motor driven equipment per Section 26 05 10.

B. Certified Performance Test: Furnish manufacturer's Certified Performance Test results for each pump supplied. Results of tests to be reviewed by the Engineer before pumps are shipped from the manufacturer.

C. Manufacturers' Instructions: Furnish in accordance with Section 01 33 00, manufacturers' printed instruction for delivery, handling, storage, assembly, installation, startup, adjusting, balancing, and finishing as appropriate.

D. Manufacturers' Report: Submit reports for starting of systems and systems demonstration.

E. Operation and Maintenance Data: Submit in accordance with Section 01 78 23.

F. Certificates:

1. Certification of proper installation and satisfactory performance.

1.05 QUALITY ASSURANCE

A. The equipment covered by these Specifications shall be standard units of proven ability as manufactured by competent organizations having long experience in the production of such equipment. The pumps shall be the standard cataloged product of the Manufacturer. The pumps furnished shall be designed, constructed, and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. Pumps shall be manufactured in

accordance with the Hydraulic Institute Standards, except as otherwise specified herein.

B. Manufacturer supplying equipment furnished under this section shall hold ISO 9001 certification.

C. Pumps are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to be in effect for at least ten years, to include a written record of periodic internal and external audits to confirm compliance with such program.

D. All equipment furnished under this Specification shall be new and unused and shall be the standard product of Manufacturers showing a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of ten (10) years.

E. The Manufacturer shall be fully responsible for the design, arrangement, and operation of all connected rotating components of the assembled pumping unit to ensure that neither harmful nor damaging vibrations occur within the specified operating range.

F. Performance Certifications

1. Pump Performance:

    a. A certified factory performance test shall be performed on each pumping unit in accordance with the latest edition of the Hydraulic Institute Standards. Conduct the test using complete pump bowl assembly at manufacturer's minimum submergence. Test shall be acceptance grade 1U or 1B.
    b. Hydrostatic Test: Test discharge heads and bowl assemblies at either twice the total dynamic head or one and a half times the shutoff head, whichever is greater.
    c. Performance test data must be submitted to the Engineer prior to shipment and to include:
        1) Operating speed.
        2) Head versus capacity curve from shutoff to runout.
        3) BHP requirements from shutoff to runout.
        4) Specific speed
        5) Suction specific speed.
        6) Efficiency from shutoff to runout.
    d. Liquid to be used for all tests shall be water.

2. Certified copies of a report covering each test shall be prepared by the pump manufacturer and delivered to the Engineer not less than 10 days prior to shipment of the equipment from the factory. The report shall include data and test information as stipulated in the Hydraulic Institute Standards, copies of the original test logs, certified performance curves, and test to curve conversion equations.

3. Motor Requirements:

   a. Provide short commercial motor test per IEEE 115.
   b. Certified motor efficiency data shall be furnished with the reports.
   c. Refer to section 26 05 10 - Motors for additional requirements to those stated herein.

4. Prior to conducting a pump test, notification of such test and a list of test equipment and test procedures shall be forwarded to the Engineer at least ten working days before the scheduled test date. All electronic transducers, meter, gauges, and other test instruments shall have been calibrated in accordance with the requirements of the Hydraulic Institute Standards. Copies of calibration data shall be provided upon request.

5. If any pump tested fails to meet any specification requirement it will be modified until it meets all specification requirements. If any pump tested fails to meet the efficiency requirements at any of the listed flow or head conditions listed and all reasonable attempts to correct the inefficiency are unsuccessful, the pump(s) shall be replaced with unit(s) which meet the specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Box, crate, or otherwise completely enclose and protect all equipment during shipment, handling and storage.

B. Protect equipment from exposure to elements and keep all items thoroughly dry at all times.

C. Primed or Painted Surfaces: Protect against impact, abrasion, discoloration, and other damage.

D. Protect electrical equipment, controls, and insulation against moisture or water damage.

E. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

F. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.07 MAINTENANCE AND SERVICE

A. Manufacturer's authorized representative shall have his own full time repair service available on 24 hour call.

B. A factory serviceman and service vehicle equipped with tools to make all necessary repairs, as well as component parts required to maintain satisfactory operation of the equipment outlined in these specifications, shall be available if needed, without undue delay.

1.08 PAINTING AND IDENTIFICATION SYSTEMS

A. All material and equipment in this section shall be factory coated. Primer shall be compatible with finish coats of paint provided under Section 09 90 02.

B. Finish painting of all materials and equipment in this Section that are not concealed shall be as described in Section 09 90 02, unless specifically indicated. Pump motors and stainless steel components shall not be painted.

C. The supplier shall refinish or restore to original appearance, all equipment that has sustained damage to the manufacturer's finish and prime coats of paint or enamel.

1.09 EQUIPMENT NAMEPLATES

A. Provide stainless steel nameplates on all pumps and motors.

B. Include manufacturer, model number, capacity, total dynamic head, rpm, efficiency, and additional motor information required by NEMA.

1.10 WARRANTY

A. The pump manufacturer/supplier shall warrant the units being supplied to the Owner against defects in workmanship and materials for a period of two (2) years, from the date of final acceptance, under normal use, operation and service. The warranty shall be in printed form and apply to all similar units. No prorated warranty will be accepted. Pump removal, shipping and reinstallation will be covered under this warranty.

PRODUCTS

2.01 GENERAL

A. Accurately machine all rotating parts so as to provide dynamically balanced units.

B. Vibration in excess of the HI standards shall be sufficient cause for rejection of equipment.

C. Prevent resonance at normal operating speeds based on mass of unit and its operating speeds.

D. Constantly increasing head characteristics from design condition to shutoff head.

E. The pump shall be capable of operating without overloading electric motor or VFD drive.

F. All motor starting equipment, electric controls, and associated equipment shall be provided in Division 26.

2.02 MANUFACTURERS

A. As specified in Paragraph 3.03, Pump Schedule.

2.03 VERTICAL TURBINE SOLIDS HANDLING PUMPS

A. General

1. Service Conditions:

a. Pumps will be located as shown on the Drawings. The center ring of the oxidation ditch is the wet well and the vertical turbine solids handling pumps will be used to either recycle to outer ring of oxidation ditch or send to the oxidation ditch swing zone based on pump location. These pump units will be controlled by a level sensor in the wet well and/or headworks flow meter, and will operate at variable speeds (using variable frequency drives) to maintain internal recycle rates.

b. Manufacturer shall submit information detailing the pump and column design as sufficient in handling all hydraulic forces in the wetwell including, but not limited to, lateral forces caused by cross flows approaching 2 ft/s, lateral forces during drawdown of the Oxidation Ditch and a hydraulic jump on the pumps during the cleaning cycle.

2. Standard AWWA E103, standard for horizontal and vertical line shaft pumps and Hydraulic Institute Standards. Meet all requirements of this standard including the following supplementary provisions and modifications.

B. Materials:

1. Bowls: Cast iron conforming to ASTM A48 Class 30 MOD, free from blowholes, sand holes, and other faults.

2. Bowl Wear Ring: ASTM A743 CA40 material with a hardness range of 300-350 Bhn.

3. Lineshaft: Stainless steel, type 416 conforming to ASTM A582 S41600 with chrome plating at bearing area.

4. Impeller: One-piece cast iron conforming to ASTM A48, Class 30 cast-iron or Cast 316 Stainless Steel (CF8M)

5. Impeller Wear Ring: ASTM A743 CA40 material with a hardness range of 190-241 Brinell.

6. Shaft Bearings: Bronze, conforming to ASTM B505 C93200.

7. Column Pipe: Fabricated steel conforming to ASTM A120 and A283 GR.D.

8. Suction Bell: Cast iron conforming to ASTM A48 Class 30 MOD, free from blowholes, sand holes, and other faults.

9. Flow Splitters, Fillets, Anti-Rotation Baffle, Floor Vanes, and Hydrocones: Stainless steel, type 316L. Non-shrink grout to be used where indicated on the Construction Drawings.

10. Discharge Head: Fabricated steel conforming to ASTM A36 & A53

11. Mounting Plate: Material shall conform to ASTM A283 GR.D and ASTM A36.

12. Bolts and Fasteners: 3Stainless Steel.

13. Mechanical Seal: Chesterton 155 or approved equivalent.

14. Motor Coupler: Flanged spacer type.

C. Motor:

1. Motor shall be compatible with pump components in every respect.

2. Vertical solid shaft squirrel-cage induction type.

3. Motor manufacturer shall be ISO 9000 certified.

4. Electric motor shall be constructed to NEMA B standard.

5. Voltage and Phase: 460 volt, 3-phase, 60 hertz.

6. Motor shall be total enclosed fan cooled (TEFC) as specified in Division 26.

7. Windings shall be hermetically sealed to prevent water entry.

8. Service Factor: 1.15 when operated across the line; 1.00 when operated from a VFD; ensure motor operates without the use of the service factor at any point on pump capacity-head curve.

9. Factory tested per IEEE method B, dynamometer test. Motor testing procedure shall be in accordance with the American Standard Test Code for polyphase induction motors and generators, IEEE 112A. All motors shall be given routine test to determine that they are free from electrical or mechanical defects. The routine test shall, as a minimum, conform to MG1-12.51.

10. Provide no-reverse mechanism to protect line shaft and motor from reverse rotation.

11. Provide thrust bearing in driver to carry the weight of the revolving parts of the pump, including unbalanced hydraulic thrust of the pump. Provide

visual indication of lubricant level with easily accessible drain and fill ports.

12. Provide motor winding thermal switch overload protection with auto-reset; one thermal switch per phase winding; terminate all leads in easily accessible conduit box on motor enclosure; connect to VFD specified in Division 26.

13. Motor to be rated “Inverter-Duty Rated” and suitable for VFD service. Supply motor in conformance with NEMA MG1 Parts 30 and 31 and the requirements of Division 26.

14. Each motor shall be provided with an insulated or insulated/ceramic bearing on the non-drive end of the motor to complement the bearing protection (shaft grounding) ring to be installed on the drive end of the motor. The intent of this design is to eliminate circulating currents on larger motors.

15. Each motor shall include an appropriately-sized Aegis™ SGR bearing protection ring to eliminate circulating currents that could potentially damage the motor bearings. Coat motor shaft with Aegis™ “Colloidal Silver Shaft Coating” product, Part No. CS015 prior to the installation of the bearing protection ring. Confirm and coordinate the type of protection ring mounting (conductive epoxy, standard, split ring, bolt-thru, press-fit, etc.) best suited for the shaft/motor installation being furnished. Alternate bearing protection systems will be considered by Engineer at the request of the Contractor.

16. Each motor shall be of the “premium efficient” type and shall be provided with minimal nominal efficiencies as defined in the table in Section 26 05 10.

17. Provide oversized terminal box with terminal for connection of equipment grounding wire.

18. Provide stainless steel nameplate with the following information, at minimum:

    a. Manufacturer’s name, make, and serial number
    b. Type
    c. Voltage
    d. Frame
    e. Insulation
    f. Class
    g. HP
    h. Full load amps
    i. RPM

D. Discharge Head Assembly

1. ANSI 150 pound above base discharge flange.

2. Top of the head: machined register to fit the specified motor.

3. Sufficiently sized to carry the complete weight of the pump and motor and withstand all possible hydraulic loads that may be imposed on it by the system and transmit all loads to the foundation with minimum vibration.

4. The mounting face of the pump head shall be machined smooth.

5. Discharge head shall be specifically designed to elevate the discharge head natural frequency above the operating speed for use with variable frequency drive.

6. Discharge elbow shall be of the above grade three section mitred style and designed to prevent the collection of stringy material by the use of the splitter vane.

7. A two-piece top shaft shall be provided with a 304 stainless steel sleeve at the packing box.

8. Discharge head shall be provided with a packing box which shall connect to the shaft enclosing the tube with a threaded lineshaft bearing.

    a. The packing box shall be configured to accept commercially available mechanical seals.
    b. A suitable drain tap shall be provided for packing box leakage and a tapped connection shall be provided for installation of an air release valve.

9. A spacer coupling designed for vertical pump service shall be provided between each shaft motor and the pump shaft to permit easy removal of the mechanical seal. The coupling shall be flanged type, keyed to the shaft, and shall provide for vertical adjustment of the impeller with the motor in place.

10. Discharge head openings shall be fitted with guards to protect access to the rotating shaft and/or coupling.

E. Shaft Seal:

1. Cartridge style mechanical seal with adjustable four (4)-piece spacer coupling shall be provided in discharge head at terminus of lineshaft.

2. Material:

    a. Metal parts: 316 stainless steel.
    b. Seal faces shall be tungsten carbide or sintered silicon carbide.

c. Elastomer secondary seal.

F. Mounting Plates:

1. Manufacturer shall provide all supporting sole plates and fabricated steel base plates necessary to properly mount the equipment.

G. Bearing Protection System

1. A water flush assembly for flushing, lubricating, and cooling the bearings shall be connected to the stuffing box and consist of a pressure gauge, flow meter, pipe, solenoid valve, and fittings.

2. The bearings must be flushed for a minimum of five (5) minutes prior to pump start-up, continuously while in operation, and at least 15 minutes after stopping for proper lubrication.

3. The flow meter shall be of the type for 115 volt AC power supply with and on-state current of 0.02 – 1.0 amps.

H. Equipment Identification Plate: 16-gauge stainless steel with the following information at minimum:

1. Equipment number.

2. Manufacturer's model and serial number.

3. Rated capacity and discharge head.

4. Speed.

I. Column:

1. Maximum length of any column section: 15 feet, interchangeable.

2. Upper end of the column pipe flanged to the pump head.

3. Column Sections: Flanged.

4. Bottom column section: properly adapted to connect to the bowl assembly.

5. Column pipe shall contain a splitter vane to prevent trash material from accumulating on the shaft enclosing tube.

a. The splitter vane shall be securely welded in place and shall run the entire length of the column.
b. The splitter vane shall be aligned with a bowl diffusion vane and the discharge elbow splitter vane.

6. The use of "spider" type bearing retainers is not acceptable.

7. Align and support lineshaft bearings.

J. Line Shafting:

1. Shaft sizing shall conform to ANSI/AWWA E103, and shall be of sufficient size to prevent excessive elongation and transmit required torque without distortion in both forward and reverse direction.

2. Line shafting shall be furnished in interchangeable sections of not over eight (8) feet and shall be connected by threaded couplings.

3. Shaft shall be hard-chromed at the bowl bearings.

4. Maximum combined shear stress shall not exceed 30% of the elastic limit in tension or be more than 18% of the ultimate tensile strength of the shaft material.

5. Shaft shall have a first critical speed not less than 20% above maximum operating speed.

6. A two-piece headshaft and solid intermediate line shaft shall be provided.

7. Minimum of two line shaft bearings shall be provided.

8. Maximum spacing of bearing intervals shall be 5 feet.

9. Line shaft couplings shall be ASTM 582 416 stainless steel, left-hand threaded type with perfect butt-fit. Couplings shall be designed with safety factor equal to 1.5 times the shaft safety factor.

10. Shaft bearings shall be bronze, conforming to ASTM B505 C93200, and designed for potable water lubrication.

11. An enclosing tube shall be provided to house the lineshaft.

12. The enclosing tube shall be made of ASTM A53 or A120 schedule 80 pipe.

13. The enclosing tube shall be furnished in interchangeable sections not to exceed five (5) feet in length.

K. The ends of the enclosing tube shall be machined to receive connector bearings, Bowl Assembly and Suction Bell:

1. The suction bell shall be free of bearing hubs and supporting ribs or vanes to allow unobstructed flow to the impeller.

2. All casting connections shall be rabbet fitted.

3. Discharge bowls shall contain three symmetrically arranged diffusion vanes.

4. Bowl diffusion vanes shall be of a hydrofoil design with well-rounded leading edges to prevent the accumulation of fibrous and stringy material.

5. Upper and lower bronze-backed rubber bearings shall maintain alignment of the shaft through the bowl. The bowl shaft shall be 416 stainless steel with a chrome plating at the bearing area.

6. The impeller and bowl passageways and the clearance between the periphery of the maximum diameter impeller and bowl diffuser vanes shall be capable of passing a diameter sphere listed in Part 3.

7. A system to protect the bowl bearings must be provided. The protection system shall:

    a. Limit backflow of sand, grit, and other potentially destructive material during pump shutdown.
    b. Throttle or limit the amount of flush water used during pump operation.
    c. Lower bearings shall be protected by both a throttle ring and restrictor bushing.

8. Provide proper pressurization of the enclosing tube and bearing lubrication system. Interior of bowls shall be factory standard.

9. Each suction bell shall have a replaceable axial-type wear ring with side seal to prevent slippage.

    a. Material shall be ASTM A743 CA40 material with a hardness range of 410-484 Bhn.

10. Bolted flange connections shall be provided between bowls.

L. Impeller:

1. Enclosed solids handling design, statically and dynamically balanced.

2. Impellers shall contain a maximum of two vanes.

3. The impellers shall be of a hydrofoil design with well-rounded leading edges to prevent the accumulation of fibrous and stringy material.

4. The non-clog impellers shall be secured to the tapered shafts using a key and bolt.

5. Impellers shall be fitted with an axial type wear ring of ASTM A743 CA40 material with a hardness range of 300-350 Brinell.

6. Impellers shall be vertically adjustable using an adjustable spacer coupling accessible through the discharge head openings.

M. Spare Parts: Provide two (2) complete sets of the following spare parts, each set sufficient for servicing one pump:

1. One set of all gaskets and O-ring seals.

2. One complete set of line shaft bearings.

3. One set of wearing rings.

4. One set of shaft sleeves.

5. One set of set keys, dowels, or pins.

6. One complete mechanical seal.

7. One set of any special tools required to dismantle the pump.

N. Other Considerations:

1. Provide discharge head with lifting lugs capable of supporting weight of entire unit.

2. Entire unit shall be shipped in sections not to exceed ten (10) feet in length and supplied with instructions for field assembly.

3. Pump performances shall be stable and free from cavitation vibration and noise throughout the operating range.

4. Shop Painting:

a. All iron and steel parts which will be in contact with pumped liquid or submerged after installation, including the inside of the pump column and suction can and all exterior surfaces below the subbaseplate, shall be shop cleaned by blasting in accordance with the coating manufacturer's recommendations and painted with an appropriate epoxy coating system per AWWA C210 and Specification Section 09 90 02. The coating shall have a dry film thickness of at least 16 mils and shall consist of a prime (first) coat and one or more finish coats. At least 1 quart of finish coating shall be furnished with each pump for field touchup.

b. All steel surfaces shall be protected by suitable coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed and finished with a high-grade,

oil-resistant enamel and alkyd enamel system. Coatings shall be suitable for the environment where the equipment is installed.

c. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventative compound, Houghton, "Rust Veto 344", or equal.

EXECUTION

3.01 FIELD QUALITY CONTROL

A. Provide services of an experienced, competent, and authorized representative of manufacturer or supplier and equipment to visit site of Work and inspect, check, adjust if necessary, and approve equipment installation in accordance with Section 01 45 00. For each pump system, be present on site for minimum trips as described below, travel time excluded:

1. One 8-hour day for installation and inspection.

2. Two 8-hour days for functional and performance testing, vibration testing, and completion of Manufacturer's Certificate of Proper Installation and operator training.

3. One 8-hour day for follow-up inspection, adjustments, warranty work, and training. This includes second vibration test towards end of warranty period.

B. Equipment supplier's representative shall be present when equipment is placed in operation.

C. Equipment supplier's representative shall revisit the job site as often as necessary until all problems are corrected and equipment installation and operation are satisfactory in the opinion of Engineer.

D. Equipment supplier shall furnish to Owner, through Engineer, a written report prepared by equipment supplier certifying that equipment:

1. Has been properly installed and lubricated.

2. Is in accurate alignment.

3. Is free from an undue stress imposed by connecting piping or anchor bolts.

4. Has been operated under full load conditions and that it operates satisfactorily.

3.02 FIELD TESTS

A. Operation Testing:

1. After initial startup under the supervision of qualified representative of the pump manufacturer, a preliminary running-in period will be provided for the Contractor to make field tests and necessary adjustments.

2. In the presence of the Engineer such tests as necessary to indicate that the pumps and motors conform to the operating conditions specified shall be performed. A 30-day operating period of the pumps will be required before acceptance. If a pump performance does not meet the specified requirements, corrective measures shall be taken.

3. All tests shall be performed in accordance with the Hydraulic Institute Test Standards and ANSI/AWWA E103. Certified results of tests shall be submitted.

4. Written test procedures shall be submitted to the Engineer for approval 30 days prior to testing.

5. All pump operating settings, alarms, controls, and shutdown devices shall be calibrated and tested during the field tests.

6. The Contractor shall furnish all power, water, facilities, labor, materials, supplies and test instruments required to conduct field test. This includes providing, calibrating, and installing all temporary gauges and meters, making necessary tapped holes in the pipes, and installing all temporary piping and wiring required for the field acceptance tests.

7. Monitor bearing and motor temperatures during all tests and correct overheating if necessary.

B. Vibration Testing

1. Each pump included in this section shall be tested after installation for acceptable vibration levels.

    a. Field vibration acceptance testing shall be conducted to ensure that the equipment meets the vibration limits specified by the Hydraulic Institute. A testing laboratory retained by the Contractor and approved by the Engineer shall conduct the vibration acceptance testing. The testing laboratory shall provide a certified vibration analysis specialist to conduct the testing and shall submit certification credentials. Vibration testing shall be performed on each pumping unit after the equipment has been installed, grouted, aligned, and inspected and certified by the manufacturer's field service representative as being ready for continuous service. The Contractor shall provide written notification to Owner, Engineer, and equipment manufacturer's field service representative when each item of equipment subject to vibration acceptance testing is ready for testing. Owner,

Engineer, and manufacturer's field service representative shall reserve the right to be present during the tests.

b. A resonance bump test shall be performed after the equipment is installed to determine the resonant frequencies of the installed unit. A coast-down and a startup test shall be performed on the coupled equipment to determine machine critical speeds and resonance zones.

c. With the exception of the resonance bump test and the startup test, vibration tests shall be performed after the equipment has run loaded for at least 60 minutes and has reached a stable operating temperature.

d. Each pumping unit shall be tested separately, without duplicate equipment running.

e. Tests shall be conducted under various loading conditions as determined by the Engineer.

f. A bump test will be performed on each pump/motor assembly to identify its natural frequency in the field. The VFD's shall be programmed to skip this frequency during normal operations to prevent premature system deterioration.

g. Rotating equipment shall be tested for vibration in the field after installation by the following method. Equipment, complete with drive systems in place at the job Site, shall not vibrate more than the values allowed by the Hydraulic Institute. All field tests shall be running test, with the equipment operating on the product for which it is intended. The term displacement as used herein, shall mean total peak-to-peak movement of vibrating equipment, in mils; velocity or speed of the vibration cycle, measured in inches per second; and acceleration measured in G's. Vibration shall be measured by suitable equipment equal to IRD Mechanalysis, Schenk Trebel, or Bently Nevada with hard copy printout capabilities. A vibration probe appropriate for the application shall be used. The data shall be collected in the three major planes and shall be measured in units of velocity (inches per second).

h. The frequency range shall include high frequency data from 0-6000 Hz, high-resolution data form 0-200 Hz, standard motor resolution data from 0-65X run speed, and standard pump resolution data from 30X run speed. Report shall summarize findings and recommended solution. If system requires balancing, this shall be completed and the system re-tested after balancing.

i. Frequency of vibration in cycles per minute (cpm), shall be determined when vibration exceeds specified levels or as otherwise necessary. Vibration shall be measured at locations per HI standards, unless measurements at other locations are deemed necessary by the vibration analyst and the Engineer.

j. The Contractor shall submit a vibration test report following each test. The test report shall include a summary of the vibration readings in all three planes. Paper printouts shall be submitted. Resonance bump test results, startup and coast-down results, and uncoupled motor vibrations test results, if performed, shall be

included. The Engineer shall be furnished with four certified copies of vibration test data for each test performed.

k. Vibration shall be checked in the radial and axial directions. Coupled vibration shall not exceed the limits specified by the Hydraulic Institute.

l. Uncoupled motor vibration tests need not be performed unless the coupled equipment does not meet the specified vibration limit and excessive motor vibration is suspected. Uncoupled motor vibration shall not exceed the following limits:
   1) Overall vibration limit, in./sec. 0.05
   2) At rated speed, in./sec. 0.04
   3) At twice rated speed, in./sec. 0.02
   4) At any harmonic speed, in./esc. 0.02

m. All rotating assemblies shall be statically and dynamically balanced. The dynamic balance data must be certified and results submitted to the Engineer.

n. Critical speeds of all rotating equipment shall meet the requirements specified by the Hydraulic Institute.

o. The Contractor shall be responsible for unit and system assembly vibration testing and their results, which shall be within the specified limits. Copies of test results shall be submitted to the Engineer for review. Should the vibration field test results exceed shop test results or the limits specified, the contractor shall correct the deficiencies within 30 days. After corrections have been completed, the vibration testing shall be repeated and the results resubmitted to the Engineer for review. Corrections shall continue to be made and tests repeated until satisfactory operation is demonstrated and vibration meets specified limits.

p. Noise and vibration in any rotating equipment, which the Engineer judges to be excessive or damaging, shall be cause for rejection.

q. An additional monitoring event and report shall be provided near the end of the warranty period. The second analysis will compare the initial baseline data against the second measurements. If significant growth or change is present in the results, and the data indicates that any system components are wearing at a faster rate than the specified bearing lives, then the bearings(s) shall be replaced prior to termination of the warranty.

3.03 PUMP SCHEDULE

A. Oxidation Ditch Effluent and Recycle Pumps

1. Type: Vertical Turbine Solids Handling Pump.

2. Quantity: Three (3).

3. Unit Designations:

   a. IRSW-P1
   b. IRSW-P2
   c. IRSW-P3

4. Acceptable Manufacturer:

    a. Hydroflo Pumps
    b. Fairbanks Morse .
    c. Goulds Pump
    d. American Marsh
    e. Approved Equivalent.

5. Maximum (nominal) pump operating 720 rpm

SPEED AT RATED HEAD

1. Minimum Shut-Off Head: 7.6 feet

2. Primary Operating Point: 5250 gpm at 12 ft TDH, 76% min efficiency.

3. Maximum number of bowls: 1

4. Column Height, feet: Refer to Drawings.

5. Column Size, inch 18

6. Floor Vanes and Hydrocone: Design and size by pump manufacturer and in accordance with Hydraulic Institute Standards.

7. Pump discharge size, inch 18

8. Suction bell size, inch 26

9. Minimum Passing Sphere Size, inch 3.3

10. Inverter Duty Motor:

    a. Nameplate horsepower: 50 hp or less
    b. Speed: Variable via VFD specified in Division 26.
    c. Frame: 405VP
    d. Phase, Voltage, Frequency: 3 phase, 480 volt, 60 Hz.
    e. Service Factor: 1.15 when operated across the line; 1.00 when operated from a VFD.
    f. Enclosure: TEFC.

END OF SECTION 43 23 31

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SECTION 46 05 01
WASTEWATER EQUIPMENT GENERAL PROVISIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. General provisions for wastewater equipment:

a. Motors
b. Gear Reducers
c. Guards
d. Shear Pins
e. Flexible Shaft Couplings
f. Enclosures
g. Anchor Bolts and Fasteners
h. Factory Surface Preparation and Painting

B. Related Sections Include:

1. Section 01 33 00 - Submittal Procedures

2. Section 016100 - Common Product Requirements

3. Section 01 75 00 - Starting and Adjusting

4. Section 01 77 00 - Closeout Procedures

5. Section 01 78 23 - Operation and Maintenance Data

6. Division 26 – Electrical

1.02 REFERENCES

A. The following references, in their latest revision, form part of this specification. To the extent specified, the requirements of this specification prevail in case of conflict.

B. Hydraulic Institute

1. Standards for Centrifugal, Rotary and Reciprocating Pumps – Test Code.

C. American Society for Testing and Materials (ASTM)

D. American Gear Manufacturers Association (AGMA)

E. American Institute of Steel Construction (AISC)

F. American Welding Society (AWS)

G. Steel Structures Painting Council (SSPC)

H. American Society of Civil Engineers (ASCE)

I. NFPA 820: Comply with most current edition of National Fire Protection Association Standard for Fire Protection in Wastewater Treatment and Collection Facilities for electrical equipment installed within borders indicated on the Drawings.

J. National Electric Code (NEC-501)

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit detailed specifications, drawings and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for each complete operational system.

B. Operations and Maintenance Data: Submit on all parts, devices, equipment, and other accessories forming the complete operational system.

C. Shop drawings for all items of mechanical and electrical equipment specified in Division 46, including accessory items, shall be submitted for approval.

D. Shop drawings shall be specific to this project with inappropriate information clearly removed. Each shop drawing shall clearly indicate the specific piece of equipment being referenced. Each shop drawing shall clearly indicate the specific system being referenced.

E. Preliminary characteristics performance curves for all process pumps shall be submitted with associated shop drawings. Performance curves shall include operating head, brake horsepower and efficiency, plotted against pump capacity, as a minimum.

F. Certified performance curves for all specific process pumps shall be approved by Engineer prior to shipping pumps. Certified curves shall include specific pump serial numbers.

G. Manufacturer’s preliminary operation and maintenance manuals for specific pieces of equipment shall be submitted with shop drawings. Shop drawings will not be reviewed until preliminary operation and maintenance manuals are submitted for review.

H. After equipment installation, and before acceptance of equipment, submit final instruction manual containing complete information with respect to assembly, operation, maintenance, repair, and adjustment of all equipment. Manuals shall be submitted to Engineer for transmittal to Owner.

1.04 PROJECT RECORD DRAWINGS

A. Changes from original project drawings and specifications shall be compiled by CMGC and submitted to Engineer. Changes shall be clearly indicated through drawings and the written word.

1.05 QUALITY ASSURANCE

A. The Contract Documents represent the minimum acceptable standards for the equipment in Division 46. Standard manufacturer products shall be redesigned and modified from standard mode, if necessary, or provided with special features, accessories, materials, or finishes as may be necessary to conform to the requirements of the specifications and the drawings.

B. All furnished equipment and systems shall conform completely to the requirements of specific drawings and specifications.

C. Steel design and fabrication shall conform to the standard practices of the American Institute of Steel Construction (AISC).

D. Equipment and systems shall be suitable for mounting on level concrete surfaces with all live and dead loads transmitted within the limits of the concrete specified.

E. Each piece of equipment furnished shall have a standard nameplate securely attached in an easily viewed location showing the name of the manufacturer and the serial number of the specific unit. The nameplate shall also provide the rated capacity of the unit at specified conditions. Motor nameplates shall show the horsepower, speed and electric current characteristics of each specific motor. The nameplate of distributors is not acceptable.

F. Drawings and specifications are complimentary and what is called for in either one shall be binding as if called for in both.

G. For locations indicated on plan drawings, CMGC shall follow the requirements called out in NFPA 820 regarding NEC-501.

1.06 QUALIFICATIONS

A. Unless otherwise specified in individual specification sections, the following minimum requirements shall apply to all products specified in Division 46:

1. No equipment shall be supplied by any manufacturer not regularly engaged in the manufacturing and production of equipment designed for use in wastewater treatment.

2. The manufacturer must have installed and had in satisfactory use for a period of not less then five (5) years a minimum of five (5) installations having similar size and type of equipment as compared to the units specified.

3. Experience information shall be furnished with shop drawings. The term “installations” shall mean individual projects/contracts. Multiple equipment units for a project will be considered as one (1) installation toward meeting the experience requirements. Installations shall be only in the

United States (fifty states). Information shall include, but not limited to, the following:

a. Name and location of installation.
b. Name of person in direct responsible charge for the equipment.
c. Address and phone number of person in direct responsible charge.
d. Month and year the equipment was placed in operation.
e. Brief description of equipment.

B. Equipment manufacturer's not listed in the individual specification sections of Division 40, 43, and 46, and wishing to be considered, must follow the procedures indicated in Section 00 21 13 - Instructions to Bidders during Bid Period; Section 00 72 00 - Standard General Conditions (7.04 and 7.05) after Bid Period and Award, and During construction.

1.07 PROJECT CONDITIONS

A. CMGC shall be responsible for verifying any dimensions of existing or proposed structures, piping, or equipment required for the proper fabrication and installation of all new equipment and the necessary connections.

B. Discrepancies found before or after the work has started, shall be immediately brought to the attention of the Engineer. Engineer reserves the right to require minor changes in the work of the CMGC to eliminate such discrepancies.

C. Prior to roughing in any facilities, or installing any equipment, CMGC shall consult all drawings (general, structural, process, mechanical, electrical, and etc.) and shall inform himself of structural members, ceilings, pipes, ducts, materials, finishes, and etc., which may affect the installation.

D. CMGC shall examine all substrata, openings and conditions under which materials and equipment are to be installed. CMGC shall not proceed with work until unsatisfactory conditions are corrected.

E. Drawings indicate the size and general arrangement of all equipment and piping. The final exact location and dimensions will be determined by the actual equipment furnished.

F. CMGC shall determine and be responsible for the proper location and character of all sleeves, chases, inserts, hangers, anchor bolts, openings, and etc. in the construction for mechanical and process equipment and piping installation. CMGC shall be responsible to have anchorage items delivered to the project site in ample time to prevent a delay in associated work.

1.08 DELIVERY, STORAGE AND HANDLING

A. Box, crate, or otherwise completely enclose and protect all equipment during shipment, handling, and storage in accordance with Section 0016100 - Common Product Requirements.

B. Protect equipment from exposure to elements and keep all items thoroughly dry at all times.

C. Primed or Painted Surfaces: Protect against impact, abrasion, discoloration, and other damage. Factory finished coatings damaged during shipment, unloading, and original storage will be the responsibility of the Seller. Factory finished coatings damaged during long term storage, assembly, and installation will be the responsibility of the Installation Contractor. Responsible party will be expected to repair damaged coatings per manufacturer's recommendations at no additional cost to the Owner.

D. Protect electrical equipment, controls, and insulation against moisture or water damage.

E. Store pumps, motors, and electrical equipment in weather tight areas and maintain temperature of 50°F minimum.

F. Rotating equipment in storage shall be rotated by hand weekly to protect the life of new bearings.

1.09 MAINTENANCE AND SERVICE

A. If not indicated in individual specification sections, Manufacturer's authorized representative shall provide a minimum of four (4) hours for on site field calibration, startup, and training services for each specific piece of equipment.

B. A factory serviceman and service vehicle equipped with tools to make all necessary repairs, as well as component parts required to maintain satisfactory operation of the equipment outlined in these Specifications, shall be available if needed, without undue delay.

C. Manufacturer's authorized representative shall provide a start-up report, to be included in the submittal of the final Operations and Maintenance Manuals, documenting site visit, start-up, and installation and/or operational recommendations made during start-up.

1.10 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

1.11 WARRANTY

A. Unless otherwise noted a written manufacturer's warranty shall be provided for the equipment specified. The warranty shall be for a minimum period of one (1) year from Final Acceptance. Such warranty shall cover all defects or failures of

materials or workmanship that occur as the result of normal operation and service. Special warranty (guarantee) on individual pieces of equipment may also be called out in individual specification sections and shall take precedence.

B. Guarantee all equipment against:

1. Faulty or inadequate design.

2. Defective construction or materials.

3. Improper assembly.

4. Leakage, breakage, or other failure.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials shall be new, undamaged and conform to the latest standards listed.

2.02 MOTORS

A. Motors are specified in Division 26.

B. Motors shall be selected to meet Seller's process treatment requirements, as supported by process design calculations.

2.03 GEAR REDUCERS

A. Unless specified otherwise, all gear reducers shall be horizontal straight-line concentric type with heat treated alloy steel precision cut helical gearing. AGMA rating plates shall be attached to the gear housing. All gearing shall comply with the requirements of the AGMA. All gearing will be provided with a 1.5 service factor for continuous operation.

B. Unless specified otherwise, all shafts shall be of high carbon steel forgings turned and grounded to size. All gearing shall be lubricated by revolving through an oil reservoir. Lubrication shall be adequate to provide both lubrication and cooling. Shafts shall be mounted on anti-friction bearings. All shafts shall be provided with oil seals. Housings shall protect against dust and moisture intrusion. Housings shall be provided with an easy means of filling, draining, and checking oil levels.

C. Unless specified otherwise, drive motors shall be separate from the gear reducer. Motor shaft shall be connected to the gear reducer with a shear pin or torque overload coupling to protect against overload.

2.04 GUARDS

A. All rotating shafts, couplings, and belts shall be covered by an OSHA approved, and substantial, removable sheet metal or expanded metal guard or screen.

2.05 SHEAR PINS

A. Unless specified otherwise, shear pins shall be fabricated of 2017T4 aluminum, cold-headed rod, conforming to the standards set forth in ASTM B316-90.

B. Furnish pins that are 0.0002 inch oversized, and of constant diameter. Pins shall not be necked down in any way. Hubs or bushings shall be furnished to ensure that larger pins cannot be installed.

C. Pins shall have a Brinell hardness of at least 300 when tested with a 500 kg load and 10mm ball.

D. One end of the pin shall be chamfered and the other end provided with a radius to form a crown.

2.06 FLEXIBLE SHAFT COUPLINGS

A. Unless specified otherwise, flexible shaft couplings for connection of motor and equipment drive shafts shall be of the non-metallic flexible member type. Flexible element shall be of reinforced rubber tire type held in place by twin flanges. No lubrication shall be required. Coupling shall eliminate metal to metal contact between driver and driven shafts in the coupling. Coupling shall act to cushion shock loads.

B. Coupling design shall allow for replacement of flexible element without moving either driver or driven equipment.

C. Couplings shall accommodate angular misalignment up to 4 degrees, parallel misalignment of up to 1/8 inch, and end float of up to 5/16 of an inch, either singularly or in any combination.

2.07 ENCLOSURES

A. Unless specified otherwise, control devices appurtenant to major equipment shall be provided with dust and moisture tight enclosures.

B. Unless specified otherwise, electrical conduit connections shall be of the threaded type.

2.08 ANCHOR BOLTS AND FASTENERS

A. Equipment manufacturer shall furnish all anchor bolts of proper size and strength to securely anchor each piece of equipment. Anchor bolts and fasteners shall be set by template and protected from misalignment by CMGC. Equipment shall be leveled, shimmed, bolted down, and grouted in place with a non-shrinking type grout. Unless specified otherwise on the drawings or in individual specification sections, anchor bolts, and fasteners shall be 304 stainless steel. Anchor bolts shall be of the embedded, headed, type. Expansion type, and adhesive type, anchors will not be acceptable.

2.09 FACTORY SURFACE PREPARATION AND PAINTING

A. Thoroughly clean, fill and smooth surfaces, as necessary, to provide a smooth and uniform base for applying coatings.

B. Permanently protect surfaces which will not be accessible after assembly or installation of equipment.

C. Protect all steel and iron surfaces by applying proper factory coatings and finishes.

D. Provide a protective coating to surfaces that are to be painted after installation. Protective coatings are to be compatible with coating systems specified in Section 09 96 00 - High Performance Coatings.

E. Provide an oil resistant factory finish on electric motors, speed reducers, starters, and other self contained or enclosed components which is compatible with the coating systems specified in Division 09.

F. Apply a rust prohibiting compound on all machined, polished, and ferrous surfaces which are not to be painted.

PART 3 EXECUTION

3.01 FACTORY TESTS

A. All process equipment will be subjected to factory testing as specified in individual specification sections, and in accordance with the overall testing requirements specified in Division 01.

B. Process equipment which does not pass testing requirements shall be replaced with equipment which does meet the specified requirements.

C. Factory testing of all pumping equipment shall be in accordance with Hydraulic Institute Standards.

D. Certified factory performance test curves for each pump shall be furnished to Engineer, and approved by Engineer, before shipment of the pump to the construction site. Certified test curves shall cover the full operating range, from shut off, to maximum capacity.

3.02 INSPECTION

A. CMGC shall inspect all equipment as it is delivered to ascertain if the equipment has arrived at the project site in a damaged condition, and to determine if any parts are missing.

B. CMGC is responsible to repair or replace damaged items in accordance with manufacturer’s instructions, and Engineer’s approval.

3.03 FIELD PREPARATION AND PAINTING

A. Immediately following receipt of equipment at the construction site, CMGC shall touch up paint damaged in shipping with paint supplied by the equipment manufacturer. Touch up paint shall be compatible with coating systems specified in Division 09.

B. Unless specified otherwise, finish field preparation and painting shall be in accordance with specification Division 09.

C. Prior to assembly, all stainless steel bolts, nuts, and fastener threads shall be coated with a non-seizing compound.

3.04 INSTALLATION

A. Furnish and install all equipment as shown on the drawings in accordance with manufacturer’s recommendations, to provide for a complete and operational system.

B. CMGC shall make appropriate allowance in his bid for the fact that the Owner must continue to operate the wastewater treatment facility to meet NPDES effluent standards. CMGC's activities at the site must be coordinated to meet this requirement.

C. Connections to existing plant piping and processes, modifications to existing plant piping and processes, and relocation of existing piping and processes required for proper installation of new equipment shall be performed on a continual basis, and coordinated with Owner and Engineer, to minimize shut down time of wastewater treatment facilities.

D. Coordinate with other trades to minimize interferences in the installation of work, and to minimize delays.

E. CMGC shall provide all necessary scaffolding for installation of this work in conformance with the standards of any local, state, and federal codes applying to scaffolding.

F. Oil and grease required for initial operations, and acceptable to the equipment manufacturer, shall be provided by the CMGC.

3.05 FIELD TESTING

A. Field testing shall be performed in accordance with individual specification sections, and in accordance with the requirements of Division 01.

B. Excessive equipment vibration shall be cause for rejection of the equipment.

C. Motors shall be field checked for compliance with current limitations indicated in Division 26.

3.06 START-UP AND ADJUSTMENT

A. The equipment manufacturer shall inspect the completed installation and make all necessary adjustments and corrections prior to equipment start-up.

1. Check equipment clearances.
2. Remove debris from in and around equipment.
3. Check for proper lubrication.
4. Check for ease of rotation of rotating equipment. Check direction of rotation.
5. Check for proper valve positions.
6. Check for alignment of all parts.
7. Check that all nuts and fasteners are adequately torqued.

B. Following start-up authorization by Engineer, the equipment manufacturer shall supervise the actual starting of the equipment. The equipment manufacturer shall make all final adjustments of the operating equipment, and shall provide written certification that the equipment is properly installed, adjusted, and operating properly.

1. Check safety equipment.
2. Check lubrication systems, and lubricant usage.
3. Check temperatures of bearings and seals.
4. Check motor loads.
5. Check that the system is operating under all design conditions.
6. Check for excessive vibration.
7. Check for excessive noise.
8. Optimize system operation.
9. Provide initial operation instruction to Owner.

C. See Section 01 75 00 - Starting and Adjusting for additional requirements.

3.07 WRITTEN REPORT (CERTIFICATION)

A. CMGC shall provide manufacturer’s written certification to Engineer for approval, and transmittal to Owner. Manufacturer shall certify that the equipment:

1. Is properly installed.

2. Is properly lubricated.

3. Is properly and accurately aligned.

4. Has been operated at all design load conditions, and is operating satisfactorily.

5. Is free from stress caused by connecting pipes and other attachments.

B. Final acceptance of equipment will not be provided until written certification is provided and approved by Engineer.

3.08 OPERATOR TRAINING

A. The manufacturer shall provide the minimum hours of operator training on the proper use and maintenance of the equipment, as specified in individual specification sections.

B. Time of operator training shall be coordinated and agreeable to Owner and Engineer.

C. Operator training hours may not be consecutive.

D. Operator training will usually take place after start-up.

3.09 SPARE PARTS

A. All spare parts shall be new and identical to the original equipment. Spare parts shall be packaged in individual boxes suitable for long term storage. Spare parts required shall be as listed in the individual specifications sections.

B. CMGC shall provide the Owner with all spare parts called for in individual specification sections. Spare parts shall be provided to the Owner at the wastewater treatment plant site.

END OF SECTION 46 05 01

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SECTION 46 41 00

EXISTING AERATION EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.
   a. Two (2) Existing Aire-O2 Triton 2.0 Aerators
   b. Part replacement for existing Aire-O2 Triton 2.0 Aerators

B. Related Sections Include:

1. Section 01 61 00 – Common Product Requirements
2. Section 01 75 00 – Starting and Adjusting
3. Section 01 78 23 – Operations and Maintenance Data
4. Section 01 79 00 – Demonstration and Testing
5. Section 40 05 97 - Identification for Process Equipment

1.02 SUBMITTALS

A. Shop Drawings and Product Data shall be submitted in accordance with specification Section 01 33 00 and shall include detailed specifications, drawings, and data covering all materials, parts, devices, equipment, and other accessories forming part of the equipment for the complete operational system.

B. Operations and Maintenance Data shall be submitted in accordance with specification Section 01 78 23.

1.03 QUALITY ASSURANCE

A. The equipment and material to be furnished under this Contract shall be in accordance with Section 01 45 00 Quality Controls and Section 01 61 00 Common Product Requirements.

1.04 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

1.05 WARRANTY REQUIREMENTS

A. A written warranty shall be provided for the equipment specified in this Section. The warranty shall be for a minimum period identified herein and shall begin from the date of

Final Completion, as defined in Section 01 77 00. Such warranty shall cover all defects or failures of materials or workmanship that occur as the result of normal operation and service. No prorated warranty will be accepted.

1. Contractor's Warranty: One (1) Year.
2. Manufacturer's Warranty: Minimum of one (1) year but not less than manufacturer's standard warranty period.

PART 2 PRODUCTS

2.01 AIRE-O2 TRITON 2.0 AERATORS

A. The Aerators shall be designed to sit on manufacturer supplied support structure.

B. The element design shall be capable of both initiating and completing the mixing at the outlet of the static mixer to a coefficient of variation less than 0.05 for the flow range of 2 to 5 MGD.

C. The mixing elements shall be compatible with the chemicals to be dosed at the maximum concentration to be in contact with the mixer and shall be of type 316 stainless steel construction. Chemicals include ferric chloride, polymer, chlorine, sulfuric acid, and/or power activated carbon

2.02 DESIGN REQUIREMENTS

A. The static mixer shall be capable of efficiently processing the full range of flow from 2 to 5 MGD.

2.03 APPROVED MANUFACTURERS

A. Aeration Industries International LLC., 4100 Peavy Rd, Chaska MN 55138 USA. 1-952-448-6789, aii@aireao2.com

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all equipment per the manufacturer's recommendations.

B. System to be installed complete with all necessary connections, valves, pipes, fittings, and tubing.

C. Contractor shall be responsible for pipe, tubing, and fittings.

END OF SECTION 46 41 00

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Accepting the Eagle Mountain City Fiscal Year 2025 Audited Financial Statements.
ITEM TYPE:	Resolution
FISCAL IMPACT:	N/A
APPLICANT:	N/A

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING
No

PREPARED BY
Kimberly Ruesch, Finance Director

PRESENTED BY

RECOMMENDATION:
N/A

BACKGROUND:
Utah law requires the City to obtain an annual independent audit of its financial records and accounts.

The City's financial statements for the fiscal year ending June 30, 2025, were audited by Gilbert and Stewart a certified public accounting firm, in accordance with generally accepted auditing standards and applicable governmental auditing standards.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Resolution

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, ACCEPTING THE FISCAL YEAR 2025 AUDITED FINANCIAL STATEMENTS

PREAMBLE

WHEREAS, Eagle Mountain City ("City") is a municipal corporation organized and existing under the laws of the State of Utah;

WHEREAS, Utah law requires the City to obtain an annual independent audit of its financial records and accounts; and

WHEREAS, the City's financial statements for the fiscal year ending June 30, 2025 were audited by an independent public accounting firm in accordance with generally accepted auditing standards and applicable governmental auditing standards; and

WHEREAS, the independent auditors have completed their audit and presented the audited financial statements and auditor's reports to the Eagle Mountain City Council.

NOW, THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City, Utah:

1. The City Council hereby accepts the audited financial statements and related independent auditor reports for the fiscal year ending June 30, 2025.

2. The City Recorder, and other appropriate City officials are authorized and directed to file, distribute, and submit the audited financial statements and audit reports as required by Utah law and applicable regulatory requirements.

3. This Resolution shall become effective immediately upon its passing.

PASSED AND APPROVED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	ORDINANCE/PUBLIC HEARING - An Ordinance of Eagle Mountain City, Utah, Amending the Eagle Mountain Municipal Code 16.20.040 (Preliminary Plats) regarding Street Names.
ITEM TYPE:	Development Code Amendment
FISCAL IMPACT:	N/A
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING
Yes

PREPARED BY
David Stroud, Senior Planner

PRESENTED BY
David Stroud

RECOMMENDATION:
Staff recommends the City Council adopt an Ordinance of Eagle Mountain City, Utah, Amending the Eagle Mountain Municipal Code 16.20.040 (Preliminary Plats) regarding Street Names.

BACKGROUND:
A preliminary plat under review by Staff contained a road name change once it crossed another road. Because this can affect public wayfinding and emergency response, Staff proposes a code change to prohibit the changing of street names at intersections. In most instances, this will also prevent the installation of a second street sign. Fire has stated they prefer that road names do not change when intersecting a street.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
The Planning Commission recommends the City Council approve the proposed changes.

ATTACHMENTS:
1. Ordinance
2. Redlines
3. Presentation

ORDINANCE NO. O- -2026

AN ORDINANCE OF EAGLE MOUNTAIN CITY, UTAH, AMENDING THE EAGLE MOUNTAIN MUNICIPAL CODE SECTION 16.20.040 (PRELIMINARY PLATS) REGARDING STREET NAMES

PREAMBLE

WHEREAS the City Council of Eagle Mountain City finds that it is in the public interest to amend the Eagle Mountain Municipal Code Section 16.20.040 (Preliminary Plats) regarding street names, as described in Exhibit A.

NOW, THEREFORE, BE IT ORDAINED by the City Council of Eagle Mountain City, Utah as follows:

1. The City Council finds that all required notices, public hearings, and other requirements have been completed for the City Council to consider an amendment to the Eagle Mountain Municipal Code Section 16.20.040 (Preliminary Plats) regarding street names, as described in Exhibit A.

2. Section 16.20.040 of the Eagle Mountain Municipal Code is hereby amended as set forth in Exhibit A, attached hereto and incorporated herein by this reference.

3. The City Council has considered the impact of this Ordinance on and found it consistent with family health, stability, and formation as required by Utah law.

4. This Ordinance shall become effective immediately upon its passing.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above ordinance was adopted by the City Council of Eagle Mountain City on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Posted on _____ by _____.

Exhibit A

16.20.040 Application.

Only property owners or their duly authorized agents shall make application for a preliminary plat. All applications shall be filed on forms prepared by the planning director. No preliminary plat application shall be processed without the submission of the completed application and all supporting materials as required by this chapter, including the processing fee. Incomplete applications shall not be processed under any circumstance.

A. Supporting Materials. The preliminary plat application shall be submitted with the materials listed below. However, the planning commission or city council may require additional supporting materials, if necessary, to demonstrate that the proposed development complies with this title and EMMC Title 17. The number of hard copies and electronic copies, as well as the appropriate format of each, will be determined by the planning director.

1. Preliminary Plat. A preliminary plat drawing will be required which shows accurate alignments, boundaries and monuments as certified by a land surveyor registered in Utah. Preliminary plats shall be prepared at a scale no smaller than one inch equals 100 feet. Plats of large areas may be prepared on multiple, serially numbered sheets with match lines and an index map. The vicinity and index maps shall appear on the first of the serially numbered sheets. The following data shall be included on the preliminary plat:

a. A title block showing the name of the proposed development and its location by lot, block, and subdivision, or quarter-quarter section, section, township, range, principal meridian, county, and state;

b. The name and address of a registered engineer licensed in the state of Utah who prepared the plat, together with a professional registration number;

c. A north point and scale, including both graphic and written scales;

d. The exterior boundaries of the proposed development;

e. The location, nature, and boundaries of existing public streets and public or private easements in or adjacent to the proposed development, and the county entry number book and page number referencinges to the instruments establishing the easements;

f. A vicinity map that locates the proposed development within the city and its subdivision or section showing major streets, landmarks, and boundaries and recorded names of adjacent or nearby subdivisions;

g. Existing contours at two-foot intervals. Elevations will be based on National Geodetic Survey area level data;

h. The layout of streets, their proposed names and grades. Plats shall not contain lots fronting onto arterial or collector streets. Proposed streets must provide connectivity to adjacent properties under other ownership if within 200 feet;

i. Street names shall continue when crossing a right-of-way and shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address; shall not cause confusion such as East Aster (E Aster, Easter); and shall not be a separately spelled name already in use such as Jeffrey Way and Goeffrey Way.

ij. The location, exterior dimensions to the nearest foot, and number of proposed lots and blocks, or other parcels to be created by the proposed development;

jk. The acreage of each proposed lot or parcel, and a table showing the total number of lots, total acreage of the area proposed for development, the total buildable acreage (excluding slopes greater than 25 percent, major utility corridors, and natural washes), the total acreage in lots, the average lot size, the total acreage in streets, and the total acreage of neighborhood parks, neighborhood squares, and other parcels proposed for dedication to public use or to be held in common by the owners;

PHASE A – PLAT 16 CALCULATIONS	
TOTAL ACREAGE:	25.46 ACRES
BUILDABLE ACREAGE:	25.46 ACRES
TOTAL ACREAGE IN LOTS:	17.98 ACRES
PUBLIC RIGHT-OF-WAY:	5.48 ACRES
PAVED ROADWAY AREA WITHIN R.O.W.	3.11 ACRES
TOTAL OPEN SPACE:	2.01 ACRES
TOTAL IMPROVED OPEN SPACE:	2.01 ACRES
AVERAGE LOT SIZE:	6,419 SF/0.15 ACRES
LARGEST LOT SIZE:	15,935 SF/0.37 ACRES
SMALLEST LOT SIZE:	4,400 SF/0.10 ACRES
OVERALL DENSITY:	4.79 LOTS/ACRE
TOTAL # OF LOTS:	122 LOTS

kl. The location of irrigation structures and watercourses within or adjacent to the proposed development;

lm. The location and exterior dimensions of existing and proposed buildings;

mn. The location(s), demarcated, of any lot or parcel area(s), or portions thereof, where the existing, natural slope of that portion equals or exceeds 25 percent;

no. Sites, if any, to be reserved, dedicated for parks, playgrounds, schools, churches, public or natural open space or other public purposes, together with proposed ownership of such sites;

op. Sites intended for conditional uses within the underlying zone, such as commercial sites or other business establishments.

16.20.040 Application.

Only property owners or their duly authorized agents shall make application for a final plat on forms prepared by the planning director. No final plat application shall be processed without approval or submission of the preliminary plat, the submission of the application, all the supporting materials as required by this chapter, and the processing fee. Incomplete applications shall not be processed under any circumstance.

A. Supporting Materials. The final plat application shall be submitted with the materials listed below. The planning director or development review committee (DRC) members may determine that additional items be submitted in order to properly evaluate the proposed final plat application. The number of hard copies and electronic copies, as well as the appropriate format of each, will be determined by the planning director.

1. Final Plat. The final plat prepared at a scale of not less than one inch equals 100 feet, with all dimensions shown in feet and decimals thereof, will be required for final approval prior to recordation. Plats of large areas may be prepared on multiple, serially numbered sheets with match lines and an index map, with vicinity and index maps appearing on the first of the serially numbered sheets. Final plats must show trails, roads, sidewalks and other public facilities, which will be deeded to the city in accordance with the requirements of this title. The city shall provide a set of standard cross-sections for roads, trails and sidewalks. The final plat submission must conform in all major respects to the preliminary plat as previously reviewed and approved by the land use authority (unless processed simultaneously). Final plat submissions shall include all information listed below, delineated in permanent ink on a Mylar for recordation (which can be submitted after the land use authority grants final approval) and submitted in an electronic format:

a. A title block showing the name of the proposed subdivision and its location by quarter-quarter section, section, township, range, principal meridian, city, county, and state;

b. The name, address, telephone number, stamp, signature and registration number of a land surveyor registered in the state of Utah who prepared or reviewed the final plat;

c. A north point, and both graphic and written scales;

d. A vicinity map that locates the proposed subdivision within its township and the section, shows major roads and watercourses adjacent to or near the subdivision, and shows the boundaries of and recorded names of adjacent or nearby subdivisions;

e. The point of beginning for the survey, which shall be tied to a section or quarter-section corner, and the location and a description of all existing monuments found during the course of the survey;

f. The location, nature, and boundaries, with bearings and distances, of all existing public ways and public or private easements in or adjacent to the subdivision, including the county book and page number references of the instruments establishing those ways or easements;

g. The exterior boundaries of the subdivision, with all bearings and distances, including curve data for curving boundaries;

h. The location, exterior dimensions, and consecutive number of all lots and blocks, or other parcels created by the subdivision, including bearings and distances and curve data for curving boundaries (with all curve dimensions for boundary lines shown outside any such boundaries);

i. The acreage of each lot and a table showing the total number of lots, total acreage of the subdivided area, the total acreage in lots, the average lot size, the total acreage in streets, and the total acreage of any parcels dedicated to public use or held in common by the lot owners;

PHASE A – PLAT 16 CALCULATIONS

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TOTAL # OF LOTS:	122 LOTS

j. The names of all streets and widths and boundaries of all street and trail rights-of-way and utility easements, including bearings and distances and curve data for curving boundaries;

k. Street names shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address;

lk. Address of all lots and parcels;

ml. The location and a description of all monuments set during the course of the survey;

nm. A signed and dated owner's dedication in the form approved by the city which includes a complete legal description of the parcel being subdivided, and in which the owners of record dedicate all open space, public ways, utilities and other public spaces to public use;

on. A notary public's acknowledgment of the owner's certificate;

po. A signed and dated certificate of consent in which all mortgagors, lienholders, and other parties with any real property interest, including the holders of mineral rights, in the property consent to its subdivision;

qp. A notary public's acknowledgment of the certificate of consent;

rq. Signature blocks for approval by the city council, city engineer and city attorney;

sr. An owner's dedication certificate, notary public's acknowledgement for each signature on the plat, a correct metes and bounds description of all property included within the subdivision, other affidavits, certificates, acknowledgements, endorsements and notarial seals as required by law, this title or by the city recorder or city attorney;

ts. A certificate for use by the county recorder in recording the plat after its approval;

ut. Building envelopes for each lot shall be shown on the final plat;

vu. Water rights conforming to the city's requirements or a public water supply agreement shall be submitted to the city attorney for approval;

wv. The zone in which standards were used to review the subdivision plat;

xw. Setbacks on residential plats.

x. y. Identification of any City-maintained property, including but not limited to detention/retention basins, open space, parks, and parkstrips.

12.A
EMMC 16.20.040 Preliminary Plats
Code Amendment

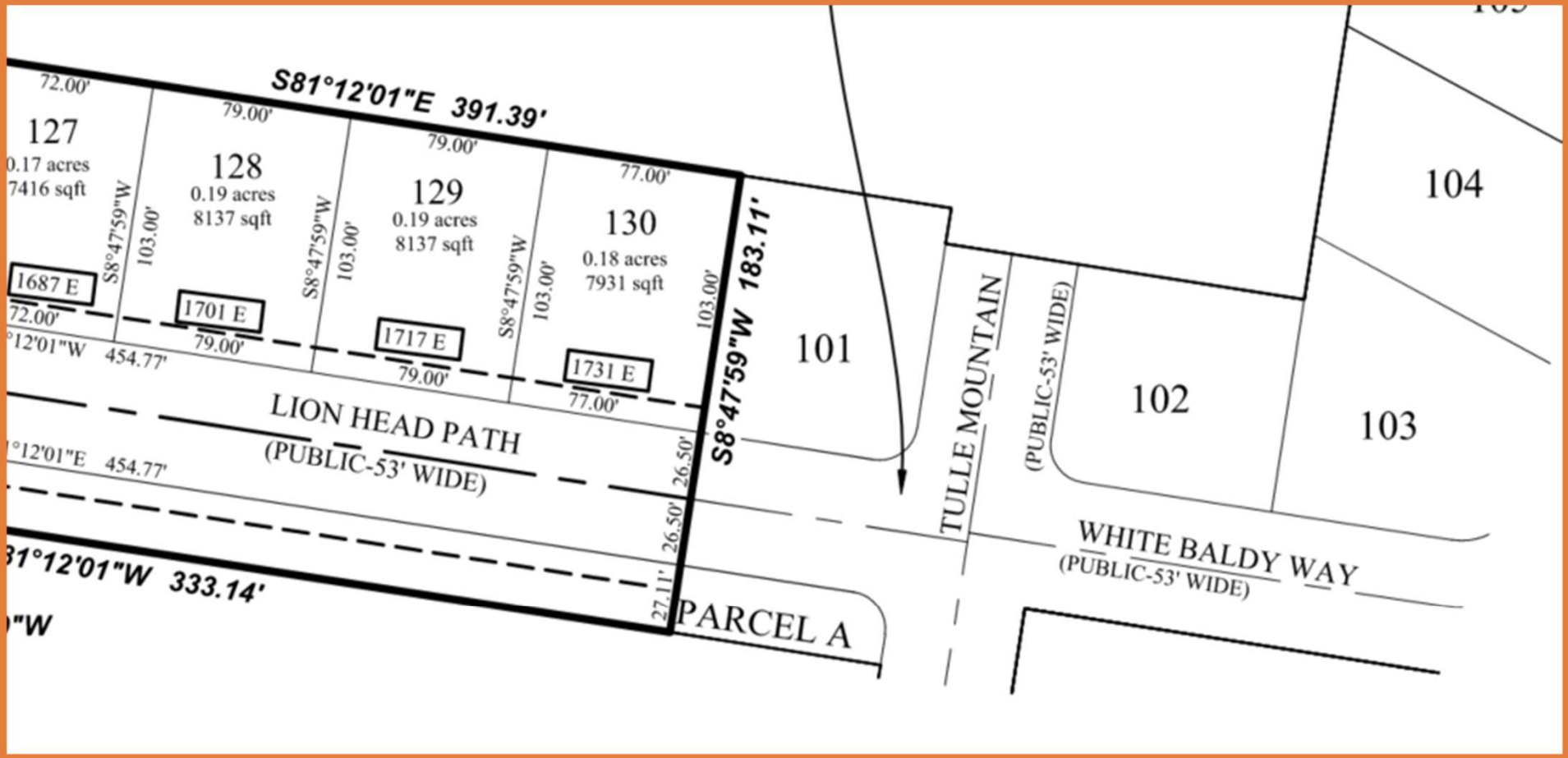
Preliminary Plats
16.20.040

A.1.

e. The location, nature, and boundaries of existing public streets and public or private easements in or adjacent to the proposed development, and the county entry number ~~book and page number~~ referencinges ~~to~~ the instruments establishing the easements;

i. Street names shall continue when crossing a right-of-way and shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address; shall not cause confusion such as East Aster (E Aster, Easter); and shall not be a separately spelled name already in use such as Jeffrey Way and Geoffrey Way.

Fire prefers to see street names continue through intersections.


S81°12'01"E 391.39'
72.00'
127
0.17 acres
7416 sqft
79.00'
128
0.19 acres
8137 sqft
79.00'
129
0.19 acres
8137 sqft
77.00'
130
0.18 acres
7931 sqft
S8°47'59"W
103.00'
1687 E
1701 E
1717 E
1731 E
72.00'
79.00'
79.00'
77.00'
°12'01"W 454.77'
LION HEAD PATH
(PUBLIC-53' WIDE)
°12'01"E 454.77'
S8°47'59"W 183.11'
26.50'
26.50'
27.11'
31°12'01"W 333.14'
PARCEL A
101
TULLE MOUNTAIN
(PUBLIC-53' WIDE)
102
103
104
WHITE BALDY WAY
(PUBLIC-53' WIDE)

12.B
EMMC 16.25.040 Final Plats
Code Amendment

Final Plats
16.25.40

A.1.

~~k. Street names shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address~~;

x. Identification of any City-maintained property, including but not limited to detention/retention basins, open space, parks, and parkstrips.

Recommendation

The Planning Commission recommends the City Council approve the proposed amendments to EMMC 16.20.040 and EMMC 16.25.040

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	ORDINANCE/PUBLIC HEARING - An Ordinance of Eagle Mountain, Utah, Amending Eagle Mountain Municipal Code 16.25.040, Final Plats.
ITEM TYPE:	Development Code Amendment
FISCAL IMPACT:	N/A
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING	PREPARED BY	PRESENTED BY
Yes	David Stroud, Senior Planner	David Stroud

RECOMMENDATION:
Staff recommends the City Council adopt an Ordinance of Eagle Mountain, Utah, Amending Eagle Mountain Municipal Code 16.25.040, Final Plats.

BACKGROUND:
A preliminary plat under review by Staff contained a road name change once it crossed another road. Because this can affect public wayfinding and emergency response, staff proposes a code change to prohibit the changing of street names at intersections. In most instances, this will also prevent the installation of a second street sign.

ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:
The Planning Commission recommends the City Council approve the proposed changes.

ATTACHMENTS:
1. Ordinance
2. Redline
3. Presentation

ORDINANCE NO. O- -2026

AN ORDINANCE OF EAGLE MOUNTAIN CITY, UTAH, AMENDING THE EAGLE MOUNTAIN MUNICIPAL CODE SECTION 16.25.040 FINAL PLATS

PREAMBLE

WHEREAS the City Council of Eagle Mountain City finds that it is in the public interest to amend the Eagle Mountain Municipal Code Section 16.25.040 Final Plats, as described in Exhibit A.

NOW, THEREFORE, BE IT ORDAINED by the City Council of Eagle Mountain City, Utah as follows:

1. The City Council finds that all required notices, public hearings, and other requirements have been completed for the City Council to consider an amendment to the Eagle Mountain Municipal Code Section 16.25.040 Final Plats, as described in Exhibit A.

2. Section 16.25.040 of the Eagle Mountain Municipal Code is hereby amended as set forth in Exhibit A, attached hereto and incorporated herein by this reference.

3. The City Council has considered the impact of this Ordinance on and found it consistent with family health, stability, and formation as required by Utah law.

4. This Ordinance shall become effective immediately upon its passing.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above ordinance was adopted by the City Council of Eagle Mountain City on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Posted on _____ by _____.

Exhibit A

16.20.040 Application.

Only property owners or their duly authorized agents shall make application for a preliminary plat. All applications shall be filed on forms prepared by the planning director. No preliminary plat application shall be processed without the submission of the completed application and all supporting materials as required by this chapter, including the processing fee. Incomplete applications shall not be processed under any circumstance.

A. Supporting Materials. The preliminary plat application shall be submitted with the materials listed below. However, the planning commission or city council may require additional supporting materials, if necessary, to demonstrate that the proposed development complies with this title and EMMC Title 17. The number of hard copies and electronic copies, as well as the appropriate format of each, will be determined by the planning director.

1. Preliminary Plat. A preliminary plat drawing will be required which shows accurate alignments, boundaries and monuments as certified by a land surveyor registered in Utah. Preliminary plats shall be prepared at a scale no smaller than one inch equals 100 feet. Plats of large areas may be prepared on multiple, serially numbered sheets with match lines and an index map. The vicinity and index maps shall appear on the first of the serially numbered sheets. The following data shall be included on the preliminary plat:

a. A title block showing the name of the proposed development and its location by lot, block, and subdivision, or quarter-quarter section, section, township, range, principal meridian, county, and state;

b. The name and address of a registered engineer licensed in the state of Utah who prepared the plat, together with a professional registration number;

c. A north point and scale, including both graphic and written scales;

d. The exterior boundaries of the proposed development;

e. The location, nature, and boundaries of existing public streets and public or private easements in or adjacent to the proposed development, and the county entry number ~~book and page number~~ referencinges ~~to~~ the instruments establishing the easements;

f. A vicinity map that locates the proposed development within the city and its subdivision or section showing major streets, landmarks, and boundaries and recorded names of adjacent or nearby subdivisions;

g. Existing contours at two-foot intervals. Elevations will be based on National Geodetic Survey area level data;

h. The layout of streets, their proposed names and grades. Plats shall not contain lots fronting onto arterial or collector streets. Proposed streets must provide connectivity to adjacent properties under other ownership if within 200 feet;

i. Street names shall continue when crossing a right-of-way and shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address; shall not cause confusion such as East Aster (E Aster, Easter); and shall not be a separately spelled name already in use such as Jeffrey Way and Goeffrey Way.

~~i~~j. The location, exterior dimensions to the nearest foot, and number of proposed lots and blocks, or other parcels to be created by the proposed development;

~~j~~k. The acreage of each proposed lot or parcel, and a table showing the total number of lots, total acreage of the area proposed for development, the total buildable acreage (excluding slopes greater than 25 percent, major utility corridors, and natural washes), the total acreage in lots, the average lot size, the total acreage in streets, and the total acreage of neighborhood parks, neighborhood squares, and other parcels proposed for dedication to public use or to be held in common by the owners;

PHASE A – PLAT 16 CALCULATIONS

TOTAL ACREAGE:	25.46 ACRES
BUILDABLE ACREAGE:	25.46 ACRES
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TOTAL OPEN SPACE:	2.01 ACRES
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OVERALL DENSITY:	4.79 LOTS/ACRE
TOTAL # OF LOTS:	122 LOTS

~~k~~l. The location of irrigation structures and watercourses within or adjacent to the proposed development;

~~l~~m. The location and exterior dimensions of existing and proposed buildings;

~~m~~n. The location(s), demarcated, of any lot or parcel area(s), or portions thereof, where the existing, natural slope of that portion equals or exceeds 25 percent;

~~n~~o. Sites, if any, to be reserved, dedicated for parks, playgrounds, schools, churches, public or natural open space or other public purposes, together with proposed ownership of such sites;

~~o~~p. Sites intended for conditional uses within the underlying zone, such as commercial sites or other business establishments.

16.20.040 Application.

Only property owners or their duly authorized agents shall make application for a final plat on forms prepared by the planning director. No final plat application shall be processed without approval or submission of the preliminary plat, the submission of the application, all the supporting materials as required by this chapter, and the processing fee. Incomplete applications shall not be processed under any circumstance.

A. Supporting Materials. The final plat application shall be submitted with the materials listed below. The planning director or development review committee (DRC) members may determine that additional items be submitted in order to properly evaluate the proposed final plat application. The number of hard copies and electronic copies, as well as the appropriate format of each, will be determined by the planning director.

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a. A title block showing the name of the proposed subdivision and its location by quarter-quarter section, section, township, range, principal meridian, city, county, and state;

b. The name, address, telephone number, stamp, signature and registration number of a land surveyor registered in the state of Utah who prepared or reviewed the final plat;

c. A north point, and both graphic and written scales;

d. A vicinity map that locates the proposed subdivision within its township and the section, shows major roads and watercourses adjacent to or near the subdivision, and shows the boundaries of and recorded names of adjacent or nearby subdivisions;

e. The point of beginning for the survey, which shall be tied to a section or quarter-section corner, and the location and a description of all existing monuments found during the course of the survey;

f. The location, nature, and boundaries, with bearings and distances, of all existing public ways and public or private easements in or adjacent to the subdivision, including the county book and page number references of the instruments establishing those ways or easements;

g. The exterior boundaries of the subdivision, with all bearings and distances, including curve data for curving boundaries;

h. The location, exterior dimensions, and consecutive number of all lots and blocks, or other parcels created by the subdivision, including bearings and distances and curve data for curving boundaries (with all curve dimensions for boundary lines shown outside any such boundaries);

i. The acreage of each lot and a table showing the total number of lots, total acreage of the subdivided area, the total acreage in lots, the average lot size, the total acreage in streets, and the total acreage of any parcels dedicated to public use or held in common by the lot owners;

PHASE A – PLAT 16 CALCULATIONS

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j. The names of all streets and widths and boundaries of all street and trail rights-of-way and utility easements, including bearings and distances and curve data for curving boundaries;

~~k. Street names shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address~~;

~~l~~k. Address of all lots and parcels;

~~m~~l. The location and a description of all monuments set during the course of the survey;

~~n~~m. A signed and dated owner's dedication in the form approved by the city which includes a complete legal description of the parcel being subdivided, and in which the owners of record dedicate all open space, public ways, utilities and other public spaces to public use;

~~o~~n. A notary public's acknowledgment of the owner's certificate;

~~p~~o. A signed and dated certificate of consent in which all mortgagors, lienholders, and other parties with any real property interest, including the holders of mineral rights, in the property consent to its subdivision;

~~q~~p. A notary public's acknowledgment of the certificate of consent;

~~r~~q. Signature blocks for approval by the city council, city engineer and city attorney;

~~s~~r. An owner's dedication certificate, notary public's acknowledgement for each signature on the plat, a correct metes and bounds description of all property included within the subdivision, other affidavits, certificates, acknowledgements, endorsements and notarial seals as required by law, this title or by the city recorder or city attorney;

~~t~~s. A certificate for use by the county recorder in recording the plat after its approval;

~~u~~t. Building envelopes for each lot shall be shown on the final plat;

~~v~~u. Water rights conforming to the city's requirements or a public water supply agreement shall be submitted to the city attorney for approval;

~~w~~v. The zone in which standards were used to review the subdivision plat;

~~x~~w. Setbacks on residential plats.

x. y. Identification of any City-maintained property, including but not limited to detention/retention basins, open space, parks, and parkstrips.

12.A
EMMC 16.20.040 Preliminary Plats
Code Amendment

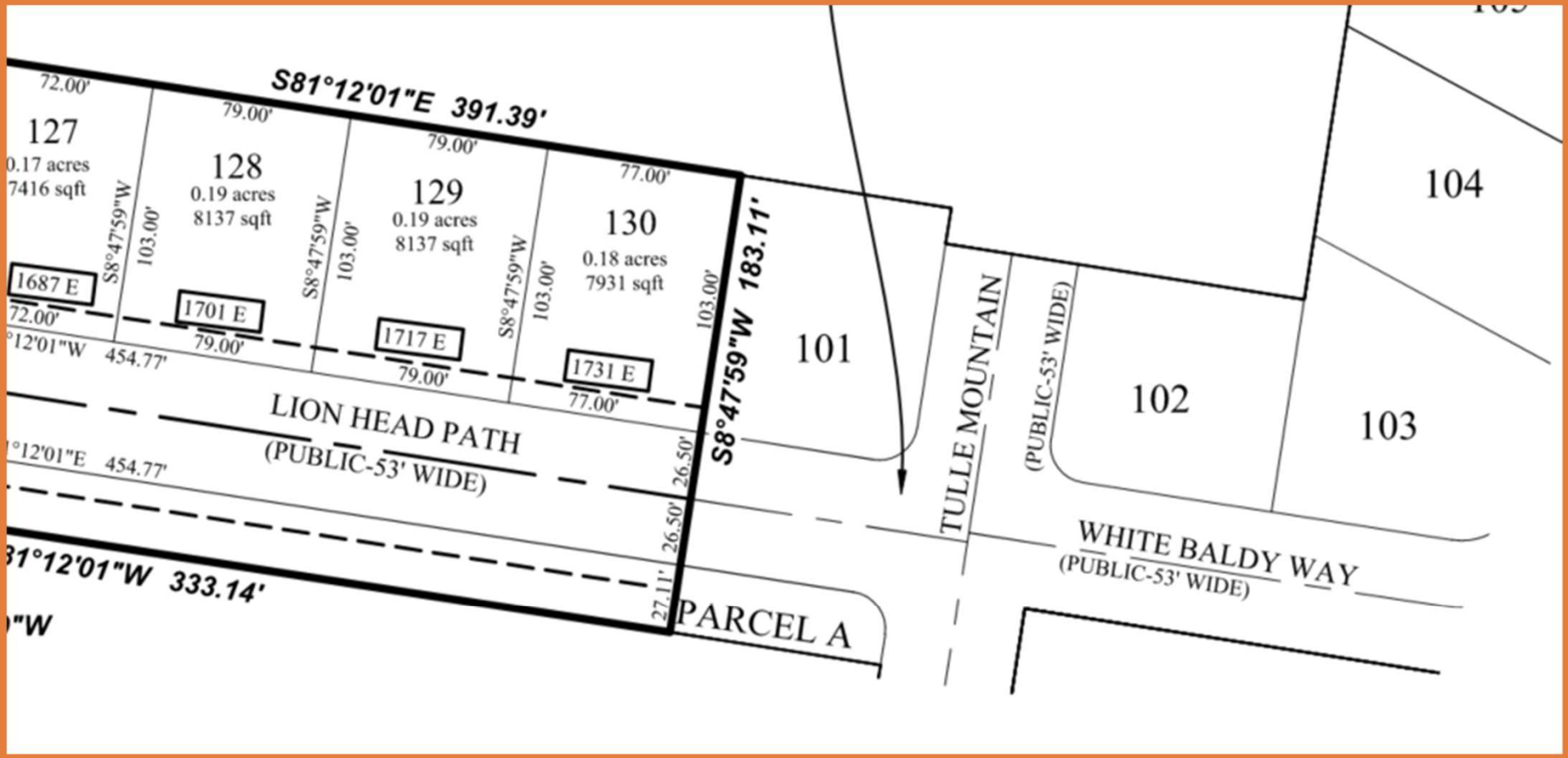
Preliminary Plats
16.20.040

A.1.

e. The location, nature, and boundaries of existing public streets and public or private easements in or adjacent to the proposed development, and the county entry number ~~book and page number~~ referencinges ~~to~~ the instruments establishing the easements;

i. Street names shall continue when crossing a right-of-way and shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address; shall not cause confusion such as East Aster (E Aster, Easter); and shall not be a separately spelled name already in use such as Jeffrey Way and Geoffrey Way.

Fire prefers to see street names continue through intersections.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(PUBLIC-53' WIDE)

12.B
EMMC 16.25.040 Final Plats
Code Amendment

Final Plats
16.25.40

A.1.

~~k. Street names shall not contain cardinal directions (North, South, East, West) as this may conflict with the geographical coordinate identifier of the lot or parcel address~~;

x. Identification of any City-maintained property, including but not limited to detention/retention basins, open space, parks, and parkstrips.

Recommendation

The Planning Commission recommends the City Council approve the proposed amendments to EMMC 16.20.040 and EMMC 16.25.040

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Repealing a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026-2027.
ITEM TYPE:	Resolution
FISCAL IMPACT:	
APPLICANT:	

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE

PUBLIC HEARING **PREPARED BY** **PRESENTED BY**
No

RECOMMENDATION:

BACKGROUND:
On August 6, 2026, the Eagle Mountain City Council held a public hearing regarding the City's proposed property tax rate for Fiscal Year 2026-2027. Following the public hearing, the City Council approved a resolution adopting a property tax rate of 0.001500 for Fiscal Year 2026-2027. The adopted rate exceeds the City's certified tax rate of 0.000530 and constitutes a property tax increase subject to the applicable statutory requirements. Based on the adopted rate, the City's budgeted ad valorem property tax revenue is expected to increase by approximately $5,591,594.00, representing an increase of approximately 183.02% over the City's property tax budgeted revenue for the prior fiscal year, exclusive of new growth.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:

ATTACHMENTS:
1. Resolution
2. Exhibit A - RES-57-2026 - Approving a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026-2027

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, REPEALING RESOLUTION NO. 57-2026, A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH APPROVING A PROPERTY TAX INCREASE ABOVE THE CERTIFIED TAX RATE FOR FISCAL YEAR 2026-2027

PREAMBLE

WHEREAS, on August 6, 2026, the City Council of Eagle Mountain City, Utah, adopted Resolution No. 57-2026, attached hereto as Exhibit A, approving a property tax increase above the certified tax rate for Fiscal Year 2026-2027; and

WHEREAS, the City Council has determined that it is appropriate and in the best interests of Eagle Mountain City to repeal Resolution No. 57-2026 and withdraw the property tax increase approved therein.

NOW, THEREFORE, be it resolved by the City Council of Eagle Mountain City, Utah:

1. Resolution No. 57-2026 is repealed in its entirety, and the property tax increase approved therein is withdrawn.

2. This Resolution shall become effective immediately upon its passing.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Exhibit A

RESOLUTION NO. R-57-2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, APPROVING A PROPERTY TAX INCREASE ABOVE THE CERTIFIED TAX RATE FOR FISCAL YEAR 2026-2027

PREAMBLE

WHEREAS, the City Council of Eagle Mountain City (the "City"), is authorized to levy a property tax rate that exceeds the City's certified tax rate upon satisfaction of applicable notice and public hearing requirements; and

WHEREAS, the Utah State Tax Commission has certified that the certified tax rate for the City for Fiscal year 2026-2027 is 0.000530; and

WHEREAS, the City Council has proposed a tax rate of 0.0017000 for Fiscal Year 2026-2027, which exceeds the certified tax rate and constitutes a property tax increase; and

WHEREAS, notice of the proposed tax increase was advertised in the Daily Herald, a newspaper of general circulation, City bulletin boards, posted on the Utah Public Notice Website, the City's webpage and mailed notice was provided by the County Auditor to affected property owners, each within the time periods required by law; and

WHEREAS, the City Council held a duly noticed public hearing on the proposed tax increase on August 6, 2026 at 6PM, at which the City Council provided all interested persons desiring to be heard a reasonable opportunity to present oral testimony, within reasonable time limits and without unreasonable restriction on the number of individuals permitted to comment, whether in person, by electronic means, or through written comments read into the record; and

WHEREAS, following the public hearing, the City Council has determined that it is necessary and in the best interest of the City to approve and levy a property tax rate above the certified tax rate for Fiscal Year 2026-2027;

NOW, THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City, Utah, as follows:

1. The City finds that the City has satisfied all applicable notice and public hearing requirements as a condition of levying a property tax rate that exceeds the certified tax rate for Fiscal Year 2026-2027, including publication of notice, mailed notice to affected property owners, and the conduct of a public hearing on August 6, 2026, at which public comment was received and considered.

2. The City Council hereby approves and adopts a property tax rate of 0.001500 for Fiscal Year 2026-2027. This rate exceeds the certified tax rate of 0.000530 and will result in an increase in the City's ad valorem property tax budgeted revenue of approximately $ 5,591,594.00 or 183.02 %, above the City's property tax budgeted revenue for the prior year, exclusive of new growth.

3. The City Recorder is hereby directed to certify this Resolution and the adopted tax rate to the Utah County Auditor and to the Utah State Tax Commission, together with any other documentation required to complete the Truth in Taxation process.

4. This Resolution shall take effect immediately upon adoption.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 6th day of August 2026.

EAGLE MOUNTAIN CITY, UTAH

Jared R. Gray, Mayor

ATTEST:

Lacie A. Messerly
City Recorder

EAGLE MOUNTAIN 19 96 CORPORATE SEAL

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 6th day of August 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☑ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☑ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☑ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☑ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☑ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

Lacie A. Messerly
City Recorder

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026–2027.
ITEM TYPE:	Resolution
FISCAL IMPACT:	
APPLICANT:	City-initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
	N/A

PUBLIC HEARING **PREPARED BY** **PRESENTED BY**
No

RECOMMENDATION:
Staff recommends the City Council approve a Resolution of Eagle Mountain City, Utah, Approving a Property Tax Increase Above the Certified Tax Rate for Fiscal Year 2026–2027.

BACKGROUND:

ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Resolution

RESOLUTION NO. R-___-2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, APPROVING A PROPERTY TAX INCREASE ABOVE THE CERTIFIED TAX RATE FOR FISCAL YEAR 2026-2027

PREAMBLE

WHEREAS, the City Council of Eagle Mountain City (the "City"), is authorized to levy a property tax rate that exceeds the City's certified tax rate upon satisfaction of applicable notice and public hearing requirements; and

WHEREAS, the Utah State Tax Commission has certified that the certified tax rate for the City for Fiscal year 2026-2027 is 0.000530; and

WHEREAS, the City Council has proposed a tax rate of 0.0017000 for Fiscal Year 2026-2027, which exceeds the certified tax rate and constitutes a property tax increase; and

WHEREAS, notice of the proposed tax increase was advertised in the Daily Herald, a newspaper of general circulation, City bulletin boards, posted on the Utah Public Notice Website, the City's webpage and mailed notice was provided by the County Auditor to affected property owners, each within the time periods required by law; and

WHEREAS, the City Council held a duly noticed public hearing on the proposed tax increase on August 6, 2026 at 6PM, at which the City Council provided all interested persons desiring to be heard a reasonable opportunity to present oral testimony, within reasonable time limits and without unreasonable restriction on the number of individuals permitted to comment, whether in person, by electronic means, or through written comments read into the record; and

WHEREAS, following the public hearing, the City Council has determined that it is necessary and in the best interest of the City to approve and levy a property tax rate above the certified tax rate for Fiscal Year 2026-2027;

NOW, THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City, Utah, as follows:

1. The City finds that the City has satisfied all applicable notice and public hearing requirements as a condition of levying a property tax rate that exceeds the certified tax rate for Fiscal Year 2026-2027, including publication of notice, mailed notice to affected property owners, and the conduct of a public hearing on August 6, 2026, at which public comment was received and considered.

2. The City Council hereby approves and adopts a property tax rate of _____for Fiscal Year 2026-2027. This rate exceeds the certified tax rate of 0.000530 and will result in an increase in the City's ad valorem property tax budgeted revenue of approximately $_____ or _____%, above the City's property tax budgeted revenue for the prior year, exclusive of new growth.

3. The City Recorder is hereby directed to certify this Resolution and the adopted tax rate to the Utah County Auditor and to the Utah State Tax Commission, together with any other documentation required to complete the Truth in Taxation process.

4. This Resolution shall take effect immediately upon adoption.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August 2026.

EAGLE MOUNTAIN CITY, UTAH

_____

Jared R. Gray, Mayor

ATTEST:

_____

Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION/PUBLIC HEARING - A Resolution of Eagle Mountain City, Utah, Adopting the Fiscal Year 2026-2027 Annual Budget.
ITEM TYPE:	Resolution
FISCAL IMPACT:	$363,992,973 (A reduction of $1,151,343 from the Interim Budget)
APPLICANT:	City-Initiated

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	N/A

PUBLIC HEARING
Yes

PREPARED BY
Kimberly Ruesch, Finance Director
Terrence Dela Peña, Finance Analyst

PRESENTED BY
Kimberly Ruesch

RECOMMENDATION:
Staff recommends the City Council approve a Resolution of Eagle Mountain City, Utah, Adopting the Fiscal Year 2026-2027 Annual Budget.

BACKGROUND:
State law requires the City Council to adopt an interim budget by June 30 and to complete the Truth-in-Taxation process before adopting a final property tax rate and budget when a tax increase above the certified tax rate is proposed. The City Council reviewed the proposed Property Tax Impact Schedule on May 5, 2026, and adopted the Fiscal Year 2026-2027 Interim Budget on June 16, 2026.

A Truth-in-Taxation public hearing was held on August 6, 2026, to receive public comment regarding the proposed property tax increase and Property Tax Impact Schedule. Following completion of the public hearing process, the City Council is being asked to consider adoption of the Fiscal Year 2026-2027 Annual Budget. The budget will establish the authorized revenues and expenditures for Fiscal Year 2026-2027.

ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Resolution
2. Proposed Final Budget for FY27

3. Proposed Property Tax Impact Schedule 08-06-2026

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, ADOPTING THE EAGLE MOUNTAIN CITY FISCAL YEAR 2026-2027 ANNUAL BUDGET TOTALING $363,992,973

PREAMBLE

WHEREAS, Eagle Mountain City ("City") is a municipal corporation organized and existing under the laws of the State of Utah; and

WHEREAS, Pursuant to the Utah Uniform Fiscal Procedures Act for Utah Cities, the City is required to prepare and adopt an annual budget for all budgeted funds prior to the beginning of the fiscal year; and

WHEREAS, The City Administration has prepared a proposed annual budget for Fiscal Year 2027, beginning July 1, 2026, and ending June 30, 2027; and

WHEREAS, The proposed budget was made available for public inspection and review as required by law; and

WHEREAS, The City Council conducted a public hearing on the proposed budget, allowing interested persons an opportunity to comment on the proposed revenues and expenditures; and

WHEREAS, The City Council has reviewed the proposed annual budget and determined that adoption of the budget is in the best interests of the residents of Eagle Mountain City and provides for the funding of municipal services, capital improvements, debt obligations, and other lawful governmental purposes.

NOW THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City:

1. City Council hereby adopts the Annual Budget for Fiscal Year 2027, covering the period from July 1, 2026, through June 30, 2027, as presented in Exhibit A, attached hereto and incorporated herein by this reference.

2. Expenditures from the various City funds are hereby authorized in accordance with the appropriations established in the adopted budget and subject to all applicable provisions of state law and City policy.

3. The revenue estimates contained within the adopted budget are hereby approved as the anticipated funding sources for Fiscal Year 2027 operations and capital activities.

4. The Mayor, City Manager, and other designated City officials are authorized to administer the adopted budget and make expenditures consistent with the appropriations approved herein and applicable City policies.

5. This Resolution shall take effect immediately upon adoption.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

FY 2026-2027 Proposed Final Budget
Tuesday, August 18, 2026

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10	**General Fund**			
	Revenue			
10-00-31111-0000	Property Taxes - Restricted Interim Budget	$ -	$ -	$ -
10-00-31116-0000	Property Taxes	$ 2,715,551.02	$ 2,839,998.00	$ 8,646,795.00
10-00-31121-0000	Property Taxes (Delinquent and Prior Year)	$ 99,108.11	$ 105,000.00	$ 105,000.00
10-00-31122-0000	Penalties/Interest Property Tx	$ 1,608.85	$ 1,500.00	$ 1,500.00
10-00-31300-0000	Sales and Use Taxes - General	$ 12,039,844.07	$ 13,458,726.00	$ 14,535,425.00
10-00-31320-0000	Transient Room Tax	$ 7,772.97	$ 8,000.00	$ 6,200.00
10-00-31330-0000	Public Transit Tax	$ 469,901.50	$ 472,982.00	$ 510,821.00
10-00-31350-0000	Transportation Tax	$ 1,084,762.79	$ 1,189,213.00	$ 1,284,350.00
10-00-31401-0000	Franchise Tax - Cable	$ 4,829.02	$ -	$ -
10-00-31415-0000	Municipal Energy Tax	$ 5,458,303.77	$ 7,726,283.00	$ 8,896,371.00
10-00-31420-0000	Motor Vehicle Fee-In-Lieu	$ 172,275.02	$ 210,000.00	$ 190,000.00
10-00-32100-0000	Licenses - Business	$ 40,934.72	$ 48,935.00	$ 50,403.00
10-00-32215-0000	Franchise Agreement Fee	$ 3,057.68	$ -	$ -
10-00-32316-0000	Grading & Excavating Permits	$ 93,393.00	$ 85,000.00	$ 121,000.00
10-00-32401-0000	Traffic Control/Road Permits	$ -	$ -	$ 30,000.00
10-00-33101-0000	Eco Dev - Golf Sponsorship	$ 20,465.00	$ 15,000.00	$ 15,000.00
10-00-33400-0000	State Grants	$ 7,008.00	$ -	$ -
10-00-33447-0000	EMP Grant	$ 3,750.00	$ -	$ -
10-00-33448-0000	CLEF Grant	$ 10,248.00	$ 15,000.00	$ 15,000.00
10-00-33457-0000	Grant - Library	$ 10,049.66	$ -	$ -
10-00-33460-0000	Class BC@ Road Fund Allotment	$ 2,994,523.07	$ 3,154,287.00	$ 3,154,287.00
10-00-33470-0000	Telecommunication Tax	$ 123,633.48	$ 120,000.00	$ 123,600.00
10-00-33480-0000	State Liquor Fund Allotment	$ 43,486.50	$ 35,000.00	$ 35,000.00
10-00-34121-0000	Process Fees - Recording of Legal Document	$ 42,590.00	$ 8,000.00	$ 45,000.00
10-00-34218-0000	Infrastructure Inspection Fees	$ 847,616.45	$ 550,000.00	$ 850,000.00
10-00-34330-0000	Fire Services	$ 20,594.30	$ 27,500.00	$ 52,967.00
10-00-34331-0000	Sheriff's Service	$ 77,752.50	$ 90,000.00	$ -
10-00-34411-0000	Road Surface Treatment Fees	$ 538,233.59	$ -	$ -
10-00-34555-0000	Banked Water Transfer Fee	$ 750.00	$ -	$ -
10-00-34612-0000	Pony Express Days Rev Tickets	$ 34,019.75	$ 50,000.00	$ 51,500.00
10-00-34627-0000	Vendor Booth	$ 7,475.00	$ 5,000.00	$ 5,000.00
10-00-34665-0000	EM City Merchandise	$ 922.00	$ 500.00	$ -
10-00-34671-0000	Miss EM Pageant Revenue	$ 640.00	$ 1,500.00	$ -
10-00-34680-0000	Miscellaneous Events Revenue	$ 1,500.00	$ -	$ -
10-00-34711-0000	Rec Fees - Youth Sports	$ 139,727.00	$ 125,000.00	$ 128,750.00
10-00-34712-0000	Rec Fees - Adult Sports	$ 10,740.00	$ 10,000.00	$ 10,300.00
10-00-34731-0000	Use Fees - Parks and Public Pr	$ 10,129.00	$ 12,000.00	$ 12,360.00
10-00-34910-0000	Services - Copies & Postage	$ 42.75	$ -	$ -
10-00-35020-0000	Damage to Propery-Reimb	$ 6,368.70	$ -	$ -
10-00-35610-0000	Code Enforcement Fines	$ 4,775.00	$ 6,000.00	$ 6,180.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-00-35710-0000	Cell Tower Lease	$ 5,500.00	$ 6,000.00	$ 6,000.00
10-00-36010-0000	Library - Fees	$ 8,568.76	$ 7,500.00	$ 7,725.00
10-00-36020-0000	Late/Delinquent Fees Penalties	$ (25.00)	$ -	$ -
10-00-36030-0000	Revenue from Collections	$ 11,468.87	$ 500.00	$ -
10-00-36080-0000	NSF Fee	$ 11,575.00	$ 11,700.00	$ 13,750.00
10-00-37010-0000	Interest Earnings	$ 431,076.78	$ 500,000.00	$ 515,000.00
10-00-37090-0000	Other Miscellaneous	$ 93,267.25	$ 15,000.00	$ 15,450.00
10-00-37142-0000	Insurance Reimbursements	$ 81,525.44	$ -	$ -
10-00-37151-0000	Due From Water (Admin Charge)	$ 1,221,989.00	$ -	$ -
10-00-37152-0000	Due From Sewer (Admin Charge)	$ 1,026,110.00	$ -	$ -
10-00-37157-0000	Due From Solid Waste (Admin Ch	$ 155,540.00	$ -	$ -
10-00-37159-0000	Due From Storm Drain (Admin Ch	$ 157,468.00	$ -	$ -
10-00-37172-0000	Due From AA 2013-1 (Admin Chrg	$ 5,000.00	$ 5,000.00	$ -
10-00-38145-0000	Due From Cap Projects	$ 18,701.04	$ -	$ -
10-00-38180-0000	Due From RDA	$ 201,166.38	$ 22,917.00	$ 39,558.00
10-00-39320-0000	Library - Donation - Fundraisi	$ 382.75	$ -	$ -
10-00-39360-0000	Senior Council Fundraiser	$ 400.00	$ -	$ -
10-00-39365-0000	Senior Meals - MAG Reimb.	$ 2,776.80	$ 2,500.00	$ 2,575.00
10-00-39700-0000	Contributions Private Sources	$ 78,444.41	$ -	$ -
10-00-39725-0000	Developer Cont-Street Lights	$ 1,853,510.76	$ 1,000,000.00	$ 1,500,000.00
10-00-39920-0000	Use of Fund Reserves	$ -	$ -	$ 516,231.00
	Revenue	**$ 35,379,594.07**	**$ 35,252,041.00**	**$ 41,499,098.00**
41100	**City Council**			
10-11-41100-1111	Salaries - Full-Time Permanent	$ -	$ 168,095.00	$ -
10-11-41100-1112	Salaries - Part-Time Permanent	$ 84,019.00	$ 90,955.00	$ 90,500.00
10-11-41100-1242	Car Allowance	$ -	$ 12,000.00	$ 12,000.00
10-11-41100-1300	Employee Benefits (401K & 457)	$ -	$ 10,390.00	$ -
10-11-41100-1321	Clothing Allowance	$ -	$ 170.00	$ -
10-11-41100-1511	FICA	$ 5,550.20	$ 5,640.00	$ 5,615.00
10-11-41100-1512	Medicare	$ 1,298.05	$ 3,759.00	$ 1,315.00
10-11-41100-1521	Retirement	$ 2,864.59	$ 29,008.00	$ -
10-11-41100-1531	State Insurance Fund	$ 3,655.88	$ 1,841.00	$ 1,640.00
10-11-41100-1541	Health Insurance	$ -	$ 8,252.00	$ -
10-11-41100-1545	Dental Insurance	$ -	$ 2,609.00	$ -
10-11-41100-1548	Vision Insurance	$ -	$ 427.00	$ -
10-11-41100-1561	Long Term Disability	$ -	$ 828.00	$ -
10-11-41100-2121	Dues & Memberships	$ -	$ 1,300.00	$ -
10-11-41100-2321	Travel & Training	$ 12,171.18	$ 24,654.00	$ 35,550.00
10-11-41100-2369	Meetings	$ 8,483.01	$ 10,200.00	$ 11,000.00
10-11-41100-2411	Office Expense & Supplies	$ 624.80	$ 500.00	$ 500.00
10-11-41100-4261	Computer Software & Maint.	$ 257.64	$ -	$ -
10-11-41100-4530	Administrative Cost	$ -	$ (102,577.00)	$ (162,361.00)
10-11-41100-4531	Professional & Technical Servi	$ 129,999.96	$ 162,000.00	$ 185,000.00
10-11-41100-5003	Special Projects	$ 64,202.97	$ 50,000.00	$ 50,000.00
41100	**City Council**	**$ 313,127.28**	**$ 480,051.00**	**$ 230,759.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
41110	**City Recorder's Office**			
10-11-41110-1111	Salaries - Full-Time Permanent	$ 285,944.32	$ 285,961.00	$ 140,028.00
10-11-41110-1112	Salaries - Part-Time Permanent	$ 48,129.77	$ 31,450.00	$ 54,010.00
10-11-41110-1211	Overtime	$ 295.12	$ 1,000.00	$ -
10-11-41110-1242	Car Allowance	$ 9,150.00	$ -	$ -
10-11-41110-1300	Employee Benefits (401K & 457)	$ 13,311.56	$ 13,785.00	$ 8,683.00
10-11-41110-1321	Clothing Allowance	$ 400.00	$ 500.00	$ 300.00
10-11-41110-1511	FICA	$ 2,996.44	$ 1,950.00	$ 3,349.00
10-11-41110-1512	Medicare	$ 4,817.29	$ 4,604.00	$ 2,816.00
10-11-41110-1521	Retirement	$ 47,129.99	$ 44,314.00	$ 22,364.00
10-11-41110-1531	State Insurance Fund	$ 289.10	$ 379.00	$ 233.00
10-11-41110-1541	Health Insurance	$ 29,860.52	$ 44,599.00	$ 37,932.00
10-11-41110-1545	Dental Insurance	$ 1,941.60	$ 2,394.00	$ 2,810.00
10-11-41110-1548	Vision Insurance	$ 407.19	$ 407.00	$ 580.00
10-11-41110-1561	Long Term Disability	$ 1,415.91	$ 1,063.00	$ 798.00
10-11-41110-2121	Dues & Memberships	$ 2,619.00	$ 2,425.00	$ 1,950.00
10-11-41110-2211	Public Notices	$ -	$ 2,000.00	$ 1,000.00
10-11-41110-2321	Travel & Training	$ 9,464.57	$ 10,800.00	$ 7,500.00
10-11-41110-2369	Meetings	$ 808.55	$ 600.00	$ 750.00
10-11-41110-2411	Office Expense & Supplies	$ 3,350.84	$ 4,000.00	$ 3,500.00
10-11-41110-2513	Equipment Materials & Supplies	$ -	$ -	$ 1,500.00
10-11-41110-4138	Property Taxes	$ 4,247.51	$ 4,000.00	$ 4,000.00
10-11-41110-4139	Recording Fees	$ 8,622.35	$ 8,000.00	$ 7,000.00
10-11-41110-4261	Computer Software & Maint.	$ 12,915.00	$ 22,200.00	$ 40,200.00
10-11-41110-4530	Administrative Cost	$ -	$ (146,751.00)	$ (152,089.00)
10-11-41110-4531	Professional & Technical Servi	$ 39,215.19	$ 19,000.00	$ 22,000.00
10-11-41110-4532	Record Transcription Services	$ 743.75	$ 2,000.00	$ 1,000.00
10-11-41110-4950	Elections	$ 13,586.48	$ 150,000.00	$ 18,000.00
41110	**City Recorder's Office**	**$ 554,121.78**	**$ 519,180.00**	**$ 230,214.00**
41115	**Legislative & Strategic Svcs**			
10-11-41115-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 186,900.00
10-11-41115-1300	Employee Benefits (401K & 457)	$ -	$ -	$ 8,011.00
10-11-41115-1321	Clothing Allowance	$ -	$ -	$ 170.00
10-11-41115-1512	Medicare	$ -	$ -	$ 2,711.00
10-11-41115-1521	Retirement	$ -	$ -	$ 26,522.00
10-11-41115-1531	State Insurance Fund	$ -	$ -	$ 224.00
10-11-41115-1541	Health Insurance	$ -	$ -	$ 19,043.00
10-11-41115-1545	Dental Insurance	$ -	$ -	$ 2,389.00
10-11-41115-1548	Vision Insurance	$ -	$ -	$ 493.00
10-11-41115-1561	Long Term Disability	$ -	$ -	$ 949.00
10-11-41115-2121	Dues & Memberships	$ -	$ -	$ 375.00
10-11-41115-2321	Travel & Training	$ -	$ -	$ 7,560.00
10-11-41115-2369	Meetings	$ -	$ -	$ 300.00
10-11-41115-2411	Office Expense & Supplies	$ -	$ -	$ 500.00
10-11-41115-4261	Computer Software & Maint.	$ -	$ -	$ 15,000.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-11-41115-4531	Professional & Technical Servi	$ -	$ -	$ 5,000.00
41115	**Legislative & Strategic Svcs**	**$ -**	**$ -**	**$ 276,147.00**
41220	**City Attorney;s Office**			
10-11-41220-1111	Salaries - Full-Time Permanent	$ 141,662.31	$ 151,278.00	$ 278,932.00
10-11-41220-1112	Salaries - Part-Time Permanent	$ 16,943.75	$ 16,080.00	$ -
10-11-41220-1114	Salaries - Seasonal	$ -	$ -	$ 16,800.00
10-11-41220-1211	Overtime	$ 18.75	$ -	$ -
10-11-41220-1300	Employee Benefits (401K & 457)	$ 8,783.09	$ 9,380.00	$ 17,295.00
10-11-41220-1321	Clothing Allowance	$ 100.00	$ 100.00	$ 200.00
10-11-41220-1511	FICA	$ 1,051.68	$ 997.00	$ 1,042.00
10-11-41220-1512	Medicare	$ 2,231.91	$ 2,428.00	$ 4,289.00
10-11-41220-1521	Retirement	$ 24,146.31	$ 24,160.00	$ 44,546.00
10-11-41220-1531	State Insurance Fund	$ 46.65	$ 200.00	$ 3,030.00
10-11-41220-1541	Health Insurance	$ 17,123.40	$ 17,849.00	$ 43,020.00
10-11-41220-1545	Dental Insurance	$ 1,534.20	$ 1,535.00	$ 2,810.00
10-11-41220-1548	Vision Insurance	$ 250.32	$ 251.00	$ 580.00
10-11-41220-1561	Long Term Disability	$ 715.48	$ 717.00	$ 1,474.00
10-11-41220-2121	Dues & Memberships	$ 3,521.27	$ 2,700.00	$ 2,700.00
10-11-41220-2321	Travel & Training	$ 5,489.48	$ 5,000.00	$ 5,000.00
10-11-41220-2369	Meetings	$ 101.43	$ 300.00	$ 300.00
10-11-41220-4121	Attorney Fees	$ 826.00	$ 73,000.00	$ 75,000.00
10-11-41220-4530	Administrative Cost	$ -	$ (88,875.00)	$ (203,514.00)
10-11-41220-4531	Professional & Technical Servi	$ 8,178.00	$ 16,550.00	$ 14,550.00
41220	**City Attorney;s Office**	**$ 232,724.03**	**$ 233,650.00**	**$ 308,054.00**
41310	**Executive**			
10-11-41310-1111	Salaries - Full-Time Permanent	$ 700,596.23	$ 891,727.00	$ 656,255.00
10-11-41310-1112	Salaries - Part-Time Permanent	$ 16,817.25	$ 12,864.00	$ -
10-11-41310-1114	Salaries - Seasonal	$ -	$ -	$ 13,440.00
10-11-41310-1211	Overtime	$ 907.70	$ 2,000.00	$ 2,000.00
10-11-41310-1242	Car Allowance	$ 14,000.00	$ 22,800.00	$ 19,200.00
10-11-41310-1300	Employee Benefits (401K & 457)	$ 43,125.09	$ 55,210.00	$ 40,635.00
10-11-41310-1321	Clothing Allowance	$ 610.00	$ 675.00	$ 450.00
10-11-41310-1511	FICA	$ 802.52	$ 798.00	$ 834.00
10-11-41310-1512	Medicare	$ 10,524.93	$ 13,122.00	$ 9,715.00
10-11-41310-1521	Retirement	$ 116,519.84	$ 138,455.00	$ 100,653.00
10-11-41310-1531	State Insurance Fund	$ 1,855.90	$ 3,104.00	$ 9,980.00
10-11-41310-1541	Health Insurance	$ 70,294.92	$ 73,979.00	$ 64,543.00
10-11-41310-1545	Dental Insurance	$ 8,510.46	$ 7,785.00	$ 5,098.00
10-11-41310-1548	Vision Insurance	$ 1,402.04	$ 1,298.00	$ 768.00
10-11-41310-1561	Long Term Disability	$ 3,619.75	$ 3,897.00	$ 2,706.00
10-11-41310-2121	Dues & Memberships	$ 70,760.04	$ 81,325.00	$ 84,234.00
10-11-41310-2321	Travel & Training	$ 18,881.24	$ 27,650.00	$ 28,260.00
10-11-41310-2369	Meetings	$ 844.31	$ 1,000.00	$ 1,000.00
10-11-41310-2411	Office Expense & Supplies	$ 206.18	$ 500.00	$ 500.00
10-11-41310-2513	Equipment Materials & Supplies	$ 860.00	$ 500.00	$ 500.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-11-41310-4261	Computer Software & Maint.	$ 99.99	$ -	$ -
10-11-41310-4530	Administrative Cost	$ -	$ (382,260.00)	$ (418,422.00)
10-11-41310-5003	Special Projects	$ 48,308.49	$ 11,000.00	$ 11,000.00
10-11-41310-9154	Due To Fleet Fund	$ 25,700.16	$ -	$ -
41310	**Executive**	**$ 1,156,620.28**	**$ 967,429.00**	**$ 633,349.00**
41410	**Finance**			
10-11-41410-1111	Salaries - Full-Time Permanent	$ 500,440.11	$ 693,462.00	$ 495,162.00
10-11-41410-1112	Salaries - Part-Time Permanent	$ 52,275.36	$ 48,516.00	$ -
10-11-41410-1211	Overtime	$ 878.32	$ 1,500.00	$ 1,500.00
10-11-41410-1300	Employee Benefits (401K & 457)	$ 23,751.84	$ 31,206.00	$ 26,466.00
10-11-41410-1321	Clothing Allowance	$ 850.00	$ 1,020.00	$ 580.00
10-11-41410-1511	FICA	$ 3,258.13	$ 3,009.00	$ -
10-11-41410-1512	Medicare	$ 7,995.91	$ 10,766.00	$ 6,283.00
10-11-41410-1521	Retirement	$ 82,398.42	$ 106,875.00	$ 72,389.00
10-11-41410-1531	State Insurance Fund	$ 214.48	$ 2,044.00	$ 595.00
10-11-41410-1541	Health Insurance	$ 113,640.93	$ 153,205.00	$ 102,504.00
10-11-41410-1545	Dental Insurance	$ 10,044.55	$ 12,988.00	$ 6,744.00
10-11-41410-1548	Vision Insurance	$ 1,643.00	$ 2,133.00	$ 1,392.00
10-11-41410-1561	Long Term Disability	$ 2,806.75	$ 3,679.00	$ 2,236.00
10-11-41410-2121	Dues & Memberships	$ 1,268.00	$ 1,829.00	$ 2,325.00
10-11-41410-2321	Travel & Training	$ 9,233.97	$ 15,250.00	$ 18,400.00
10-11-41410-2369	Meetings	$ 1,176.25	$ 600.00	$ 600.00
10-11-41410-2411	Office Expense & Supplies	$ 22,333.72	$ 30,600.00	$ 30,600.00
10-11-41410-2513	Equipment Materials & Supplies	$ -	$ 1,500.00	$ 1,500.00
10-11-41410-4140	Banking Fees	$ 49,553.34	$ 61,200.00	$ 61,200.00
10-11-41410-4261	Computer Software & Maint.	$ 79,008.16	$ 115,237.00	$ 52,910.00
10-11-41410-4530	Administrative Cost	$ -	$ (752,786.00)	$ (372,529.00)
10-11-41410-4531	Professional & Technical Servi	$ 48,521.91	$ 44,470.00	$ 4,470.00
10-11-41410-6110	Contractual Agreements	$ -	$ 27,600.00	$ 27,600.00
41410	**Finance**	**$ 1,015,842.78**	**$ 615,903.00**	**$ 542,927.00**
41411	**Accounting**			
10-11-41411-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 248,065.00
10-11-41411-1112	Salaries - Part-Time Permanent	$ -	$ -	$ 33,075.00
10-11-41411-1114	Salaries - Seasonal	$ -	$ -	$ 51,773.00
10-11-41411-1211	Overtime	$ -	$ -	$ 1,500.00
10-11-41411-1300	Employee Benefits (401K & 457)	$ -	$ -	$ 10,836.00
10-11-41411-1321	Clothing Allowance	$ -	$ -	$ 450.00
10-11-41411-1511	FICA	$ -	$ -	$ 5,261.00
10-11-41411-1512	Medicare	$ -	$ -	$ 4,831.00
10-11-41411-1521	Retirement	$ -	$ -	$ 35,202.00
10-11-41411-1531	State Insurance Fund	$ -	$ -	$ 400.00
10-11-41411-1541	Health Insurance	$ -	$ -	$ 73,693.00
10-11-41411-1545	Dental Insurance	$ -	$ -	$ 4,918.00
10-11-41411-1548	Vision Insurance	$ -	$ -	$ 725.00
10-11-41411-1561	Long Term Disability	$ -	$ -	$ 1,310.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-11-41411-2121	Dues & Memberships	$ -	$ -	$ 434.00
10-11-41411-2321	Travel & Training	$ -	$ -	$ 2,600.00
10-11-41411-2369	Meetings	$ -	$ -	$ 600.00
10-11-41411-2411	Office Expense & Supplies	$ -	$ -	$ 500.00
10-11-41411-2513	Equipment Materials & Supplies	$ -	$ -	$ 1,500.00
10-11-41411-4261	Computer Software & Maint.	$ -	$ -	$ 36,000.00
10-11-41411-4530	Administrative Cost	$ -	$ -	$ (225,310.00)
10-11-41411-4531	Professional & Technical Servi	$ -	$ -	$ 40,000.00
41411	**Accounting**	**$ -**	**$ -**	**$ 328,363.00**
41460	**Risk Management**			
10-11-41460-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 94,581.00
10-11-41460-1300	Employee Benefits (401K & 457)	$ -	$ -	$ 1,877.00
10-11-41460-1321	Clothing Allowance	$ -	$ -	$ 100.00
10-11-41460-1512	Medicare	$ -	$ -	$ 1,372.00
10-11-41460-1521	Retirement	$ -	$ -	$ 13,422.00
10-11-41460-1531	State Insurance Fund	$ -	$ -	$ 113.00
10-11-41460-1541	Health Insurance	$ -	$ -	$ 15,567.00
10-11-41460-1545	Dental Insurance	$ -	$ -	$ 786.00
10-11-41460-1548	Vision Insurance	$ -	$ -	$ 180.00
10-11-41460-1561	Long Term Disability	$ -	$ -	$ 491.00
10-11-41460-2121	Dues & Memberships	$ -	$ -	$ 1,660.00
10-11-41460-2321	Travel & Training	$ -	$ -	$ 3,700.00
10-11-41460-2411	Office Expense & Supplies	$ -	$ -	$ 4,600.00
10-11-41460-4530	Administrative Cost	$ -	$ -	$ (274,116.00)
10-11-41460-6211	LIability Insurance Premium	$ -	$ -	$ 375,046.00
41460	**Risk Management**	**$ -**	**$ -**	**$ 239,379.00**
41510	**Customer Services**			
10-11-41510-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 90,985.00
10-11-41510-1112	Salaries - Part-Time Permanent	$ -	$ -	$ 92,427.00
10-11-41510-1300	Employee Benefits (401K & 457)	$ -	$ -	$ 5,597.00
10-11-41510-1321	Clothing Allowance	$ -	$ -	$ 350.00
10-11-41510-1512	Medicare	$ -	$ -	$ 2,661.00
10-11-41510-1521	Retirement	$ -	$ -	$ 12,912.00
10-11-41510-1531	State Insurance Fund	$ -	$ -	$ 222.00
10-11-41510-1541	Health Insurance	$ -	$ -	$ 11,548.00
10-11-41510-1545	Dental Insurance	$ -	$ -	$ 540.00
10-11-41510-1548	Vision Insurance	$ -	$ -	$ 129.00
10-11-41510-1561	Long Term Disability	$ -	$ -	$ 473.00
10-11-41510-2321	Travel & Training	$ -	$ -	$ 1,500.00
10-11-41510-2369	Meetings	$ -	$ -	$ 300.00
10-11-41510-2411	Office Expense & Supplies	$ -	$ -	$ 1,000.00
10-11-41510-2513	Equipment Materials & Supplies	$ -	$ -	$ 1,500.00
10-11-41510-4530	Administrative Cost	$ -	$ -	$ (90,804.00)
10-11-41510-4531	Professional & Technical Servi	$ -	$ -	$ 1,000.00
41510	**Customer Services**	**$ -**	**$ -**	**$ 132,340.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
41710	**Engineering**			
10-11-41710-1111	Salaries - Full-Time Permanent	$ 800,396.05	$ 797,123.00	$ 1,006,754.00
10-11-41710-1211	Overtime	$ 4,643.85	$ 4,000.00	$ 6,500.00
10-11-41710-1300	Employee Benefits (401K & 457)	$ 46,330.00	$ 46,895.00	$ 42,615.00
10-11-41710-1321	Clothing Allowance	$ 2,927.02	$ 2,450.00	$ 3,150.00
10-11-41710-1512	Medicare	$ 11,598.08	$ 11,564.00	$ 14,604.00
10-11-41710-1521	Retirement	$ 128,566.94	$ 119,278.00	$ 145,733.00
10-11-41710-1531	State Insurance Fund	$ 5,912.84	$ 12,588.00	$ 16,224.00
10-11-41710-1541	Health Insurance	$ 137,295.49	$ 146,729.00	$ 211,235.00
10-11-41710-1545	Dental Insurance	$ 10,507.63	$ 11,914.00	$ 13,708.00
10-11-41710-1548	Vision Insurance	$ 1,729.80	$ 1,957.00	$ 2,841.00
10-11-41710-1561	Long Term Disability	$ 4,402.16	$ 4,055.00	$ 5,247.00
10-11-41710-2121	Dues & Memberships	$ 2,020.17	$ 1,780.00	$ 2,280.00
10-11-41710-2321	Travel & Training	$ 9,316.52	$ 8,100.00	$ 15,230.00
10-11-41710-2369	Meetings	$ 64.39	$ 500.00	$ 580.00
10-11-41710-2411	Office Expense & Supplies	$ 339.91	$ 800.00	$ 900.00
10-11-41710-2513	Equipment Materials & Supplies	$ 3,941.18	$ 8,050.00	$ 8,850.00
10-11-41710-2523	Blue Stakes Supplies	$ 3,319.19	$ 4,500.00	$ 5,500.00
10-11-41710-4261	Computer Software & Maint.	$ 64,176.91	$ 2,700.00	$ 2,800.00
10-11-41710-4530	Administrative Cost	$ -	$ (1,109,968.00)	$ (1,452,758.00)
10-11-41710-4531	Professional & Technical Servi	$ 65,065.50	$ 105,000.00	$ 30,000.00
10-11-41710-9154	Due To Fleet Fund	$ 81,678.96	$ 114,260.00	$ 100,897.00
41710	**Engineering**	**$ 1,384,232.59**	**$ 294,275.00**	**$ 182,890.00**
41910	**Economic Development**			
10-18-41910-1111	Salaries - Full-Time Permanent	$ 86,229.33	$ 103,593.00	$ 131,250.00
10-18-41910-1242	Car Allowance	$ -	$ -	$ 3,600.00
10-18-41910-1300	Employee Benefits (401K & 457)	$ 3,120.00	$ 3,710.00	$ 8,138.00
10-18-41910-1321	Clothing Allowance	$ 80.00	$ 90.00	$ 100.00
10-18-41910-1512	Medicare	$ 1,259.87	$ 1,503.00	$ 1,904.00
10-18-41910-1521	Retirement	$ 14,256.32	$ 15,539.00	$ 18,625.00
10-18-41910-1531	State Insurance Fund	$ 18.66	$ 1,866.00	$ 157.00
10-18-41910-1541	Health Insurance	$ 13,841.64	$ 16,148.00	$ 21,055.00
10-18-41910-1545	Dental Insurance	$ 1,227.41	$ 1,381.00	$ 1,405.00
10-18-41910-1548	Vision Insurance	$ 200.16	$ 226.00	$ 290.00
10-18-41910-1561	Long Term Disability	$ 453.04	$ 511.00	$ 650.00
10-18-41910-2121	Dues & Memberships	$ 21,852.56	$ 27,355.00	$ 24,055.00
10-18-41910-2321	Travel & Training	$ 7,748.34	$ 15,500.00	$ 44,800.00
10-18-41910-2369	Meetings	$ 643.57	$ 1,000.00	$ 2,000.00
10-18-41910-4261	Computer Software & Maint.	$ 28,500.00	$ -	$ 1,350.00
10-18-41910-4531	Professional & Technical Servi	$ 119,377.65	$ 180,000.00	$ 25,000.00
10-18-41910-5780	Marketing Tools	$ 6,010.45	$ 20,000.00	$ 45,300.00
10-18-41910-6522	Economic Development	$ 7,487.68	$ 15,000.00	$ 25,000.00
10-18-41910-6525	Development Agreements	$ 3,066,552.72	$ 5,022,083.00	$ 6,480,000.00
41910	**Economic Development**	**$ 3,378,859.40**	**$ 5,425,505.00**	**$ 6,834,679.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
41940	**Recreation**			
10-18-41940-1111	Salaries - Full-Time Permanent	$ 171,799.26	$ 188,949.00	$ 204,625.00
10-18-41940-1112	Salaries - Part-Time Permanent	$ 32,321.50	$ 56,160.00	$ 102,102.00
10-18-41940-1114	Salaries - Seasonal	$ -	$ -	$ 58,968.00
10-18-41940-1211	Overtime	$ 5,109.40	$ 7,000.00	$ 7,000.00
10-18-41940-1300	Employee Benefits (401K & 457)	$ 11,011.69	$ 11,695.00	$ 10,753.00
10-18-41940-1321	Clothing Allowance	$ 627.50	$ 633.00	$ 1,433.00
10-18-41940-1511	FICA	$ 2,003.98	$ 3,500.00	$ 3,657.00
10-18-41940-1512	Medicare	$ 3,015.58	$ 3,561.00	$ 5,311.00
10-18-41940-1521	Retirement	$ 30,027.98	$ 29,675.00	$ 31,563.00
10-18-41940-1531	State Insurance Fund	$ 3,170.94	$ 4,334.00	$ 6,529.00
10-18-41940-1541	Health Insurance	$ 41,774.44	$ 45,172.00	$ 53,221.00
10-18-41940-1545	Dental Insurance	$ 3,550.76	$ 3,707.00	$ 3,387.00
10-18-41940-1548	Vision Insurance	$ 588.36	$ 616.00	$ 712.00
10-18-41940-1561	Long Term Disability	$ 1,019.93	$ 1,067.00	$ 1,114.00
10-18-41940-2121	Dues & Memberships	$ 1,215.00	$ 820.00	$ 1,075.00
10-18-41940-2321	Travel & Training	$ 6,442.49	$ 7,500.00	$ 10,000.00
10-18-41940-2369	Meetings	$ -	$ -	$ 500.00
10-18-41940-2513	Equipment Materials & Supplies	$ 4,515.77	$ 6,000.00	$ 6,000.00
10-18-41940-4261	Computer Software & Maint.	$ -	$ 2,000.00	$ 2,000.00
10-18-41940-4531	Professional & Technical Servi	$ 2,240.00	$ 1,240.00	$ 1,350.00
10-18-41940-4811	Equipment Rental/Lease	$ -	$ 5,000.00	$ -
10-18-41940-5711	Youth Sports	$ 99,978.50	$ 114,000.00	$ 151,700.00
10-18-41940-5712	Adult Sports	$ 6,906.68	$ 16,800.00	$ 14,300.00
10-18-41940-9154	Due To Fleet Fund	$ 20,928.00	$ 36,579.00	$ 38,671.00
41940	**Recreation**	**$ 455,473.21**	**$ 546,008.00**	**$ 715,971.00**
41950	**Operations & Facilities**			
10-19-41950-1111	Salaries - Full-Time Permanent	$ 120,060.18	$ 184,039.00	$ 194,937.00
10-19-41950-1112	Salaries - Part-Time Permanent	$ 44,644.79	$ 47,192.00	$ 55,642.00
10-19-41950-1211	Overtime	$ 1,020.38	$ 7,000.00	$ 7,000.00
10-19-41950-1300	Employee Benefits (401K & 457)	$ 6,397.04	$ 10,434.00	$ 5,567.00
10-19-41950-1321	Clothing Allowance	$ 750.00	$ 1,300.00	$ 900.00
10-19-41950-1511	FICA	$ 2,795.87	$ 2,927.00	$ 3,450.00
10-19-41950-1512	Medicare	$ 2,384.24	$ 3,357.00	$ 3,638.00
10-19-41950-1521	Retirement	$ 20,210.22	$ 28,586.00	$ 28,683.00
10-19-41950-1531	State Insurance Fund	$ 3,674.54	$ 4,073.00	$ 4,042.00
10-19-41950-1541	Health Insurance	$ 23,772.44	$ 43,806.00	$ 51,176.00
10-19-41950-1545	Dental Insurance	$ 1,579.56	$ 3,117.00	$ 2,853.00
10-19-41950-1548	Vision Insurance	$ 265.44	$ 518.00	$ 598.00
10-19-41950-1561	Long Term Disability	$ 663.86	$ 1,184.00	$ 1,082.00
10-19-41950-2321	Travel & Training	$ 100.43	$ 3,500.00	$ -
10-19-41950-2513	Equipment Materials & Supplies	$ 29,504.51	$ 27,000.00	$ 40,000.00
10-19-41950-2610	Building & Grounds Maint	$ 72,137.87	$ 80,000.00	$ 100,000.00
10-19-41950-2612	Janitorial-Custdial Supplies	$ 28,906.23	$ 30,000.00	$ 30,000.00
10-19-41950-3111	Utilities	$ 68,720.75	$ 77,334.00	$ 77,334.00
10-19-41950-4261	Computer Software & Maint.	$ 11,919.30	$ 11,897.00	$ 11,897.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-19-41950-4530	Administrative Cost	$ -	$ (322,918.00)	$ (318,692.00)
10-19-41950-4531	Professional & Technical Servi	$ 22,558.03	$ 8,200.00	$ 9,000.00
10-19-41950-6110	Contractual Agreements	$ 25,300.00	$ -	$ -
10-19-41950-7211	Building & Bldg Improvements	$ -	$ 15,000.00	$ 75,000.00
10-19-41950-7552	Furniture	$ 55,627.20	$ 30,000.00	$ 30,000.00
10-19-41950-9154	Due To Fleet Fund	$ 33,216.96	$ 88,217.00	$ 49,256.00
41950	**Operations & Facilities**	**$ 576,209.84**	**$ 385,763.00**	**$ 463,363.00**
41955	**Information Systems**			
10-19-41955-1111	Salaries - Full-Time Permanent	$ 43,479.76	$ 93,752.00	$ 100,902.00
10-19-41955-1211	Overtime	$ 153.23	$ -	$ -
10-19-41955-1300	Employee Benefits (401K & 457)	$ 2,426.96	$ 5,512.00	$ 6,185.00
10-19-41955-1321	Clothing Allowance	$ 10.00	$ 110.00	$ 110.00
10-19-41955-1512	Medicare	$ 615.38	$ 1,360.00	$ 1,464.00
10-19-41955-1521	Retirement	$ 7,055.95	$ 13,397.00	$ 14,585.00
10-19-41955-1531	State Insurance Fund	$ 27.99	$ 306.00	$ 121.00
10-19-41955-1541	Health Insurance	$ 8,864.91	$ 21,549.00	$ 23,616.00
10-19-41955-1545	Dental Insurance	$ 792.62	$ 1,689.00	$ 1,546.00
10-19-41955-1548	Vision Insurance	$ 129.38	$ 277.00	$ 319.00
10-19-41955-1561	Long Term Disability	$ 236.44	$ 490.00	$ 527.00
10-19-41955-2121	Dues & Memberships	$ 313.00	$ 200.00	$ 150.00
10-19-41955-2321	Travel & Training	$ 600.00	$ 760.00	$ 1,500.00
10-19-41955-2411	Office Expense & Supplies	$ -	$ 200.00	$ -
10-19-41955-2513	Equipment Materials & Supplies	$ 7,806.26	$ 8,000.00	$ 8,000.00
10-19-41955-3311	Telecommunication	$ 39,113.25	$ 45,000.00	$ 41,000.00
10-19-41955-3313	Cell Phone	$ 115,105.31	$ 95,000.00	$ 84,000.00
10-19-41955-3315	Internet Service	$ 33,877.52	$ 34,200.00	$ 34,950.00
10-19-41955-4221	Website Maintenance	$ 30,982.24	$ 53,150.00	$ 44,150.00
10-19-41955-4222	Printer/Copier Maintenance	$ 10,784.06	$ 1,760.00	$ 1,600.00
10-19-41955-4261	Computer Software & Maint.	$ 197,148.71	$ 330,250.00	$ 344,592.00
10-19-41955-4530	Administrative Cost	$ -	$ (291,695.00)	$ (451,739.00)
10-19-41955-4531	Professional & Technical Servi	$ 307,258.56	$ 187,500.00	$ 190,000.00
10-19-41955-7410	Equipment	$ -	$ 6,050.00	$ -
10-19-41955-7412	Computer Equipment	$ 154,514.74	$ 125,000.00	$ 131,500.00
41955	**Information Systems**	**$ 961,296.27**	**$ 733,817.00**	**$ 579,078.00**
41970	**Communications**			
10-19-41970-1111	Salaries - Full-Time Permanent	$ 159,233.71	$ 169,947.00	$ 170,561.00
10-19-41970-1112	Salaries - Part-Time Permanent	$ 26,187.37	$ 32,602.00	$ 36,495.00
10-19-41970-1211	Overtime	$ 476.87	$ 1,000.00	$ 1,500.00
10-19-41970-1300	Employee Benefits (401K & 457)	$ 3,792.10	$ 3,985.00	$ 10,543.00
10-19-41970-1321	Clothing Allowance	$ 200.00	$ 300.00	$ 300.00
10-19-41970-1511	FICA	$ 1,623.62	$ 2,022.00	$ 2,263.00
10-19-41970-1512	Medicare	$ 2,628.07	$ 2,938.00	$ 3,005.00
10-19-41970-1521	Retirement	$ 25,233.65	$ 24,641.00	$ 24,204.00
10-19-41970-1531	State Insurance Fund	$ 195.83	$ 2,012.00	$ 3,749.00
10-19-41970-1541	Health Insurance	$ 30,094.44	$ 31,208.00	$ 36,435.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-19-41970-1545	Dental Insurance	$ 2,392.32	$ 2,394.00	$ 2,191.00
10-19-41970-1548	Vision Insurance	$ 405.72	$ 407.00	$ 470.00
10-19-41970-1561	Long Term Disability	$ 883.09	$ 887.00	$ 934.00
10-19-41970-2121	Dues & Memberships	$ 1,155.95	$ 1,500.00	$ 1,000.00
10-19-41970-2321	Travel & Training	$ 1,528.56	$ 2,386.00	$ 1,500.00
10-19-41970-2369	Meetings	$ 114.30	$ 300.00	$ 300.00
10-19-41970-2513	Equipment Materials & Supplies	$ -	$ 12,114.00	$ 9,000.00
10-19-41970-4261	Computer Software & Maint.	$ -	$ 26,842.00	$ 3,000.00
10-19-41970-4530	Administrative Cost	$ -	$ (103,559.00)	$ (155,131.00)
10-19-41970-4531	Professional & Technical Servi	$ 110,699.16	$ 42,100.00	$ -
10-19-41970-4541	Printing & Mailing	$ 12,852.43	$ 8,000.00	$ 20,000.00
10-19-41970-5003	Special Projects	$ 170.00	$ 47,500.00	$ 2,500.00
10-19-41970-5005	EM City Merchandise	$ 2,953.86	$ 3,000.00	$ 20,000.00
41970	**Communications**	**$ 384,339.04**	**$ 314,526.00**	**$ 194,819.00**
41980	**Human Resources**			
10-19-41980-1111	Salaries - Full-Time Permanent	$ 146,459.75	$ 234,593.00	$ 339,061.00
10-19-41980-1211	Overtime	$ 97.50	$ -	$ -
10-19-41980-1300	Employee Benefits (401K & 457)	$ 9,086.54	$ 14,472.00	$ 20,904.00
10-19-41980-1321	Clothing Allowance	$ 200.00	$ 200.00	$ 410.00
10-19-41980-1512	Medicare	$ 2,095.09	$ 3,403.00	$ 4,920.00
10-19-41980-1521	Retirement	$ 23,713.92	$ 34,706.00	$ 48,381.00
10-19-41980-1531	State Insurance Fund	$ 46.61	$ 281.00	$ 408.00
10-19-41980-1541	Health Insurance	$ 23,504.66	$ 36,271.00	$ 67,868.00
10-19-41980-1545	Dental Insurance	$ 1,867.60	$ 2,704.00	$ 3,821.00
10-19-41980-1548	Vision Insurance	$ 311.62	$ 451.00	$ 824.00
10-19-41980-1561	Long Term Disability	$ 812.00	$ 1,228.00	$ 1,701.00
10-19-41980-2121	Dues & Memberships	$ 1,768.68	$ 919.00	$ 1,069.00
10-19-41980-2321	Travel & Training	$ 12,589.81	$ 16,100.00	$ 20,395.00
10-19-41980-2371	Education Assistance	$ 16,840.51	$ 15,000.00	$ 17,500.00
10-19-41980-2377	Wellness Committee	$ 7,559.52	$ 6,500.00	$ 6,600.00
10-19-41980-2378	Safety Award	$ 1,869.17	$ 1,500.00	$ 1,500.00
10-19-41980-2379	Employee Activities	$ 45,006.22	$ 40,000.00	$ 41,000.00
10-19-41980-2411	Office Expense & Supplies	$ 667.83	$ 500.00	$ 2,372.00
10-19-41980-2431	Uniform & Clothing	$ 2,218.50	$ 2,700.00	$ 5,600.00
10-19-41980-4261	Computer Software & Maint.	$ 43,323.75	$ 51,000.00	$ 81,000.00
10-19-41980-4530	Administrative Cost	$ -	$ (142,325.00)	$ (315,150.00)
10-19-41980-4531	Professional & Technical Servi	$ 42,249.35	$ 112,841.00	$ 126,850.00
41980	**Human Resources**	**$ 382,288.63**	**$ 433,044.00**	**$ 477,034.00**
41990	**Special Events**			
10-18-41990-1111	Salaries - Full-Time Permanent	$ 164,569.74	$ 172,198.00	$ 180,756.00
10-18-41990-1112	Salaries - Part-Time Permanent	$ 1,872.72	$ -	$ -
10-18-41990-1211	Overtime	$ 31,839.22	$ 15,000.00	$ 30,000.00
10-18-41990-1300	Employee Benefits (401K & 457)	$ 7,582.27	$ 6,447.00	$ 6,777.00
10-18-41990-1321	Clothing Allowance	$ 914.00	$ 919.00	$ 919.00
10-18-41990-1511	FICA	$ 120.27	$ -	$ -

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-18-41990-1512	Medicare	$ 2,898.68	$ 2,499.00	$ 2,625.00
10-18-41990-1521	Retirement	$ 32,783.62	$ 25,928.00	$ 25,792.00
10-18-41990-1531	State Insurance Fund	$ 2,200.99	$ 3,016.00	$ 3,179.00
10-18-41990-1541	Health Insurance	$ 39,809.40	$ 39,170.00	$ 45,177.00
10-18-41990-1545	Dental Insurance	$ 2,668.56	$ 2,561.00	$ 2,345.00
10-18-41990-1548	Vision Insurance	$ 451.70	$ 436.00	$ 503.00
10-18-41990-1561	Long Term Disability	$ 1,035.78	$ 1,001.00	$ 1,033.00
10-18-41990-2321	Travel & Training	$ 8,869.75	$ 7,000.00	$ 10,000.00
10-18-41990-2369	Meetings	$ -	$ 1,500.00	$ 1,500.00
10-18-41990-2513	Equipment Materials & Supplies	$ 953.77	$ 8,350.00	$ 8,350.00
10-18-41990-4531	Professional & Technical Servi	$ 891.36	$ 1,025.00	$ 3,000.00
10-18-41990-5821	Fireworks	$ 250.00	$ -	$ -
10-18-41990-5850	Veterans Board	$ -	$ 2,100.00	$ 2,100.00
10-18-41990-5851	Youth Council	$ 1,301.56	$ 12,000.00	$ 12,000.00
10-18-41990-5852	Senior Council	$ 6,877.05	$ 8,000.00	$ 15,000.00
10-18-41990-5856	Special Events	$ 135,410.03	$ 199,000.00	$ 170,000.00
10-18-41990-5858	Pony Express Days Celebration	$ 57,630.78	$ 60,000.00	$ 65,000.00
10-18-41990-5859	Miss Eagle Mountain Pageant	$ 11,213.50	$ 10,020.00	$ 10,020.00
10-18-41990-9154	Due To Fleet Fund	$ 11,919.00	$ 17,465.00	$ 15,417.00
41990	**Special Events**	**$ 568,655.45**	**$ 595,635.00**	**$ 611,493.00**
42100	**Public Safety**			
10-21-42100-1111	Salaries - Full-Time Permanent	$ 63,160.47	$ 79,691.00	$ 83,259.00
10-21-42100-1112	Salaries - Part-Time Permanent	$ 96,196.53	$ 169,845.00	$ -
10-21-42100-1114	Salaries - Seasonal	$ -	$ -	$ 177,450.00
10-21-42100-1211	Overtime	$ 1,553.26	$ -	$ -
10-21-42100-1300	Employee Benefits (401K & 457)	$ 1,941.40	$ 2,391.00	$ -
10-21-42100-1321	Clothing Allowance	$ 100.00	$ 100.00	$ 100.00
10-21-42100-1511	FICA	$ 5,964.22	$ 10,531.00	$ 11,002.00
10-21-42100-1512	Medicare	$ 2,334.66	$ 3,619.00	$ 3,782.00
10-21-42100-1521	Retirement	$ 3,354.16	$ 3,276.00	$ 3,423.00
10-21-42100-1531	State Insurance Fund	$ 18,260.75	$ 4,496.00	$ 4,721.00
10-21-42100-1541	Health Insurance	$ 17,301.96	$ 17,942.00	$ 21,055.00
10-21-42100-1545	Dental Insurance	$ 1,534.20	$ 1,535.00	$ 1,405.00
10-21-42100-1548	Vision Insurance	$ 250.32	$ 251.00	$ 290.00
10-21-42100-1561	Long Term Disability	$ 368.64	$ 369.00	$ 442.00
10-21-42100-2121	Dues & Memberships	$ 80.00	$ 90.00	$ 90.00
10-21-42100-2321	Travel & Training	$ 1,264.44	$ 2,600.00	$ 2,600.00
10-21-42100-4410	Animal Control	$ 62,983.00	$ 70,500.00	$ 71,557.00
10-21-42100-4520	Contract Services	$ 6,665,502.20	$ 7,873,141.00	$ 9,798,139.00
10-21-42100-4525	Dispatch Services	$ 362,323.72	$ 505,993.00	$ 588,515.00
10-21-42100-4531	Professional & Technical Servi	$ -	$ 100.00	$ 100.00
10-21-42100-5002	Special Projects	$ 5,421.88	$ 6,000.00	$ 6,000.00
10-21-42100-5230	Emergency Management	$ 4,739.76	$ 4,000.00	$ 4,000.00
10-21-42100-5235	CERT Training	$ 2,312.42	$ 2,000.00	$ 2,000.00
10-21-42100-5859	Rad Women/Kids	$ 5,317.00	$ 6,000.00	$ 6,000.00
10-21-42100-5860	Community Safety/VIPS	$ 5,687.48	$ 3,000.00	$ 3,000.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-21-42100-5861	Communities That Care Program	$ -	$ 7,000.00	$ 7,000.00
10-21-42100-5862	DUI Blitzes w/ Alcohol Tax Fnd	$ -	$ 35,000.00	$ 35,000.00
10-21-42100-7415	Emergency Management Equipment	$ 20,095.19	$ 6,500.00	$ 6,500.00
10-21-42100-9498	Restricted Interim Budget - Contract Services	$ -	$ -	$ -
42100	**Public Safety**	**$ 7,348,047.66**	**$ 8,815,970.00**	**$ 10,837,430.00**
42430	**Neighborhood Improvement**			
10-31-42430-1111	Salaries - Full-Time Permanent	$ 181,549.55	$ 212,014.00	$ 295,098.00
10-31-42430-1112	Salaries - Part-Time Permanent	$ 342.99	$ -	$ -
10-31-42430-1211	Overtime	$ 64.75	$ -	$ 1,000.00
10-31-42430-1300	Employee Benefits (401k & 457)	$ 11,260.22	$ 13,080.00	$ 16,081.00
10-31-42430-1321	Clothing Allowance	$ 1,200.00	$ 1,300.00	$ 1,700.00
10-31-42430-1511	FICA	$ 21.26	$ -	$ -
10-31-42430-1512	Medicare	$ 2,584.91	$ 3,077.00	$ 4,281.00
10-31-42430-1521	Retirement	$ 29,351.02	$ 31,357.00	$ 41,877.00
10-31-42430-1531	State Insurance Fund	$ -	$ 3,055.00	$ 3,280.00
10-31-42430-1541	Health Insurance	$ 38,823.20	$ 43,499.00	$ 52,293.00
10-31-42430-1545	Dental Insurance	$ 2,536.70	$ 2,795.00	$ 2,292.00
10-31-42430-1548	Vision Insurance	$ 437.56	$ 481.00	$ 532.00
10-31-42430-1561	Long Term Disability	$ 1,183.09	$ 1,230.00	$ 1,610.00
10-31-42430-2121	Dues & Memberships	$ 2,039.06	$ 225.00	$ 425.00
10-31-42430-2321	Travel & Training	$ -	$ 1,000.00	$ 1,000.00
10-31-42430-2369	Meetings	$ 112.23	$ 300.00	$ 600.00
10-31-42430-2411	Office Expense & Supplies	$ 109.92	$ 300.00	$ -
10-31-42430-2513	Equipment Materials & Supplies	$ 476.67	$ 1,500.00	$ 1,500.00
10-31-42430-4261	Computer Software & Maint.	$ 4,700.97	$ 35,000.00	$ 35,000.00
10-31-42430-5002	Special Projects	$ 1,904.64	$ 20,000.00	$ 20,000.00
10-31-42430-6110	Contractual Agreements	$ 26,450.00	$ 27,600.00	$ 27,600.00
10-31-42430-9154	Due To Fleet Fund	$ -	$ 36,750.00	$ 53,586.00
42430	**Neighborhood Improvement**	**$ 306,344.07**	**$ 434,563.00**	**$ 559,755.00**
44100	**Streets & Roads**			
10-41-44100-1111	Salaries - Full-Time Permanent	$ 534,836.07	$ 665,287.00	$ 754,274.00
10-41-44100-1112	Salaries - Part-Time Permanent	$ 6,791.25	$ 33,286.00	$ -
10-41-44100-1114	Salaries - Seasonal	$ -	$ -	$ 34,776.00
10-41-44100-1211	Overtime	$ 15,109.39	$ 25,000.00	$ 25,000.00
10-41-44100-1300	Employee Benefits (401k & 457)	$ 27,768.23	$ 30,068.00	$ 42,010.00
10-41-44100-1321	Clothing Allowance	$ 4,206.50	$ 4,267.00	$ 4,667.00
10-41-44100-1511	FICA	$ 421.06	$ 2,064.00	$ 2,158.00
10-41-44100-1512	Medicare	$ 8,090.55	$ 10,138.00	$ 11,451.00
10-41-44100-1521	Retirement	$ 91,232.77	$ 101,316.00	$ 111,343.00
10-41-44100-1531	State Insurance Fund	$ 7,628.83	$ 13,566.00	$ 15,443.00
10-41-44100-1541	Health Insurance	$ 125,465.94	$ 154,921.00	$ 188,507.00
10-41-44100-1545	Dental Insurance	$ 10,442.11	$ 12,593.00	$ 11,498.00
10-41-44100-1548	Vision Insurance	$ 1,730.91	$ 2,099.00	$ 2,425.00
10-41-44100-1561	Long Term Disability	$ 3,101.11	$ 3,685.00	$ 4,125.00
10-41-44100-2321	Travel & Training	$ 8,819.74	$ 10,200.00	$ 11,015.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-41-44100-2369	Meetings	$ 100.35	$ 600.00	$ 600.00
10-41-44100-2513	Equipment Materials & Supplies	$ 69,181.65	$ 77,000.00	$ 87,000.00
10-41-44100-3111	Utilities	$ -	$ 56,160.00	$ 66,640.00
10-41-44100-4261	Computer Software & Maint.	$ 11,544.30	$ 12,122.00	$ 12,728.00
10-41-44100-4394	Collar Maintenance	$ -	$ 5,000.00	$ -
10-41-44100-4530	Administrative Cost	$ -	$ -	$ 365,188.00
10-41-44100-4531	Professional & Technical Servi	$ 54,850.00	$ 57,850.00	$ 20,000.00
10-41-44100-4811	Equipment Rental/Lease	$ 12,919.04	$ 23,900.00	$ 45,000.00
10-41-44100-5121	Unimproved Road Maint.	$ 9,923.83	$ 20,000.00	$ 20,000.00
10-41-44100-5122	Paved Road Maint.	$ 1,530,812.54	$ 2,350,000.00	$ 2,000,000.00
10-41-44100-5123	Snow Removal	$ 64,694.18	$ 100,000.00	$ 110,000.00
10-41-44100-5124	Sidewalk Maintenance	$ 67,704.23	$ 85,000.00	$ 95,000.00
10-41-44100-5140	Street Light New Install	$ 1,225,222.22	$ 1,000,000.00	$ 1,500,000.00
10-41-44100-5141	Street Light Maintenance	$ 351,655.95	$ 290,000.00	$ 310,000.00
10-41-44100-5142	Traffic Signal Maintenance	$ 24,551.15	$ 30,000.00	$ 35,000.00
10-41-44100-5730	Street Sign Maintenance	$ 47,235.77	$ 65,000.00	$ 75,000.00
10-41-44100-9154	Due To Fleet Fund	$ 314,277.00	$ 308,894.00	$ 309,759.00
44100	**Streets & Roads**	**$ 4,697,075.96**	**$ 5,612,846.00**	**$ 6,270,607.00**
45100	**Parks**			
10-41-45100-1111	Salaries - Full-Time Permanent	$ 635,848.24	$ 758,155.00	$ 1,001,458.00
10-41-45100-1112	Salaries - Part-Time Permanent	$ 47,494.49	$ 55,420.00	$ -
10-41-45100-1114	Salaries - Seasonal	$ -	$ -	$ 58,191.00
10-41-45100-1211	Overtime	$ 32,548.57	$ 23,000.00	$ 23,000.00
10-41-45100-1300	Employee Benefits (401k & 457)	$ 38,165.49	$ 42,989.00	$ 60,176.00
10-41-45100-1321	Clothing Allowance	$ 5,245.73	$ 5,618.00	$ 6,728.00
10-41-45100-1511	FICA	$ 3,036.41	$ 3,454.00	$ 3,608.00
10-41-45100-1512	Medicare	$ 10,409.55	$ 11,812.00	$ 15,374.00
10-41-45100-1521	Retirement	$ 110,568.52	$ 115,437.00	$ 144,801.00
10-41-45100-1531	State Insurance Fund	$ 12,959.98	$ 14,202.00	$ 18,693.00
10-41-45100-1541	Health Insurance	$ 129,872.94	$ 160,524.00	$ 209,160.00
10-41-45100-1545	Dental Insurance	$ 8,100.46	$ 10,237.00	$ 10,450.00
10-41-45100-1548	Vision Insurance	$ 1,346.28	$ 1,703.00	$ 2,242.00
10-41-45100-1561	Long Term Disability	$ 3,763.85	$ 4,457.00	$ 5,589.00
10-41-45100-2121	Dues & Memberships	$ 380.00	$ 875.00	$ 875.00
10-41-45100-2321	Travel & Training	$ 2,560.00	$ 8,400.00	$ 8,400.00
10-41-45100-2369	Meetings	$ 582.85	$ 600.00	$ 600.00
10-41-45100-2411	Office Expense & Supplies	$ 27.88	$ -	$ -
10-41-45100-2513	Equipment Materials & Supplies	$ 48,811.74	$ 40,000.00	$ 50,000.00
10-41-45100-2610	Building & Grounds Maint	$ 34,669.11	$ 31,000.00	$ 31,000.00
10-41-45100-3111	Utilities	$ 342,939.92	$ 365,000.00	$ 400,000.00
10-41-45100-4261	Computer Software & Maint.	$ 15,571.20	$ 20,122.00	$ 20,728.00
10-41-45100-4530	Administrative Cost	$ -	$ -	$ 253,847.00
10-41-45100-4531	Professional & Technical Servi	$ 699,341.11	$ 850,655.00	$ 795,655.00
10-41-45100-4811	Equipment Rental/Lease	$ 17,913.00	$ 29,500.00	$ 29,500.00
10-41-45100-5405	Park Amenities Repair/Replace	$ 113,475.62	$ 104,000.00	$ 134,000.00
10-41-45100-5410	Landscape Maintenance	$ 94,915.87	$ 118,000.00	$ 158,000.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-41-45100-5420	Parks Trails Pavement Mainten	$ 1,020.32	$ 100,000.00	$ 100,000.00
10-41-45100-5430	City Wide Trees	$ 181,590.72	$ 195,300.00	$ 215,300.00
10-41-45100-5721	Chemicals & Fertilizers	$ 3,188.43	$ 8,000.00	$ 8,000.00
10-41-45100-9154	Due To Fleet Fund	$ 190,476.96	$ 216,596.00	$ 245,564.00
45100	**Parks**	**$ 2,912,398.70**	**$ 3,295,056.00**	**$ 4,010,939.00**
45200	**Open Space**			
10-41-45200-1111	Salaries - Full-Time Permanent	$ 39,712.46	$ 120,654.00	$ 240,350.00
10-41-45200-1112	Salaries - Part-Time Permanent	$ 728.00	$ -	$ -
10-41-45200-1211	Overtime	$ 3,523.51	$ -	$ 2,500.00
10-41-45200-1300	Employee Benefits (401k & 457)	$ 2,680.91	$ 7,482.00	$ 9,736.00
10-41-45200-1321	Clothing Allowance	$ -	$ 800.00	$ 1,396.00
10-41-45200-1511	FICA	$ 45.14	$ -	$ -
10-41-45200-1512	Medicare	$ 612.66	$ 1,751.00	$ 3,487.00
10-41-45200-1521	Retirement	$ 7,224.46	$ 19,269.00	$ 27,850.00
10-41-45200-1531	State Insurance Fund	$ -	$ 2,174.00	$ 4,353.00
10-41-45200-1541	Health Insurance	$ 6,828.73	$ 30,972.00	$ 31,593.00
10-41-45200-1545	Dental Insurance	$ 357.55	$ 2,265.00	$ 1,769.00
10-41-45200-1548	Vision Insurance	$ 64.75	$ 384.00	$ 400.00
10-41-45200-1561	Long Term Disability	$ 272.10	$ 670.00	$ 981.00
10-41-45200-2321	Travel & Training	$ 2,307.50	$ 1,500.00	$ 1,500.00
10-41-45200-2369	Meetings	$ -	$ 300.00	$ 300.00
10-41-45200-2513	Equipment Materials & Supplies	$ 401.78	$ 10,000.00	$ 10,000.00
10-41-45200-4531	Professional & Technical Servi	$ -	$ 10,000.00	$ 10,000.00
10-41-45200-4811	Equipment Rental/Lease	$ -	$ 10,000.00	$ 10,000.00
10-41-45200-5002	Special Projects	$ 42,659.61	$ 40,000.00	$ 40,000.00
10-41-45200-5410	Landscape Maintenance	$ -	$ 45,000.00	$ 45,000.00
10-41-45200-9154	Due To Fleet Fund	$ -	$ 70,355.00	$ 17,059.00
45200	**Open Space**	**$ 107,419.16**	**$ 373,576.00**	**$ 458,274.00**
45800	**Library**			
10-18-45800-1111	Salaries - Full-Time Permanent	$ 273,070.93	$ 309,939.00	$ 328,738.00
10-18-45800-1112	Salaries - Part-Time Permanent	$ 178,163.12	$ 218,319.00	$ 293,074.00
10-18-45800-1211	Overtime	$ 30.62	$ -	$ -
10-18-45800-1300	Employee Benefits (401K & 457)	$ 14,228.43	$ 15,786.00	$ 16,652.00
10-18-45800-1321	Clothing Allowance	$ 1,500.00	$ 1,500.00	$ 1,500.00
10-18-45800-1511	FICA	$ 11,108.13	$ 13,542.00	$ 18,173.00
10-18-45800-1512	Medicare	$ 6,448.13	$ 7,666.00	$ 9,025.00
10-18-45800-1521	Retirement	$ 46,048.68	$ 48,154.00	$ 49,841.00
10-18-45800-1531	State Insurance Fund	$ 820.69	$ 637.00	$ 749.00
10-18-45800-1541	Health Insurance	$ 59,409.96	$ 61,802.00	$ 73,365.00
10-18-45800-1545	Dental Insurance	$ 4,726.68	$ 4,731.00	$ 4,316.00
10-18-45800-1548	Vision Insurance	$ 803.16	$ 806.00	$ 932.00
10-18-45800-1561	Long Term Disability	$ 1,690.09	$ 1,696.00	$ 1,803.00
10-18-45800-2121	Dues & Memberships	$ 1,113.37	$ 1,295.00	$ 1,300.00
10-18-45800-2321	Travel & Training	$ 3,062.70	$ 1,500.00	$ 1,600.00
10-18-45800-2369	Meetings	$ 246.68	$ 600.00	$ 600.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
10-18-45800-2411	Office Expense & Supplies	$ 7,189.56	$ 12,500.00	$ 10,500.00
10-18-45800-2513	Equipment Materials & Supplies	$ 1,090.81	$ 20,550.00	$ 7,000.00
10-18-45800-4211	Computer Network & Data Proces	$ 10,507.93	$ 11,329.00	$ 18,219.00
10-18-45800-4261	Computer Software & Maint.	$ 13,427.09	$ 20,788.00	$ 24,100.00
10-18-45800-4531	Professional & Technical Servi	$ 15,389.81	$ 16,890.00	$ 26,050.00
10-18-45800-5791	Library Materials & Books	$ 71,588.84	$ 87,500.00	$ 92,200.00
10-18-45800-5795	Grant funded Material/Supplies	$ 12,615.47	$ 15,000.00	$ 15,000.00
10-18-45800-5856	Special Events	$ 7,239.83	$ 7,000.00	$ 8,000.00
45800	**Library**	**$ 765,122.83**	**$ 879,530.00**	**$ 1,002,737.00**
48100	**Transfers & Contributions**			
10-61-48100-9130	Due To Debt Service Fund	$ 217,921.00	$ 217,590.00	$ -
10-61-48100-9147	Due To Cap Proj Fund	$ -	$ 609,982.00	$ 5,242,007.00
10-61-48100-9164	Due to GIS Fund	$ -	$ 165,361.00	$ 136,490.00
48100	**Transfers & Contributions**	**$ 217,921.00**	**$ 1,007,933.00**	**$ 5,378,497.00**
48700	**Fund Reserve**			
10-99-48700-9499	Fund Balance Appropriation	$ -	$ 967,788.00	$ -
48700	**Fund Reserve**	**$ -**	**$ 967,788.00**	**$ -**
	Expense	**$ 30,659,472.38**	**$ 36,475,841.00**	**$ 41,499,098.00**
10	**General Fund**	**$ 4,720,121.69**	**$ (1,223,800.00)**	**$ -**
11	**Water Impact Fee Fund**			
	Revenue			
11-00-34800-0000	Impact Fees	$ 3,566,418.73	$ 2,078,250.00	$ 2,140,598.00
11-00-37010-0000	Interest Earnings	$ 566,747.07	$ -	$ 350,000.00
11-00-39920-0000	Use of Fund Reserves	$ -	$ 24,168,927.00	$ 5,983,881.00
	Revenue	**$ 4,133,165.80**	**$ 26,247,177.00**	**$ 8,474,479.00**
	Expense			
11-61-48100-9151	Due To Water Fund	$ 660,644.40	$ 550,675.00	$ 675,578.00
11-51-51000-4531	Professional & Technical Servi	$ -	$ 9,850.00	$ -
11-51-51000-6310	Developer Impact Fee Reimb.	$ 1,060,973.74	$ 985,335.00	$ -
11-81-51000-7000	Capital Projects	$ 3,233,350.27	$ 24,701,317.00	$ 7,798,901.00
	Expense	**$ 4,954,968.41**	**$ 26,247,177.00**	**$ 8,474,479.00**
11	**Water Impact Fee Fund**	**$ (821,802.61)**	**$ -**	**$ -**
12	**Sewer Impact Fee Fund**			
	Revenue			
12-00-34800-0000	Impact Fees	$ -	$ 2,954,500.00	$ 3,043,135.00
12-00-37010-0000	Interest Earnings	$ 155,841.89	$ -	$ 100,000.00
12-00-39920-0000	Use of Fund Reserves	$ -	$ 5,373,493.00	$ -
	Revenue	**$ 4,938,655.39**	**$ 8,327,993.00**	**$ 3,143,135.00**
	Expense			
12-61-48100-9152	Due To Sewer Fund	$ 1,236,350.00	$ 2,031,152.00	$ 1,827,708.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
12-51-52000-4531	Professional & Technical Servi	$ -	$ 9,850.00	$ -
12-51-52000-6310	Developer Impact Fee Reimb.	$ 174,336.63	$ 108,630.00	$ -
12-81-52000-7000	Capital Projects	$ 108,500.00	$ 2,724,086.00	$ -
12-81-52100-7306	Wastewater Treatment Plant	$ 754,158.68	$ 3,454,275.00	$ -
12-99-48700-9499	Fund Balance Appropriation	$ -	$ -	$ 1,315,427.00
	Expense	**$ 2,273,345.31**	**$ 8,327,993.00**	**$ 3,143,135.00**
12	**Wastewater Impact Fee Fund**	**$ 2,665,310.08**	**$ -**	**$ -**
15	**Parks & Trails Impact Fee Fund**			
	Revenue			
15-00-34800-0000	Impact Fees	$ 2,562,148.00	$ 3,136,500.00	$ 3,230,595.00
15-00-37010-0000	Interest Earnings	$ 337,861.60	$ -	$ 250,000.00
15-00-39920-0000	Use of Fund Reserves	$ -	$ 288,292.00	$ -
	Revenue	**$ 2,900,009.60**	**$ 3,424,792.00**	**$ 3,480,595.00**
	Expense			
15-51-45100-7000	Capital Outlay	$ 474,095.78	$ 3,424,792.00	$ -
15-61-48100-9147	Due To General Fund CP Fund	$ -	$ -	$ 89,373.00
15-99-48700-9499	Fund Balance Appropriation	$ -	$ -	$ 3,391,222.00
	Expense	**$ 474,095.78**	**$ 3,424,792.00**	**$ 3,480,595.00**
15	**Parks/Trails Impact Fee Fund**	**$ 2,425,913.82**	**$ -**	**$ -**
16	**Public Safety Impact Fee Fund**			
	Revenue			
16-00-34800-0000	Public Safety Impact Fees	$ 147,184.41	$ 35,700.00	$ 36,771.00
16-00-37010-0000	Interest Earnings	$ 8,206.31	$ -	$ 2,800.00
	Revenue	**$ 155,390.72**	**$ 35,700.00**	**$ 39,571.00**
	Expense			
16-51-42100-4531	Professional & Technical Servi	$ 6,500.00	$ -	$ -
16-99-48700-9499	Fund Balance Appropriation	$ -	$ 35,700.00	$ 39,571.00
	Expense	**$ 6,500.00**	**$ 35,700.00**	**$ 39,571.00**
16	**Public Safety Facility Impact**	**$ 148,890.72**	**$ -**	**$ -**
17	**Stormwater Impact Fee Fund**			
	Revenue			
17-00-34800-0000	Stormwater Impact Fees	$ -	$ 410,100.00	$ 422,403.00
17-00-34820-0000	EMP Property Buy In	$ 5,196.51	$ -	$ -
17-00-34825-0000	Future Facilities StrmWtr SSA	$ 567,877.53	$ -	$ -
17-00-34833-0000	Tickville Wash/Basin Eq Buy In	$ 18,030.00	$ -	$ -
17-00-34845-0000	Future Facilities StrmWtr NSA	$ 57,992.80	$ -	$ -
17-00-34850-0000	Future Facilities StrmWtr WSA	$ 22,230.00	$ -	$ -
17-00-37010-0000	Interest Earnings	$ 116,249.46	$ -	$ 65,000.00
17-00-39920-0000	Use of Fund Reserves	$ -	$ -	$ 1,012,597.00
	Revenue	**$ 787,576.30**	**$ 410,100.00**	**$ 1,500,000.00**
	Expense			

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
17-51-59000-4531	Professional & Technical Servi	$ -	$ 9,850.00	$ -
17-51-59000-6310	Developer Impact Fee Reimb.	$ 19,870.51	$ -	$ -
17-51-59000-7000	Capital Outlay	$ -	$ -	$ 1,500,000.00
17-99-48700-9499	Fund Balance Appropriation	$ -	$ 400,250.00	$ -
	Expense	**$ 19,870.51**	**$ 410,100.00**	**$ 1,500,000.00**
17	**Stormwater Impact Fee Fund**	**$ 767,705.79**	**$ -**	**$ -**
18	**Transportation Impact Fees**			
	Revenue			
18-00-34800-0000	Transportation Impact Fees	$ -	$ 4,125,050.00	$ 4,248,802.00
18-00-37010-0000	Interest Earnings	$ 30,881.27	$ -	$ 25,000.00
18-00-39920-0000	Use of Fund Reserves	$ -	$ -	$ 1,049,448.00
	Revenue	**$ 4,047,863.92**	**$ 4,125,050.00**	**$ 5,323,250.00**
	Expense			
18-51-44100-4531	Professional & Technical Servi	$ 3,900.00	$ 9,850.00	$ -
18-81-44100-7000	Capital Projects	$ 289,979.75	$ 2,086,567.00	$ -
18-61-48100-9147	Due To General Fund CP Fund	$ -	$ -	$ 3,510,000.00
18-61-48100-9179	Due To Debt Service Fund	$ 1,832,302.00	$ 1,595,660.00	$ 1,813,250.00
18-99-48700-9499	Fund Balance Appropriation	$ -	$ 432,973.00	$ -
	Expense	**$ 2,126,181.75**	**$ 4,125,050.00**	**$ 5,323,250.00**
18	**Transportation Impact Fee Fund**	**$ 1,921,682.17**	**$ -**	**$ -**
20	**Community Development Fund**			
	Revenue			
20-00-32214-0000	Sign Permits	$ -	$ -	$ 5,160.00
20-00-32220-0000	Conditional Use Permits	$ -	$ -	$ 24,840.00
20-00-32311-0000	Building Permits	$ -	$ -	$ 3,150,032.00
20-00-34512-0000	Plan Check Fees	$ -	$ -	$ 1,849,900.00
20-00-34515-0000	Plat Fees	$ -	$ -	$ 309,000.00
20-00-34516-0000	Zoning & Subdivision Fees	$ -	$ -	$ 10,815.00
	Revenue	**$ -**	**$ -**	**$ 5,349,747.00**
	Expense			
43100	**Community Development Administration**			
20-31-43100-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 196,974.00
20-31-43100-1112	Salaries - Part-Time Permanent	$ -	$ -	$ 33,096.00
20-31-43100-1300	Employee Benefits (401k & 457)	$ -	$ -	$ 3,650.00
20-31-43100-1321	Clothing Allowance	$ -	$ -	$ 300.00
20-31-43100-1511	FICA	$ -	$ -	$ 2,057.00
20-31-43100-1512	Medicare	$ -	$ -	$ 3,339.00
20-31-43100-1521	Retirement	$ -	$ -	$ 30,410.00
20-31-43100-1531	State Insurance Fund	$ -	$ -	$ 2,616.00
20-31-43100-1541	Health Insurance	$ -	$ -	$ 42,110.00
20-31-43100-1545	Dental Insurance	$ -	$ -	$ 2,810.00
20-31-43100-1548	Vision Insurance	$ -	$ -	$ 580.00
20-31-43100-1561	Long Term Disability	$ -	$ -	$ 1,017.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
20-31-43100-2322	Planning Commission Meetings	$ -	$ -	$ 3,800.00
20-31-43100-2369	Meetings	$ -	$ -	$ 600.00
20-31-43100-2411	Office Expense & Supplies	$ -	$ -	$ 14,000.00
20-31-43100-4140	Banking Fees	$ -	$ -	$ 1,000.00
20-31-43100-4261	Computer Software & Maint.	$ -	$ -	$ 136,630.00
20-31-43100-4530	Administrative Cost	$ -	$ -	$ 139,590.00
20-31-43100-5002	Special Projects	$ -	$ -	$ 22,500.00
20-31-43100-6110	Contractual Agreements	$ -	$ -	$ 55,200.00
20-31-43100-9154	Due To Fleet Fund	$ -	$ -	$ 27,455.00
43100	**Community Development Administration**	**$ -**	**$ -**	**$ 719,734.00**
43110	**Planning & Zoning**			
20-31-43110-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 585,408.00
20-31-43110-1112	Salaries - Part-Time Permanent	$ -	$ -	$ 43,134.00
20-31-43110-1300	Employee Benefits (401k & 457)	$ -	$ -	$ 36,057.00
20-31-43110-1321	Clothing Allowance	$ -	$ -	$ 1,100.00
20-31-43110-1511	FICA	$ -	$ -	$ 2,675.00
20-31-43110-1512	Medicare	$ -	$ -	$ 9,119.00
20-31-43110-1521	Retirement	$ -	$ -	$ 84,836.00
20-31-43110-1531	State Insurance Fund	$ -	$ -	$ 10,652.00
20-31-43110-1541	Health Insurance	$ -	$ -	$ 128,995.00
20-31-43110-1545	Dental Insurance	$ -	$ -	$ 8,171.00
20-31-43110-1548	Vision Insurance	$ -	$ -	$ 1,716.00
20-31-43110-1561	Long Term Disability	$ -	$ -	$ 2,805.00
20-31-43110-2121	Dues & Memberships	$ -	$ -	$ 5,047.00
20-31-43110-2321	Travel & Training	$ -	$ -	$ 18,950.00
20-31-43110-2411	Office Expense & Supplies	$ -	$ -	$ 750.00
20-31-43110-4530	Administrative Cost	$ -	$ -	$ 223,449.00
20-31-43110-4531	Professional & Technical Servi	$ -	$ -	$ 37,880.00
43110	**Planning & Zoning**	**$ -**	**$ -**	**$ 1,200,744.00**
43120	**Building**			
20-31-43120-1111	Salaries - Full-Time Permanent	$ -	$ -	$ 1,275,295.00
20-31-43120-1211	Overtime	$ -	$ -	$ 49,920.00
20-31-43120-1300	Employee Benefits (401K & 457)	$ -	$ -	$ 72,009.00
20-31-43120-1321	Clothing Allowance	$ -	$ -	$ 5,200.00
20-31-43120-1512	Medicare	$ -	$ -	$ 18,499.00
20-31-43120-1521	Retirement	$ -	$ -	$ 182,078.00
20-31-43120-1531	State Insurance Fund	$ -	$ -	$ 19,199.00
20-31-43120-1541	Health Insurance	$ -	$ -	$ 280,526.00
20-31-43120-1545	Dental Insurance	$ -	$ -	$ 17,580.00
20-31-43120-1548	Vision Insurance	$ -	$ -	$ 3,652.00
20-31-43120-1561	Long Term Disability	$ -	$ -	$ 6,632.00
20-31-43120-2121	Dues & Memberships	$ -	$ -	$ 2,170.00
20-31-43120-2321	Travel & Training	$ -	$ -	$ 10,840.00
20-31-43120-2369	Meetings	$ -	$ -	$ 1,200.00
20-31-43120-2513	Equipment Materials & Supplies	$ -	$ -	$ 3,350.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
20-31-43120-4530	Administrative Cost	$ -	$ -	$ 462,779.00
20-31-43120-4531	Professional & Technical Servi	$ -	$ -	$ 550,000.00
20-31-43120-9154	Due To Fleet Fund	$ -	$ -	$ 88,606.00
43120	**Building**	**$ -**	**$ -**	**$ 3,049,535.00**
48700	**Fund Reserve**			
20-99-48700-9499	Fund Balance Appropriation	$ -	$ -	$ 379,734.00
48700	**Fund Reserve**	**$ -**	**$ -**	**$ 379,734.00**
	Expense	**$ -**	**$ -**	**$ 5,349,747.00**
	Community Development Fund	**$ -**	**$ -**	**$ -**
22	**Affordable Housing Fund**			
	Revenue			
22-00-38180-0000	Transfer From RDA	$ 3,249,986.60	$ 843,459.00	$ 1,650,232.00
22-00-39920-0000	Use of Fund Reserves	$ -	$ 1,004,428.00	$ 5,315.00
	Revenue	**$ 3,249,986.60**	**$ 1,847,887.00**	**$ 1,655,547.00**
70000	**Affordable Housing**			
22-18-70000-1111	Salaries - Full-Time Permanent	$ -	$ 80,084.00	$ 88,899.00
22-18-70000-1300	Employee Benefits (401K & 457)	$ -	$ 4,967.00	$ 5,261.00
22-18-70000-1321	Clothing Allowance	$ -	$ 100.00	$ 105.00
22-18-70000-1512	Medicare	$ -	$ 1,162.00	$ 1,290.00
22-18-70000-1521	Retirement	$ -	$ 12,791.00	$ 12,616.00
22-18-70000-1531	State Insurance Fund	$ -	$ 101.00	$ 107.00
22-18-70000-1541	Health Insurance	$ -	$ 18,092.00	$ 16,958.00
22-18-70000-1545	Dental Insurance	$ -	$ 1,612.00	$ 857.00
22-18-70000-1548	Vision Insurance	$ -	$ 264.00	$ 195.00
22-18-70000-1561	Long Term Disability	$ -	$ 443.00	$ 432.00
22-18-70000-2321	Travel & Training	$ -	$ 1,000.00	$ 5,000.00
22-18-70000-2369	Meetings	$ -	$ 300.00	$ 1,000.00
22-18-70000-2411	Office Expense & Supplies	$ -	$ 250.00	$ 1,500.00
22-18-70000-2513	Equipment Materials & Supplies	$ -	$ 500.00	$ -
22-18-70000-4530	Administrative Cost	$ -	$ -	$ 28,827.00
70000	**Affordable Housing**	**$ -**	**$ 121,666.00**	**$ 163,047.00**
70100	**Mortgage Assistance Program**			
22-18-70100-4531	Professional & Technical Servi	$ -	$ -	$ 50,000.00
22-18-70100-6701	Mortgage Assistance Program	$ 197,461.65	$ 1,500,000.00	$ 1,200,500.00
70100	**Mortgage Assistance Program**	**$ 197,461.65**	**$ 1,500,000.00**	**$ 1,250,500.00**
70200	**Homeless Shelter Mandate**			
22-18-70200-6702	Homeless Shelter Mandate	$ -	$ 226,221.00	$ 242,000.00
70200	**Homeless Shelter Mandate**	**$ -**	**$ 226,221.00**	**$ 242,000.00**
	Expense	**$ 197,461.65**	**$ 1,847,887.00**	**$ 1,655,547.00**
22	**Affordable Housing Fund**	**$ 3,052,524.95**	**$ -**	**$ -**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
23	**RAP Tax Fund**			
	Revenue			
23-00-31390-0000	RAP Tax	$ -	$ -	$ 600,000.00
	Revenue	**$ -**	**$ -**	**$ 600,000.00**
	Expense			
23-18-41820-4630	Local Grants	$ -	$ -	$ 600,000.00
41820	**RAP Tax**	**$ -**	**$ -**	**$ 600,000.00**
	Expense	**$ -**	**$ -**	**$ 600,000.00**
23	**RAP Tax Fund**	**$ -**	**$ -**	**$ -**
24	**Public Art Fund**			
	Revenue			
24-00-38110-0000	Due From Capital Project Fund	$ -	$ -	$ 16,585.00
24-00-38151-0000	Due From Water Fund	$ -	$ -	$ 21,814.00
24-00-38152-0000	Due From Sewer Fund	$ -	$ -	$ 10,500.00
	Revenue	**$ -**	**$ -**	**$ 48,899.00**
	Expense			
24-18-41830-4530	Administrative Cost	$ -	$ -	$ -
24-18-41830-5003	Special Projects	$ -	$ -	$ 48,899.00
	Expense	**$ -**	**$ -**	**$ 48,899.00**
24	**Public Art Fund**	**$ -**	**$ -**	**$ -**
25	**CDBG Fund**			
	Revenue			
25-00-33502-0000	CDBG Awards	$ -	$ -	$ 246,979.00
33502	**CDBG Awards**	**$ -**	**$ -**	**$ 246,979.00**
	Revenue	**$ -**	**$ -**	**$ 246,979.00**
	Expense			
25-31-43140-4531	Professional & Technical Servi	$ -	$ -	$ 49,396.00
25-31-43140-4630	Local Grants	$ -	$ -	$ 197,583.00
	Expense	**$ -**	**$ -**	**$ 246,979.00**
25	**CDBG Fund**	**$ -**	**$ -**	**$ -**
30	**Debt Service Fund**			
	Revenue			
30-00-37010-0000	Interest Earnings	$ 102,208.69	$ -	$ -
30-00-38110-0000	Due From General Fund	$ 217,921.00	$ 217,590.00	$ -
30-00-38118-0000	Due From Trans Imp Fee Fnd	$ 1,832,302.00	$ 1,595,660.00	$ 1,813,250.00
30-00-38147-0000	Due from Capital Project Fund	$ -	$ -	$ 800,000.00
	Revenue	**$ 2,152,431.69**	**$ 1,813,250.00**	**$ 2,613,250.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
	Expense			
44100	**Streets & Roads**			
30-71-44100-8111	Principal	$ 755,000.00	$ 790,000.00	$ 830,000.00
30-71-44100-8121	Interest Expense	$ 1,058,500.00	$ 1,020,750.00	$ 981,250.00
30-71-44100-8122	Arbitage Interest Rebate	$ -	$ -	$ 800,000.00
30-71-44100-8151	Paying Agent Fee	$ 1,750.00	$ 2,500.00	$ 2,000.00
44100	**Streets & Roads**	**$ 1,815,250.00**	**$ 1,813,250.00**	**$ 2,613,250.00**
	Expense	**$ 1,815,250.00**	**$ 1,813,250.00**	**$ 2,613,250.00**
30	**Debt Service Fund**	**$ 337,181.69**	**$ -**	**$ -**
47	**Capital Project Fund**			
	Revenue			
47-00-33330-0000	MAG Funding	$ -	$ -	$ 1,230,764.00
47-00-33400-0000	Misc State Grant Revenue	$ -	$ 100,843.00	$ -
47-00-34520-0000	Park Fee In Lieu	$ 190,159.00	$ -	$ -
47-00-37010-0000	Interest Earnings	$ 2,077,682.65	$ -	$ -
47-00-38110-0000	Due From General Fund	$ -	$ 609,982.00	$ 5,242,007.00
47-00-38115-0000	Due From Prk/Trls Imp Fee Fnd	$ -	$ -	$ 89,373.00
47-00-38118-0000	Due From Trans Imp Fee Fnd	$ -	$ -	$ 3,510,000.00
47-00-39920-0000	Use of Fund Reserves	$ -	$ 19,095,117.00	$ 6,882,493.00
	Revenue	**$ 2,267,841.65**	**$ 19,805,942.00**	**$ 16,954,637.00**
	Expense			
41000	**General Government**			
47-80-41000-7118	USP - Eagle Monument & Wall	$ -	$ 80,000.00	$ -
47-80-41000-7119	USP - Digital Info Displays	$ -	$ 268,000.00	$ -
47-81-41000-7057	Fencing - Wildlife Corridor	$ 84,671.98	$ 297,360.00	$ -
47-81-41000-7058	Land Acquisition	$ 926,489.92	$ 3,609,800.00	$ 2,500,000.00
47-81-41000-7060	Reuse Water Study	$ 15,412.00	$ 44,248.00	$ -
47-81-41000-7061	Civic Campus	$ 7,350,380.00	$ -	$ 500,000.00
47-81-41000-7062	Park & Ride SR73 Area	$ -	$ 750,000.00	$ -
47-81-41000-7077	Fieldhouse	$ -	$ -	$ 30,000.00
47-81-41000-7078	Relocate Rodeo Grounds	$ -	$ -	$ 1,000,000.00
41000	**General Government**	**$ 8,376,953.90**	**$ 5,049,408.00**	**$ 4,030,000.00**
41950	**Operations & Facilities**			
47-81-41950-7049	Public Works Yard Improvement	$ 98,955.15	$ 1,050,000.00	$ -
41950	**Operations & Facilities**	**$ 98,955.15**	**$ 1,050,000.00**	**$ -**
44100	**Streets & Roads**			
47-80-44100-7118	Speed Tables	$ -	$ -	$ 200,000.00
47-81-44100-7026	Old Airport Road Phase 4	$ 6,918,623.49	$ 1,515,764.00	$ 2,000,000.00
47-81-44100-7029	Campus Drive High T	$ 223.00	$ 62,174.00	$ 2,790,000.00
47-81-44100-7047	8000 N Harmony Way	$ 235,000.00	$ 500,000.00	$ -
47-81-44100-7067	Mid Valley Rd EastFeasibility	$ 119,121.92	$ 280,823.00	$ -
47-81-44100-7070	Silverlake Parkway Turn Lane	$ -	$ 650,000.00	$ 150,000.00
47-81-44100-7071	Streetlights PEP to Shadow Dr	$ -	$ 70,000.00	$ -

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
47-81-44100-7074	Trail Head/Pony Express Pwky	$ -	$ 100,000.00	$ 3,360,000.00
47-81-44100-7075	TRCC - Project	$ -	$ 100,843.00	$ -
47-81-44100-7079	Ranches Pkwy Widening PEP-SR73	$ -	$ -	$ 750,000.00
47-81-44100-7080	Pole Cny/PEP Intersection	$ -	$ -	$ 300,000.00
47-81-44100-7081	South City Connectivity Study	$ -	$ -	$ -
47-81-44100-7082	Mt Airy Widening SR73	$ -	$ -	$ 50,000.00
47-81-44100-7083	Traffic Signal MVR/EMB	$ -	$ -	$ 425,000.00
47-81-44100-7125	Seal Coat Roads	$ 345,075.64	$ 500,000.00	$ 500,000.00
44100	**Streets & Roads**	**$ 7,618,044.05**	**$ 3,878,220.00**	**$ 10,525,000.00**
45100	**Parks**			
47-80-45100-7102	USP - Nolen Park Improvements	$ -	$ 750,000.00	$ -
47-80-45100-7103	USP - Bike Park Improvements	$ -	$ 70,000.00	$ -
47-80-45100-7106	USP - City Center Streetscape	$ -	$ 792,991.00	$ -
47-80-45100-7117	USP - City Cntr Median Lndscap	$ -	$ 152,000.00	$ -
47-81-45100-7021	Smith Ranch Park	$ 7,363.80	$ -	$ -
47-81-45100-7044	Trails - Misc	$ -	$ 20,000.00	$ -
47-81-45100-7045	Observatory	$ -	$ -	$ 262,915.00
47-81-45100-7072	Parks PRV Ranches	$ -	$ 100,000.00	$ -
47-81-45100-7084	Trail - Ranches PEP to SR73	$ -	$ -	$ 1,320,137.00
45100	**Parks**	**$ 7,363.80**	**$ 1,884,991.00**	**$ 1,583,052.00**
48000	**Transfers & Other Uses**			
47-61-48000-9124	Due to Public Art Fund	$ -	$ -	$ 16,585.00
47-61-48000-9179	Due to Debt Service Fund	$ -	$ -	$ 800,000.00
48000	**Transfers & Other Uses**	**$ 18,701.04**	**$ -**	**$ 816,585.00**
	Expense	**$ 16,120,017.94**	**$ 11,862,619.00**	**$ 16,954,637.00**
47	**Capital Projects General Fund**	**$ (13,852,176.29)**	**$ 7,943,323.00**	**$ -**
51	**Water Utility Fund**			
	Revenue			
51-00-33550-0000	CWP Development Fee	$ 21,409,150.35	$ 10,143,540.00	$ 8,853,500.00
51-00-33551-0000	CWP Capital Recovery	$ 2,977,936.17	$ -	$ -
51-00-34898-0000	Reimbursement - Contractual	$ 604,000.00	$ 628,000.00	$ 663,000.00
51-00-35110-0000	Utility Billing - Water	$ 4,566,923.51	$ 5,687,727.00	$ 6,888,167.00
51-00-35111-0000	Utility Billing - Water Base	$ 5,454,556.79	$ 5,719,622.00	$ 6,324,172.00
51-00-35120-0000	Damage to Service	$ 5,259.22	$ -	$ -
51-00-35130-0000	Hydrant Meter Revenue	$ 157,231.08	$ 150,000.00	$ 154,500.00
51-00-35160-0000	Meter Fee - Water	$ 133,230.00	$ 110,000.00	$ 113,300.00
51-00-35170-0000	Connection Fee - Water	$ 729,594.00	$ 567,340.00	$ 584,361.00
51-00-35175-0000	Secondary Meter Connection Fee	$ 4,740.00	$ -	$ -
51-00-36020-0000	Late/Delinquent Fees Penalties & Charges	$ 97,000.00	$ -	$ -
51-00-37010-0000	Interest Earnings	$ 3,911,003.14	$ 834,404.00	$ 1,800,000.00
51-00-38111-0000	Due From Wtr Imp Fee Fund	$ 660,644.40	$ 550,675.00	$ 675,578.00
51-00-39111-0000	Bond Proceeds	$ -	$ -	$ 20,000,000.00
	Revenue	**$ 40,711,268.66**	**$ 24,391,308.00**	**$ 46,056,578.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
	Expense			
51000	**Water Utility**			
51-45-51000-1111	Salaries - Full-Time Permanent	$ 493,083.53	$ 546,255.00	$ 645,433.00
51-45-51000-1112	Salaries - Part-Time Permanent	$ 8,474.00	$ -	$ -
51-45-51000-1211	Overtime	$ 29,955.48	$ 35,000.00	$ 40,000.00
51-45-51000-1300	Employee Benefits (401k & 457)	$ 26,450.16	$ 31,592.00	$ 38,768.00
51-45-51000-1321	Clothing Allowance	$ 5,164.78	$ 3,207.00	$ 3,607.00
51-45-51000-1511	FICA	$ 556.39	$ -	$ -
51-45-51000-1512	Medicare	$ 7,658.90	$ 7,927.00	$ 9,364.00
51-45-51000-1521	Retirement	$ 85,553.21	$ 83,927.00	$ 93,355.00
51-45-51000-1531	State Insurance Fund	$ 10,669.20	$ 9,843.00	$ 11,689.00
51-45-51000-1541	Health Insurance	$ 130,875.95	$ 147,555.00	$ 194,862.00
51-45-51000-1545	Dental Insurance	$ 11,454.52	$ 12,573.00	$ 12,913.00
51-45-51000-1548	Vision Insurance	$ 1,875.91	$ 2,057.00	$ 2,665.00
51-45-51000-1561	Long Term Disability	$ 2,738.80	$ 2,984.00	$ 3,372.00
51-45-51000-2121	Dues & Memberships	$ 1,348.87	$ 1,500.00	$ 1,500.00
51-45-51000-2321	Travel & Training	$ 5,996.96	$ 8,646.00	$ 13,450.00
51-45-51000-2369	Meetings	$ 259.02	$ 600.00	$ 600.00
51-45-51000-2513	Equipment Materials & Supplies	$ 763,087.80	$ 220,000.00	$ 286,000.00
51-45-51000-2515	Scada Maintenance & Upgrades	$ 42,143.20	$ 40,000.00	$ 50,000.00
51-45-51000-2610	Building & Grounds Maint	$ -	$ 15,000.00	$ 20,000.00
51-45-51000-3111	Utilities	$ 1,224,236.67	$ 1,363,000.00	$ 1,913,450.00
51-45-51000-4121	Attorney Fees	$ 38,672.41	$ 75,000.00	$ 75,000.00
51-45-51000-4140	Banking Fees	$ 2,444.40	$ 5,000.00	$ 5,000.00
51-45-51000-4261	Computer Software & Maint.	$ 16,183.04	$ 18,175.00	$ 19,150.00
51-45-51000-4320	Engineering Services	$ 9,707.50	$ -	$ -
51-45-51000-4391	Blue Staking	$ 7,496.11	$ 10,000.00	$ 10,000.00
51-45-51000-4392	Valve Maintenance	$ 10,520.43	$ 40,000.00	$ 50,000.00
51-45-51000-4394	Collar Maintenance	$ -	$ 10,000.00	$ 20,000.00
51-45-51000-4522	CUWCD - Contracted Water	$ 3,122,576.12	$ 5,169,984.00	$ 4,418,895.00
51-45-51000-4523	CUWCD - Development Fees	$ 2,632,500.00	$ 10,143,540.00	$ 8,853,500.00
51-45-51000-4530	Administrative Cost	$ -	$ 1,005,624.00	$ 1,089,054.00
51-45-51000-4531	Professional & Technical Servi	$ 132,342.20	$ 260,000.00	$ 140,000.00
51-45-51000-4811	Equipment Rental/Lease	$ 11,272.19	$ 14,000.00	$ 14,000.00
51-45-51000-5721	Chemicals & Fertilizers	$ 36,006.25	$ 40,000.00	$ 50,000.00
51-45-51000-6110	Contractual Agreements	$ 17,411.57	$ 53,000.00	$ -
51000	**Water Utility**	**$ 8,958,297.73**	**$ 19,913,082.00**	**$ 18,085,627.00**
51010	**Water Resource**			
51-45-51010-1111	Salaries - Full-Time Permanent	$ 240,361.70	$ 441,743.00	$ 441,355.00
51-45-51010-1112	Salaries - Part-Time Permanent	$ 31,696.75	$ 54,314.00	$ 60,798.00
51-45-51010-1211	Overtime	$ 10,395.44	$ 9,500.00	$ 15,000.00
51-45-51010-1300	Employee Benefits (401k & 457)	$ 9,337.20	$ 20,258.00	$ 18,535.00
51-45-51010-1321	Clothing Allowance	$ 223.07	$ 3,100.00	$ 3,100.00
51-45-51010-1511	FICA	$ 1,966.63	$ 3,368.00	$ 3,770.00
51-45-51010-1512	Medicare	$ 4,091.64	$ 7,196.00	$ 7,286.00
51-45-51010-1521	Retirement	$ 41,193.98	$ 67,323.00	$ 62,632.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
51-45-51010-1531	State Insurance Fund	$ -	$ 8,028.00	$ 8,139.00
51-45-51010-1541	Health Insurance	$ 68,783.98	$ 119,091.00	$ 133,754.00
51-45-51010-1545	Dental Insurance	$ 5,842.85	$ 9,703.00	$ 8,255.00
51-45-51010-1548	Vision Insurance	$ 973.05	$ 1,611.00	$ 1,751.00
51-45-51010-1561	Long Term Disability	$ 1,560.76	$ 2,579.00	$ 2,448.00
51-45-51010-2121	Dues & Memberships	$ -	$ 1,500.00	$ 1,500.00
51-45-51010-2211	Public Notices	$ -	$ 5,000.00	$ 5,000.00
51-45-51010-2321	Travel & Training	$ 3,825.02	$ 10,450.00	$ 11,700.00
51-45-51010-2369	Meetings	$ 146.09	$ 300.00	$ 300.00
51-45-51010-2513	Equipment Materials & Supplies	$ 14,490.72	$ 25,000.00	$ 40,750.00
51-45-51010-2515	Scada Maintenance & Upgrades	$ 32.50	$ 5,000.00	$ 5,000.00
51-45-51010-4261	Computer Software & Maint.	$ 11,544.30	$ 78,858.00	$ 79,800.00
51-45-51010-4393	Lab Work	$ 49,702.92	$ 35,000.00	$ 40,000.00
51-45-51010-4530	Administrative Cost	$ -	$ 456,519.00	$ 448,805.00
51-45-51010-4531	Professional & Technical Servi	$ 11,851.43	$ 15,000.00	$ -
51-45-51010-5311	Meters - Water - New	$ 301,231.15	$ 567,340.00	$ 850,000.00
51-45-51010-5312	Meters - Water - Replacement	$ 282,454.35	$ 410,500.00	$ 461,800.00
51-45-51010-5721	Chemicals & Fertilizers	$ 6,866.30	$ 10,000.00	$ 11,000.00
51010	**Water Resource**	**$ 1,098,571.83**	**$ 2,368,281.00**	**$ 2,722,478.00**
47100	**Debt Service - Bonds**			
51-71-47100-8111	Principal	$ 477,000.00	$ 381,100.00	$ 520,700.00
51-71-47100-8121	Interest	$ 183,644.40	$ 169,575.00	$ 154,878.00
51-71-47100-8151	Paying Agent Fee	$ 3,427.00	$ 5,500.00	$ 2,567.00
47100	**Debt Service - Bonds**	**$ 664,071.40**	**$ 556,175.00**	**$ 678,145.00**
48000	**Transfers & Other Uses**			
51-61-48000-9110	Due To General Fund	$ 1,221,989.00	$ -	$ -
51-61-48000-9124	Due to Public Art Fund	$ -	$ -	$ 21,814.00
51-61-48000-9154	Due To Fleet Fund	$ 300,425.04	$ 423,968.00	$ 371,256.00
51-61-48000-9163	Due to UB Internal Service Fnd	$ 138,296.70	$ 178,702.00	$ 196,253.00
51-61-48000-9164	Due to GIS Internal Service Fd	$ 126,686.04	$ 183,139.00	$ 136,490.00
48000	**Transfers & Other Uses**	**$ 1,787,396.78**	**$ 785,809.00**	**$ 725,813.00**
51100	**Water Capital Projects**			
51-81-51100-7327	Waterline Crossing SR73	$ 294,021.64	$ -	$ -
51-81-51700-7000	Capital Projects	$ 28,894.00	$ -	$ 4,165,094.00
	Water Capital Projects	**$ 322,915.64**	**$ -**	**$ 4,165,094.00**
48700	**Fund Reserve**			
51-99-48700-9499	Fund Balance Appropriation	$ -	$ 704,961.00	$ 19,679,421.00
48700	**Fund Reserve**	**$ -**	**$ 704,961.00**	**$ 19,679,421.00**
	Expense	**$ 12,831,253.38**	**$ 24,328,308.00**	**$ 46,056,578.00**
51	**Water Fund**	**$ 27,880,015.28**	**$ 63,000.00**	**$ -**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
52	**Wastewater Fund**			
	Revenue			
52-00-33450-0000	Sewer Grant	$ -	$ 500,000.00	$ -
52-00-35200-0000	Utility Billing - Sewer	$ 5,196,027.83	$ 6,300,000.00	$ 6,850,500.00
52-00-35211-0000	Utility Billing - Sewer Base	$ 5,954,024.29	$ 7,081,000.00	$ 8,463,491.00
52-00-35270-0000	Connection Fee - Sewer	$ 118,400.00	$ 85,000.00	$ 87,550.00
52-00-37010-0000	Interest Earnings	$ 484,989.82	$ 225,000.00	$ 231,750.00
52-00-37090-0000	Other Miscellaneous	$ 2,189.29	$ -	$ -
52-00-38112-0000	Due From WW Impact Fee Fund	$ 1,236,350.00	$ 2,031,152.00	$ 1,827,708.00
52-00-39111-0000	Bond Proceeds	$ -	$ -	$ 200,000,000.00
52-00-39920-0000	Use of Fund Reserves	$ -	$ 1,269,105.00	$ -
	Revenue	**$ 12,991,981.23**	**$ 17,491,257.00**	**$ 217,460,999.00**
	Expense			
52000	**Wastewater Utility**			
52-45-52000-1111	Salaries - Full-Time Permanent	$ 454,161.93	$ 490,399.00	$ 685,950.00
52-45-52000-1211	Overtime	$ 3,558.73	$ 5,000.00	$ 5,000.00
52-45-52000-1300	Employee Benefits (401k & 457)	$ 25,793.19	$ 29,016.00	$ 42,318.00
52-45-52000-1321	Clothing Allowance	$ 3,872.46	$ 2,657.00	$ 3,657.00
52-45-52000-1512	Medicare	$ 6,612.01	$ 7,116.00	$ 9,953.00
52-45-52000-1521	Retirement	$ 77,062.13	$ 76,455.00	$ 101,740.00
52-45-52000-1531	State Insurance Fund	$ 6,229.95	$ 8,396.00	$ 11,959.00
52-45-52000-1541	Health Insurance	$ 98,866.02	$ 116,052.00	$ 182,206.00
52-45-52000-1545	Dental Insurance	$ 7,953.47	$ 9,458.00	$ 11,689.00
52-45-52000-1548	Vision Insurance	$ 1,333.39	$ 1,575.00	$ 2,418.00
52-45-52000-1561	Long Term Disability	$ 2,553.15	$ 2,677.00	$ 3,445.00
52-45-52000-2121	Dues & Memberships	$ 1,635.86	$ 888.00	$ 980.00
52-45-52000-2321	Travel & Training	$ 4,634.44	$ 5,534.00	$ 11,750.00
52-45-52000-2369	Meetings	$ -	$ 300.00	$ 300.00
52-45-52000-2513	Equipment Materials & Supplies	$ 108,689.65	$ 75,000.00	$ 81,000.00
52-45-52000-2515	Scada Maintenance & Upgrades	$ 13,018.76	$ 15,000.00	$ 20,000.00
52-45-52000-2516	Pre-Treatment Program	$ 2,346.88	$ 14,875.00	$ 14,875.00
52-45-52000-2610	Building & Grounds Maint	$ 2,436.20	$ 5,000.00	$ 5,000.00
52-45-52000-3111	Utilities	$ 82,910.49	$ 38,986.00	$ 39,256.00
52-45-52000-4261	Computer Software & Maint.	$ 11,544.30	$ 14,625.00	$ 15,932.00
52-45-52000-4320	Engineering Services	$ 8,040.00	$ -	$ -
52-45-52000-4391	Blue Staking	$ 7,496.13	$ 10,000.00	$ 10,000.00
52-45-52000-4393	Lab Work	$ 150.90	$ -	$ -
52-45-52000-4394	Collar Maintenance	$ -	$ 10,000.00	$ 10,000.00
52-45-52000-4530	Administrative Cost	$ -	$ 788,318.00	$ 512,680.00
52-45-52000-4531	Professional & Technical Servi	$ 83,046.59	$ 25,000.00	$ 25,000.00
52-45-52000-4811	Equipment Rental/Lease	$ -	$ 70,500.00	$ 2,500.00
52-45-52000-5721	Chemicals & Fertilizers	$ 4,906.65	$ 18,000.00	$ 13,500.00
52000	**Wastewater Utility**	**$ 1,076,977.92**	**$ 1,847,827.00**	**$ 1,823,108.00**
52010	**Wastewater Treatment**			
52-45-52010-1111	Salaries - Full-Time Permanent	$ 160,992.54	$ 349,232.00	$ 317,748.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
52-45-52010-1211	Overtime	$ 854.22	$ 2,000.00	$ 5,000.00
52-45-52010-1300	Employee Benefits (401k & 457)	$ 8,563.31	$ 18,651.00	$ 19,589.00
52-45-52010-1321	Clothing Allowance	$ -	$ 2,050.00	$ 1,850.00
52-45-52010-1512	Medicare	$ 2,312.07	$ 5,067.00	$ 4,611.00
52-45-52010-1521	Retirement	$ 26,421.47	$ 53,358.00	$ 45,581.00
52-45-52010-1531	State Insurance Fund	$ -	$ 5,853.00	$ 5,291.00
52-45-52010-1541	Health Insurance	$ 43,358.79	$ 78,974.00	$ 92,935.00
52-45-52010-1545	Dental Insurance	$ 3,720.60	$ 6,405.00	$ 5,885.00
52-45-52010-1548	Vision Insurance	$ 616.95	$ 1,068.00	$ 1,238.00
52-45-52010-1561	Long Term Disability	$ 1,023.09	$ 1,939.00	$ 1,721.00
52-45-52010-2121	Dues & Memberships	$ 388.00	$ 888.00	$ 2,780.00
52-45-52010-2321	Travel & Training	$ 6,414.28	$ 13,202.00	$ 14,250.00
52-45-52010-2369	Meetings	$ -	$ 600.00	$ 600.00
52-45-52010-2513	Equipment Materials & Supplies	$ 221,867.34	$ 380,940.00	$ 365,500.00
52-45-52010-2515	Scada Maintenance & Upgrades	$ 31,353.71	$ 40,000.00	$ 50,000.00
52-45-52010-2517	Bio Solids Disposal	$ 54,036.96	$ 61,600.00	$ 80,000.00
52-45-52010-2610	Building & Grounds Maint	$ 9,156.06	$ 18,000.00	$ 15,000.00
52-45-52010-3111	Utilities	$ 161,679.14	$ 264,490.00	$ 399,000.00
52-45-52010-4261	Computer Software & Maint.	$ 11,995.17	$ 18,175.00	$ 19,082.00
52-45-52010-4320	Engineering Services	$ 4,940.00	$ -	$ -
52-45-52010-4393	Lab Work	$ 40,155.41	$ 65,000.00	$ 85,000.00
52-45-52010-4530	Administrative Cost	$ -	$ 395,574.00	$ 586,392.00
52-45-52010-4531	Professional & Technical Servi	$ 24,971.48	$ 65,000.00	$ 112,000.00
52-45-52010-4581	TSSD Services	$ 3,229,181.11	$ 4,781,138.00	$ 3,203,092.00
52-45-52010-4811	Equipment Rental/Lease	$ -	$ 5,000.00	$ 35,000.00
52-45-52010-5721	Chemicals & Fertilizers	$ 137,630.01	$ 234,958.00	$ 278,200.00
52-81-52010-7000	Capital Outlay	$ -	$ 1,600,000.00	$ -
52010	**Wastewater Treatment**	**$ 4,365,527.72**	**$ 8,535,152.00**	**$ 5,747,345.00**
47100	**Debt Service - Bonds**			
52-71-47100-8111	Principal	$ 1,032,000.00	$ 847,900.00	$ 1,066,300.00
52-71-47100-8121	Interest	$ 243,920.00	$ 222,542.00	$ 200,668.00
52-71-47100-8151	Paying Agent Fee	$ 4,473.00	$ 7,000.00	$ 5,083.00
47100	**Debt Service - Bonds**	**$ 1,280,393.00**	**$ 1,077,442.00**	**$ 1,272,051.00**
48000	**Transfers & Other Uses**			
52-61-48000-9110	Due To General Fund	$ 1,026,110.00	$ -	$ -
52-61-48000-9124	Due To Public Art Fund	$ -	$ -	$ 10,500.00
52-61-48000-9154	Due To Fleet Fund	$ 183,530.04	$ 253,479.00	$ 196,706.00
52-61-48000-9163	Due to UB Internal Service Fnd	$ 118,527.00	$ 127,644.00	$ 151,852.00
52-61-48000-9164	Due to GIS Internal Service Fd	$ 126,686.04	$ 149,356.00	$ 136,490.00
48000	**Transfers & Other Uses**	**$ 1,454,853.08**	**$ 530,479.00**	**$ 495,548.00**
52100	**Wastewater Capital Projects**			
52-81-52100-7059	Lone Tree Lift Station	$ 239,642.44	$ 160,357.00	$ -
52-81-52100-7065	Gravity Sewer Line Old Airport	$ 11,640.00	$ -	$ -
52-81-52100-7220	EffluentPond Storage Liner R&R	$ -	$ -	$ 4,010,000.00
52-81-52100-7304	Effluent Disposal Upgrades	$ -	$ -	$ 2,500,000.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
52-81-52100-7305	Steeplechase Lift Station	$ -	$ -	$ 300,750.00
52-81-52100-7306	Wastewater Treatment Plant	$ -	$ 77,000.00	$ 48,056,951.00
52-81-52100-7307	Headworks Project	$ 290.00	$ -	$ -
52-81-52100-7308	Tertiary Treatment Project	$ 418,663.76	$ 5,200,000.00	$ 300,000.00
52-81-52100-7309	Ox Ditch Upgrade	$ -	$ -	$ 2,600,000.00
52-81-52100-7310	East Trunkline	$ -	$ -	$ 5,900,000.00
52100	**Wastewater Capital Projects**	**$ 670,236.20**	**$ 5,437,357.00**	**$ 63,667,701.00**
48700	**Fund Reserve**			
52-99-48700-9499	Fund Balance Appropriation	$ -	$ -	$ 144,455,246.00
48700	**Fund Reserve**	**$ -**	**$ -**	**$ 144,455,246.00**
	Expense	**$ 8,847,987.92**	**$ 17,428,257.00**	**$ 217,460,999.00**
52	**Sewer Fund**	**$ 4,143,993.31**	**$ 63,000.00**	**$ -**
54	**Fleet Fund**			
	Revenue			
54-00-34891-0000	Reimbursement-Fuel Tax	$ 23,095.12	$ -	$ -
54-00-37010-0000	Interest Earnings	$ 89,247.51	$ 18,924.00	$ -
54-00-37020-0000	Sale of Vehicles	$ 184,072.50	$ 90,000.00	$ 234,000.00
54-00-37142-0000	Insurance Reimbursements	$ 535.80	$ -	$ -
54-00-38110-0000	Due From General Fund	$ 797,418.96	$ 1,009,154.00	$ 946,270.00
54-00-38120-0000	Due from Community Development	$ -	$ -	$ 116,061.00
54-00-38151-0000	Due From Water Fund	$ 300,425.04	$ 423,968.00	$ 371,256.00
54-00-38152-0000	Due From Sewer Fund	$ 183,530.04	$ 253,479.00	$ 196,706.00
54-00-38159-0000	Due From Storm Drain Fund	$ 106,253.04	$ 438,164.00	$ 417,419.00
54-00-38164-0000	Due From GIS Fund	$ -	$ 14,989.00	$ 15,964.00
54-00-39920-0000	Use of Fund Reserves	$ -	$ 1,150,000.00	$ 454,275.00
	Revenue	**$ 1,684,578.01**	**$ 3,398,678.00**	**$ 2,751,951.00**
54000	**Fleet Services**			
54-45-54000-1111	Salaries - Full-Time Permanent	$ 199,200.61	$ 205,291.00	$ 212,764.00
54-45-54000-1211	Overtime	$ 4,114.04	$ 2,500.00	$ 1,000.00
54-45-54000-1300	Employee Benefits (401k & 457)	$ 8,380.70	$ 8,694.00	$ 6,585.00
54-45-54000-1321	Clothing Allowance	$ 1,250.00	$ 1,250.00	$ 1,250.00
54-45-54000-1512	Medicare	$ 2,943.44	$ 2,978.00	$ 3,087.00
54-45-54000-1521	Retirement	$ 33,914.25	$ 31,326.00	$ 31,212.00
54-45-54000-1531	State Insurance Fund	$ 1,464.21	$ 3,701.00	$ 3,853.00
54-45-54000-1541	Health Insurance	$ 48,258.98	$ 51,204.00	$ 52,328.00
54-45-54000-1545	Dental Insurance	$ 3,895.78	$ 3,975.00	$ 3,212.00
54-45-54000-1548	Vision Insurance	$ 657.52	$ 673.00	$ 683.00
54-45-54000-1561	Long Term Disability	$ 1,139.37	$ 1,146.00	$ 1,183.00
54-45-54000-2321	Travel & Training	$ -	$ -	$ 3,500.00
54-45-54000-2513	Equipment Materials & Supplies	$ 3,922.95	$ 5,000.00	$ 5,000.00
54-45-54000-2521	Fleet Vehicle Fuel	$ 171,468.68	$ 200,000.00	$ 200,000.00
54-45-54000-2522	Vehicle Maintenance	$ 167,319.67	$ 204,093.00	$ 200,000.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
54-45-54000-3111	Utilities	$ -	$ 2,000.00	$ -
54-45-54000-4261	Computer Software & Maint.	$ -	$ 12,125.00	$ 13,000.00
54-45-54000-4530	Administrative Cost	$ -	$ 158,722.00	$ -
54-45-54000-4531	Professional & Technical Servi	$ 21,445.09	$ 25,000.00	$ 25,000.00
54-45-54000-6211	Auto Insurance Premium	$ 88,656.63	$ 93,000.00	$ 82,294.00
54-45-54000-7421	Vehicle	$ 997,362.56	$ 2,381,000.00	$ 1,906,000.00
54000	**Fleet Services**	**$ 1,755,394.48**	**$ 3,398,678.00**	**$ 2,751,951.00**
	Expense	**$ 1,755,394.48**	**$ 3,398,678.00**	**$ 2,751,951.00**
54	**Fleet Fund**	**$ (70,816.47)**	**$ -**	**$ -**
57	**Solid Waste Fund**			
	Revenue			
57-00-35700-0000	Utility Billing - Garbage	$ 2,867,983.59	$ 3,005,294.00	$ 2,999,685.00
57-00-37010-0000	Interest Earnings	$ 65,185.24	$ 35,000.00	$ 30,000.00
	Revenue	**$ 2,933,168.83**	**$ 3,040,294.00**	**$ 3,029,685.00**
	Expense			
57-45-57000-1111	Salaries - Full-Time Permanent	$ 7,518.80	$ 4,465.00	$ 4,914.00
57-45-57000-1112	Salaries - Part-Time Permanent	$ 153.19	$ -	$ -
57-45-57000-1211	Overtime	$ 5,728.16	$ -	$ -
57-45-57000-1300	Employee Benefits (401K & 457)	$ 777.29	$ 277.00	$ 305.00
57-45-57000-1321	Clothing Allowance	$ 9.00	$ 9.00	$ 9.00
57-45-57000-1511	FICA	$ 9.50	$ -	$ -
57-45-57000-1512	Medicare	$ 182.91	$ 65.00	$ 72.00
57-45-57000-1521	Retirement	$ 2,077.09	$ 714.00	$ 785.00
57-45-57000-1531	State Insurance Fund	$ -	$ 81.00	$ 89.00
57-45-57000-1541	Health Insurance	$ 2,428.30	$ 537.00	$ 633.00
57-45-57000-1545	Dental Insurance	$ 221.02	$ 47.00	$ 43.00
57-45-57000-1548	Vision Insurance	$ 36.11	$ 8.00	$ 9.00
57-45-57000-1561	Long Term Disability	$ 71.90	$ 21.00	$ 23.00
57-45-57000-4530	Administrative Cost	$ -	$ 80,564.00	$ 101,848.00
57-45-57000-4585	Code Enforcement Cleanup	$ 256.25	$ -	$ -
57-45-57000-4586	City Clean Up Projects	$ 34,907.22	$ 40,000.00	$ 40,000.00
57-45-57000-5638	Glass Recycling Program	$ 1,800.00	$ 3,000.00	$ 3,000.00
57-45-57000-5640	Solid Waste Contract	$ 2,611,809.96	$ 2,709,000.00	$ 2,709,000.00
57-45-57000-6810	Dump Passes	$ 49,117.57	$ 36,000.00	$ 36,000.00
57000	**Solid Waste Collection Service**	**$ 2,717,104.27**	**$ 2,874,788.00**	**$ 2,896,730.00**
57-61-48000-9110	Due To General Fund (Admn Chrg	$ 155,540.00	$ -	$ -
57-61-48000-9163	Due to UB Internal Service Fnd	$ 61,542.96	$ 102,115.00	$ 132,955.00
48000	**Transfers & Other Uses**	**$ 217,082.96**	**$ 102,115.00**	**$ 132,955.00**
57-99-48700-9499	Fund Balance Appropriation	$ -	$ 63,391.00	$ -
48700	**Fund Reserve**	**$ -**	**$ 63,391.00**	**$ -**
	Expense	**$ 2,934,187.23**	**$ 3,040,294.00**	**$ 3,029,685.00**
57	**Solid Waste Fund**	**$ (1,018.40)**	**$ -**	**$ -**
59	**Storm Drain Fund**			
	Revenue			

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
59-00-35900-0000	Utility Billing - Storm Drain	$ 1,800,615.08	$ 2,090,846.00	$ 2,261,738.00
59-00-35920-0000	Damage to Services-Storm Drain	$ 2,708.85	$ -	$ -
59-00-37010-0000	Interest Earnings	$ 84,617.88	$ 40,000.00	$ 41,200.00
	Revenue	**$ 1,887,941.81**	**$ 2,130,846.00**	**$ 2,302,938.00**
	Expense			
59000	**Stormwater Services**			
59-45-59000-1111	Salaries - Full-Time Permanent	$ 264,995.33	$ 580,696.00	$ 607,091.00
59-45-59000-1112	Salaries - Part-Time Permanent	$ 7,255.00	$ 12,240.00	$ -
59-45-59000-1114	Salaries - Seasonal	$ -	$ -	$ 17,388.00
59-45-59000-1211	Overtime	$ 24,932.12	$ 10,000.00	$ 10,000.00
59-45-59000-1300	Employee Benefits (401K & 457)	$ 17,429.74	$ 35,831.00	$ 37,321.00
59-45-59000-1321	Clothing Allowance	$ 1,481.47	$ 3,358.00	$ 3,358.00
59-45-59000-1511	FICA	$ 450.50	$ 759.00	$ 1,079.00
59-45-59000-1512	Medicare	$ 4,252.59	$ 8,604.00	$ 9,063.00
59-45-59000-1521	Retirement	$ 48,708.49	$ 90,592.00	$ 89,577.00
59-45-59000-1531	State Insurance Fund	$ 3,376.10	$ 10,000.00	$ 10,814.00
59-45-59000-1541	Health Insurance	$ 58,981.53	$ 147,664.00	$ 152,246.00
59-45-59000-1545	Dental Insurance	$ 4,352.57	$ 10,429.00	$ 8,308.00
59-45-59000-1548	Vision Insurance	$ 721.25	$ 1,711.00	$ 1,756.00
59-45-59000-1561	Long Term Disability	$ 1,491.85	$ 3,266.00	$ 3,300.00
59-45-59000-2121	Dues & Memberships	$ 7,285.02	$ 7,500.00	$ 9,500.00
59-45-59000-2321	Travel & Training	$ 4,705.00	$ 13,650.00	$ 13,650.00
59-45-59000-2369	Meetings	$ -	$ 600.00	$ 600.00
59-45-59000-2513	Equipment Materials & Supplies	$ 23,769.41	$ 40,000.00	$ 50,000.00
59-45-59000-2514	Stormdrain Maintenance	$ 84,873.45	$ 100,000.00	$ 100,000.00
59-45-59000-2520	Public Education & Outreach	$ 1,715.15	$ 2,500.00	$ 2,500.00
59-45-59000-3111	Utilities	$ 559.43	$ 3,600.00	$ 3,800.00
59-45-59000-4261	Computer Software & Maint.	$ 11,544.30	$ 12,123.00	$ 12,729.00
59-45-59000-4394	Collar Maintenance	$ -	$ 4,000.00	$ 4,000.00
59-45-59000-4530	Administrative Cost	$ -	$ 350,899.00	$ 373,651.00
59-45-59000-4531	Professional & Technical Servi	$ 66,994.00	$ 16,000.00	$ 20,000.00
59-45-59000-4811	Equipment Rental/Lease	$ 16,503.53	$ 22,750.00	$ 30,000.00
59000	**Stormwater Services**	**$ 954,065.68**	**$ 1,488,772.00**	**$ 1,571,731.00**
48000	**Transfers & Other Uses**			
59-61-48000-9110	Due To General Fund (Admn Chrg	$ 157,468.00	$ -	$ -
59-61-48000-9154	Due To Fleet Fund	$ 106,253.04	$ 438,164.00	$ 417,419.00
59-61-48000-9163	Due to UB Internal Service Fnd	$ 27,026.04	$ 102,115.00	$ 139,469.00
59-61-48000-9164	Due to GIS Internal Service Fd	$ 56,193.00	$ 19,160.00	$ 136,490.00
48000	**Transfers & Other Uses**	**$ 346,940.08**	**$ 559,439.00**	**$ 693,378.00**
48700	**Fund Reserve**			
59-99-48700-9499	Fund Balance Appropriation	$ -	$ 74,135.00	$ 37,829.00
48700	**Fund Reserve**	**$ -**	**$ 74,135.00**	**$ 37,829.00**
	Expense	**$ 1,301,005.76**	**$ 2,122,346.00**	**$ 2,302,938.00**

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
59	**Storm Drain Fund**	**$ 586,936.05**	**$ 8,500.00**	**$ -**
62	**Cemetery Fund**			
	Revenue			
62-00-33200-0000	Burial Plot Sales	$ 44,910.00	$ 40,000.00	$ 27,500.00
62-00-33201-0000	Burial Plot Opening/Closing	$ 12,100.00	$ 13,000.00	$ 8,000.00
62-00-33202-0000	Headstone Inspections	$ 920.00	$ 800.00	$ 875.00
62-00-33203-0000	Xfr of Ownership Fee-Cemetery	$ (35.00)	$ -	$ -
62-00-37010-0000	Interest Earnings	$ 13,777.16	$ 10,000.00	$ 8,400.00
62-00-39920-0000	Use of Fund Reserves	$ -	$ 17,723.00	$ 56,172.00
	Revenue	**$ 71,672.16**	**$ 81,523.00**	**$ 100,947.00**
	Expense			
62000	**Cemetery**			
62-49-62000-1111	Salaries - Full-Time Permanent	$ 7,985.43	$ 8,701.00	$ 17,309.00
62-49-62000-1211	Overtime	$ 156.77	$ -	$ -
62-49-62000-1300	Employee Benefits (401k & 457)	$ 462.11	$ 496.00	$ 960.00
62-49-62000-1321	Clothing Allowance	$ 33.00	$ 33.00	$ 77.00
62-49-62000-1512	Medicare	$ 117.44	$ 128.00	$ 253.00
62-49-62000-1521	Retirement	$ 1,385.95	$ 1,386.00	$ 2,682.00
62-49-62000-1531	State Insurance Fund	$ 969.94	$ 159.00	$ 316.00
62-49-62000-1541	Health Insurance	$ 1,526.32	$ 1,611.00	$ 3,592.00
62-49-62000-1545	Dental Insurance	$ 136.64	$ 140.00	$ 222.00
62-49-62000-1548	Vision Insurance	$ 22.31	$ 24.00	$ 48.00
62-49-62000-1561	Long Term Disability	$ 43.04	$ 45.00	$ 88.00
62-49-62000-2321	Travel & Training	$ -	$ 1,500.00	$ 1,500.00
62-49-62000-2513	Equipment Materials & Supplies	$ 3,689.90	$ 3,000.00	$ 3,000.00
62-49-62000-3111	Utilities	$ 4,530.98	$ -	$ 6,600.00
62-49-62000-4261	Computer Software & Maint.	$ -	$ 800.00	$ 800.00
62-49-62000-4531	Professional & Technical Servi	$ -	$ 50,000.00	$ 50,000.00
62-49-62000-5002	Special Projects	$ 3,277.37	$ 5,000.00	$ 5,000.00
62-49-62000-5410	Landscape Maintenance	$ 60.84	$ 8,500.00	$ 8,500.00
62000	**Cemetery**	**$ 34,520.96**	**$ 81,523.00**	**$ 100,947.00**
	Expense	**$ 34,520.96**	**$ 81,523.00**	**$ 100,947.00**
62	**Cemetery Fund**	**$ 37,151.20**	**$ -**	**$ -**
63	**Utility Billing Fund**			
	Revenue			
63-00-35990-0000	Set Up/Connection Fee	$ 70,885.00	$ 79,200.00	$ 79,199.00
63-00-36020-0000	Late/Delinquent Fees	$ 112,655.00	$ 138,000.00	$ 115,000.00
63-00-36030-0000	Revenue from Collections	$ 1,881.70	$ -	$ -
63-00-37010-0000	Interest Earnings	$ 82.08	$ -	$ -
63-00-38151-0000	Due From Water Fund	$ 138,296.70	$ 178,702.00	$ 196,253.00
63-00-38152-0000	Due From Sewer Fund	$ 118,527.00	$ 127,644.00	$ 151,852.00
63-00-38157-0000	Due From Solid Waste Fund	$ 61,542.96	$ 102,115.00	$ 132,955.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
63-00-38159-0000	Due From Storm Drain Fund	$ 27,026.04	$ 102,115.00	$ 139,469.00
	Revenue	**$ 530,896.48**	**$ 742,776.00**	**$ 814,728.00**
	Expense			
63000	**Utility Billing**			
63-43-63000-1111	Salaries - Full-Time Permanent	$ 85,746.34	$ 125,002.00	$ 159,950.00
63-43-63000-1112	Salaries - Part-Time Permanent	$ 40,155.94	$ 47,034.00	$ 53,457.00
63-43-63000-1211	Overtime	$ 138.00	$ 1,000.00	$ 1,000.00
63-43-63000-1300	Employee Benefits (401K & 457)	$ 5,316.34	$ 7,699.00	$ 9,844.00
63-43-63000-1321	Clothing Allowance	$ 500.00	$ 430.00	$ 450.00
63-43-63000-1511	FICA	$ 2,516.84	$ 2,918.00	$ 3,315.00
63-43-63000-1512	Medicare	$ 1,809.81	$ 2,496.00	$ 3,097.00
63-43-63000-1521	Retirement	$ 14,257.59	$ 18,751.00	$ 22,698.00
63-43-63000-1531	State Insurance Fund	$ 242.48	$ 206.00	$ 258.00
63-43-63000-1541	Health Insurance	$ 20,113.97	$ 28,007.00	$ 37,672.00
63-43-63000-1545	Dental Insurance	$ 1,083.48	$ 1,320.00	$ 2,108.00
63-43-63000-1548	Vision Insurance	$ 83.44	$ 76.00	$ 435.00
63-43-63000-1561	Long Term Disability	$ 564.17	$ 687.00	$ 837.00
63-43-63000-2321	Travel & Training	$ -	$ 1,000.00	$ 1,000.00
63-43-63000-2369	Meetings	$ 628.27	$ 600.00	$ 600.00
63-43-63000-2513	Equipment Materials & Supplies	$ 309.78	$ 2,800.00	$ 2,800.00
63-43-63000-4140	Banking Fees	$ 106,369.43	$ 106,000.00	$ 129,375.00
63-43-63000-4261	Computer Software & Maint.	$ 16,823.36	$ 17,100.00	$ 17,100.00
63-43-63000-4530	Administrative Cost	$ -	$ 104,300.00	$ 108,382.00
63-43-63000-4531	Professional & Technical Servi	$ 127,770.66	$ 147,000.00	$ 147,000.00
63-43-63000-4541	Printing & Mailing	$ 104,849.09	$ 111,350.00	$ 111,350.00
63-43-63000-5002	Special Projects	$ 25.00	$ -	$ -
63-43-63000-6820	Deployed Military Abatement	$ 1,675.00	$ 2,000.00	$ 2,000.00
63000	**Utility Billing**	**$ 530,978.99**	**$ 727,776.00**	**$ 814,728.00**
	Expense	**$ 530,978.99**	**$ 727,776.00**	**$ 814,728.00**
63	**Utility Billing Fund**	**$ (82.51)**	**$ 15,000.00**	**$ -**
64	**GIS Fund**			
	Revenue			
64-00-37010-0000	Interest Earnings	$ 19,914.49	$ -	$ -
64-00-38110-0000	Due From General Fund	$ -	$ 165,361.00	$ 136,490.00
64-00-38151-0000	Due From Water Fund	$ 126,686.04	$ 183,139.00	$ 136,490.00
64-00-38152-0000	Due From Sewer Fund	$ 126,686.04	$ 149,356.00	$ 136,490.00
64-00-38159-0000	Due From Storm Drain Fund	$ 56,193.00	$ 19,160.00	$ 136,490.00
	Revenue	**$ 329,479.57**	**$ 517,016.00**	**$ 545,960.00**
	Expense			
64-46-64000-1111	Salaries - Full-Time Permanent	$ 145,166.82	$ 185,790.00	$ 196,910.00
64-46-64000-1112	Salaries - Part-Time Permanent	$ 41,957.46	$ 39,183.00	$ 37,933.00
64-46-64000-1211	Overtime	$ 1,458.69	$ 1,200.00	$ 2,000.00
64-46-64000-1300	Employee Benefits (401K & 457)	$ 9,057.25	$ 11,471.00	$ 12,149.00

Account Number	Description	2025 Actual	2026 Estimate	2027 Final Proposed
64-46-64000-1321	Clothing Allowance	$ 400.00	$ 500.00	$ 500.00
64-46-64000-1511	FICA	$ 2,640.81	$ 2,430.00	$ 2,351.00
64-46-64000-1512	Medicare	$ 2,582.10	$ 3,264.00	$ 3,409.00
64-46-64000-1521	Retirement	$ 23,274.29	$ 27,286.00	$ 27,943.00
64-46-64000-1531	State Insurance Fund	$ 2,191.68	$ 4,054.00	$ 4,253.00
64-46-64000-1541	Health Insurance	$ 29,649.84	$ 37,505.00	$ 44,848.00
64-46-64000-1545	Dental Insurance	$ 2,363.34	$ 2,795.00	$ 2,551.00
64-46-64000-1548	Vision Insurance	$ 401.58	$ 481.00	$ 470.00
64-46-64000-1561	Long Term Disability	$ 871.14	$ 1,023.00	$ 1,056.00
64-46-64000-2121	Dues & Memberships	$ -	$ 200.00	$ 200.00
64-46-64000-2321	Travel & Training	$ 7,744.68	$ 10,150.00	$ 10,150.00
64-46-64000-2513	Equipment Materials & Supplies	$ -	$ -	$ 100.00
64-46-64000-4211	Network-Data Process Supplies	$ 803.79	$ 600.00	$ 1,000.00
64-46-64000-4261	Computer Software & Maint.	$ 995.00	$ 39,965.00	$ 60,300.00
64-46-64000-4530	Administrative Cost	$ -	$ 103,194.00	$ 96,873.00
64-46-64000-4531	Professional & Technical Servi	$ 511.00	$ 25,000.00	$ 25,000.00
64-46-64000-9154	Due To Fleet Fund	$ -	$ 14,989.00	$ 15,964.00
64000	**GIS**	**$ 272,069.47**	**$ 517,016.00**	**$ 545,960.00**
	Expense	**$ 272,069.47**	**$ 517,016.00**	**$ 545,960.00**
64	**GIS Fund**	**$ 57,410.10**	**$ -**	**$ -**

Revenue Total	$ 136,578,778.80	$ 161,537,582.00	$ 363,992,973.00
Expense Total	$ 103,886,297.90	$ 154,668,559.00	$ 363,992,973.00
Grand Total	$ 32,692,480.90	$ 6,869,023.00	$ -

Proposed Property Tax Impact Schedule

Eagle Mountain City will consider an increase to its property tax rate to generate an additional $5,591,594. The following information is intended to provide decision makers and the public with an explanation of how the City's operations would be affected if the proposed property tax increase is adopted.

Certified Property Tax Rate with no increase	0.000530
Property Tax Revenue with no increase	$3,055,201
Proposed Revenue with Tax Change	$8,646,795
New Property Tax Revenue to Eagle Mountain City	**$5,591,594**
Eagle Mountain City's 2026 Proposed Property Tax Rate	**0.001500**

Estimated increase to Eagle Mountain City's Property Tax Revenue 183.02%

Estimated increase to average primary residence:
Market Value $488,000 Estimated tax increase $260.35 Total City Tax $402.60

Estimated increase to average business:
Market Value $2,554,303 Estimated tax increase $2,477.67 Total City Tax $3,831.45

Affected Budget	Proposed Budget	Budget No Tax Change	Budget Change
Sheriff Contract	$9,798,139	$8,290,000	$1,507,939

If a new property tax increase is approved, the revenue will be used to fund essential public safety operations at the level approved by the City Council. These funds help support core functions of the Utah County Sheriff's Office – Eagle Mountain Division, including the addition of deputies to meet the growth of the City.

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving an Interlocal Cooperation Agreement between the Redevelopment Agency of Eagle Mountain City and Eagle Mountain City for the Collection and Remittance of Incremental Property Taxes Collected from Property within the Mid-Valley Community Reinvestment Project Area.
ITEM TYPE:	Resolution
FISCAL IMPACT:	Up to $15,751,273
APPLICANT:	

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
N/A	Approximately 53

PUBLIC HEARING
No

PREPARED BY
Evan Berrett, Economic Development Director

PRESENTED BY
Evan Berrett

RECOMMENDATION:
Staff recommends the City Council approve a Resolution of Eagle Mountain City, Utah, Approving an Interlocal Cooperation Agreement between the Redevelopment Agency of Eagle Mountain City and Eagle Mountain City for the Collection and Remittance of Incremental Property Taxes Collected from Property within the Mid-Valley Community Reinvestment Project Area.

BACKGROUND:
The Mid-Valley CRA covers approximately 53 acres currently under review for commercial retail development. This interlocal agreement specifies the City's involvement in providing tax increment financing for the off-site project improvements and other necessary administrative procedures, terms, and so forth.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Resolution
2. MidValley Interlocal Agreement with City
3. Mid-Valley CRA Presentation

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, APPROVING AN INTERLOCAL COOPERATION AGREEMENT BETWEEN THE REDEVELOPMENT AGENCY OF EAGLE MOUNTAIN CITY AND EAGLE MOUNTAIN CITY FOR THE COLLECTION AND REMITTANCE OF INCREMENTAL PROPERTY TAXES COLLECTED FROM PROPERTY WITHIN THE MID-VALLEY COMMUNITY REINVESTMENT AREA

PREAMBLE

WHEREAS, pursuant to the provisions of the Interlocal Cooperation Act, Title 11, Chapter 13, Utah Code Annotated 1953, as amended (the "Interlocal Act"), and the provisions of the Community Reinvestment Agency Act, Title 17C, Utah Code Annotated 1953, as amended (the "Act"), public agencies, including political subdivisions of the State of Utah as therein defined, are authorized to enter into mutually advantageous agreements for joint and cooperative actions, including the sharing of tax and other revenues; and

WHEREAS, the Redevelopment Agency of Eagle Mountain City (the "Agency") and Eagle Mountain City (the "Taxing Entity") are "public agencies" for purposes of the Act; and

WHEREAS, after careful analysis and consideration of relevant information, the Agency desires to enter into Interlocal Agreements with the Taxing Entity whereby the Taxing Entity would remit to the Agency a portion of the property tax increment generated within the Mid-Valley Community Reinvestment Project Area, (the "Project Area") which would otherwise flow to the Taxing Entity, for the purpose of encouraging development activities through the payment for certain public infrastructure and other uses that directly benefit the Project Area; and

WHEREAS, Section 11-13-202.5 of the Interlocal Cooperation Act requires that certain interlocal agreements be approved by resolution of the legislative body of a public agency.

NOW, THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City:

1. The Interlocal Cooperation Agreement between the Agency and the Taxing Entity, substantially in the form attached hereto as Exhibit A (the "Interlocal Agreement"), is approved in final form, and shall be executed for and on behalf of the Agency by the Chair of the Agency Board.

2. Pursuant to Section 11-13-202.5 of the Interlocal Act, the Interlocal Agreement has been submitted to legal counsel of the Agency for review and approval as to form and legality.

3. Pursuant to Section 11-13-209 of the Interlocal Act, duly executed original counterparts of the Interlocal Agreement shall be filed immediately with the Agency Secretary, the keeper of records of the Agency.

4. As provided in Utah Code Ann. § 17C-5-205(3), the Interlocal Agreement shall be effective on the day on which the Agency publishes notice of the Agreement pursuant to Utah Code Ann. § 11-13-219 of the Interlocal Act.

5. This Resolution shall take effect upon adoption.

ADOPTED by the City Council of Eagle Mountain City, this 18th day of August, 2026.

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah, on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

EXHIBIT A

INTERLOCAL COOPERATION AGREEMENT

THIS INTERLOCAL COOPERATION AGREEMENT is made and entered into this _____ day of , 2026, by and between the **EAGLE MOUNTAIN REDEVELOPMENT AGENCY**, a community reinvestment agency and political subdivision of the State of Utah (the "Agency"), and **EAGLE MOUNTAIN CITY**, a political subdivision of the State of Utah (the "City") in contemplation of the following facts and circumstances:

A. **WHEREAS,** the Agency was created and organized pursuant to the provisions of the Utah Neighborhood Development Act, Utah Code Annotated (**"UCA"**) §17A-2-1201 *et seq.* (2000), and continues to operate under the provisions of its extant successor statute, the Limited Purpose Local Government Entities - Community Reinvestment Agency Act, Title 17C of the UCA (the **"Act"**), and is authorized and empowered under the Act to undertake, among other things, various community development activities pursuant to the Act, including, among other things, assisting the City in development activities that are likely to advance the policies, goals and objectives of the City's general plan, contributing to capital improvements which substantially benefit the City, creating economic benefits to the City, and improving the public health, safety and welfare of its citizens; and

B. **WHEREAS,** this Agreement is made pursuant to the provisions of the Act and the Interlocal Cooperation Act (UCA Title 11, Chapter 13) (the "Cooperation Act"); and

C. **WHEREAS,** the Agency will create the Mid-Valley Community Reinvestment Project Area (the "Project Area"), through the adoption of the Mid-Valley Plan (the "Project Area Plan"), located within the City, which Project Area is described in Exhibit "A" attached hereto and incorporated herein by this reference; and

D. **WHEREAS,** the Project Area contains vacant and underutilized land, which is anticipated to be developed, with encouragement and planning by the Agency, as a regional commercial center consisting of real and personal property including a building or group of buildings for the construction, maintenance, use and/or operation of retail operations, including but not limited to grocery and general merchandise stores, restaurants, financial institutions, fuel centers, service businesses, and more (each a "Building" and collectively the "Buildings"). The Agency has not entered into any participation or development agreements with developers but anticipates that prior to development of the Project Area, the City and/or the Agency may enter into one or more participation agreements with one or more developer(s) which will provide certain terms and conditions upon which the Project Area will be developed using, in part, sales and use tax revenue ("**Tax Revenue**") (as that term is defined in the Act), generated from the Project Area; and

E. **WHEREAS,** historically, the Project Area has generated a total of $0 per year in sales taxes for the City; and

F. **WHEREAS,** upon full development as contemplated in the Project Area Plan, sales taxes produced by the Project Area for the City are projected to total approximately $321,949 in the first year of sales tax revenue collection or which a portion will be distributed to support the development of the Project Area, and after major development has concluded and growth has stabilized, increase by 2.5% annually, until peaking at approximately $3,345,347 per year; and

G. **WHEREAS,** the Agency has requested the City to participate in the promotion of development in the Project Area by agreeing to remit to the Agency for a specified period of time specified portions of the increased sales tax (i.e., Tax Revenue) which will be generated by the Project Area; and

H. **WHEREAS,** it is in the best interest of the citizens of the City for the City to remit such payments to the Agency to permit the Agency to leverage private development of the Project Area; and

I. **WHEREAS,** the Agency has retained LRB Public Finance Advisors, Inc., an independent financial consulting firm with substantial experience regarding community reinvestment projects and tax revenue funding across the State of Utah, to prepare the Project Area Plan and to provide a report regarding the need and justification for investment of Tax Revenues from and within the Project Area. A copy of the report is included in the Draft Project Area Plan attached as Exhibit "B"; and

J. **WHEREAS,** the Agency will create the Mid-Valley Community Reinvestment Project Area Budget (the "Project Area Budget"), a draft copy of which is attached as Exhibit "C", which Project Area Budget, generally speaking, outlines the anticipated generation, payment and use of Tax Revenue within the Project Area;

K. **WHEREAS,** the parties desire to set forth in writing their agreements regarding the nature and timing of such assistance;

NOW, THEREFORE, the parties agree as follows:

1. **Additional Tax Revenue.** The City has determined that significant additional Tax Revenue will likely be generated by the development of the Project Area as described in further detail in the Project Area Plan and Project Area Budget. Each of the parties acknowledges, however, that the development activity required for the generation of the Tax Revenue is not likely to occur within the foreseeable future or to the degree possible or desired without Tax Revenue participation in order to induce and encourage such development activity.

2. **Offset of Development Costs and Expenses.** The City has determined that it is in the best interests of its citizens to pay specified portions of its portion of Tax Revenue to the Agency in order for the Agency to offset costs and expenses which will be incurred by the Agency or participants in Project Area development, including, without limitation, the construction and installation of infrastructure improvements, acquisition of water rights, and other development related costs needed to serve the Project Area, to the extent permitted by the Act, the Project Area Plan, and the Project Area Budget, each as adopted and amended from time to time.

3. **Base Year and Base Year Value.** The base year, for purposes of calculation of the Base Taxable Value (as that term is defined in the Act), shall be 2025, meaning the Base Taxable Value shall, to the extent and in the manner defined by the Act, be equal to the total sales tax collections from business activity within the project area boundaries during the year 2025 (which is currently estimated to be $0, but is subject to final adjustment and verification by the Agency).

4. **Agreement(s) with Developer(s).** The Agency is authorized to enter into one or more participation agreements with one or more participants which may provide for the payment of certain amounts of Tax Revenue (to the extent such Tax Revenue is actually paid to and received by the Agency from year to year) to the participant(s) conditional upon the participant(s)'s meeting of certain performance measures as outlined in said agreement. Such agreement shall be consistent with the terms and conditions of this Agreement, shall require as a condition of the payment to the participant(s) that the respective participant or its approved successors in title as owners of all current and subsequent parcels within the Project Area, as outlined in Exhibit "A" (the "Property"), shall pay any and all taxes and assessments which shall be assessed against the Property in accordance with levies made by applicable municipal entities in accordance with the laws of the state of Utah applicable to such levies, and such other performance measures as the Agency may deem appropriate.

5. **Payment Trigger.** The first year of payment of Tax Revenue from the City to the Agency shall be determined by the Agency. The Project Area automatically triggers the collection of Tax Revenue when the first business opens and completes its first transaction with a customer. The Agency shall be entitled to receive Tax Revenue for a period of twenty (20) full calendar years commencing with the year after the Agency delivers a Trigger Notice.

6. **Total Payment to Agency.** The City shall remit to the Agency 55% of its annual sales tax revenue distribution generated from within the Project Area; provided, however, that the total amount of such Tax Revenue generated for the Agency for the use of all approved activities including redevelopment activities, meeting the CRA housing requirement, and RDA administration costs, does not exceed a net present value of $15,751,273.

7. **Sales Tax Increase.** The Sales and Use Tax Revenue payable under this Agreement shall be calculated using the City's applicable sales and use tax rate in effect when each taxable transaction occurs. Accordingly, any increase or decrease in that rate during the Project Area Funds Collection Period shall be reflected in the calculation. Only Sales and Use Tax Revenue actually distributed to and received by the City shall be included.

8. **Use of Grant Monies.** Additionally, the City shall distribute to the project developers no more than $2,270,000 of grant monies received from Utah County for the purpose of paying a portion of the cost of development of Old Airport Road, east of Pony Express Parkway. These grant monies are in addition to and exclusive of any payment to the Agency or the project developers in accordance with any other section of this Agreement.

9. **Allocation of Arbitrage Monies.** The City shall allocate arbitrage monies, interest earned on a previous road bond, to the project toward completion of Lake Mountain Corridor, east of Pony Express Parkway. These monies shall be distributed to the developer who will be developing the road. These arbitrage monies are in addition to and exclusive of any payment of any monies to the Agency or the project developers in accordance with any other section of this Agreement.

10. **Timeline to Perform.** The developer shall begin construction of the infrastructure improvements in the project area within eight months after the effective date.

11. **No Independent Duty.** The City shall be responsible to remit to the Agency only Tax Revenue actually received by the Utah State Tax Commission acting as the tax collecting agency for the City. The City shall have no independent duty to pay any amount to the Agency other than the Tax Revenue actually received by the Utah State Tax Commission, on behalf of the City on an annual basis.

12. **Authority to Bind.** Each individual executing this Agreement represents and warrants that such person is authorized to do so, and, that upon executing this Agreement, this Agreement shall be binding and enforceable in accordance with its terms upon the party for whom such person is acting.

13. **Further Documents and Acts.** Each of the parties hereto agrees to cooperate in good faith with the others, and to execute and deliver such further documents and perform such other acts as may be reasonably necessary or appropriate to consummate and carry into effect the transactions contemplated under this Agreement.

14. **Notices.** Any notice, request, demand, consent, approval or other communication required or permitted hereunder or by law shall be validly given or made only if in writing and delivered to an officer or duly authorized representative of the other party in person or by Federal Express, private commercial delivery or courier service for next business day delivery, or by United States mail, duly certified or registered (return receipt requested), postage prepaid, and addressed to the party for whom intended, as follows:

If to City:
Eagle Mountain City
Attn: City Council
1650 E. Stagecoach Run
Eagle Mountain, UT 84005
Phone: (801) 789-6603

If to Agency:
Eagle Mountain Redevelopment Agency
Attn: Agency Board
1650 E. Stagecoach Run
Eagle Mountain, UT 84005
Phone: (801) 789-6603

Any party may from time to time, by written notice to the others as provided above, designate a different address which shall be substituted for that specified above. Notice sent by mail shall be deemed served or delivered seventy-two (72) hours after mailing. Notice by any other method shall be deemed served or delivered upon actual receipt at the address or facsimile number listed above. Delivery of courtesy copies noted above shall be as a courtesy only and failure of any party to give or receive a courtesy copy shall not be deemed to be a failure to provide notice otherwise properly delivered to a party to this Agreement.

15. **Entire Agreement.** This Agreement is the final expression of and contains the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior understandings with respect thereto. This Agreement may not be modified, changed, supplemented or terminated, nor may any obligations hereunder be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as otherwise expressly permitted herein. This Agreement and its exhibits constitute the entire agreement between the parties hereto pertaining to the subject matter hereof, and the final, complete and exclusive expression of the terms and conditions thereof. All prior agreements, representations, negotiations and understandings of the parties hereto, oral or written, express or implied, are hereby superseded and merged herein.

16. **No Third Party Benefit.** The parties do not intend to confer any benefit hereunder on any person, firm or corporation other than the parties hereto. There are no intended third party beneficiaries to this Agreement.

17. **Construction.** Headings at the beginning of each paragraph and subparagraph are solely for the convenience of the parties and are not a part of the Agreement. Whenever required by the context of this Agreement, the singular shall include the plural and the masculine shall include the feminine and vice versa. Unless otherwise indicated, all references to paragraphs and subparagraphs are to this Agreement. In the event the date on which any of the parties is required to take any action under the terms of this Agreement is not a business day, the action shall be taken on the next succeeding business day.

18. **Partial Invalidity.** If any term or provision of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each such term and provision of this Agreement shall be valid and shall be enforced to the fullest extent permitted by law.

19. **Amendments.** No addition to or modification of any provision contained in this Agreement shall be effective unless fully set forth in writing executed by each of the parties hereto.

20. **Counterparts.** This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute but one and the same instrument.

21. **Waivers.** No waiver of any breach of any covenant or provision herein contained shall be deemed a waiver of any preceding or succeeding breach thereof or of any other covenant or provision herein contained. No extension of time for performance of any obligation or act shall be deemed an extension of the time for performance of any other obligation or act.

22. **Governing Law.** This Agreement and the exhibits attached hereto shall be governed by and construed under the laws of the State of Utah. In the event of any dispute hereunder, it is agreed that the sole and exclusive venue shall be in a court of competent jurisdiction in Utah County, Utah, and the parties hereto agree to submit to the jurisdiction of such court.

23. **Declaration of Invalidity**. In the event that a court of competent jurisdiction declares that the City cannot pay and/or that the Agency cannot receive payments of the Tax Revenue, declares that the Agency cannot pay the Tax Revenue to developers, or takes any other action which has the effect of eliminating or reducing the payments of Tax Revenue received by the Agency, the Agency's obligation to pay the Tax Revenue to developers shall be reduced or eliminated accordingly, the Agency, and the City shall take such steps as are reasonably required to not permit the payment and/or receipt of the Tax Revenue to be declared invalid.

24. **No Separate Legal Entity.** No separate legal entity is created by this Agreement.

25. **Duration.** This Agreement shall terminate after the twentieth year following the trigger as described in section 5: Payment Trigger.

26. **Assignment.** No party may assign its rights, duties or obligations under this Agreement without the prior written consent first being obtained from all parties. Notwithstanding the foregoing, such consent shall not be unreasonably withheld or delayed so long as the assignee thereof shall be reasonably expected to be able to perform the duties and obligations being assigned.

27. **Termination.** Upon any termination of this Agreement resulting from the uncured default of any party, the order of any court of competent jurisdiction or termination as a result of any legislative action requiring such termination, then any funds held by the Agency and for which the Agency shall not be required to disburse to developers in accordance with the agreements which govern such disbursement, then such funds shall be returned to the party originally remitting same to the Agency and upon such return this Agreement shall be deemed terminated and of no further force or effect.

28. **Interlocal Cooperation Act.** In satisfaction of the requirements of the Cooperation Act in connection with this Agreement, the Parties agree as follows:

a. This Agreement has been, on or prior to the date hereof, authorized and adopted by resolution of the legislative body of each Party pursuant to and in accordance with the provisions of Section 11-13-202.5 of the Cooperation Act;

b. This Agreement has been, on or prior to the date hereof, reviewed as to proper form and compliance with applicable law by a duly authorized attorney on behalf of each Party pursuant to and in accordance with the provisions of Section 11-13-202.5(3) of the Cooperation Act;

c. A duly executed original counterpart of this Agreement shall be filed immediately with the keeper of records of each Party pursuant to Section 11-13-209 of the Cooperation Act;

d. The Chair of the Agency is hereby designated the administrator for all purposes of the Cooperation Act, pursuant to Section 11-13-207 of the Cooperation Act; and

e. Should a party to this Agreement desire to terminate this Agreement, in part or in whole, each party to the Agreement must adopt, by resolution, an amended Interlocal Cooperation Agreement stating the reasons for such termination. Any such amended Interlocal Cooperation Agreement must be in harmony with any development/participation agreement(s) entered into by the Agency as described in this Agreement.

f. Immediately after execution of this Agreement by both Parties, the Agency shall, on behalf of both parties, cause to be published notice regarding this Agreement pursuant to Section 11-13-219 of the Cooperation Act.

g. This Agreement makes no provision for the parties acquiring, holding and disposing of real and personal property used in the joint undertaking as such action is not contemplated as part of this Agreement nor part of the undertaking. Any such provision would be outside the parameters of the current undertaking. However, to the extent that this Agreement may be construed as providing for the acquisition, holding or disposing of real and/or personal property, all such property shall be owned by the Agency upon termination of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement on the day specified above.

City: EAGLE MOUNTAIN CITY

Attest: By: _____

Its: Mayor

_____
City Recorder

Approved as to form:

_____
Attorney for City

Agency: EAGLE MOUNTAIN REDEVELOPMENT AGENCY

Attest: By: _____

Its: Chair

_____

Secretary

Approved as to form:

_____

Attorney for Agency

EXHIBIT "A"
to
INTERLOCAL AGREEMENT

Map and Legal Description of Project

EXHIBIT "B"
To
INTERLOCAL AGREEMENT

Project Area Plan

EXHIBIT "C"
To
INTERLOCAL AGREEMENT

Project Area Budget

Mid-Valley

Community Reinvestment Area

*Not a representation of the anticipated development

CRA Process

Title 17C of the state code regulates the operation of Redevelopment Agencies, which operate Community Reinvestment Areas (CRA)

Step 1: Survey Area Resolution

RDA staff identifies area to explore creating a CRA. Can occur with or without a project in mind. RDA adopts a “Survey Area Resolution” to kick off the process, but nothing approved or agreed to at this point.

Step 2: Project Area Plan & Budget Development and Approval

RDA staff works with outside consultants to determine project feasibility, perform “but for” analysis, negotiate terms of any agreements, and so forth.

Step 3: Interlocal Agreements & Development Agreements as needed

Other taxing entities are engaged for participation, development agreement negotiated. ILAs approved at meetings of other participating entities.

Step 4: Participation Agreement followed by 30-day protest period

Participation agreement ties altogether and covers final term nuances. 30-day protest period follows.

Basic Project Characteristics

- Commercial/Retail Area Development
- Increment to be used towards infrastructure.
- Project supports the development of multiple businesses, not a single business.
- Anticipated to be home to two large anchor tenants, a handful of junior/mid-box tenants, and several other desirable tenants along the perimeter of the project.
- Following project approvals, permitting and construction anticipated to start immediately.

What you're considering for approval tonight

Approvals tonight will cover several aspects of the CRA and generally kick off the project to move forward into construction.

Permits & More

Staff has been working with the Kroger team for the past several weeks to discuss, within the terms of the Development Agreement, how to proceed with permits and any other administrative approvals needed.

Project Area Plan & Budget

The Plan & Budget documents provide the analysis, parameters, and conditions by which the project area will operate.

Interlocal Agreement

Between the City and RDA, establishing how funds are to be collected and used, sets caps, and establishes other conditions as needed.

Participation Agreement

Between the City, RDA, and Development Team, further providing limitations on the use of the funds, establishing terms to be met for the distribution of the funds, insights into procedures for other circumstances that may occur.

Already Approved

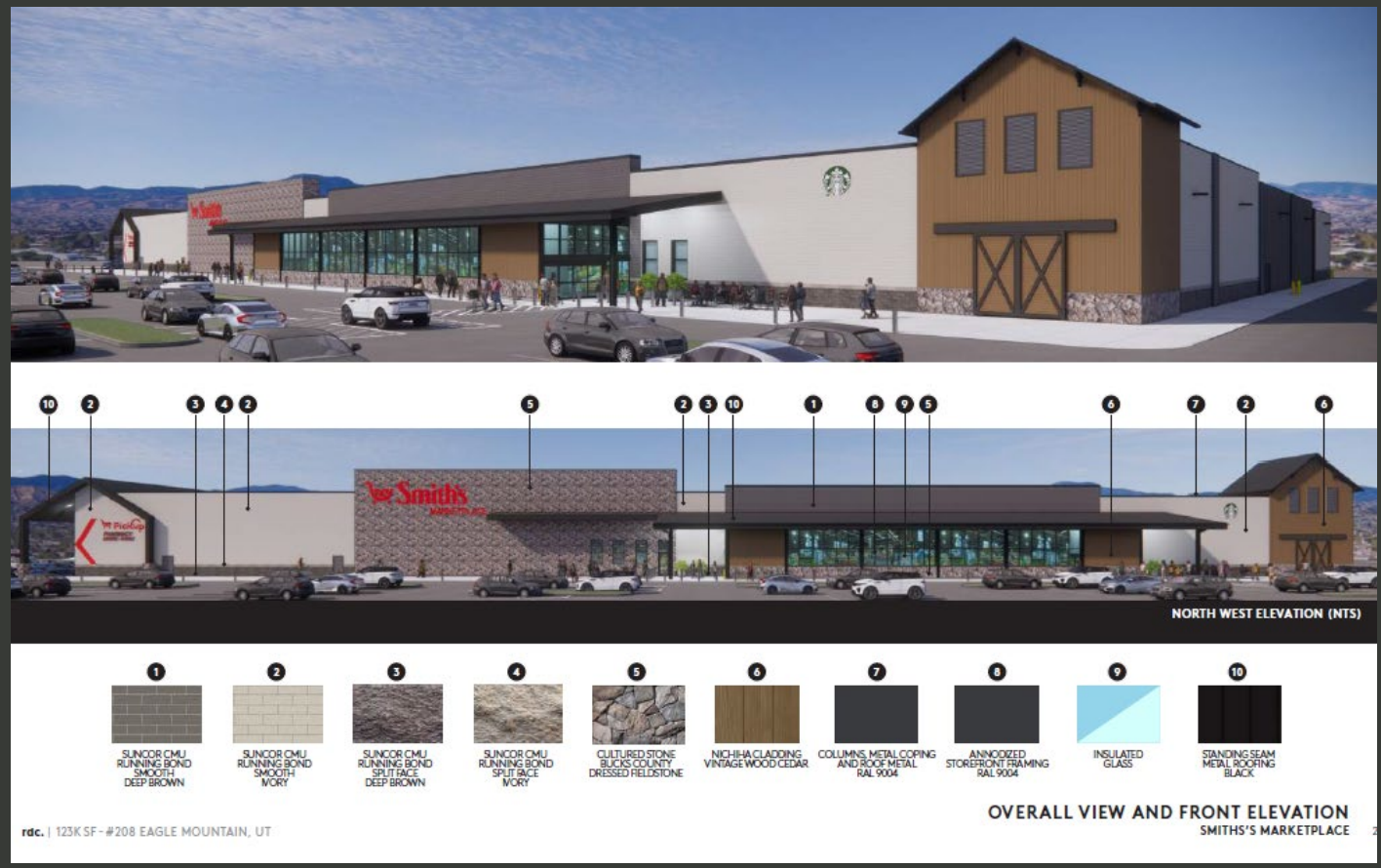
Development Agreement (which anticipates these approvals), Bond parameters, creation of the Project Area

Purpose of this CRA

- Utilize the new sales tax revenues from a proposed retail development to advance needed infrastructure projects which go above and beyond what the project otherwise would be required to complete.
  - Essentially taking a portion of the new sales tax dollars and redirecting to cover costs of roads surrounding the project that will be built to full width from the start.
- Enable a retail area to achieve its full potential, resulting in the siting of desirable businesses in the city and the increase of tax revenues needed for city growth.

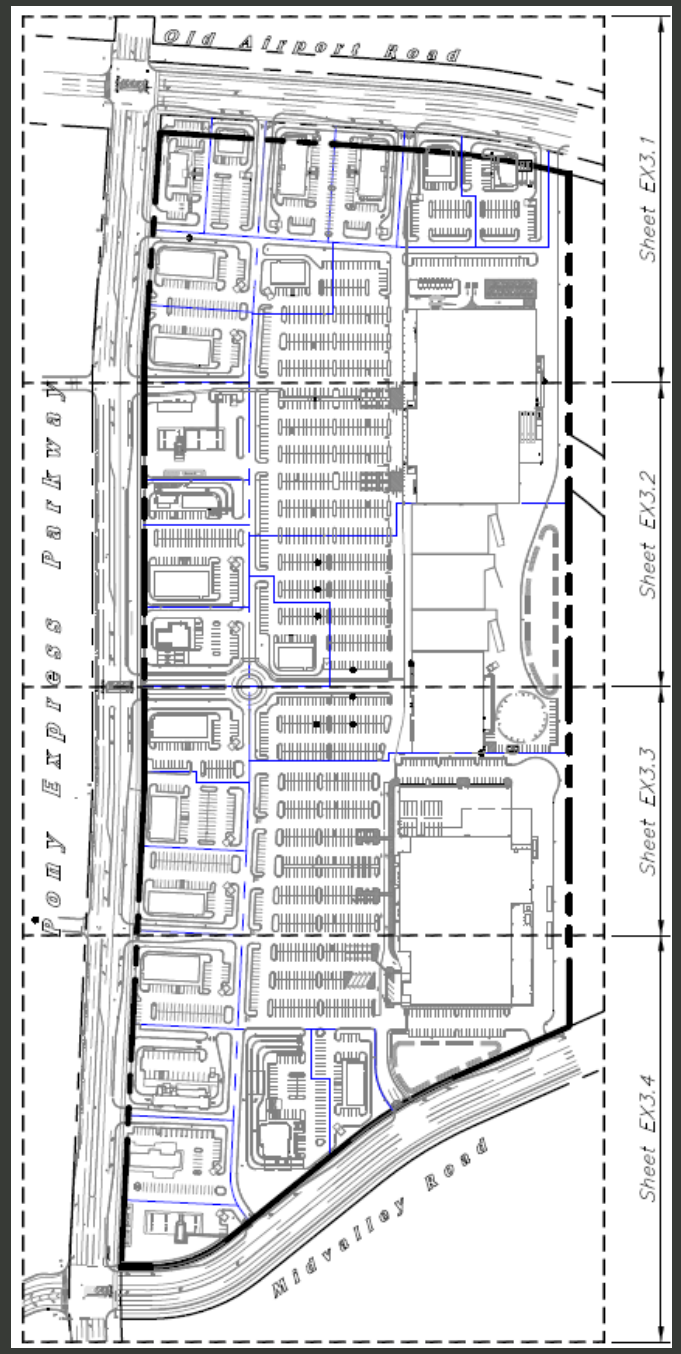
Project Details

- Center will be called Eagle's Landing
- **Major Anchors:** Smith's Marketplace and Lowe's Home Improvement.
- **Junior/Mid-Box:** Four spaces available.
- **Pad Sites:** 20+ Pad Sites, 2 Smith's Fuel stations
- Construction anticipated to start in September. Completion of Smith's and Lowe's anticipated for Spring of 2028.
- Smith's and Lowe's will feature architectural styles custom to Eagle Mountain.



Project Details (cont.)

- **Planned Infrastructure Improvements:**
  - Adding northbound lane to Pony Express Pkwy.
  - Adding new signal on Pony Express Pkwy.
  - Enhancing Intersections on Pony Express Pkwy at Old Airport Road and Lake Mountain Corridor.
  - Building out Lake Mountain Corridor (5 lanes) to the east of Pony Express Pkwy.
  - Building out Old Airport Road (5 lanes) to the east of Pony Express Pkwy.
  - Adding various turn pockets, acceleration lanes, etc. as discussed with Council.
  - Improvements to retention areas.



Unique Considerations for this CRA

Interlocal Agreement

- Some similarities to past CRA interlocal agreements
- Base year is 2025, base value is $0
- Trigger as soon as first business is open.
- Cap of $15,751,273 (NPV), but not likely to be reached.
- Pulls in funds from the County for Old Airport Road.
- Pulls in funds from interest earned on previous road bond tied to specific roads.
- Project must begin construction within 8 months of approval.

Participation Agreement

- Also similar to past Participation Agreements
- Specifies improvements to be made in the project in line with development agreement
- Specifies how City will provide TIF bond funds to the development for the improvements.
- Makes clear that the Bond costs are only for the agreed upon infrastructure, and that once the Bond is paid, the agreement is satisfied.
- Makes clear that should we collect more revenue than anticipated, we can use those funds to accelerate payment of the Bond.

Details of the Project Budget

Context to Changes: Third party market study (cost covered by Kroger) demonstrated that project would generate revenues high enough and quickly enough that we could reduce the parameters of the TIF.

Renegotiations landed with the City participating at only 55% instead of the original 62% considered, and the County no longer being necessary to be included. Additionally, although the project stays at 20 years, we have built in language that allows us to complete the project much sooner and we are anticipating that outcome.

TIF Parameters:
City Participation: 55% of new sales tax revenue
Duration: 20 years, or as soon as bond is paid

Anticipated Revenues to City During CRA
Sales Tax per year average: $1.2 - $1.4 million
Sales Tax Total after 20 years: $22 million
Affordable Housing Dollars after 20 years: $2.7 million

Anticipated Revenues Post-CRA
Per year average: $2.5 - $3 million

Expected Benefits & Outcomes

- Larger center than otherwise possible
- Hundreds of Jobs
- In-Demand Businesses
- Reduced Sales Tax Leakage
- Increased RAP Tax funds
- Expanding Pony Express
- Setting standard for any development around Downtown
- Enhance our Business Recruiting Capabilities
- Helps push forward Lake Mountain Corridor project
- Tax Revenues help advance other projects.
- Additional affordable housing dollars

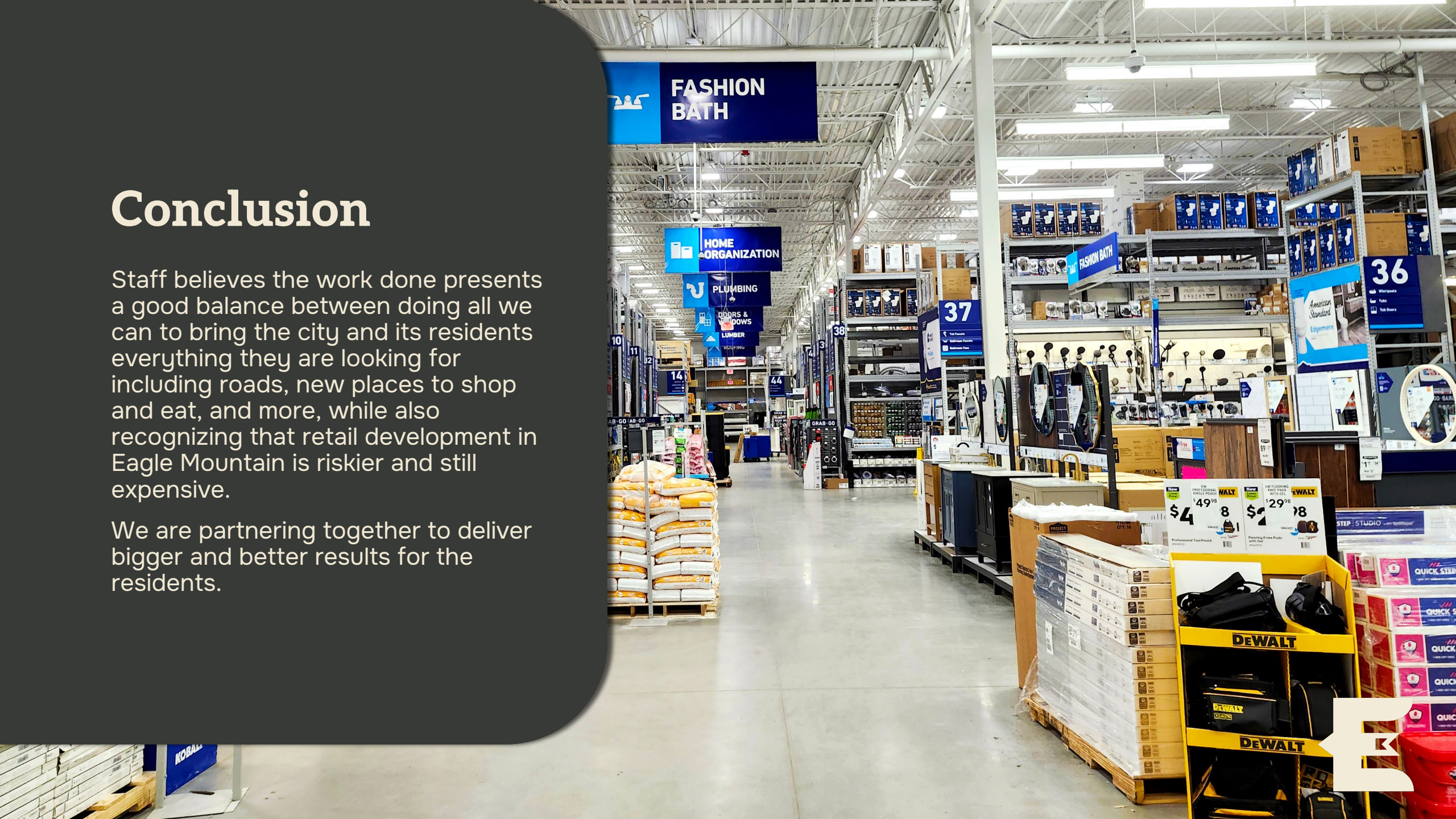
Use of a TIF Bond

- Infrastructure projects to start quickly.
- Sales tax doesn’t come in until a business is open, but construction bills need to be paid.
- TIF bond allows for funds to be available up front and for the debt service to be paid off once sales tax starts coming in.
- Project Area Budget is structured with the intent to pay off the bond early.
- City opted to commit city-wide sales tax dollars as subordinate in case the project stumbles due to unforeseen economic downturn, etc. Very unlikely to be needed.

Conclusion

Staff believes the work done presents a good balance between doing all we can to bring the city and its residents everything they are looking for including roads, new places to shop and eat, and more, while also recognizing that retail development in Eagle Mountain is riskier and still expensive.

We are partnering together to deliver bigger and better results for the residents.



Questions?

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	RESOLUTION - A Resolution of Eagle Mountain City, Utah, Approving the Mid-Valley CRA Participation Agreement between Eagle Mountain City, the Redevelopment Agency of Eagle Mountain City, and Terra Smith's Eagle Mountain, LLC.
ITEM TYPE:	Resolution
FISCAL IMPACT:	Up to $15,751,273
APPLICANT:	

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
	Up to 53 Acres

PUBLIC HEARING
No

PREPARED BY
Evan Berrett, Economic Development Director

PRESENTED BY
Evan Berrett

RECOMMENDATION:
Staff recommends the City Council approve a Resolution of Eagle Mountain City, Utah, Approving the Mid-Valley CRA Participation Agreement between Eagle Mountain City, the Redevelopment Agency of Eagle Mountain City, and Terra Smith's Eagle Mountain, LLC.

BACKGROUND:
The Mid-Valley CRA covers approximately 53 acres currently under review for commercial retail development. The proposed resolution sets terms and conditions for the distribution and use of project area funds and satisfies any other obligations any or all parties participating in the Mid-Valley CRA have agreed to through negotiations.

ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:
N/A

ATTACHMENTS:
1. Resolution
2. Participation Agreement

RESOLUTION NO. R- -2026

A RESOLUTION OF EAGLE MOUNTAIN CITY, UTAH, APPROVING THE MID-VALLEY CRA PARTICIPATION AGREEMENT BETWEEN EAGLE MOUNTAIN CITY, THE REDEVELOPMENT AGENCY OF EAGLE MOUNTAIN, AND TERRA SMITH'S FOOD AND DRUG CENTERS, INC

PREAMBLE

WHEREAS, the Eagle Mountain City and The Redevelopment Agency of Eagle Mountain (the "Agency") created the Mid-Valley Community Reinvestment Project Area (the "Project Area") and adopted a Community Reinvestment Project Area Plan for the Project Area for the purposes of facilitation development and job growth within the Project Area; and

WHEREAS, the Agency has been working with Terra Smith's Eagle Mountain, LLC (the "Participant"), to develop a grocery and general merchandise store within the Project Area that will create a significant economic benefit within the Project Area; and

WHEREAS, after careful analysis and consideration of relevant information, the Agency desires to enter into a Participation Agreement with the Participant whereby the Agency agrees to pay to the Participant a portion of the tax increment generated by the development within the Project Area as provided in the Participation Agreement attached hereto as Exhibit A (the "Participation Agreement").

NOW THEREFORE, BE IT RESOLVED by the City Council of Eagle Mountain City, as follows:

1. The Participation Agreement, substantially in the form attached hereto as Exhibit A, is approved and shall be executed for and on behalf of the City by the Mayor.

2. This Resolution shall take effect upon adoption.

ADOPTED by the City Council of Eagle Mountain City, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah, on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Exhibit A

CRA Participation Agreement

between

The Redevelopment Agency of the City of Eagle Mountain

and

Eagle Mountain City

and

Terra Smith's Eagle Mountain, LLC

August 18, 2026

CRA Participation Agreement

The Redevelopment Agency of the City of Eagle Mountain, a political subdivision of the State of Utah (the **"Agency"**), Eagle Mountain City, a municipal corporation and political subdivision of the State of Utah ("The **"City"**), and Terra Smith's Eagle Mountain, LLC, a Delaware limited liability company (the **"Participant"**, and with the City and Agency, may be referred to herein collectively as **"Parties"** or individually as a **"Party"**), agree as follows as of August 18, 2026 (the **"Effective Date"**):

1. SUBJECT OF AGREEMENT

1.1 Purpose of the Agreement

The purpose of this CRA Participation Agreement (the **"Agreement"**) is (a) to implement the Mid-Valley Community Reinvestment Project Area Plan (the **"Project Area Plan"**) adopted by the Agency, by providing for the potential development of a regional commercial center consisting of real and personal property which may include a building or group of buildings for the construction, maintenance, use and/or operation of retail operations, including but not limited to grocery and general merchandise stores, restaurants, financial institutions, fuel centers, service businesses, and more (each a "Building" and collectively the "Buildings"), as well as certain accessory uses or buildings located on the Project Area (as defined below) and other related or associated uses, buildings, or structures (collectively, the **"Project"**) on approximately 53 acres of land, as more particularly described below, located in Eagle Mountain City, Utah, comprising the Mid-Valley Community Reinvestment Project Area (the **"Project Area"**), and (b) to specify the terms and conditions pursuant to which the Agency and the Participant will cooperate in bringing about this objective, including the funds the Agency will provide to assist in the development of the Project Area. The fulfillment of this Agreement is vital to and in the best interests of the City and the health, safety, and welfare of its residents, and in accord with public purposes and will provide a benefit to the City and its residents. This Agreement is carried out pursuant to the Limited Purpose Local Government Entities — Community Reinvestment Agency, Title 17C of the Utah Code Annotated, in effect when the Project Area Plan was adopted (the **"Reinvestment Act"**).

1.2 The Project Area Plan

The Agency adopted Resolution No. R-06-2025 on September 16, 2025, which authorized the preparation of a draft community reinvestment project area plan. This Agreement is subject to the provisions of the Project Area Plan, as approved and adopted on _____, 2026, by the City Council of the City, in Ordinance No. ____ (the **"Ordinance"**), in accordance with Section 17C-5-104 of the Reinvestment Act. The Project Area Plan and the Ordinance are attached hereto as **Exhibit A** and **Exhibit B**, respectively.

1.3 The Project Area

The Project Area is located within the boundaries of the city. The exact boundaries of the Project Area are specifically and legally described in **Exhibit C** attached hereto. The Project Area is shown on the Project Area Map which is attached hereto as **Exhibit D.** If requested by the Participant, the Agency agrees to cooperate and take such action as is necessary under the Reinvestment Act to expand the Project Area to include any real property within the municipal limits of the City that is adjacent and contiguous to the Project Area (or that is separated from the Project Area only by roads, public rights of way, easements or similar land rights or uses) that the Participant or an affiliate of the Participant may from time to time acquire following the Effective Date.

1.4 The Project Area Budget

Pursuant to the Reinvestment Act, a Project Area Budget has been adopted by the Agency for the Project Area (the **"Project Area Budget"**). A copy of the Project Area Budget is attached hereto as **Exhibit E**.

1.5 Interlocal Agreements

On or before the Effective Date, the Agency has entered into a separate interlocal agreement (the **"Interlocal Agreement"**) with the City, a copy of which is attached hereto as **Exhibit F**.

1.6 Parties to the Agreement

(a) Agency

The Agency is a public body, corporate and politic, exercising governmental functions and powers, and organized and existing under the Reinvestment Act. The physical delivery address of the Agency for purposes of this Agreement is: Redevelopment Agency of the City of Eagle Mountain, 2565 North Pony Express Parkway, Eagle Mountain, Utah 84005, Attention: Evan Berrett. The electronic mail address of the Agency for purposes of this Agreement is: eberrett@eaglemountain.gov.

(b) City

The City is a municipal corporation and political subdivision of the State of Utah. The physical delivery address of the City for purposes of this Agreement is: Eagle Mountain City, 1650 Stagecoach Run, Eagle Mountain, Utah 84005, Attention: City Recorder. The electronic mail address of the City for purposes of this Agreement is: recorder@eaglemountain.gov.

(c) The Participant

The Participant is Terra Smith's Eagle Mountain, LLC. The physical delivery address of the Participant for the purposes of this Agreement is: Terra Smith's Eagle Mountain, LLC, c/o The Kroger Co., 1014 Vine Street Cincinnati, OH 45202 Attn: Law Department, Jennifer Gothard. The electronic mail address of the Participant for purposes of this Agreement is: jennifer.gothard@kroger.com.

1.7 No Additional Approvals. Upon the approval of this Agreement by the Agency, and the expiration of all statutory notice and contest periods, no additional legislative action is required for the Agency to perform its obligations hereunder.

2. ASSIGNMENT

Except as permitted by Section 2.1 hereof, the Participant agrees for itself and any successor in interest that during the term of this Agreement the Participant shall not assign or transfer or attempt to assign or transfer all or any part of its obligations under this Agreement without the prior written consent of the other Parties, which consent shall not be unreasonably withheld, conditioned, or delayed.

2.1 Permissible Transfers.

Notwithstanding the provisions of this Agreement to the contrary, the Participant shall not be required to obtain the other Parties' consent, and the other Parties shall not be permitted to terminate this Agreement, in connection with the following transfers or the assignment of the Agreement pursuant to the following transfers: (a) the sale, exchange, issuance or redemption of any stock of the Participant or its parent that is listed on a public exchange; (b) transfers of less than a controlling interest in the Participant or its parent; (c) transfers of interests in either the Project or the Participant to an affiliate of the Participant; (d) changes in the organizational form of the Participant; (e) a transfer of the operational responsibilities of the Project to a third party; (f) a transfer of the fee simple ownership of the Project so long as the Participant or its affiliate continues to maintain a leasehold interest in the Project; (g) subletting or licensing of the Project; (h) a sale and lease back or similar financing transaction of the Project; (i) or the granting of any lien, security interest, or other encumbrance upon the Project or the interests of the Participant in the Project. In addition, the Participant may transfer real and personal property in the Project Area and retain the Participant's rights to receive Tax Increment (as defined below) under this Agreement.

2.2 Continuing Obligations

Except as otherwise provided herein, and except for a transfer or assignment of this Agreement which has been consented to by the City and the Agency, no assignment or transfer of this Agreement, any part hereof, any right herein, or approval hereof, by the City and the Agency shall be deemed to relieve the Participant from any obligation under this Agreement. Upon the approval by the Agency of an assignment of this Agreement, the

assigning Participant will be relieved of all obligations under this Agreement arising from and after the date of such assignment and the City and the Agency shall look solely to the assignee for performance of the obligations under this Agreement from and after the date of such assignment. All of the terms, covenants, and conditions of this Agreement shall be binding upon and shall inure to the benefit of the Participant and its permitted successors and assigns.

3. FINANCING OF THE DEVELOPMENT OF THE PROJECT AREA

3.1 Nature of Participant's Obligations

The Participant shall have the right to improve the Project Area by developing, at its own initial expense to be reimbursed in accordance with this Agreement, the Project pursuant to and in accordance with that certain Development Agreement, dated as of the Effective Date, between the City and the Participant (as amended, restated, supplemented or otherwise modified from time to time,) (the **"Development Agreement"**) or as otherwise permitted by applicable law. If Participant chooses to develop the Project, it shall have the following obligations:

(a) Participant shall construct Old Airport Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide median from Pony Express Parkway back to the second access into the project. The road shall include a single left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B of the Development Agreement.

(b) Participant shall construct Mid Valley Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide concrete median from Pony Express Parkway back to the second access into the project. The road shall include a dual left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B of the Development Agreement.

(c) Participant shall construct a third northbound auxiliary lane on Pony Express Parkway along the project frontage to act as a deceleration and acceleration lane. Participant shall modify and/or remove the medians along Pony Express Parkway to add left turn lanes in the project accesses as shown on Exhibit B of the Development Agreement. Participant

shall construct a traffic signal at the middle access into the project. The center access will have dual left turn lanes exiting the project onto Pony Express Parkway.

3.2 Responsibility for Development Plans and Permits

In the event the Participant elects to develop the Project Area, the Participant, but not the Agency, shall be responsible for preparing and completing any plans for the acquisition and construction of the Project.

3.3 Nature of City's Obligations

The City shall reimburse Participant, or its designee, for its expenses related to its obligations in Section 3.1 of this Agreement in the manner set forth in the Development Agreement (the **"Reimbursement"**). The Parties intend that the Reimbursement fully and completely reimburse Participant for all costs expended in fulfilling Participant's obligations in Section 3.1. Participant shall not be obligated to expend Participant's own unreimbursed funds, nor make payments on or shortfalls into the TIF Bond (defined below). The Reimbursement shall not exceed Participant's actual costs expended to complete Participant's obligations herein. To fund the Reimbursement, the City shall have the following obligations:

(a) The City shall distribute to the Participant, or its designee, up to $2,270,000 of grant monies received from Utah County for the purpose of paying a portion of the cost of development of Old Airport Road, east of Pony Express Parkway ("**Grant Monies**"). The City shall place these Grant Monies in escrow as provided for in the Development Agreement and use them to reimburse the Participant for eligible expenses.

(b) The City shall allocate up to $1,000,000 in arbitrage monies, interest earned on a previous road bond ("**Arbitrage Monies**"). These Arbitrage Monies shall be placed in escrow as provided for in the Development Agreement and distributed to the Participant, or its designee as reimbursements for eligible expenses.

(c) The City shall bond for the remaining anticipated costs and place the monies in escrow as provided for in the Development Agreement (the **"TIF Bond"**). The amount of the TIF Bond shall be such amount that, when added to the amount of available Grant Monies and amount of available Arbitrage Monies, shall equal no less than a net present value of $12,454,325.35 to cover anticipated and estimated reimbursement costs.

(d) To fund the TIF Bond payments, the City shall remit to the Agency 55% of its annual sales tax revenue distribution generated from within the Project Area (the **"Tax Revenue"**)The estimated total amount of such Tax Revenue generated for the Agency for the use of all approved activities including redevelopment activities, meeting the CRA housing requirement, and RDA administration costs, is expected to reach a net present value of $15,751,273. It is anticipated that it will take up to twenty (20) years to retire the TIF Bond. If the Tax Revenue is greater than

currently projected, the City may retire the TIF Bond early. Upon retirement of the TIF Bond, the City's duty to remit the Tax Revenue shall cease.

4. TAX INCREMENT

4.1 Tax Increment Reimbursement

The Project Area Plan will be funded in part by tax increment pursuant to the provisions of the Reinvestment Act. Under the Reinvestment Act, the Interlocal Agreements and the Project Area Budget, the Agency is entitled to receive specified portions of the Tax Increment (as defined below) generated by and within the Project Area (collectively, the **"Project Area Funds"**) over an initial period of up to twenty (20) full calendar years commencing with the Trigger Year (as defined below) (the **"Increment Period"**). In accordance with the Project Area Budget and the Interlocal Agreement, the Agency shall begin to receive the Project Area Funds generated in the Trigger Year. Project Area Funds are to be paid into a separate account of the Agency used solely for repayment of the TIF Bond and other uses permissible hereunder and in accordance with the Reinvestment Act and shall be applied for the purposes described in the Project Area Plan, the Project Area Budget, the Interlocal Agreement and this Agreement. The Agency, at the City's request subject to the availability of Project Area Funds, may retire the TIF Bond early. Upon retirement of the TIF Bond, the Agency's entitlement to receive specified portions of the Tax Increment shall cease and the Increment Period shall end.

For purposes of this Agreement, the following terms shall have the following corresponding meaning:

(a) **"Affordable Housing"** has the meaning set forth in the Reinvestment Act;

(b) **"Affordable Housing Funds"** means ten percent (10%) (the **"Maximum Affordable Housing Percentage"**) of the Project Area Funds, provided, however, if a change in law reduces the percentage of Project Area Funds the Agency is required to allocate to Affordable Housing, the Maximum Affordable Housing Percentage shall, from and after the effective date of such change in law, be automatically reduced to the minimum percentage required by such change in the law;

(c) **"Base Tax Amount"** shall for each Phase be the sales and use tax revenue generated by sales attributable to the Base Taxable Value for all property included within the Project Area;

(d) **"Base Taxable Value"** shall be equal to the total sales and use tax collections from business activity within the project area boundaries during the year 2025 (which is currently estimated to be $0, but is subject to final adjustment and verification by the Agency);

(e) **"Net Project Area Funds"** means the Project Area Funds less the Affordable Housing Funds and the Agency Expenses and Initial Agency Costs (as defined in section 4.2);

(f) **"Tax Increment"** means annual sales tax revenue distribution generated from within the Project Area in excess of the Base Amount;

(g) **"Taxes"** shall mean the local option of the sales and use tax levied on sales within the Project Area in accordance with the Local Sales and Use Tax Act and Chapter 3.05 of the Eagle Mountain Municipal Code;

(h) **"Trigger Date"** means the date when the first business within the Project Area opens and completes its first transaction with a customer; and

(i) **"Trigger Year"** means the calendar year immediately after the calendar year in which the Trigger Date occurs.

In consideration for the Participant's election to construct the Project, which will promote the creation or retention of jobs within the City and State of Utah, and will provide a public benefit to the City and its residents and the City's willingness to provide funding for the infrastructure improvements outlined in Section 3.1, the Agency agrees to pay to the City, subject to the terms (including any applicable limitations) of the Interlocal Agreement as of the Effective Date, (the **"Tax Increment Reimbursement"**) the Net Project Area Funds, which are generally attributable to fifty-five percent (55%) of the Tax Increment during the Increment Period. The Tax Increment Reimbursement will be paid by the Agency in periodic installments within thirty (30) calendar days after the receipt by the Agency of each portion of the Project Area Funds generated. The Agency agrees to promptly provide, and in all events within ten (10) days of the Trigger Date, written notice of the occurrence of such Trigger Date to the City in accordance with the terms of the Interlocal Agreement.

4.2 Agency Expenses

The Parties acknowledge and agree that the Agency has no other funds or revenue other than Project Area Funds it receives, and that the Agency utilizes resources provided by the City to operate the Agency. Accordingly, the Agency may pay to the City 0.5% of the sum of 55% for each year to cover the Agency's out of pocket legal, administrative, and overhead costs and expenses incurred by the Agency in administering or defending the Project Area and the Project Area Plan (the "**Agency Expenses**"). In addition, the Agency may reimburse the City for the all third party fees and costs (including reasonable legal fees, financial advisor fees, administrative fees and overhead costs and expenses) related to the establishment of the Project Area, the Project Area Plan, the infrastructure (roads, water, sewer and electric infrastructure) for the Project Area, development agreements, interlocal

agreements, and other related agreements related to the Project Area, and this Agreement in an amount not to exceed $40,000 (the "**Initial Agency Costs**").

4.3 Conditions Precedent to Payment of the Tax Increment Reimbursement

In addition to the conditions stated elsewhere in this Agreement, the Agency shall have no obligation to make payment hereunder to the City until the following conditions precedent are satisfied: (a) the Participant has constructed and received a temporary certificate of occupancy for one (1) Building within the Project Area; and (b) the Agency has actually received payment of a portion of the Project Area Funds. The Participant shall begin construction of the infrastructure improvements in the project area within eight months of this agreement being signed.

4.4 Payment of Taxes

The Participant understands and agrees that the primary source of Project Area Funds is the payment of the Taxes within the Project Area. Nothing herein contained, however, shall be deemed to prohibit the Participant from contesting the validity or amount of any tax assessment, encumbrance, or lien, or to limit the remedies available to the Participant in respect thereto.

4.5 Reduction or Elimination of Property Area Funds

In the event that the provisions of Utah law which govern the payment of Project Area Funds to the Agency are changed or amended so as to reduce or eliminate the amount paid to the Agency, the Agency's obligation to pay the Project Area Funds to the City hereunder shall be accordingly reduced or eliminated. The Parties specifically reserve and do not waive hereunder any right it may have to challenge any law change that would reduce or eliminate the payment of Project Area Funds to the Agency. The Parties acknowledge, understand, and agree that the Agency is under no obligation to challenge a change in law that reduces or eliminates the payment of Project Area Funds to the Agency; provided, the Agency will not oppose either other Party, and, if requested by either other Party, the Agency will cooperate with the other Party, if the other Party challenges a change in the law that reduces or eliminates the payment of Project Area Funds to the Agency. The Parties agree that the Agency may utilize funds from the Net Project Area Funds as necessary to pay for such cooperation. For purposes of this Section 4.5 and Section 4.6 below, the Agency's agreement to cooperate means the Agency agrees to (i) defend against any legal action seeking specific performance, declaratory relief or injunctive relief, (ii) set court dates at the earliest practicable date(s), (iii) testify on behalf of the other Parties, (iv) to provide information and data necessary to defend against such action, (v) affirmatively support the actions of the other Parties and (vi) not cause delay in the prosecution/defense of the action, provided such cooperation shall not require any Party to waive any rights against the other Party.

4.6 Declaration of Invalidity

In the event a court of competent jurisdiction after final adjudication (by the highest court to which the matter may be appealed) (i) declares that the Agency cannot receive Project Area Funds or reimburse the City from Project Area Funds as provided in this Agreement, (ii) invalidates the Project Area, or (iii) takes any other action which eliminates or reduces the amount Project Area Funds paid to the Agency, the Agency's obligation to pay the Tax Increment Reimbursement to the Participant hereunder shall be accordingly reduced or eliminated. The Parties specifically reserve and do not waive hereunder any right it may have to challenge a ruling, decision or order by any court that would reduce or eliminate the payment of Project Area Funds to the Agency. The Parties acknowledge, understand, and agree that the Agency is under no obligation to challenge a ruling, decision or order by any court that reduces or eliminates the payment of Project Area Funds to the Agency; provided, the Agency will not oppose the other Parties and, if requested by the other Parties, will cooperate with the other Parties if the other Parties challenge a ruling by any court. The Parties agree that Agency may utilize funds from the Net Project Area Funds as necessary to pay for such cooperation. Additionally, if any court invalidates the Project Area Plan or Project Area Budget as a result of a procedural defect, the Agency shall take such actions as are necessary to correct such procedural defect and adopt the Project Area Plan and Project Area Budget.

4.7 New Taxes

The Agency agrees that if any Taxes, other than special assessments assessed against all property within an assessment district in accordance with the special benefits conferred upon the property and not in excess of such benefits as provided for under applicable law, but including levies, imposts, franchise fees or taxes, duties, deductions, withholdings, and similar charges, are enacted during the term of this Agreement and by applicable law are allowed to be used as Project Area Funds (the **"New Taxes"**), the Agency shall seek to amend the Interlocal Agreements to include such New Taxes and the Agency shall make an economic development payment to the Participant equal to all such New Taxes for the duration of the term of this Agreement to the fullest extent the Agency is legally able to do so pursuant to the Reinvestment Act. The Agency shall not consent to an amendment or modification of any existing Taxes so as to cause them to first become applicable to the Project Area or the Participant (including without limitation any materials purchased for use in connection with the construction, repair, replacement or replenishment of any materials or equipment used for the Project (collectively, **"Equipment"**) after the Effective Date, and if existing Taxes are so amended or modified, the Agency shall seek to amend the Interlocal Agreements to include such Taxes and will make economic development payments equal to all such Taxes to the Participant to the fullest extent the Agency is legally able to do so. The Agency will not consent to any increase in the applicable rate, as of the Effective Date, of

any Tax affecting the Project Area unless such increase is pursuant to, and in proportion with, an across-the-board increase in all rates for such Tax.

5. DEVELOPMENT OF THE PROJECT AREA

If and to the extent the Participant elects to develop the Project Area, the Participant agrees to develop, or cause to be developed, the Project Area as permitted by the Development Agreement; provided, a breach of the Development Agreement shall not constitute a default hereunder.

6. DEFAULTS, REMEDIES AND TERMINATION

6.1 Default

If any Party fails to perform or delays performance of any term or provision of this Agreement or any representation or warranty made herein proves to be false or misleading in any material respect when made, such conduct shall constitute a default hereunder. The Party in default must commence to cure, correct, or remedy such failure or delay and shall complete such cure, correction, or remedy within the periods provided in Section 6.3 hereof.

6.2 Notice

If a default under this Agreement occurs, a non-defaulting Party shall give written notice of the default (a **"Default Notice"**) to the Party in default, specifying the nature of the default. Failure or delay in giving a Default Notice shall not constitute a waiver of any default or operate as a waiver of any rights or remedies of a non-defaulting Party; but the non-defaulting Party shall have no right to exercise any remedy hereunder without delivering the Default Notice as provided herein. Delays by any Party in asserting any right or remedy hereunder shall not deprive any Party of its right to institute and maintain any actions or proceedings which it may deem necessary to protect, assert, or enforce any such rights or remedies.

6.3 Cure Period

A non-defaulting Party shall have no right to exercise a right or remedy hereunder unless the subject default continues uncured for a period of one hundred eighty (180) days after delivery of the Default Notice with respect thereto or, where the default is of a nature which cannot be cured within such one hundred eighty (180) day period, the defaulting Party fails to commence such cure within one hundred eighty (180) days and to diligently proceed to complete the same. A default which can be cured by the payment of money is understood and agreed to be among the types of defaults which can be cured within one hundred eighty (180) days. Notwithstanding the foregoing, with respect to any default arising with respect to a non-monetary obligation of a Party hereunder, a non-defaulting Party shall have no right to exercise a right or remedy hereunder unless and until the defaulting Party fails to fully rectify

and cure the default within one hundred and eighty (180) days after final adjudication (by the highest court to which the matter may be appealed) that the defaulting Party is in default under this Agreement (or, where the default is of a nature which cannot be cured within such one hundred eighty (180) day period, the defaulting party fails to commence such cure within one hundred eighty (180) days, if reasonably possible, and to diligently proceed to complete the same).

6.4 Rights and Remedies

Upon the occurrence and during the continuance of an event of default beyond all applicable notice and cure periods hereunder (an **"Event of Default"**) by the Agency, the Participant sole and exclusive remedy under this Agreement for a default by the Agency shall be specific performance of the rights granted in this Agreement and Agency's obligations under this Agreement. Upon the occurrence and during the continuance of an Event of Default by the Participant, the Agency may terminate this Agreement and, if the Agency has actual damages (excluding any consequential, punitive, or special damages) as a result of such Event of Default the Agency may seek to recover such damages in an amount not to exceed the amount of the Tax Increment Reimbursement actually received by the Participant. Such rights and remedies are cumulative, and the exercise of one or more of such rights or remedies shall not preclude the exercise, at the same or different times, of any other rights or remedies for the Event of Default or any other Event of Default by the defaulting Party.

6.5 Legal Actions

6.5.1 Venue

All legal actions by any Party for claims arising under or related to this Agreement must be instituted in the Fourth Judicial District Court for the State of Utah, unless they involve a case with mandatory federal jurisdiction, in which case they must be instituted in the United States District Court for the District of Utah.

6.5.2 Services of Process

Service of process on the Agency shall be made by personal service upon the Executive Director of the Agency with a copy to the Eagle Mountain City, c/o City Recorder, 1650 E. Stagecoach Run Eagle Mountain, UT 84005, or in such other manner as may be provided by law.

Service of process on the City shall be made by personal service upon the City Recorder, 1650 E. Stagecoach Run Eagle Mountain, UT 84005, or in such other manner as may be provided by law.

Service of process on the Participant shall be made by personal service upon its Registered Agent, or in such other manner as may be provided by law. The Participant's

Registered Agent is _____. The Participant shall notify the Agency of any change in its Registered Agent by delivering written notice to the Agency.

6.5.3 Applicable Law

The laws of the State of Utah shall govern the interpretation and enforcement of this Agreement.

6.5.4 Waiver of Jury Trial.

Each Party hereto hereby irrevocably waives any and all rights it may have to demand that any action, proceeding or counterclaim arising out of or in any way related to this Agreement be tried by jury. This waiver extends to any and all rights to demand a trial by jury arising from any source, including but not limited to the Constitution of the United States, the Constitution of any state, common law or any applicable statute or regulation. Each Party hereby acknowledges that it is knowingly and voluntarily waiving the right to demand trial by jury.

7. GENERAL PROVISIONS

7.1 Notices, Demands, and Communications among the Parties

Notices, demands, and communications between the Parties shall be sufficiently given if (a) personally delivered or if dispatched by registered or certified mail, postage prepaid, return receipt requested, or an overnight commercial delivery service to the principal offices of the Party, as designated in Section 1.6 hereof; or (b) electronic mail, as designated in Section 1.6 hereof. Any Party hereto may change its address specified for notices herein by designating a new address by notice in accordance with this Section. All such notices and other communications shall be effective if delivered by overnight courier service, upon the first business day after the date deposited with such courier service for overnight (next-day) delivery or, if mailed, upon the third business day after the date deposited into the mail or, if delivered by hand, upon delivery or if provided via electronic mail upon (i) acknowledgment of receipt by reply electronic mail or (ii) through means of an electronic "read receipt" confirmation to the sender that the designated electronic mail address provided herein as the principal contact for the relevant Party has read the electronic mail.

7.2 Severability

In the event that any condition, covenant or other provision herein contained is held to be invalid or void by a court of competent jurisdiction, the same shall be deemed severable from the remainder of this Agreement and shall in no way affect any other condition, covenant or provision herein contained unless such severance shall have a material effect on the terms of this Agreement. If such condition, covenant, or other provision shall be deemed invalid due

to its scope, all other provisions shall be deemed valid to the extent of the scope or breadth permitted by law.

7.3 Nonliability of Agency Officials and Employees

No member, director, officer, agent, employee, or consultant of the Agency or City shall be personally liable to the Participant, or any successor in interest, in the event of any default or breach by the Agency or for any amount which may become due to the Participant or its successors or on any obligations under the terms of this Agreement. No member, director, officer, agent, employee, or consultant of the Participant shall be personally liable to the Agency or the City, or any successor in interest, in the event of any default or breach by the Participant or for any amount which may become due to the Agency or City or their successors or on any obligations under the terms of this Agreement.

7.4 Enforced Delay: Extension of Time and Performance

In addition to the specific provisions of this Agreement, no Party shall be deemed to be in default hereunder when its fails to perform or delays performance of any non-monetary obligations under this Agreement to the extent due to war, insurrection, strikes, lock-outs, riots, public disturbances, floods, earthquakes, fires, casualties, acts of God, acts of a public enemy, epidemics, quarantine restrictions, freight embargoes, lack of transportation, newly enacted governmental restrictions unusually severe weather, inability to secure necessary labor, materials or tools, acts or failure to act of the Agency or City (with respect to the Participant only) or any other public or governmental entity. An extension of time to perform shall be granted as a result of any of the foregoing causes, which extension shall be for the period of the forced delay and shall run from the time of the commencement of the cause, if notice is sent by the Party claiming such extension to the other Party within thirty (30) days of actual knowledge of the commencement of the cause. Time of performance under this Agreement may also be extended in writing by the Parties by mutual agreement.

7.5 Approvals

Whenever the consent or approval is required of any Party hereunder, such consent or approval shall not be unreasonably withheld, delayed, or conditioned except as otherwise specifically provided herein, and shall be in writing.

7.6 Time of the Essence

Time shall be of the essence of this Agreement.

7.7 Interpretation

The Parties hereto agree that they intend by this Agreement to create only the contractual relationship established herein, and that no provision hereof, or act of either Party hereunder,

shall ever be construed as creating the relationship of principal and agent, or a partnership, or a joint venture or enterprise among the Parties hereto.

7.8 No Third-Party Beneficiaries

It is understood and agreed that this Agreement shall not create in any Party hereto any independent duties, liabilities, agreements, or rights to or with any third party, nor does this Agreement contemplate or intend that any of the benefits hereunder should accrue to any third party.

7.9 Effect and Duration of Covenants; Term of Agreement

The covenants contained in this Agreement shall, without regard to technical classification and designation, bind the Participant and the Agency and any of their respective successors in interest. The covenants contained in this Agreement shall inure to the benefit of and in favor of the Parties and to their respective successors and assigns during the term of this Agreement. Except as otherwise provided herein, the term of this Agreement shall run from the Effective Date until the expiration of the last Increment Period, provided, the Parties shall continue to have the right to seek to enforce, or commence proceeding to enforce, any obligations of the other Party that arose prior to the termination of this Agreement.

8. ENTIRE AGREEMENT, WAIVERS AND AMENDMENTS

8.1 This Agreement may be executed in duplicate originals, each of which shall be deemed an original. This Agreement, including all Exhibits hereto, constitutes the entire understanding and agreement of the Parties with respect to the matters set forth herein. All Exhibits attached hereto are hereby incorporated herein by reference and are made a part hereof as though fully set forth herein.

8.2 When executed by all Parties, this Agreement integrates all of the terms and conditions mentioned herein or incidental hereto, and supersedes all negotiations or previous agreements between or among the Parties with respect to all or any part of the Project Area and the development thereof.

8.3 All waivers of the provisions of this Agreement must be in writing. This Agreement and any provisions hereof may be amended only by mutual written agreement by the Parties.

8.4 Each Party hereto hereby represents and warrants unto the other as of the Effective Date that (i) this Agreement has been duly authorized by such Party and when executed and delivered will constitute the valid, legal and binding agreement and obligation of such Party enforceable against such Party in accordance with the terms hereof, and (ii) each person signing on behalf of such Party has been duly authorized by the governing body or board of such Party to bind such Party to the terms and conditions hereof.

8.5 In the event any litigation ensues with respect to the rights, duties and obligations of the Parties under this Agreement, the unsuccessful Party in any such action or proceeding shall pay for all costs, expenses, and reasonable attorney's fees incurred by the prevailing party in enforcing the covenants and agreements of this Agreement. The term "prevailing party," as used herein, shall include, without limitation, a Party who obtains legal counsel and (a) brings action against the other Party by reason of the other Party's breach or default and obtains substantially the relief sought, whether by compromise, settlement or judgment or (b) defends an action against brought by the other Party and the other Party fails to obtain substantially the relief sought, whether by compromise, settlement or judgment.

9. MORTGAGEE PROTECTIONS; ESTOPPEL

9.1 The Parties hereto agree that this Agreement shall not prevent or limit the Participant from encumbering the Project or any estate or interest therein, portion thereof, or any improvement thereon, in any manner whatsoever by one or more mortgages, deeds of trust, sale and leaseback, or other form of secured financing **("Mortgage")** with respect to the construction, development, use or operation of the Project and parts thereof. The Agency acknowledges that the lender(s) providing such Mortgages may require certain interpretations and modifications to this Agreement and the Agency agrees, upon request, from time to time, to meet with the Participant and representatives of such lender(s) to negotiate in good faith any such request for interpretation or modification. The Agency will not unreasonably withhold its consent to any such requested interpretation or modification, provided such interpretation or modification is consistent with the intent and purposes of this Agreement.

9.2 Notwithstanding any of the provisions of this Agreement to the contrary, the holder of a Mortgage (a **"Mortgagee")** shall not have any obligation or duty pursuant to the terms set forth in this Agreement to perform the obligations of the Participant or other affirmative covenants of the Participant hereunder, or to guarantee such performance.

9.3 The Mortgagee of any Mortgage or deed of trust encumbering the Project, or any part or interest thereof, that has submitted a request in writing to the Agency in the manner specified herein for giving notices shall be entitled to receive written notification from the Agency of any notice of non-compliance by the Participant in the performance of the Participant's obligations under this Agreement. If the Agency timely receives a request from a Mortgagee requesting a copy of any notice of non-compliance given to the Participant under the terms of this Agreement, the Agency shall provide a copy of that notice to the Mortgagee within ten (10) days of sending the notice of non-compliance to the Participant. The Mortgagee shall have the right, but not the obligation, to cure the noncompliance for a period of one hundred twenty (120) days after the Mortgagee receives such written notice.

9.4 If this Agreement is terminated as to any portion of the Project by reason of (i) any Event of Default or (ii) as a result of a bankruptcy proceeding of the Participant, or if this

Agreement is disaffirmed by a receiver, liquidator, or trustee for the Participant or its property, the Agency, if requested by any Mortgagee, shall negotiate in good faith with such Mortgagee for a new CRA Participation Agreement for the Project as to such portion of the Project with the most senior Mortgagee requesting such new agreement. At any time, and from time to time, the Participant may deliver written notice to the Agency, and the Agency may deliver written notice to the Participant, requesting that such Party certify in writing that, to the knowledge of the certifying Party (i) this Agreement is in full force and effect and a binding obligation of the Parties, (ii) this Agreement has not been amended, or if amended, the identity of each amendment, (iii) the requesting Party is not then in breach of this Agreement, or if in breach, a description of each such breach, and (iv) any other factual matters reasonably requested (an **"Estoppel Certificate"**). The Executive Director of the Agency shall be authorized to execute, on behalf of the Agency, any Estoppel Certificate requested by the Participant which complies with this Section 9.5 within fifteen (15) days of a written request for such Estoppel Certificate. The Agency's failure to furnish an Estoppel Certificate within fifteen (15) days after request therefor shall be conclusively presumed that: (a) this Agreement is in full force and effect without modification in accordance with the terms set forth in the request; and (b) that there are no breaches or defaults on the part of the Participant. The Agency acknowledges that an Estoppel Certificate may be relied upon by transferees or successors in interest to the Participant and by Mortgagees holding an interest in the Property.

10. CONFIDENTIALITY

10.1 The Parties acknowledge and agree that this Agreement shall become a public record under Utah law, and that discussion regarding this Agreement shall take place before the City Council and the Agency board in open session. The City and the Agency covenant that they will hold all information obtained by it, or any person employed by or representing either the City or the Agency, related to the Participant's business in strictest confidence and the City and the Agency covenant not to disclose, divulge or otherwise communicate in any manner to any person or entity, other than to those parties necessary to verify compliance with this Agreement, provided that such parties are likewise under reasonable confidentiality obligations and not subject to public disclosure unless otherwise required by applicable laws.

10.2 The Participant may designate any trade secrets or confidential business information included in any report or other writing delivered to the Agency and the City pursuant to or in connection with this Agreement by any method intended to clearly set apart the specific material that the Participant claims to be either its trade secrets or confidential business information that, if released, would give an advantage to competitors of the Participant and serve no public purpose (such information, collectively, **"Confidential Business Information"**). The Agency and the City shall redact or delete from any records it makes available for inspection or of which it provides copies any material designated by the

Participant as Confidential Business Information. Promptly following the City or Agency's receipt of any request to provide copies of public records relating to this Agreement or the Project or for inspection of the same by any third party, the City or Agency shall give written notice and a copy of such request to the Participant. The City and Agency shall not allow inspection or provide copies of any such records until the Agency shall have had not less than ten (10) business days excluding the day of receipt to determine whether to contest the right of any party to inspect or receive copies of the records or to inspect such records without redaction of the Confidential Business Information. Any such action to enjoin the release of Confidential Business Information may be brought in the name of the Participant, the City, or the Agency. The costs, damages, if any, and attorneys' fees in any proceeding commenced by the Participant or at its request by the City or Agency to prevent or enjoin the release of Confidential Business Information in any public records relating to this Agreement or the Project shall be borne by the Participant.

[SIGNATURES ON THE FOLLOWING PAGE]

IN WITNESS WHEREOF, the Parties have executed this CRA Participation Agreement to be effective as of the Effective Date.

AGENCY:

THE REDEVELOPMENT AGENCY OF THE CITY OF EAGLE MOUNTAIN

By: _____

Its: Chairperson

ATTEST:

By: _____
Executive Director

CITY:

EAGLE MOUNTAIN CITY

By: _____

Its: Mayor

ATTEST:

By: _____

City Recorder

PARTICIPANT:

TERRA SMITH'S EAGLE MOUNTAIN, LLC, a Delaware limited liability company By:

_____

Its:

EXHIBIT “A”
to
PARTICIPATION AGREEMENT

Project Area Plan

EXHIBIT “B”
to
PARTICIPATION AGREEMENT

Ordinance

EXHIBIT “C”
to
PARTICIPATION AGREEMENT

Legal Description of Project Area

EXHIBIT “D”
to
PARTICIPATION AGREEMENT

Project Area Map

EXHIBIT “F”
to
PARTICIPATION AGREEMENT

Interlocal Cooperation Agreement between Agency and City

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	ORDINANCE - An Ordinance of Eagle Mountain City, Utah, Adopting the Mid-Valley Community Reinvestment Project Area Plan, as Approved by the Redevelopment Agency of Eagle Mountain City, as the Official Community Reinvestment Project Area Plan for the Project Area and Directing that Notice of the Adoption be Given as Required by Statute.
ITEM TYPE:	Ordinance
FISCAL IMPACT:	Up to $15,751,273
APPLICANT:	

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
	Approximately 53

PUBLIC HEARING
No

PREPARED BY
Evan Berrett, Economic Development Director

PRESENTED BY

RECOMMENDATION:
Staff recommends the City Council adopt an Ordinance of Eagle Mountain City, Utah, Adopting the Mid-Valley Community Reinvestment Project Area Plan, as Approved by the Redevelopment Agency of Eagle Mountain City, as the Official Community Reinvestment Project Area Plan for the Project Area and Directing that Notice of the Adoption be Given as Required by Statute.approval of the ordinance with the motion including "pending the approval of the Project Area Plan by the Redevelopment Agency of Eagle Mountain, UT

BACKGROUND:
The proposed ordinance will allow for the adoption of the Mid-Valley Community Reinvestment Project Area Plan as the official community reinvestment project area plan for the Mid-Valley Project Area. This Plan is the end result of a comprehensive evaluation of the intended development plans and guides and controls the community reinvestment activities within the Project Area. The Plan is intended to define the method and means of the Project Area from its current state to a higher and better use.

ITEMS FOR CONSIDERATION:

PLANNING COMMISSION ACTION/RECOMMENDATION:

ATTACHMENTS:

1. Ordinance
2. Mid-Valley CRA Project Area Plan

ORDINANCE NO. O- -2026

AN ORDINANCE OF EAGLE MOUNTAIN CITY, UTAH, ADOPTING THE MID-VALLEY COMMUNITY REINVESTMENT PROJECT AREA PLAN AS APPROVED BY THE EAGLE MOUNTAIN REDEVELOPMENT AGENCY AND DIRECTING NOTICE OF ADOPTION AS REQUIRED BY STATUTE

PREAMBLE

WHEREAS, the Board of the Eagle Mountain Redevelopment Agency (the "Agency") prepared a Project Area Plan (the "Plan") for the Mid-Valley Community Reinvestment Project Area (the "Project Area"), the boundary description of which is attached hereto as Exhibit A, pursuant to Utah Code § 17C-5-105;

WHEREAS, the Agency held the required public hearing on the Plan on August 18, 2026, in accordance with Utah Code § 17C-5-104, and thereafter adopted the Plan as the Official Community Reinvestment Project Area Plan for the Project Area, attached hereto as Exhibit B; and

WHEREAS, the Utah Community Reinvestment Agency Act (the "Act") requires that before a community reinvestment project plan approved by an agency may take effect, it must be adopted by ordinance of the legislative body of the community that created the agency, pursuant to Utah Code § 17C-5-109; and

WHEREAS, the Act further requires that notice of adoption be provided by the community's legislative body pursuant to Utah Code § 07C-5-110.

NOW THEREFORE, BE IT ORDAINED by the City Council of Eagle Mountain City, Utah:

1. Adoption of the Plan. The City of Eagle Mountain hereby adopts and designates the Project Area Plan as approved by the Agency Board, as the official Community Reinvestment Project Area Plan for the Project Area (the "Official Plan").

2. Publication of Notice. City staff and consultants are authorized and directed to publish, or cause to be published, the notice required by Utah Code § 17C-5-110. Upon such publication, the Official Plan shall become effective as provided in § 17C-5-110(2).

3. Implementation. Pursuant to Utah Code § 17C-5-110(5), the Agency may proceed to carry out the Official Plan upon its adoption.

4. The City Council has considered the impact of this Ordinance on and found it consistent with family, health, stability, and formation as required by Utah law.

5. This Ordinance shall take effect upon its first publication or posting.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared R. Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Ordinance was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Posted on _____ by _____.

Exhibit A

(Boundary Description)

Exhibit B

(Project Area Plan)

LRB PUBLIC FINANCE ADVISORS

LEWIS | ROBERTSON | BURNINGHAM

EAGLE MOUNTAIN REDEVELOPMENT AGENCY, UTAH

JULY 2026

PROJECT AREA PLAN

MID-VALLEY COMMERCIAL COMMUNITY REINVESTMENT AREA (CRA)

PREPARED BY:

LRB PUBLIC FINANCE ADVISORS

FORMERLY LEWIS YOUNG ROBERTSON & BURNINGHAM INC.

TABLE OF CONTENTS

DEFINITIONS 3
INTRODUCTION 4
RESOLUTION AUTHORIZING THE PREPARATION OF A DRAFT COMMUNITY REINVESTMENT PROJECT AREA PLAN 5
RECITALS OF PREREQUISITES FOR ADOPTING A COMMUNITY REINVESTMENT PROJECT AREA PLAN 5
DESCRIPTION OF THE BOUNDARIES OF THE PROPOSED PROJECT AREA 6
GENERAL STATEMENT OF THE EXISTING LAND USES, LAYOUT OF PRINCIPAL STREETS, POPULATION DENSITIES, AND BUILDING INTENSITIES AND HOW EACH WILL BE AFFECTED BY PROJECT AREA DEVELOPMENT 6
STANDARDS GUIDING THE COMMUNITY REINVESTMENT 7
HOW THE PURPOSES OF THIS TITLE WILL BE ATTAINED BY COMMUNITY REINVESTMENT 7
CONFORMANCE OF THE PROPOSED DEVELOPMENT TO THE COMMUNITY'S GENERAL PLAN 8
DESCRIBE ANY SPECIFIC PROJECT OR PROJECTS THAT ARE THE OBJECT OF THE PROPOSED COMMUNITY REINVESTMENT 8
METHOD OF SELECTION OF PRIVATE DEVELOPERS TO UNDERTAKE THE COMMUNITY REINVESTMENT AND IDENTIFICATION OF DEVELOPERS CURRENTLY INVOLVED IN THE PROCESS 8
REASON FOR SELECTION OF THE PROJECT AREA 8
DESCRIPTION OF PHYSICAL, SOCIAL AND ECONOMIC CONDITIONS EXISTING IN THE PROJECT AREA 9
DESCRIPTION OF ANY TAX INCENTIVES OFFERED PRIVATE ENTITIES FOR FACILITIES LOCATED IN THE PROJECT AREA 9
ANTICIPATED PUBLIC BENEFIT TO BE DERIVED FROM THE COMMUNITY DEVELOPMENT 9
OTHER INFORMATION 10

EXHIBIT A: BOUNDARY DESCRIPTION OF MID-VALLEY COMMERCIAL CRA 12
EXHIBIT B: CRA PROJECT AREA MAP 13
EXHIBIT C: LAYOUT OF STREETS 14

DEFINITIONS

As used in this Community Reinvestment Project Area Plan, the term:

"Act" shall mean and include the Limited Purpose Local Government Entities – Community Reinvestment Agency Act in Title 17C, Chapters 1 through 5, Utah Code Annotated 1953, as amended, or such other amendments as shall from time to time be enacted or any successor or replacement law or act.

"Agency" shall mean the Eagle Mountain Redevelopment Agency, which is a separate body corporate and politic created by Eagle Mountain City pursuant to the Act.

"**Base year sales tax generation**" shall mean the total sales tax collections generated from business activity occurring within the Project Area during calendar year 2026, which serves as the baseline from which future Tax Increment generation is measured

"Base year" shall mean the agreed upon year for which the base sales tax generation is established and shall be incorporated into the interlocal agreements with participating taxing entities.

"Bond" shall mean the Sales Tax and Tax Increment Revenue Bonds, Series 2026.

"City" or "Community" shall mean Eagle Mountain City, Utah.

"Legislative body" shall mean the City Council of Eagle Mountain which is the legislative body of the City.

"Master Development Agreement" or **"MDA"** shall mean Master Development Agreement for the Eagles Landing Commercial Center.

"Plan Hearing" shall mean the public hearing on the draft Project Area Plan required under Subsection 17C-1-102(45) and 17C-5-104(3)(e).

"Project Area" shall mean the geographic area described in the Project Area Plan or draft Project Area Plan where the community development and reinvestment is anticipated to take place, as further referenced and included by this definition in **Exhibit A** and **Exhibit B** attached hereto.

"Net Present Value (NPV)" shall mean the discounted value of a cash flow. The NPV illustrates the total value of a stream of revenue over a number of years expressed in terms of current or present-day dollars.

"Project Area Budget" shall mean (as further described under 17C-5-303 of the Act) the multi-year projection of annual or cumulative revenues, other expenses and other fiscal matters pertaining to the Project Area that includes:

- the base year sales tax generation within the Project Area;
- the projected tax increment expected to be generated within the Project Area;

- the amount of tax increment expected to be shared with other taxing entities;
- the amount of tax increment expected to be used to implement this Project Area Plan;
- if the area from which tax increment is to be collected is less than the entire Project Area:
    - the tax identification number of the parcels from which tax increment will be collected; or
    - a legal description of the portion of the Project Area from which tax increment will be collected; and
- for property that the Agency owns and expects to sell, the expected total cost of the property to the Agency and the expected selling price.

"Project Area Plan" or **"Plan"** shall mean the written plan (outlined by 17C-5-302 of the Act) that, after its effective date, guides and controls the community reinvestment activities within the Project Area. Project Area Plan refers to this document and all of the attachments to this document, which attachments are incorporated by this reference. It is anticipated that the **MID-VALLEY COMMERCIAL COMMUNITY REINVESTMENT PROJECT AREA PLAN** will be subject to an interlocal agreement process with the taxing entities within the Project Area.

"Sales Tax" Refers to a tax on retail sales, or on the receipts from sales as defined by Utah State Code 59-12.

"Taxing Entity" shall mean any public entity that levies a tax on any property within the Project Area or imposes a sales and use tax.

"Tax Increment" shall mean the portion of sales tax revenues generated within the Project Area and remitted to the Agency during the Tax Increment Collection Period. The difference in sales tax revenue is attributable to the creation of new business opportunities that result in new sales tax revenue.

"Tax Increment Collection Period" shall mean the period of time in which the taxing entities from the Project Area consent to a portion of their tax increment to be remitted to the Agency from within the Project Area and used to fund the objectives outlined in this Project Area Plan. Tax increment revenues generated within the Project Area will accrue monthly after the effective trigger date. Consistent with the timing of sales tax collection and distribution procedures, monthly sales tax revenues are expected to be remitted to the Agency approximately three months after the month in which the underlying taxable sales occur.

"Tax Year" shall mean the 12-month period that begins January 1st and ends December 31st.

INTRODUCTION

The Eagle Mountain Redevelopment Agency (Agency), has the opportunity to enable development to be realized within the vicinity of Eagle Mountain City (the City) which lies within the central portion of the City, to the east of Pony Express Parkway, and to the south of Old Airport Road, and is shown on the attached map in **Exhibit B**. In consideration of the City's residents, as well as the City's capacity for new development, the Agency has carefully crafted this Project Area Plan (the Plan) for the MID-VALLEY COMMERCIAL COMMUNITY REINVESTMENT PROJECT AREA (the Project Area). The purpose of the Project Area is to enable the development of a commercial center in the City. Without the assistance of the Project

Area Plan, specific financial hurdles would not be overcome, and the project would likely be prevented from developing as contemplated herein within the foreseeable future.

The City and Agency have undergone a comprehensive evaluation of the types of appropriate land-uses and economic development for the land encompassed by the Project Area. The Plan is intended to define the method and means of supporting the property owners and/or developers in overcoming the development shortfalls which will improve the Project Area from its current state to a higher and better use and meet road improvement requirements of the City. The Project Area Plan is consistent with the General Plan of the City and is believed to facilitate the desired land-uses for the Project Area.

The City has determined it is in the best interest of its residents to assist in the development of the Project Area. It is the purpose of this Plan to clearly set forth the aims and objectives of development, scope, potential financing mechanism, and value to the residents of the City and other taxing entities within the Project Area.

The Project Area is being undertaken as a community reinvestment project area (CRA) pursuant to certain provisions of Chapters 1 and 5 of the Utah Limited Purpose Local Governmental Entities -- Community Reinvestment Agency Act (the "Act", Utah Code Annotated (UCA) Title 17C). The requirements of the Act, including notice and hearing obligations, have been observed at all times throughout the establishment of the Project Area. The realization of the Plan is subject to interlocal cooperation agreements between the taxing entities and the Agency.

RESOLUTION AUTHORIZING THE PREPARATION OF A DRAFT COMMUNITY REINVESTMENT PROJECT AREA PLAN

Pursuant to the provisions of §17C-5-103 of the Act, the governing body of the Agency adopted a resolution authorizing the preparation of a draft Community Reinvestment Project Area Plan on September 16, 2025.

RECITALS OF PREREQUISITES FOR ADOPTING A COMMUNITY REINVESTMENT PROJECT AREA PLAN

In order to adopt a community reinvestment project area plan, the Agency shall;

- Pursuant to the provisions of §17C-5-104(1)(a) and (b) of the Act, the City has a planning commission and General Plan as required by law; and

- Pursuant to the provisions of §17C-5-104 of the Act, the Agency has conducted or will conduct one or more public hearings for the purpose of informing the public about the Project Area, and allowing public input into the Agency's deliberations and considerations regarding the Project Area; and

- Pursuant to the provisions of §17C-5-104 of the Act, the Agency has allowed opportunity for input on the *draft* Project Area Plan and has made a *draft* Project Area Plan available to the public at the Agency's offices during normal business hours, provided notice of the plan hearing, sent copies of the *draft* Project Area Plan to all required entities prior to the hearing, and provided opportunities for affected entities to provide feedback.

DESCRIPTION OF THE BOUNDARIES OF THE PROPOSED PROJECT AREA

A legal description of the Project Area along with a detailed map of the Project Area is attached respectively as **Exhibit A** and **Exhibit B** and incorporated herein. The Plan focuses on property that is adjacent to Mid Valley Road, Old Airport Road, and Pony Express Parkway. The current land use in the Project Area is vacant exempt land and is 103.60 acres of land. However, once the recording of the land purchase is completed, the Project Area will be comprised of four parcels that total 53.17 acres of land.

TABLE 1: PARCEL LIST

PARCEL ID	PARCEL OWNER	ACRES
58:054:0046	STATE OF UTAH	49.55
59:033:0016	EAGLE MOUNTAIN CITY	13.86
58:054:0045	STATE OF UTAH	39.64
58:054:0061	STATE OF UTAH SCHOOL AND INSTITUTIONAL LANDS ADMINISTRATION	0.55
	TOTAL (CURRENT)	**103.60**
	TOTAL (FOLLOWING COMPLETION OF LAND PURCHASE)	**53.17**

GENERAL STATEMENT OF THE EXISTING LAND USES, LAYOUT OF PRINCIPAL STREETS, POPULATION DENSITIES, AND BUILDING INTENSITIES AND HOW EACH WILL BE AFFECTED BY PROJECT AREA DEVELOPMENT

Community reinvestment activities within the Project Area will mostly consist of development and economic enhancement of underutilized areas. To promote the development of the Project Area, the Agency, along with property owners, developers, and/or businesses will need to construct infrastructure improvements and create better utilization of land.

EXISTING GENERAL LAND USES

The Project Area's land is currently zoned as overall commercial use. This Project Area Plan is consistent with the General Plan of the City and promotes economic activity by virtue of the land uses contemplated. Any zoning change, amendment or conditional use permit necessary to the successful development contemplated by this Project Area Plan shall be undertaken in accordance with the requirements of the City's Code and all other applicable laws including all goals and objectives in the City's General Plan.

EXISTING LAYOUT OF PRINCIPAL STREETS

The principal streets within the Project Area are Mid Valley Road, Old Airport Road, and Pony Express Parkway. **Exhibit C** shows the principal streets located within the Project Area.

EXISTING POPULATION DENSITIES

The estimated population density of the Project Area is 0.0 residents per acre. There are no residential buildings within the Project Area.

EXISTING BUILDING INTENSITIES

Currently, there are no buildings within the Project Area, as it is made up entirely of vacant land. Building intensities will increase as development occurs. The intent of this Plan is to assist the

development of a regional commercial, promote greater economic utilization of the land area, and increase overall density.

IMPACT ON GENERAL LAND USES

It is anticipated that future development will include, but not limited to grocery and general merchandise stores, restaurants, financial institutions, fuel centers, and service businesses.

IMPACT ON LAYOUT OF PRINCIPAL STREETS

As part of the MDA, significant road development is planned for Old Airport Road and Mid Valley Road. The developer will construct Old Airport Road from Pony Express Parkway, as well as Mid Valley Road from Pony Express Parkway, as 5-lane roadways with other improvements and design requirements. The developer will also construct a third northbound auxiliary lane on Pony Express Parkway.

IMPACT ON POPULATION DENSITIES

There are currently no residential developments in the Project Area. Anticipated development does not include any residential components, therefore there will be no impact to the City's population density.

IMPACT ON BUILDING INTENSITIES

The intent of this Plan is to assist in the development of a regional commercial center, promote greater economic utilization of the land area, and increase overall density. The total planned square footage of each phase equals 427,626.

STANDARDS GUIDING THE COMMUNITY REINVESTMENT

In order to provide maximum flexibility in the development and economic promotion of the Project Area, and to encourage and obtain the highest quality in development and design, specific development controls for the uses identified above are not set forth herein. Each development proposal in the Project Area will be subject to appropriate elements of the City's General Plan; the Zoning Ordinance of the City, including adopted Architectural Design Guidelines pertaining to the area; institutional controls, deed restrictions if the property is acquired and resold by the Agency, other applicable building codes and ordinances of the City; and, as required by ordinance or agreement, review and recommendation of the Planning Commission, approval by the Agency and City Council.

Each development proposal by an owner, tenant, participant or a developer shall be accompanied by site plans, development data and other appropriate material that clearly describes the extent of proposed development and any other data determined to be necessary or requested by the Agency or the City.

HOW THE PURPOSES OF THIS TITLE WILL BE ATTAINED BY COMMUNITY REINVESTMENT

It is the intent of the Agency, with the assistance and participation of private developers and property owners, to assist with the development of a regional commercial center in an underutilized, yet highly visible portion of the City.

CONFORMANCE OF THE PROPOSED DEVELOPMENT TO THE COMMUNITY'S GENERAL PLAN

The proposed Community Reinvestment Project Area Plan and the development contemplated are consistent with the City's General Plan and land use regulations.

DESCRIBE ANY SPECIFIC PROJECT OR PROJECTS THAT ARE THE OBJECT OF THE PROPOSED COMMUNITY REINVESTMENT

Currently, the Project Area will include the construction of a grocery and general merchandise stores, restaurants, financial institutions, fuel centers, and service businesses. In addition, the development includes road and intersection improvements for Old Airport Road and Mid Valley Road.

METHOD OF SELECTION OF PRIVATE DEVELOPERS TO UNDERTAKE THE COMMUNITY REINVESTMENT AND IDENTIFICATION OF DEVELOPERS CURRENTLY INVOLVED IN THE PROCESS

The City and Agency will partner with developers to create development as solicited or presented to the Agency and City that meets the development objectives set forth in this plan. The City and Agency retain the right to approve or reject any such development plan(s) that in their judgment do not meet the development intent for the Project Area. To the extent the RDA owns, controls, or partners on the land, the City and Agency may choose to solicit development through an RFP or RFQ process, through targeted solicitation to specific industries, from inquiries to the City and or Agency.

The City and Agency will ensure that all development conforms to this Plan and is approved by the City. If seeking CRA funds all potential developers may need to provide a detailed development plan including sufficient financial information to provide the City and Agency with confidence in the sustainability of the development and the wherewithal of the developer to successfully finance said development. Such a review may include a series of studies and reviews including reviews of the developer's financial statements, third-party verification of benefit of the development to the City, appraisal reports, etc.

Any participation between the Agency and developers and or property owners shall be governed by a Participation/Development Agreement or similar agreement as approved by the Agency.

REASON FOR SELECTION OF THE PROJECT AREA

The Project Area is a highly visible and important section of the City. Major transportation and utility connections exist or will exist due to investment in the project which will greatly benefit the city as a whole. The Project Area presents an opportunity to reinvest in underutilized and vacant land that would otherwise remain as such for the foreseeable future, and expedite the attraction of goods and services that are in high demand. Additionally, this project area represents an opportunity to greatly reduce sales tax leakage, and create a large increase to the community's tax base. It is anticipated that development of this project area will also aid in the development of the bordering downtown development and other projects in the vicinity.

DESCRIPTION OF PHYSICAL, SOCIAL AND ECONOMIC CONDITIONS EXISTING IN THE PROJECT AREA

PHYSICAL CONDITIONS

The Project Area currently consists of approximately 103.6 acres of relatively flat, State of Utah and City owned land. However, once the recording of the land purchase is completed, the Project Area will be comprised of four parcels that total 53.17 acres of land as shown in the Project Area map.

SOCIAL CONDITIONS

The Project Area experiences a lack of connectivity and vitality. There are no residential units and no parks, libraries, or other social gathering places in the Project Area.

ECONOMIC CONDITIONS

The Project Area is currently vacant and underutilized. The Agency desires to encourage development within the Project Area that will directly benefit the existing economic base of the City, the County, and other taxing entities.

DESCRIPTION OF ANY TAX INCENTIVES OFFERED PRIVATE ENTITIES FOR FACILITIES LOCATED IN THE PROJECT AREA

Tax increment arising from the development within the Project Area shall be used for public infrastructure improvements, Agency requested improvements and upgrades, both off-site and on-site improvements, land and development incentives, desirable Project Area improvements, and other items approved by the Agency. Subject to provisions of the Act, the Agency may agree to pay for eligible costs and other items from taxes during the Tax Increment Collection Period which the Agency deems to be appropriate under the circumstances. The Agency will consider each request for support individually, paying close attention to the potential costs and benefits.

In general, tax incentives may be offered to achieve the community reinvestment goals and objectives of this Plan, specifically to:

- Foster and accelerate economic development;
- Stimulate job development;
- Make needed infrastructure improvements to roads, street lighting, water, storm water, sewer, and parks and open space; and
- Provide attractive development for high-quality tenants.

The Project Area Budget will include specific participation percentages and timeframes for each taxing entity. Furthermore, a resolution and interlocal agreement will formally establish the participation percentage and Tax Increment Collection Period for each taxing entity.

ANTICIPATED PUBLIC BENEFIT TO BE DERIVED FROM THE COMMUNITY DEVELOPMENT

THE BENEFICIAL INFLUENCES UPON THE TAX BASE OF THE COMMUNITY

The beneficial influences upon the tax base of the City and the other taxing entities will include increased property tax revenues, increased sales and use tax revenues, and job creation. The increased revenues will come from the property values associated with new construction in the Project Area, as well as increased spending at new commercial properties and spending by the commercial and office space employees.

Job growth in the Project Area will result in increased wages, increasing local purchases and benefiting existing businesses in the Project Area. Job growth will also result in increased income taxes paid, which will be beneficial to the school district and the State of Utah. Additionally, business growth will generate corporate income taxes, also a benefit to the school district and State of Utah.

There will also be a beneficial impact on the community through increased construction activity within the Project Area. Positive impacts will be felt through construction wages paid, as well as construction supplies purchased locally. The nature of the development will attract visitors from outside the City and County who may make additional purchases that benefit the existing businesses in the area.

THE ASSOCIATED BUSINESS AND ECONOMIC ACTIVITY LIKELY TO BE STIMULATED

Other business and economic activity likely to be stimulated includes increased spending by new employees in the Project Area and in surrounding areas. This includes both direct and indirect purchases that are stimulated by the spending of the additional employees in the area.

Employees may make some purchases in the local area, such as convenience shopping for personal services (haircuts, banking, dry cleaning, etc.). The employees will not make all of their convenience or personal services purchases near their workplace and each employee's purchasing patterns will be different. However, it is reasonable to assume that a percentage of these annual purchases will occur within close proximity of the workplace (assuming the services are available).

EFFORTS TO MAXIMIZE PRIVATE INVESTMENT

The Agency is in discussions with developers who are looking to develop within the Project Area. Creating a CRA will act as a catalyst to jumpstart the development of the area and guide the development to be the highest and best uses.

BUT FOR ANALYSIS

The developer of the land has informed the Agency that the current property owners will only accept a premium price above fair market value for their land. This land price, combined with increases in construction costs, the existence of other desirable properties outside of Eagle Mountain, and required infrastructure costs which include oversizing to accommodate future growth create a financing gap that cannot be overcome without assistance. "But for" public participation, the land will remain underutilized, the City will find great difficulty attracting highly desirable goods and service providers, infrastructure vital to the City's growth will not be built, and needed tax revenues will not be realized. Based on the Benefits Analysis included in the following section, public participation will bring **$19,429,369.** of benefit to the City over the life of the Project Area.

OTHER INFORMATION

CITY COST/BENEFIT ANALYSIS

Based on the land use assumptions, current economic and market demand factors, tax increment participation levels, the following table outlines the benefits (revenues) and costs (expenditures) anticipated in the Project Area. This does not factor in the benefit of other economic multipliers such as job creation, disposable income for retail consumption, etc. The revenues calculated in this analysis consist of property and sales tax revenues.

TABLE 1.2: TOTAL REVENUES (OVER LIFE OF PROJECT AREA)

ENTITY	SALES TAX	PROPERTY TAX	TOTAL SALES TAX REVENUE
Eagle Mountain City	$48,924,285	$896,220	$49,820,504
TOTAL REVENUES	**$48,924,285**	**$896,220**	**$49,820,504**

The expenditures consist of general government, public safety, public works, and sales tax participation. The net benefit is calculated using total revenues less total expenditures. As shown below, the proposed community reinvestment will create a net benefit to the City.

TABLE 1.3: TOTAL EXPENDITURES (OVER LIFE OF PROJECT AREA)

ENTITY	CRA BUDGET (SALES TAX PARTICIPATION)	GENERAL GOVERNMENT	PUBLIC WORKS	PUBLIC SAFETY	TOTAL INCREMENTAL EXPENDITURES
Eagle Mountain City	$26,908,357	$1,776,312	$82,699	$1,623,768	$30,391,135
TOTAL EXPENDITURES	**$26,908,357**	**$1,776,312**	**$82,699**	**$1,623,768**	**$30,391,135**

The net benefit to the City of participating in the Project Area is **$19,429,369**.[1]

[1] This does not include the $2,690,836 housing portion of tax increment that will be reinvested into the City.

EXHIBIT A: BOUNDARY DESCRIPTION OF MID-VALLEY COMMERCIAL CRA

A part of the South Half of Section 36, Township 5 South, Range 2 West and the Northeast Quarter of Section 1, Township 6 South, Range 2 West of the Salt Lake Base and Meridian, U.S. Survey in Utah County, Utah.

Beginning at a point on the Easterly Line of Pony Express Parkway as widened to 76.00 foot half-width and the Southwesterly Line of the Old Airport Road as it exists at 103.00 foot half-width located 267.81 feet South 0°36'08" West along the Section Line; and 1774.46 feet North 89°23'10" West from an existing Monument found marking the East Quarter Corner of said Section 36; and running thence along said Southwesterly Line of the Old Airport Road the following two courses: South 61°32'38" East 616.62 feet; and Southeasterly along the arc of an 1897.00 foot radius curve to the right a distance of 331.50 feet (Center bears South 28°27'20" West, Central Angle equals 10°00'44" and Long Chord bears South 56°32'18" East 331.08 feet); thence South 24°30'40" West 2009.05 feet to the Northerly Line of Midvalley Road as it will be dedicated to 61.00 foot half-width; thence along said Northerly Line the following five courses: North 89°22'13" West 277.48 feet to a point of curvature; Southwesterly along the arc of and 1103.00 foot radius curve to the left a distance of 288.77 feet (Central Angle equals 15°00'00" and Long Chord bears South 83°07'47" West 287.94 feet) to a point of tangency; South 75°37'47" West 368.88 feet to a point of curvature; Westerly along the arc of a 281.00 foot radius curve to the right a distance of 191.64 feet (Central Angle equals 39°04'29" and Long Chord bears North 84°49'59" West 187.95 feet) to a point of tangency; and North 65°17'44" West 68.92 feet to the Easterly Line of Pony Express Parkway as widened to 76.00 foot half-width; thence along said Easterly Line the following six courses: Northeasterly along the arc of a 2374.00 foot radius curve to the right a distance of 45.88 feet (Center bears South 63°49'21" East, Central Angle equals 1°06'26" and Long Chord bears North 26°43'52" East 45.88 feet); North 27°17'06" East 1067.90 feet to a point of curvature; Northeasterly along the arc of a 576.00 foot radius curve to the left a distance of 27.89 feet (Central Angle equals 2°46'26" and Long Chord bears North 25°53'53" East 27.88 feet) to a point of tangency; North 24°30'40" East 972.70 feet to a point of curvature; Northeasterly along the arc of a 424.00 foot radius curve to the right a distance of 29.18 feet (Central Angle equals 3°56'36" and Long Chord bears North 26°28'58" East 29.18 feet) to a point of tangency; and North 28°27'16" East 517.83 feet to the point of beginning

Contains 2,316,098 sq ft
or 53.170 acres

EXHIBIT B: CRA PROJECT AREA MAP

EXHIBIT C: LAYOUT OF STREETS

	EAGLE MOUNTAIN CITY **CITY COUNCIL MEETING** **AUGUST 18, 2026**
TITLE:	ORDINANCE - An Ordinance of Eagle Mountain, Utah Approving the 5th Amendment to the Amended and Restated Overland Master Development Agreement.
ITEM TYPE:	Master Development Agreement
FISCAL IMPACT:	$12,454,325.35
APPLICANT:	Terra Smith's Eagle Mountain, LLC

CURRENT GENERAL PLAN DESIGNATION & ZONE	ACREAGE
Historical Commercial Zone Town Center Mixed Use	53 acres

PUBLIC HEARING
No

PREPARED BY
Marcus Draper, City Attorney

PRESENTED BY
Marcus Draper

RECOMMENDATION:
Staff recommends the City Council adopt an Ordinance of Eagle Mountain, Utah Approving the 5th Amendment to the Amended and Restated Overland Master Development Agreement.

BACKGROUND:
This item was approved at the March 25, 2026 Special City Council meeting. The parties have corrected some clerical errors in the document and have altered the language in sections 5.3, 5.4, and 5.6 for the City Council's review. The changes in the language relate to the infrastructure funding and directly incorporate the provisions of the participation agreement to insure that there is no discrepancy between the agreements. It also adds some stronger language that reinforces existing language that the infrastructure improvements discussed in the agreement will be fully reimbursed.

ITEMS FOR CONSIDERATION:
N/A

PLANNING COMMISSION ACTION/RECOMMENDATION:
Approve Agreement

ATTACHMENTS:
1. Ordinance
2. Compare Approved Version vs. Proposed
3. Amended and Restated MDA for Overland & Pony Express - Final

ORDINANCE NO. O- -2026

AN ORDINANCE OF EAGLE MOUNTAIN CITY, UTAH, APPROVING THE FIFTH AMENDMENT TO THE AMENDED AND RESTATED OVERLAND MASTER DEVELOPMENT AGREEMENT

PREAMBLE

The City Council of Eagle Mountain City, Utah, finds that it is in the public interest to approve the Fifth Amendment to the Amended and Restated Overland Master Development Agreement, as set forth more specifically in Exhibit A.

NOW THEREFORE, BE IT ORDAINED by the City Council of Eagle Mountain City, Utah:

1. The City Council finds that all required notices and hearings have been completed as required by law to consider and approve the Fifth Amendment to the Amended and Restated Overland Master Development Agreement, as set forth in Exhibit A.

2. The Fifth Amendment to the Amended and Restated Overland Master Development Agreement is hereby approved, as set forth more specifically in Exhibit A.

3. The City Council has considered the impact of this Ordinance on and found it consistent with family health, stability, and formation as required by Utah law.

4. This Ordinance shall become effective immediately upon its passing.

ADOPTED by the City Council of Eagle Mountain City, Utah, this 18th day of August, 2026.

EAGLE MOUNTAIN CITY, UTAH

_____
Jared Gray, Mayor

ATTEST:

_____
Lacie A. Messerly
City Recorder

CERTIFICATION

The above Resolution was adopted by the City Council of Eagle Mountain City, Utah on the 18th day of August, 2026.

Those voting yes:	Those voting no:	Those excused:	Those abstaining:
☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark	☐ Melissa Clark
☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish	☐ Zachory Huish
☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting	☐ Craig Whiting
☐ Rich Wood	☐ Rich Wood	☐ Rich Wood	☐ Rich Wood
☐ Brett Wright	☐ Brett Wright	☐ Brett Wright	☐ Brett Wright

_____

Lacie A. Messerly
City Recorder

Posted on _____ by _____.

Exhibit A

WHEN RECORDED RETURN TO:
Smith's Food & Drug Centers, Inc.
c/o The Kroger Co.
1014 Vine Street
Cincinnati, Ohio 45202-1100
Attention: Jennifer K Gothard
Law Department (SM-208)

FIFTH AMENDMENT TO THE
AMENDED AND RESTATED MASTER DEVELOPMENT AGREEMENT FOR OVERLAND DEVELOPMENT AND PONY EXPRESS PARCEL

AND

MASTER DEVELOPMENT AGREEMENT
FOR THE
EAGLES LANDING COMMERCIAL CENTER
(Eagle Mountain)

THIS FIFTH AMENDMENT TO THE *AMENDED AND RESTATED MASTER DEVELOPMENT AGREEMENT FOR OVERLAND DEVELOPMENT AND PONY EXPRESS PARCEL* AND MASTER DEVELOPMENT AGREEMENT FOR THE EAGLES LANDING COMMERCIAL CENTER ("**Agreement**") is entered into on this _____day of _____, 2026 ("**Effective Date**"), by Terra Smith's Eagle Mountain, LLC, a Delaware limited liability company, ~~Smith's Food & Drug Centers, Inc., an Ohio Corporation (collectively "~~("**Developer**"), and Eagle Mountain City, a political subdivision of the State of Utah ("**City**"). City and Developer are the "**Parties**" to this Agreement, and individually each is a "**Party**."

RECITALS

A. Developer, a joint venture, ~~owns~~controls certain property located in City, legally described on the attached and incorporated Exhibit A ("**Property**"), and known by the following Utah County Tax ID numbers: 58:054:0046, 59:033:0016, 58:054:0045, and 58:054:0061.

B. Developer desires to create a commercial development project the Property to be known as Eagles Landing Commercial Center ("**Project**"), consisting of commercial development adjacent to Mid Valley Road, Old Airport Road; and Pony Express Parkway, including road and intersection improvements attached hereto as Exhibit M and incorporated herein; with multiple commercial facilities and uses as generally depicted on the Project Plan ("**Project Plan**") attached hereto as Exhibit B and incorporated herein.

~~C.~~ The Property is currently subject to the *Amended and Restated Master Development Agreement for Overland Development and Pony Express Parcel*, dated December

C. 5, 2017, and recorded with the Utah County Recorder's Office as entry number 62737:2018 and four prior amendments: First Amendment dated August 20, 2019, Second Amendment dated November 17, 2020, Third Amendment dated August 14, 2022, and Fourth Amendment dated January 21, 2025 (collectively, "**Overland DA**"). Developer is successor in interest in the fee ownership of the Property, having obtained the Property from Ivory Homes, Ltd, Master Developer under the Overland DA. The Property consists of a portion of the area identified in the Overland DA as "Village 8."

D. To develop the Project, the Overland DA requires amendment with respect to the Property, modifying the development plan and uses for the Property, removing certain requirements associated with commercial development of the Property, and adopting a new name for the Project and a new zoning designation and development plan for the Property. This Agreement both amends the Overland DA and adopts a new Master Development Agreement and Project Plan on the Property.

E. Concurrent with the adoption of this Agreement, and as of the Effective Date, City has designated the Property into the City's Commercial Zone as designated in the 2017 Eagle Mountain Municipal Code Title 17.35.

F. Developer has submitted a Project Plan Application to the City that will enable development of the Project in accordance with the Project Plan attached hereto.

G. The Parties intend that the Project Plan, this Agreement, and the provisions of the City's Commercial Zoning designation in place as of adoption of the Overland DA in 2017 will permit development of the Project in substantial accordance with the Project Plan.

H. The Parties desire to facilitate the development of the Project by special financing vehicles, including but not limited to those provided for in Titles 17C and 17D of the Utah Code.

I. The Parties intend that this Agreement specify the rights and responsibilities of Developer to develop the Property as expressed in this Agreement and the Project Plan, and the rights and responsibilities of City to allow and regulate such development pursuant to the requirements of this Agreement, the Project Plan, and all other applicable laws.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals (which recitals are incorporated into this Agreement) and the covenants hereafter set forth in this Agreement, the sufficiency of which the Parties hereby acknowledge, the Parties agree as follows:

1. Interpretation. Whenever in this Agreement:

1.1. the consent or approval of any person is required, such consent or approval shall not be unreasonably withheld, conditioned or delayed, unless expressly provided to the contrary or where the City has discretion under the City's Vested Laws;

1.2. there is a reference to "days," such reference shall be deemed to be to "calendar days" unless the phrase "business days" is expressly stated;

1.3. the date on which any payment or performance is due under this Agreement is not a business day, such payment or performance shall be due on the immediately following business day; and

1.4. there appears a reference to a consent, approval, description, designation, estimate, notice, request, demand, response, statement, warning, correspondence, Agreement, schedule or other communication, such reference shall be deemed to require the same to be in writing, unless otherwise expressly stated.

1.5. Priority of documents when interpreting terms, and priority in the event of conflict, shall be as follows:

1.5.1. The Project Plan, attached hereto as Exhibit B.

1.5.2. "**Design Guideline Elements**" meaning the Project-specific standards and exhibits for the Project, consisting of exhibits C-J and L_M attached hereto, including (as applicable): Streetscape Landscaping and Style (-Exhibit C), Site Furnishings (Exhibit D), Landscape Treatments (Exhibit E), Anchor Tenant Architectural Elevations (Exhibit F), Fuel Center Architectural Elevations (Exhibit G), Sign Plans (Pylon and Monument) including the Sign Location Plan (Exhibit H), Site Lighting (Exhibit I), Outdoor Sales Display and Storage Plan (Exhibit J), Outbuilding/Pad Architectural Elevations (Exhibit L), and Public Road Improvements (Exhibit M), each to be discussed in Section 4 below, and once approved, shall be binding as provided herein. Notwithstanding anything to the contrary, if there is a conflict between the generally applicable Design Guideline Elements and (i) the approved Anchor Tenant Architectural Elevations, (ii) any subsequently approved Outbuilding/Pad Architectural Elevations for a particular building, or (iii) any approved tenant-specific Sign Plan, the approval listed in clauses (i)–(iii) shall control for the applicable building or tenant.

1.5.3. This Agreement;

1.5.4. The Overland DA; and

1.5.5. City ordinances in place as of the date of adoption of the 2017 Overland DA, except as expressly modified herein.

2. Amendment of the Overland DA

2.1. In accordance with Section 23 of the Overland DA, City and Developer (as successor to all of the rights and obligations of Master Developer in the Overland DA), hereby modify and amend the Overland DA with respect to the following provisions:

2.1.1. Section 6.4 of the Overland DA is hereby amended with the addition of the following language at the beginning of that section: "*Except with respect to the Property,*

which shall be a planned commercial development and shall not require submission of a Village Site Plan or compliance with the terms of this Section 6.4, . . ."

2.1.2. Section 11.4.9 of the Overland DA is hereby amended with the addition of the following language at the beginning of that section: "*Village 8. The portion of Village 8 that includes the Property shall be a planned commercial area. Open space and amenities thereon shall not be subject to the requirements of the Overland DA but shall be as shown in the Master Site Plan. Remaining portions of Village 8, not part of the Property, shall include . . .*"

2.1.3. In the event of any other conflict or disagreement between the Overland DA and this Agreement or the Project Plan attached hereto, such conflicting language or terms shall be considered an amendment to the Overland DA to conform with the Project Plan and this Agreement. Except with respect to the terms specified in this Agreement, which are applicable only to the Property, the Overland DA remains in full force and effect.

3. Zoning & Vesting.

3.1. Following the adoption of this Agreement, the Developer shall retain its vested ~~right~~rights, to the fullest extent permissible under the law, to develop the Project in accordance with Utah law, the 2017 City ordinances (unless otherwise specified herein), the Project Plan, and Design Guideline Elements, without further action or approval by the City. These vested rights are subject to the requirement that Developer proceed with reasonable diligence as contemplated in UTAH CODE § 10-20-902, as amended.

3.2. In addition to all uses permitted by applicable 2017 City ordinances, the following uses shall also be vested as permitted uses in the Project:

3.2.1. automobile gas/service stations;
3.2.2. restaurants and banks with drive-through service facilities; and
3.2.3. outdoor storage.

3.3. As an exception to the vesting principles above, the following future laws ("**Future Laws**") and ordinances adopted by City after the Effective Date shall apply to the Project:

3.3.1. Future Laws that Developer agrees in writing apply to the Project;

~~3.3.2.~~ Future Laws that are both generally applicable to all properties in the

3.3.2. City's jurisdiction and that are required in order to comply with state and federal laws and regulations affecting the Project;

3.3.3. City's Future Laws that are updates or amendments to existing building, plumbing, mechanical, electrical, dangerous buildings, drainage, or similar construction or safety related codes, such as the International Building Code, the APWA Specifications, AAHSTO Standards, the Manual of Uniform Traffic Control Devices or similar standards that are generated by a nationally or statewide recognized construction/safety organization, or by the state or federal governments and are otherwise required to meet legitimate concerns related to public health, safety or welfare;

3.3.4. Future Laws regarding lawful taxes, or modifications thereto, provided that nothing in this Agreement shall be construed as waiving or limiting in any way Developer's right to challenge taxes imposed by City, which right is hereby reserved

3.3.5. Future Laws regarding changes to the amounts of fees for the processing of applications that are generally applicable to all development within City and that are adopted in accordance with state and local law.

3.4. Developer may elect to sell one or more portions of the Project to a subdeveloper ("**Subdeveloper**"). Any portion of the Property (each a "**Parcel**") sold by Developer to a Subdeveloper shall include the transfer of the right and obligation to develop such Parcel in accordance with this Agreement and the Project Plan. At the recordation of a Final Plat or other document of conveyance for any Parcel sold to a Subdeveloper, Developer shall provide City with a report showing the Parcel ownership, and the projected or potential uses.

4. Development of the Project.

4.1. Developer may develop the Project in phases, and Developer reserves all discretion to determine when to develop a particular portion or phase of the Property, based upon Developer's business judgment. Notwithstanding the foregoing, Developer is subject to the requirement to proceed with reasonable diligence. If it appears the Developer will not proceed with development for an extended period of time, the Parties shall meet to confer in good faith as to how best to amend this Agreement in a manner that fulfills the intent of the Parties.

4.2. At any time prior to the construction of Old Airport Road east of Pony Express Parkway by the City, Developer may purchase from the City the portion of the Old Airport Road right-of-way depicted in Exhibit K. If Developer elects to purchase the portion of Old Airport Road within six months of the Effective date, the purchase price will match the price paid by Developer for the Property, adjusted pro-rata per square foot. If Developer elects to purchase the portion of Old Airport Road at a time that is more than six months following the Effective Date, the purchase price shall be determined by a commercial appraisal, performed by a mutually acceptable appraiser based on a commercial use of the property.

4.3. The Project Plan comprises the Anchor Area and the Pad Area. The "**Anchor Area**" includes the buildings labeled *Grocery*, *Major*, and *Anchors A through D* on the Project

Plan, with their surrounding features. The "**Pad Area**" includes the 23 buildings labeled *Pads A-B, Fuel C, Pads D-L, Fuel M, Pad N-Q, Retail R & S,* and *Pads T-W*, with their surrounding features. The Pad Areas are intended for commercial tenants such as fast-food restaurants, fuel centers, banks, and automotive service centers, and other commercial uses (each, a "**Pad User**"). Developer has sole discretion to select and enter into agreements with Pad Users, provided the proposed use is permitted or conditionally permitted use under applicable City ordinances and this Agreement.

4.4. The Project shall be constructed in substantial conformance with the Design Guidelines Elements, attached hereto as Exhibits C through J and L through M, which are expressly approved by City.

4.5. Following City Council approval of this Agreement, and the associated zoning, Project Plan, and Design Guideline Elements included therewith all subsequent Project approvals (including pad site plans, building permits, and similar approvals) shall be processed as administrative reviews. Such reviews shall be limited to confirming compliance with the Project Plan (as modified with respect to the Pad Area), the applicable Design Guideline Elements, and applicable City codes, and shall not require discretionary land use hearings except to the extent a Material Change is proposed. No additional architectural design review, beyond staff confirmation of substantial conformance, shall be required for anchor tenants at Site Plan approval and the issuance of Building Permits.

4.5.1. City shall complete its administrative review of complete Site Plan and Building Permit Plan submittals for the Project within the following timeframes: (i) the first submittal shall be reviewed within four (4) weeks after City's receipt; (ii) the second submittal shall be reviewed within three (3) weeks after City's receipt of a resubmittal addressing City comments; and (iii) the third submittal shall be reviewed within two (2) weeks after City's receipt of a second resubmittal addressing City comments. City may complete its review in less time. If any portion of City's review is delegated to an approved third-party reviewer, such third-party reviewer shall be required to comply with the same review timeframes set forth herein.

4.5.2. Only a **"Material Change"** to the Anchor Area will require amendment of this Agreement or the Project Plan. A Material Change in the Anchor Area includes: (i) a change that substantially increases parking requirements; (ii) a change in pedestrian or traffic patterns that initiate safety concerns; (iii) a change that is directly contrary to the terms of this Agreement or applicable City ordinances; (iv) a change that materially deviates from the approved Anchor Tenant Architectural Elevations, Fuel Center Architectural Elevations, Sign Plans, Site Lighting, Landscape Treatments, Streetscape Landscaping and Style, Site Furnishings, or Outdoor Storage Plan Design Guideline Elements applicable to the Anchor Area; (v) changes to anchor tenant façade materials or colors; (vi) changes to approved sign types, heights, or locations; (vii) changes to lighting pole heights/fixture types; (viii) changes to the Outdoor Storage Plan; and (ix) changes to increase the number of Pad Area units.

4.5.3. Any non-Material Changes to the Anchor Area may be requested by Developer and shall be reviewed and approved by City planning staff upon a staff finding that such change is not a Material Change.

4.5.4. The Anchor Tenant Architectural Elevations and the Sign Plans Design Guideline Elements are approved as final for the Anchor Area. Any deviation visible from public right-of-way shall constitute a Material Change unless approved by the City as a minor modification consistent with the approved Design Guideline Elements.

4.5.5. The anchor tenant buildings, including the occupant of the unit labeled "Major," Smith's Marketplace," and the "Smith's Fuel Center" shall be constructed in substantial conformance with the applicable Design Guideline Elements, specifically the Anchor Tenant Architectural Elevations attached hereto as Exhibit F and the Fuel Center Architectural Elevations attached hereto as Exhibit G.

4.5.6. Developer may construct and establish two automobile fuel/service stations within the Pad Area as shown on Exhibit B, affiliated with the use at the site labeled "Grocery" within the Anchor Area. Such fuel station shall be an unsevered part of the permitted use at the site for a grocery store and shall not be required to obtain a separate conditional or special use permit. The fuel center shall be constructed in accordance with the Fuel Center Architectural Elevations attached hereto as Exhibit G.

4.5.7. Any outdoor storage yard or outdoor sales and display area authorized herein shall be located, configured, and operated in substantial conformance with the **Outdoor Sales Display and Storage Plan attached hereto as Exhibit J (the "Outdoor Sales Display and Storage Plan")** and the applicable provisions of the Overland DA, as amended by this Agreement. City may enforce the Outdoor Sales Display and Storage Plan through administrative review and code enforcement, and any Material Change to the footprint of such outdoor storage or display areas shall constitute a Material Change. Outdoor sales and display of retail products customarily sold on-site, including without limitation palletized, shrink-wrapped, or otherwise packaged materials, equipment, and merchandise (e.g., landscaping materials, bulk goods, snow blowers, lawn mowers, and similar items), **shall be permitted within the designated outdoor display areas as shown on Exhibit J and may be visible from public rights-of-way**, and shall not be required to be screened or considered prohibited outdoor storage. For purposes of this Section, "**Semi-Trailer or Storage Unit**" shall mean any semi-trailer, truck trailer, cargo container, shipping container, portable storage container, or similar unit used for the storage or transport of goods, whether or not attached to a tractor or other vehicle. **Semi-Trailers or Storage Units shall not be parked, stored, or utilized within customer parking areas.** Semi-Trailers or Storage Units may be parked or placed **only at the rear of the principal building within the Anchor Area, in locations designated on Exhibit J**, and shall be arranged in substantial conformance with the Outdoor Sales Display and Storage Plan and the Overland DA, as amended.

4.6. The Parties acknowledge that the Pad Areas are expected to undergo significant and frequent changes, based upon pad tenant needs and commercial market factors. Accordingly, except as otherwise indicated in this Agreement, no changes to Pad Areas will require amendment of this Agreement or the Project Plan.

4.6.1. Development of all uses within the Pad Area will require submission to

City of a Site Plan application for that Pad. Site plan applications for properties within the Pad Area will be reviewed and approved administratively by City Staff.

4.6.2. Architectural styles, façade composition, roof forms, and site design for Pad Area development shall generally comply with the Design Guideline Elements including but not limited to the Streetscape Landscaping and Style attached hereto as Exhibit C, Site Furnishings attached hereto as Exhibit D, Landscape Treatments attached hereto as Exhibit E, and any Pad Area architectural guidance exhibits approved hereunder. Pad Area developments may utilize tenant-specific prototype designs, provided they are generally consistent with the intent of the approved Design Guideline Elements and meet the applicable City code requirements. Site design for Pad Area development shall also generally comply with the Landscape Screening for the Drive Thru Exhibit attached hereto as Exhibit C.

4.7. Developer is obligated to ~~Develop~~develop the Project in substantial accordance with the City's *Commercial and Multifamily Design Standards* (Eagle Mountain City Code Chapter 17.72), as they existed at the time of approval of the 2017 Overland DA ("**Design Standards**"). The applicable Design Standards are attached hereto as Exhibit ~~M~~L. Developer is expressly authorized to deviate from the Design Standards as follows:

4.7.1. Primary entrances to commercial uses in the Pad Areas shall not be required to face a public street, but may be oriented toward internal traffic and pedestrian zones, in order to meet the needs of the occupant of the Pad Area.

4.7.2. Commercial uses on Pad Areas shall be permitted to have parking near the Primary Entrance of that building.

4.7.3. Commercial uses on Pad Areas shall be permitted to have parking on the Pad Area between the building and the public street.

4.7.4. Architectural styles, entrances, elevations, articulations, and roof designs in the Pad Areas shall generally comply with those shown on the renderings provided in the Design Guideline Elements.

4.8. Site lighting for the Project is expressly approved as part of this Agreement and shall be installed in substantial conformance with Exhibit I. **The approved lighting intensity for the Project is one hundred and Eleven thousand (111,000) lumens per gross acre (One Hundred Thirty-Seven Thousand (137,000) lumens per net acre), and the approved fixture mounting heights shall be as shown on Exhibit I.** The Project shall in all other respects comply with Eagle Mountain Municipal Code Chapter 17.56, with the exception that fixture heights shall be twenty-five ~~()~~ feet. (25'). Following City Council approval of this Agreement, City shall process lighting reviews and permits for the Project as administrative approvals upon a finding of substantial conformance with Exhibit I and the foregoing approved lighting standards, and shall not require discretionary design review or additional lighting limitations beyond applicable codes related to public safety and light spillover.

4.9. Developer is obligated to ~~Develop~~develop the Project in substantial accordance

with the City's Sign Regulations and Sign Permits ordinances (Eagle Mountain City Code Chapter 17.80), as they existed at the time of approval of the 2017 Overland DA ("**Sign Standards**"). The Project's Sign Plans and Sign Location Plan are attached hereto as Exhibit H. For clarity, Exhibit H contains both (i) the applicable Sign Standards (Eagle Mountain City Code Chapter 17.80 as of adoption of the 2017 Overland DA) and (ii) the Project's approved Sign Plans and Sign Location Plan. In the event of any conflict between the Sign Standards and the approved Sign Plans/Location Plan in Exhibit H, the approved Sign Plans/Location Plan shall control for the Project.

4.10. Developer is authorized to deviate from the Sign Standards as follows:

4.10.1. Developer shall be permitted to install up to five (5) Pylon Signs and up to ten (10) additional Monument Signs for Project identification and wayfinding as shown in the Sign Plans and Sign Location Plan attached hereto as Exhibit H. Sign Plans and Sign Location Plan establishes the approved sign locations, sign types, and sign configurations for the Project, and City shall process sign permits for such signs as administrative approvals provided the proposed signs substantially conform to the approved Sign Plans Design Guideline Element and the Sign Standards, as modified herein. Developer shall be permitted to install up to five (5) Pylon Signs at entrances to the Project, with up to three (3) along Pony Express Parkway, as shown on the sign plan attached hereto as Exhibit H. The Pylon signs shall be up to twenty-seven (27) feet in height and fourteen (14) feet across and shall identify occupants of Anchor Areas as well as Pad Areas.

4.11. Public Infrastructure

4.11.1. Developer shall construct Old Airport Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide median from Pony Express Parkway back to the second access into the project. The road shall include a single left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B.

4.11.2. Developer shall construct Mid Valley Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide concrete median from Pony Express Parkway back to the second access into the project. The road shall include a dual left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B.

4.11.3. Developer shall construct a third northbound auxiliary lane on Pony Express

Parkway along the project frontage to act as a deceleration and acceleration lane. Developer shall modify and/or remove the medians along Pony Express Parkway to add left turn lanes in the project accesses as shown on Exhibit B. Developer shall construct a traffic signal at the middle access into the project. The center access will have dual left turn lanes exiting the project onto Pony Express Parkway.

5. Infrastructure Financing.

5.1. The Parties acknowledge and agree that development of the Property pursuant to this Agreement will result in positive economic benefits to City and its residents by, among other things, increasing property tax and other revenues to the community based on improvements to be constructed on the Property.

~~5.2.~~ In consideration thereof, and to the extent permitted by applicable law, City shall provide to Developer, by means of bonding or other lawful revenue sources chosen by City, funds to pay for the development of public infrastructure related to the Project. Such "**Public Infrastructure**" may include, but is not limited to, the following elements of the Project: (i) major roadway and traffic-related improvements; (ii) acquisition of culinary water shares and installation of public culinary and secondary water infrastructure; (iii) mass grading of the overall site; (iv) construction of public improvements to storm drain, electrical and other utilities;

5.2. (v) necessary engineering, permitting, materials, and inspection costs; (vi) any other infrastructure primarily for use by the public that would fit the definition of "system improvement" under the *Utah Impact Fees Act*, Utah Code § 11-36a-101 *et seq.*; and (vii) any management or other soft costs associated therewith.

5.3. The amount provided by the City to pay for such Public Infrastructure shall be no less than the amount estimated by the City Engineer's of probable costs to construct the Public Infrastructure~~, but shall not exceed Ten Million Two Hundred Seventy Thousand Dollars ($10,270,000)) ("**Infrastructure Funds**"). The Infrastructure Funds shall consist of up to Eight Million Dollars ($8,000,000) for use on any Public Infrastructure and up to Two Million Two Hundred Seventy Thousand Dollars ($2,270,000) that the City received from Utah County for the construction of Old Airport Road that may only be used for purposes consistent with the restrictions attached to those monies. City shall provide to Developer an additional amount of One Million Dollars ($1,000,000) in existing City infrastructure improvement funds, to enable Developer to complete infrastructure improvements. These additional funds shall not be included in the Infrastructure Funds for purposes of this Agreement~~ ("**Infrastructure Funds**"). The Parties acknowledge that current estimates of the anticipated amount of Infrastructure Funds are approximate, and that the final Infrastructure Funds amount may vary from the estimate depending on multitude of factors. The Parties agree that the Infrastructure Funds shall be limited to the actual amount of funds needed to construct the Public Infrastructure. The Infrastructure Funds will be governed by the Participation Agreement of even date herewith.

~~5.3.~~5.4. Sources of various portions of the Infrastructure Funds may vary, and certain sources may include restrictions on the use of those funds. The Parties agree to comply with such restrictions. Developer agrees to work cooperatively with City to enable City to obtain the Infrastructure Funds. Such cooperation shall include collaborating on the issuance of bonds and/or creating public financing opportunities, such as the financing mechanisms set forth in Title 17C or Title 17D of the Utah Code. City agrees that in obtaining the Infrastructure Funds, no mills, tax levies, or assessments shall be placed on the Property or the Project without the express written consent of the Developer.

~~5.4.~~5.5. Prior to commencement of construction on the Project, City will deposit the Infrastructure Funds into a mutually agreed escrow account (the "**Infrastructure Escrow**"). Disbursement of Infrastructure Funds from such Infrastructure Escrow during construction, including progress payments, retainage, payment for materials delivered to the Project, and final release following acceptance, shall be governed by Section 6 of this Agreement.

~~5.5.~~5.6. The Parties agree that the intent of the Infrastructure Funds is to fully fund the Public Infrastructure without placing any obligation for such costs directly on Developer, as set forth in Paragraph 5.8 below. Notwithstanding any other term or obligation in this Agreement, Developer's obligation to provide Public Infrastructure is limited to the expenditure of the Infrastructure Funds. Developer is not obligated to expend Developer's funds for Public Infrastructure. City shall not require Developer to oversize any Public Infrastructure or to provide Public Infrastructure beyond what would be required to pay for Developer's proportionate share, as defined in Utah Code § 10-20-911 and in the *Nollan/Dolan* line of United States Supreme Court cases, unless such oversized and excess Public Infrastructure shall also be paid for in full out of Infrastructure Funds.

~~5.6.~~5.7. If the total amount of Infrastructure Funds exceed amounts needed to provide Public Infrastructure, City may, to the extent doing so is permitted by the financing terms, request that Developer utilize such funds to:

~~5.6.1.~~5.7.1. perform additional improvements;

~~5.6.2.~~5.7.2. pay off bonds early; or

~~5.6.3.~~5.7.3. provide the City with the excess funds.

~~5.7.~~5.8. The City acknowledges that the provision of the Infrastructure Funds, in sufficient amounts to reimburse or otherwise pay the Developer for costs and expenses incurred in providing the Public Infrastructure, is a material, integral term of this Agreement and development of the Project. If the Infrastructure Funds are not provided in sufficient amounts, Developer may (1) elect to proceed with the Project under the terms herein, or (2) elect to terminate this Agreement by delivering written notice thereof to the City. Upon delivery of such notice, this Agreement shall automatically terminate whereupon the Parties shall have no further rights or obligations hereunder.

~~5.8.~~5.9. In the event that any dispute arises with regard to the terms of this Section 5, including but not limited to a dispute over invoices, inspections, or whether a particular improvement is a Public Improvement, the parties will within ten (10) days of the dispute arising, exchange their basis for the dispute, and arguments regarding resolution of the dispute, to one another in writing. Within ten (10) days of such exchange, the Parties shall then meet and confer in good faith in an effort to resolve such dispute. The Parties may, but are not obligated to, employ the services of a mediator.

6. Infrastructure Fund Disbursements.

6.1. Developer's obligation to provide public infrastructure or any improvements

hereunder is expressly conditional upon City's approval of the Project and issuance of permits required for construction of the applicable improvements.

6.2. Developer, using Infrastructure Funds, shall make public improvements to roads within the Project Area, as shown on Exhibit M in accordance with this Agreement. Developer will complete improvements associated with identified public streets. The road right-of-way is currently owned by the City.

6.3. The Infrastructure Funds described in Section 5 shall be held in the Infrastructure Escrow. The Parties agree the Infrastructure Escrow shall serve as the Improvement Completion Assurance in accordance with Utah Code 10-20-807, for completion of required public improvements funded therefrom (the "**Public Improvements**") and shall be funded in an amount equal to **one hundred ten percent (110%)** of the City Engineer-approved Engineer's Opinion of Probable Construction Cost ("**OPCC**") for the Public Improvements required to be guaranteed under this Agreement.

6.3.1. Notwithstanding the extent that Utah State law, Eagle Mountain City Code Section 16.30.060(C), or other City policy dictates the procedure and timing of the release of improvement completion assurance or other bond funds, including but not limited to requiring City Council action to approve escrow or bond releases during construction, the Parties agree that release of the Infrastructure Funds will occur in accordance with the procedure and timing set forth in this Section.

6.3.2. **All progress releases and payments from the Infrastructure Escrow shall be authorized administratively by the Mayor, City Manager, and City Attorney.** Developer (or its contractor) may submit requests for releases and payment from the Infrastructure Escrow directly to the City no more frequently than **once every thirty (30) days**, unless otherwise approved by the Mayor, City Manager, and City Attorney. Upon submission of a request for release and payment, the City will promptly inspect and verify the work completed. The City will immediately release the funds when work is determined to pass inspection.

6.3.3. The Mayor, City Manager, and City Attorney will also immediately authorize the release of funds for materials delivered for the Public Improvements upon confirmation of delivery. The Mayor, City Manager, and City Attorney may authorize partial payment for materials delivered to the Project site but not installed, subject to inspection, verification, lien protection, and secure storage. Unless otherwise approved in writing by the Mayor, City Manager, and City Attorney, payment for delivered-but-not-installed materials shall not exceed **seventy-five percent (75%)** of invoiced cost, with the balance payable upon installation.

6.3.4. At the completion of the Project, City may retain not more than ten percent (10%) of the Infrastructure Funds owed to Developer for no more than one year as an improvement warranty, which shall be managed in accordance with Utah Code 10-20-807.

6.3.5. Final acceptance of the Public Improvements shall occur following

completion of the Project, City Engineer inspection confirming compliance, and submission of required closeout documentation (including as-builts and final lien releases). After final acceptance, the escrow agent shall release remaining escrow funds, subject to any improvement warranty holdback required by the City.

6.4. Developer and City acknowledge that timely payment of contractors and suppliers is necessary for efficient construction of the Public Improvements. Accordingly, the Parties intend that payment releases from the Infrastructure Escrow be processed through the administrative process authorized in this Section 6 without requiring City Council approval.

6.5. Third Party Inspections.

6.5.1. Developer shall have the option, at Developer's discretion, to retain a qualified third-party to perform inspections of Public Improvements, including final inspections.

6.5.2. City may provide reasonable input regarding the acceptability and qualifications of any third-party inspector retained by Developer; provided, however, City shall not be entitled to disqualify an inspector chosen by Developer without good cause.

7. Default.

7.1. If Developer, a Subdeveloper, or City fails to perform their respective obligations hereunder or to comply with the terms hereof, the Party believing that a Default has occurred shall provide notice to the other Party. If City believes that the Default has been committed by a Subdeveloper, then that City shall also provide a courtesy copy of the notice to Developer.

7.2. The notice of Default shall:

7.2.1. Specify the claimed event of Default;

7.2.2. Identify with particularity the provisions of any applicable law, rule, regulation or provision of this Agreement that is claimed to be in Default;

7.2.3. Identify why the Default is claimed to be material;

7.2.4. Propose a method and time for curing the Default which shall be of no less than sixty (60) days duration.

7.3. If the Parties are not able to resolve the Default, then the Parties have all rights and remedies available at law and in equity, including, but not limited to, injunctive relief and/or specific performance.

7.4. The Party prevailing in any action arising from an uncured default shall be awarded its reasonable legal expenses, including its reasonable attorney fees.

7.5. The Party allegedly in Default shall be afforded the right to attend a public

meeting before the City Council and address the City Council regarding the claimed Default.

~~7.6.~~ If any Default cannot be reasonably cured within sixty (60) days, then such cure

7.6. period may be extended at the discretion of the Party asserting Default so long as the defaulting Party is pursuing a cure with reasonable diligence.

7.7. A default of any obligations assumed by an assignee or Subdeveloper shall not be deemed a default of Developer.

7.8. All notices required or permitted under this Agreement shall, in addition to any other means of transmission, be given in writing either by certified mail, hand delivery, overnight courier service, or email to the following addresses:

To Developer:
Terra Smith's Eagle Mountain I, LLC
c/o Terra Strada
P.O. Box 377
Kaysville, UT 84037
Attn: J. Stuart Adams

With a copy to:

Smith's Food & Drug Centers, Inc.
c/o The Kroger Co.
1014 Vine Street
Cincinnati, OH 45202
Attn: Law Department, ~~Jenny~~Jennifer K. Gothard, Senior Attorney (Smith's 208)

With a copy to:
Dentons Durham Jones Pinegar
c/o Brent N. Bateman
1557 Innovation Way, Ste 400
Lehi, UT 84043
brent.bateman@dentons.com

To City:
Eagle Mountain City
Attn: City Recorder
1650 Stagecoach Run
Eagle Mountain, UT 84005
recorder@eaglemountain.gov

7.9. Notwithstanding the termination of this Agreement for any reason, any applications, development entitlements, approvals, or improvements, on any portion of the Property in accordance with this Agreement and the Project Plan ("**Development Activities**") shall remain fully vested under this Agreement, and the fee owner of the Parcels on which such Development Activities pertain shall be entitled to continue the Development Activities on its Parcel in accordance herewith.

8. Assignability.

8.1. The rights and responsibilities of Developer hereunder may be assigned in whole or in part, by Developer. Developer shall give the City notice of any assignment within ten (10) days after the event has occurred. Such Notice shall include providing the City with all necessary contact information for the newly responsible party. Developer's assignment of all or any part of the Developer's rights and responsibilities hereunder to any entity not "related" to Developer (as defined by regulations of the Internal Revenue Service in Section 165), shall be subject to the City's approval, which shall not be unreasonably withheld, conditioned or delayed.

8.2. If any proposed assignment is for less than all of Developer's rights and responsibilities, then the assignee shall be responsible for the performance of each of the obligations contained in this Agreement to which the assignee succeeds. Upon any such partial assignment, Developer shall be released from any future obligations as to those obligations that are assigned.

8.3. Any assignee of all or any part of Developer's rights and responsibilities under this Agreement shall consent in writing to be bound by the assigned terms and conditions of this Agreement as a condition precedent to the effectiveness of the assignment.

9. General Provisions.

9.1. The initial term of this Agreement shall be twenty (20) years beginning on the Effective Date.

9.2. This Agreement has been reviewed and revised by legal counsel for the Developer and City, and no presumption or rule that ambiguities shall be against the drafting Party shall apply to the interpretation or enforcement of this Agreement.

9.3. Each Party hereto agrees to cooperate in good faith with the other, and to execute and deliver such further documents and to take all further acts reasonably necessary in order to carry out the intent and purposes of this Agreement and the actions contemplated hereby. All provisions and requirements of this Agreement shall be carried out by each Party as allowed by law.

9.4. Both Parties understand that any legislative action by the City Council is subject to referral or challenge by individuals or groups of citizens, including approval of development Agreements and a rezone of the Property. If a referendum or challenge relates to the approval of this Agreement or the adoption of the New Zone, and the referendum or challenge is submitted to a vote of the people pursuant to Utah Code § 20A-7-601, then Developer may deliver a Notice of rescission to the City to terminate that portion of this Agreement applicable to the City. Upon Developer's delivery of a Notice of rescission pursuant to this Section, this Agreement shall automatically terminate with respect to that City only, whereupon the Parties shall have no further rights or obligations hereunder.

~~9.5.~~ The Parties intend that the administration, but not the approval, of this Agreement and any amendments, shall be processed through administrative land use applications to be

9.5. decided by the land use authority, as those terms are defined in Utah law.

9.6. The rights of City under this Agreement shall not be assigned, but City is authorized to enter into any contract with a third party to perform obligations of City to operate and maintain any infrastructure improvement so long as such Party adequately and reasonably maintains and operates such facility or improvement.

9.7. This Agreement shall be recorded in its entirety, at Developer's expense, in the Official Records of Utah County, Utah. This Agreement shall run with the land.

9.8. This Agreement shall be governed by and construed in accordance with the laws of the State of Utah.

9.9. This Agreement is made and entered into for the sole protection and benefit of the Parties and their assigns. No other person shall have any right of action based upon any provision of this Agreement whether as third-party beneficiary or otherwise.

9.10. This Agreement may be executed in multiple counterparts, each of which is deemed to be an original.

9.11. If City elects to consider terminating this Agreement due to any uncured Default by Developer, then City shall give to the Developer written notice of City's intent to terminate this Agreement and the matter shall be scheduled for consideration and review by City's legislative body at a duly noticed public meeting. Developer shall have the right to offer written and oral evidence prior to or at the time of said public meeting. If City's legislative body determines that a Default has occurred and is continuing, and elects to terminate this Agreement, City shall send written notice of termination of this Agreement to Developer by certified mail and this Agreement shall thereby be terminated. City may thereafter pursue any and all remedies at law or equity.

9.12. Developer's sole and exclusive remedy under this Agreement shall be specific performance of the rights granted in this Agreement and Eagle Mountain's obligations under this Agreement. IN NO EVENT SHALL EAGLE MOUNTAIN CITY BE LIABLE TO DEVELOPER, ITS SUCCESSORS OR ASSIGNS, FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS, COSTS OF DELAY, OR LIABILITIES TO THIRD PARTIES.

~~9.12.~~9.13. No delay in exercising any right or remedy shall constitute a waiver thereof, and no waiver by City or Developer for the breach of any covenant of this Agreement shall be construed as a waiver of any preceding or succeeding breach of the same or any other covenant or condition of this Agreement.

~~9.13.~~ If City's approval of the Project is held invalid by a court of competent jurisdiction this Agreement shall be null and void. If any provision of this Agreement shall be held to be unconstitutional, invalid or unenforceable by a court of competent jurisdiction or as a

9.14. result of any legislative action, such holding or action shall be strictly construed.

~~9.14.~~9.15. Developer shall not be liable for any delay or failure in the keeping or performance of its obligations under this Agreement during the time and to the extent that any such failure is due to causes beyond the control and without the fault or negligence of the Party affected, including but not limited to, acts of God, acts of the United States Government or the State of Utah, fires, floods, strikes, unanticipated materials shortages exceeding six months, embargoes, wars, terrorist acts or unusually adverse weather conditions. Upon the occurrence of any such cause, Developer shall notify City and shall promptly resume the keeping and performance of the affected obligations after such cause has come to an end.

~~9.15.~~9.16. Developer shall be the sole owner of all names, titles, plans, drawings, specifications, ideas, programs, designs and work products of every nature developed, formulated or prepared by or at the request of Developer in connection with the Project.

~~9.16.~~9.17. This Agreement shall not be modified or amended except in written form mutually agreed to and signed by each of the Parties.

~~9.17.~~9.18. In the event either Party hereto fails to perform any of its obligations under this Agreement or in the event a dispute arises concerning the meaning or interpretation of any provision of this Agreement, the party not prevailing in such dispute shall pay any and all reasonable and actual costs and expenses incurred by the other party in enforcing or establishing its rights hereunder, including, without limitation, court costs and attorneys' fees.

[Signature Page Follows]

THE PARTIES have executed this Agreement below, to be effective as of the Effective Date.

DEVELOPER:

TERRA SMITH'S EAGLE MOUNTAIN, LLC,
a ~~Delawarelimited~~Delaware limited liability company

By: _____

Name: _____

Title: _____

~~The forgoing instrument was acknowledged before me this _____ day of _____, 2026, by _____, the _____ of Terra Smith's Eagle Mountain, LLC.~~

_____

STATE OF UTAH _____)
:§.
COUNTY OF UTAH _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2026, _____, the _____ of Eagle Mountain City.

_____

NOTARY PUBLIC

My Commission Expires: (Seal) Residing at:

_____ _____

~~SMITH'S FOOD & DRUG CENTERS, INC,~~
~~an Ohio corporation~~

_____ _____

By: _____

Name: _____

Title: _____

The forgoing instrument was acknowledged before me this _____day of _____, 2026, by _____, the _____ of Smith's Food & Drug Centers, Inc.

_____

NOTARY PUBLIC

My Commission Expires: _____ (Seal) _____ Residing at:

_____ _____

CITY:

EAGLE MOUNTAIN CITY,
a political subdivision of the State of Utah

~~By:~~ _____

~~Name:~~ _____

~~Its:~~ _____

By: _____

Name: _____

Title: _____

Approved as to form and legality:

City Attorney

Attest:

City Recorder

By: ___ By: ___

CITY ACKNOWLEDGMENT

STATE OF UTAH)
:ss.
COUNTY OF UTAH)

The foregoing instrument was acknowledged before me this _____day of _____, 2026, _____, the _____of Eagle Mountain City.

_____

NOTARY PUBLIC

My Commission Expires: (Seal) Residing at:

_____ _____

Exhibit A
Property Description

Exhibit B
Project Plan

Exhibit C
Streetscape Landscaping and Style

Exhibit D
Site Furnishings

Exhibit E
Landscape Treatments

Exhibit F
Anchor Tenant Architectural Elevations

Exhibit G
Fuel Center Architectural Elevations

Exhibit H
Sign Plans (Pylon and Monument) including the Sign Location Plan

Exhibit I
Site Lighting

Exhibit J
Outdoor Sales Display and Storage Plan

Exhibit K
Portion of the Old Airport Road right-of-way to be Purchased

Exhibit L
Outbuilding/Pad Architectural Elevations

Exhibit M
Public Road Improvements

WHEN RECORDED RETURN TO:
Smith's Food & Drug Centers, Inc.
c/o The Kroger Co.
1014 Vine Street
Cincinnati, Ohio 45202-1100
Attention: Jennifer K Gothard
Law Department (SM-208)

FIFTH AMENDMENT TO THE
AMENDED AND RESTATED MASTER DEVELOPMENT AGREEMENT FOR OVERLAND DEVELOPMENT AND PONY EXPRESS PARCEL

AND

MASTER DEVELOPMENT AGREEMENT
FOR THE
EAGLES LANDING COMMERCIAL CENTER
(Eagle Mountain)

THIS FIFTH AMENDMENT TO THE *AMENDED AND RESTATED MASTER DEVELOPMENT AGREEMENT FOR OVERLAND DEVELOPMENT AND PONY EXPRESS PARCEL* AND MASTER DEVELOPMENT AGREEMENT FOR THE EAGLES LANDING COMMERCIAL CENTER ("**Agreement**") is entered into on this _____day of _____, 2026 ("**Effective Date**"), by Terra Smith's Eagle Mountain, LLC, a Delaware limited liability company, ("**Developer**"), and Eagle Mountain City, a political subdivision of the State of Utah ("**City**"). City and Developer are the "**Parties**" to this Agreement, and individually each is a "**Party**."

RECITALS

A. Developer, a joint venture, controls certain property located in City, legally described on the attached and incorporated Exhibit A ("**Property**"), and known by the following Utah County Tax ID numbers: 58:054:0046, 59:033:0016, 58:054:0045, and 58:054:0061.

B. Developer desires to create a commercial development project the Property to be known as Eagles Landing Commercial Center ("**Project**"), consisting of commercial development adjacent to Mid Valley Road, Old Airport Road; and Pony Express Parkway, including road and intersection improvements attached hereto as Exhibit M and incorporated herein; with multiple commercial facilities and uses as generally depicted on the Project Plan ("**Project Plan**") attached hereto as Exhibit B and incorporated herein.

C. The Property is currently subject to the *Amended and Restated Master Development Agreement for Overland Development and Pony Express Parcel*, dated December

5, 2017, and recorded with the Utah County Recorder's Office as entry number 62737:2018 and four prior amendments: First Amendment dated August 20, 2019, Second Amendment dated November 17, 2020, Third Amendment dated August 14, 2022, and Fourth Amendment dated January 21, 2025 (collectively, "**Overland DA**"). Developer is successor in interest in the fee ownership of the Property, having obtained the Property from Ivory Homes, Ltd, Master Developer under the Overland DA. The Property consists of a portion of the area identified in the Overland DA as "Village 8."

D. To develop the Project, the Overland DA requires amendment with respect to the Property, modifying the development plan and uses for the Property, removing certain requirements associated with commercial development of the Property, and adopting a new name for the Project and a new zoning designation and development plan for the Property. This Agreement both amends the Overland DA and adopts a new Master Development Agreement and Project Plan on the Property.

E. Concurrent with the adoption of this Agreement, and as of the Effective Date, City has designated the Property into the City's Commercial Zone as designated in the 2017 Eagle Mountain Municipal Code Title 17.35.

F. Developer has submitted a Project Plan Application to the City that will enable development of the Project in accordance with the Project Plan attached hereto.

G. The Parties intend that the Project Plan, this Agreement, and the provisions of the City's Commercial Zoning designation in place as of adoption of the Overland DA in 2017 will permit development of the Project in substantial accordance with the Project Plan.

H. The Parties desire to facilitate the development of the Project by special financing vehicles, including but not limited to those provided for in Titles 17C and 17D of the Utah Code.

I. The Parties intend that this Agreement specify the rights and responsibilities of Developer to develop the Property as expressed in this Agreement and the Project Plan, and the rights and responsibilities of City to allow and regulate such development pursuant to the requirements of this Agreement, the Project Plan, and all other applicable laws.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals (which recitals are incorporated into this Agreement) and the covenants hereafter set forth in this Agreement, the sufficiency of which the Parties hereby acknowledge, the Parties agree as follows:

1. Interpretation. Whenever in this Agreement:

1.1. the consent or approval of any person is required, such consent or approval shall not be unreasonably withheld, conditioned or delayed, unless expressly provided to the contrary or where the City has discretion under the City's Vested Laws;

1.2. there is a reference to "days," such reference shall be deemed to be to "calendar

days" unless the phrase "business days" is expressly stated;

1.3. the date on which any payment or performance is due under this Agreement is not a business day, such payment or performance shall be due on the immediately following business day; and

1.4. there appears a reference to a consent, approval, description, designation, estimate, notice, request, demand, response, statement, warning, correspondence, Agreement, schedule or other communication, such reference shall be deemed to require the same to be in writing, unless otherwise expressly stated.

1.5. Priority of documents when interpreting terms, and priority in the event of conflict, shall be as follows:

1.5.1. The Project Plan, attached hereto as Exhibit B.

1.5.2. "**Design Guideline Elements**" meaning the Project-specific standards and exhibits for the Project, consisting of exhibits C-J and L-M attached hereto, including (as applicable): Streetscape Landscaping and Style (Exhibit C), Site Furnishings (Exhibit D), Landscape Treatments (Exhibit E), Anchor Tenant Architectural Elevations (Exhibit F), Fuel Center Architectural Elevations (Exhibit G), Sign Plans (Pylon and Monument) including the Sign Location Plan (Exhibit H), Site Lighting (Exhibit I), Outdoor Sales Display and Storage Plan (Exhibit J), Outbuilding/Pad Architectural Elevations (Exhibit L), and Public Road Improvements (Exhibit M), each to be discussed in Section 4 below, and once approved, shall be binding as provided herein. Notwithstanding anything to the contrary, if there is a conflict between the generally applicable Design Guideline Elements and (i) the approved Anchor Tenant Architectural Elevations, (ii) any subsequently approved Outbuilding/Pad Architectural Elevations for a particular building, or (iii) any approved tenant-specific Sign Plan, the approval listed in clauses (i)–(iii) shall control for the applicable building or tenant.

1.5.3. This Agreement;

1.5.4. The Overland DA; and

1.5.5. City ordinances in place as of the date of adoption of the 2017 Overland DA, except as expressly modified herein.

2. Amendment of the Overland DA

2.1. In accordance with Section 23 of the Overland DA, City and Developer (as successor to all of the rights and obligations of Master Developer in the Overland DA), hereby modify and amend the Overland DA with respect to the following provisions:

2.1.1. Section 6.4 of the Overland DA is hereby amended with the addition of the following language at the beginning of that section: "*Except with respect to the Property, which shall be a planned commercial development and shall not require submission of a*

Village Site Plan or compliance with the terms of this Section 6.4, . . ."

2.1.2. Section 11.4.9 of the Overland DA is hereby amended with the addition of the following language at the beginning of that section: "*Village 8. The portion of Village 8 that includes the Property shall be a planned commercial area. Open space and amenities thereon shall not be subject to the requirements of the Overland DA but shall be as shown in the Master Site Plan. Remaining portions of Village 8, not part of the Property, shall include . . .*"

2.1.3. In the event of any other conflict or disagreement between the Overland DA and this Agreement or the Project Plan attached hereto, such conflicting language or terms shall be considered an amendment to the Overland DA to conform with the Project Plan and this Agreement. Except with respect to the terms specified in this Agreement, which are applicable only to the Property, the Overland DA remains in full force and effect.

3. Zoning & Vesting.

3.1. Following the adoption of this Agreement, the Developer shall retain its vested rights, to the fullest extent permissible under the law, to develop the Project in accordance with Utah law, the 2017 City ordinances (unless otherwise specified herein), the Project Plan, and Design Guideline Elements, without further action or approval by the City. These vested rights are subject to the requirement that Developer proceed with reasonable diligence as contemplated in UTAH CODE § 10-20-902, as amended.

3.2. In addition to all uses permitted by applicable 2017 City ordinances, the following uses shall also be vested as permitted uses in the Project:

3.2.1. automobile gas/service stations;
3.2.2. restaurants and banks with drive-through service facilities; and
3.2.3. outdoor storage.

3.3. As an exception to the vesting principles above, the following future laws ("**Future Laws**") and ordinances adopted by City after the Effective Date shall apply to the Project:

3.3.1. Future Laws that Developer agrees in writing apply to the Project;

3.3.2. Future Laws that are both generally applicable to all properties in the City's jurisdiction and that are required in order to comply with state and federal laws and regulations affecting the Project;

3.3.3. City's Future Laws that are updates or amendments to existing building, plumbing, mechanical, electrical, dangerous buildings, drainage, or similar construction or safety related codes, such as the International Building Code, the APWA Specifications, AAHSTO Standards, the Manual of Uniform Traffic Control Devices or similar standards that are generated by a nationally or statewide recognized

construction/safety organization, or by the state or federal governments and are otherwise required to meet legitimate concerns related to public health, safety or welfare;

3.3.4. Future Laws regarding lawful taxes, or modifications thereto, provided that nothing in this Agreement shall be construed as waiving or limiting in any way Developer's right to challenge taxes imposed by City, which right is hereby reserved

3.3.5. Future Laws regarding changes to the amounts of fees for the processing of applications that are generally applicable to all development within City and that are adopted in accordance with state and local law.

3.4. Developer may elect to sell one or more portions of the Project to a subdeveloper ("**Subdeveloper**"). Any portion of the Property (each a "**Parcel**") sold by Developer to a Subdeveloper shall include the transfer of the right and obligation to develop such Parcel in accordance with this Agreement and the Project Plan. At the recordation of a Final Plat or other document of conveyance for any Parcel sold to a Subdeveloper, Developer shall provide City with a report showing the Parcel ownership, and the projected or potential uses.

4. Development of the Project.

4.1. Developer may develop the Project in phases, and Developer reserves all discretion to determine when to develop a particular portion or phase of the Property, based upon Developer's business judgment. Notwithstanding the foregoing, Developer is subject to the requirement to proceed with reasonable diligence. If it appears the Developer will not proceed with development for an extended period of time, the Parties shall meet to confer in good faith as to how best to amend this Agreement in a manner that fulfills the intent of the Parties.

4.2. At any time prior to the construction of Old Airport Road east of Pony Express Parkway by the City, Developer may purchase from the City the portion of the Old Airport Road right-of-way depicted in Exhibit K. If Developer elects to purchase the portion of Old Airport Road within six months of the Effective date, the purchase price will match the price paid by Developer for the Property, adjusted pro-rata per square foot. If Developer elects to purchase the portion of Old Airport Road at a time that is more than six months following the Effective Date, the purchase price shall be determined by a commercial appraisal, performed by a mutually acceptable appraiser based on a commercial use of the property.

4.3. The Project Plan comprises the Anchor Area and the Pad Area. The "**Anchor Area**" includes the buildings labeled *Grocery*, *Major*, and *Anchors A through D* on the Project Plan, with their surrounding features. The "**Pad Area**" includes the 23 buildings labeled *Pads A-B, Fuel C, Pads D-L, Fuel M, Pad N-Q, Retail R & S,* and *Pads T-W*, with their surrounding features. The Pad Areas are intended for commercial tenants such as fast-food restaurants, fuel centers, banks, and automotive service centers, and other commercial uses (each, a "**Pad User**"). Developer has sole discretion to select and enter into agreements with Pad Users, provided the proposed use is permitted or conditionally permitted use under applicable City ordinances and this Agreement.

4.4. The Project shall be constructed in substantial conformance with the Design Guidelines Elements, attached hereto as Exhibits C through J and L through M, which are expressly approved by City.

4.5. Following City Council approval of this Agreement, and the associated zoning, Project Plan, and Design Guideline Elements included therewith all subsequent Project approvals (including pad site plans, building permits, and similar approvals) shall be processed as administrative reviews. Such reviews shall be limited to confirming compliance with the Project Plan (as modified with respect to the Pad Area), the applicable Design Guideline Elements, and applicable City codes, and shall not require discretionary land use hearings except to the extent a Material Change is proposed. No additional architectural design review, beyond staff confirmation of substantial conformance, shall be required for anchor tenants at Site Plan approval and the issuance of Building Permits.

4.5.1. City shall complete its administrative review of complete Site Plan and Building Permit Plan submittals for the Project within the following timeframes: (i) the first submittal shall be reviewed within four (4) weeks after City's receipt; (ii) the second submittal shall be reviewed within three (3) weeks after City's receipt of a resubmittal addressing City comments; and (iii) the third submittal shall be reviewed within two (2) weeks after City's receipt of a second resubmittal addressing City comments. City may complete its review in less time. If any portion of City's review is delegated to an approved third-party reviewer, such third-party reviewer shall be required to comply with the same review timeframes set forth herein.

4.5.2. Only a **"Material Change"** to the Anchor Area will require amendment of this Agreement or the Project Plan. A Material Change in the Anchor Area includes: (i) a change that substantially increases parking requirements; (ii) a change in pedestrian or traffic patterns that initiate safety concerns; (iii) a change that is directly contrary to the terms of this Agreement or applicable City ordinances; (iv) a change that materially deviates from the approved Anchor Tenant Architectural Elevations, Fuel Center Architectural Elevations, Sign Plans, Site Lighting, Landscape Treatments, Streetscape Landscaping and Style, Site Furnishings, or Outdoor Storage Plan Design Guideline Elements applicable to the Anchor Area; (v) changes to anchor tenant façade materials or colors; (vi) changes to approved sign types, heights, or locations; (vii) changes to lighting pole heights/fixture types; (viii) changes to the Outdoor Storage Plan; and (ix) changes to increase the number of Pad Area units.

4.5.3. Any non-Material Changes to the Anchor Area may be requested by Developer and shall be reviewed and approved by City planning staff upon a staff finding that such change is not a Material Change.

4.5.4. The Anchor Tenant Architectural Elevations and the Sign Plans Design Guideline Elements are approved as final for the Anchor Area. Any deviation visible from public right-of-way shall constitute a Material Change unless approved by the City as a minor modification consistent with the approved Design Guideline Elements.

4.5.5. The anchor tenant buildings, including the occupant of the unit labeled

"Major," Smith's Marketplace," and the "Smith's Fuel Center" shall be constructed in substantial conformance with the applicable Design Guideline Elements, specifically the Anchor Tenant Architectural Elevations attached hereto as Exhibit F and the Fuel Center Architectural Elevations attached hereto as Exhibit G.

4.5.6. Developer may construct and establish two automobile fuel/service stations within the Pad Area as shown on Exhibit B, affiliated with the use at the site labeled "Grocery" within the Anchor Area. Such fuel station shall be an unsevered part of the permitted use at the site for a grocery store and shall not be required to obtain a separate conditional or special use permit. The fuel center shall be constructed in accordance with the Fuel Center Architectural Elevations attached hereto as Exhibit G.

4.5.7. Any outdoor storage yard or outdoor sales and display area authorized herein shall be located, configured, and operated in substantial conformance with the **Outdoor Sales Display and Storage Plan attached hereto as Exhibit J (the "Outdoor Sales Display and Storage Plan")** and the applicable provisions of the Overland DA, as amended by this Agreement. City may enforce the Outdoor Sales Display and Storage Plan through administrative review and code enforcement, and any Material Change to the footprint of such outdoor storage or display areas shall constitute a Material Change. Outdoor sales and display of retail products customarily sold on-site, including without limitation palletized, shrink-wrapped, or otherwise packaged materials, equipment, and merchandise (e.g., landscaping materials, bulk goods, snow blowers, lawn mowers, and similar items), **shall be permitted within the designated outdoor display areas as shown on Exhibit J and may be visible from public rights-of-way**, and shall not be required to be screened or considered prohibited outdoor storage. For purposes of this Section, "**Semi-Trailer or Storage Unit**" shall mean any semi-trailer, truck trailer, cargo container, shipping container, portable storage container, or similar unit used for the storage or transport of goods, whether or not attached to a tractor or other vehicle. **Semi-Trailers or Storage Units shall not be parked, stored, or utilized within customer parking areas.** Semi-Trailers or Storage Units may be parked or placed **only at the rear of the principal building within the Anchor Area, in locations designated on Exhibit J**, and shall be arranged in substantial conformance with the Outdoor Sales Display and Storage Plan and the Overland DA, as amended.

4.6. The Parties acknowledge that the Pad Areas are expected to undergo significant and frequent changes, based upon pad tenant needs and commercial market factors. Accordingly, except as otherwise indicated in this Agreement, no changes to Pad Areas will require amendment of this Agreement or the Project Plan.

4.6.1. Development of all uses within the Pad Area will require submission to City of a Site Plan application for that Pad. Site plan applications for properties within the Pad Area will be reviewed and approved administratively by City Staff.

4.6.2. Architectural styles, façade composition, roof forms, and site design for Pad Area development shall generally comply with the Design Guideline Elements including but not limited to the Streetscape Landscaping and Style attached hereto as Exhibit C, Site

Furnishings attached hereto as Exhibit D, Landscape Treatments attached hereto as Exhibit E, and any Pad Area architectural guidance exhibits approved hereunder. Pad Area developments may utilize tenant-specific prototype designs, provided they are generally consistent with the intent of the approved Design Guideline Elements and meet the applicable City code requirements. Site design for Pad Area development shall also generally comply with the Landscape Screening for the Drive Thru Exhibit attached hereto as Exhibit C.

4.7. Developer is obligated to develop the Project in substantial accordance with the City's *Commercial and Multifamily Design Standards* (Eagle Mountain City Code Chapter 17.72), as they existed at the time of approval of the 2017 Overland DA ("**Design Standards**"). The applicable Design Standards are attached hereto as Exhibit L. Developer is expressly authorized to deviate from the Design Standards as follows:

4.7.1. Primary entrances to commercial uses in the Pad Areas shall not be required to face a public street, but may be oriented toward internal traffic and pedestrian zones, in order to meet the needs of the occupant of the Pad Area.

4.7.2. Commercial uses on Pad Areas shall be permitted to have parking near the Primary Entrance of that building.

4.7.3. Commercial uses on Pad Areas shall be permitted to have parking on the Pad Area between the building and the public street.

4.7.4. Architectural styles, entrances, elevations, articulations, and roof designs in the Pad Areas shall generally comply with those shown on the renderings provided in the Design Guideline Elements.

4.8. Site lighting for the Project is expressly approved as part of this Agreement and shall be installed in substantial conformance with Exhibit I. **The approved lighting intensity for the Project is one hundred and Eleven thousand (111,000) lumens per gross acre (One Hundred Thirty-Seven Thousand (137,000) lumens per net acre), and the approved fixture mounting heights shall be as shown on Exhibit I.** The Project shall in all other respects comply with Eagle Mountain Municipal Code Chapter 17.56, with the exception that fixture heights shall be twenty-five feet (25'). Following City Council approval of this Agreement, City shall process lighting reviews and permits for the Project as administrative approvals upon a finding of substantial conformance with Exhibit I and the foregoing approved lighting standards, and shall not require discretionary design review or additional lighting limitations beyond applicable codes related to public safety and light spillover.

4.9. Developer is obligated to develop the Project in substantial accordance with the City's Sign Regulations and Sign Permits ordinances (Eagle Mountain City Code Chapter 17.80), as they existed at the time of approval of the 2017 Overland DA ("**Sign Standards**"). The Project's Sign Plans and Sign Location Plan are attached hereto as Exhibit H. For clarity, Exhibit H contains both (i) the applicable Sign Standards (Eagle Mountain City Code Chapter 17.80 as of adoption of the 2017 Overland DA) and (ii) the Project's approved Sign Plans and

Sign Location Plan. In the event of any conflict between the Sign Standards and the approved Sign Plans/Location Plan in Exhibit H, the approved Sign Plans/Location Plan shall control for the Project.

4.10. Developer is authorized to deviate from the Sign Standards as follows:

4.10.1. Developer shall be permitted to install up to five (5) Pylon Signs and up to ten (10) additional Monument Signs for Project identification and wayfinding as shown in the Sign Plans and Sign Location Plan attached hereto as Exhibit H. Sign Plans and Sign Location Plan establishes the approved sign locations, sign types, and sign configurations for the Project, and City shall process sign permits for such signs as administrative approvals provided the proposed signs substantially conform to the approved Sign Plans Design Guideline Element and the Sign Standards, as modified herein. Developer shall be permitted to install up to five (5) Pylon Signs at entrances to the Project, with up to three (3) along Pony Express Parkway, as shown on the sign plan attached hereto as Exhibit H. The Pylon signs shall be up to twenty-seven (27) feet in height and fourteen (14) feet across and shall identify occupants of Anchor Areas as well as Pad Areas.

4.11. Public Infrastructure

4.11.1. Developer shall construct Old Airport Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide median from Pony Express Parkway back to the second access into the project. The road shall include a single left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B.

4.11.2. Developer shall construct Mid Valley Road from Pony Express Parkway running along the frontage of the project as a 5-lane roadway with curb and gutter on both sides, sidewalk on the project side only, and a 2' wide concrete median from Pony Express Parkway back to the second access into the project. The road shall include a dual left turn lane and a single right turn lane at Pony Express Parkway. The road shall also include the appropriate utilities such as water, sewer and storm drain per the City's Master Plans. The road shall include right turn deceleration lanes into each drive approach. The road improvements shall include modifying the traffic signal at Pony Express Parkway all as shown on Exhibit B.

4.11.3. Developer shall construct a third northbound auxiliary lane on Pony Express Parkway along the project frontage to act as a deceleration and acceleration lane. Developer shall modify and/or remove the medians along Pony Express Parkway to add left turn lanes in the project accesses as shown on Exhibit B. Developer shall construct a traffic signal at the middle access into the project. The center access will have dual left turn lanes exiting the

project onto Pony Express Parkway.

5. Infrastructure Financing.

5.1. The Parties acknowledge and agree that development of the Property pursuant to this Agreement will result in positive economic benefits to City and its residents by, among other things, increasing property tax and other revenues to the community based on improvements to be constructed on the Property.

5.2. In consideration thereof, and to the extent permitted by applicable law, City shall provide to Developer, by means of bonding or other lawful revenue sources chosen by City, funds to pay for the development of public infrastructure related to the Project. Such "**Public Infrastructure**" may include, but is not limited to, the following elements of the Project: (i) major roadway and traffic-related improvements; (ii) acquisition of culinary water shares and installation of public culinary and secondary water infrastructure; (iii) mass grading of the overall site; (iv) construction of public improvements to storm drain, electrical and other utilities; (v) necessary engineering, permitting, materials, and inspection costs; (vi) any other infrastructure primarily for use by the public that would fit the definition of "system improvement" under the *Utah Impact Fees Act*, Utah Code § 11-36a-101 *et seq*.; and (vii) any management or other soft costs associated therewith.

5.3. The amount provided by the City to pay for such Public Infrastructure shall be no less than the amount estimated by the City Engineer's of probable costs to construct the Public Infrastructure ("**Infrastructure Funds**"). The Parties acknowledge that current estimates of the anticipated amount of Infrastructure Funds are approximate, and that the final Infrastructure Funds amount may vary from the estimate depending on multitude of factors. The Parties agree that the Infrastructure Funds shall be limited to the actual amount of funds needed to construct the Public Infrastructure. The Infrastructure Funds will be governed by the Participation Agreement of even date herewith.

5.4. Sources of various portions of the Infrastructure Funds may vary, and certain sources may include restrictions on the use of those funds. The Parties agree to comply with such restrictions. Developer agrees to work cooperatively with City to enable City to obtain the Infrastructure Funds. Such cooperation shall include collaborating on the issuance of bonds and/or creating public financing opportunities, such as the financing mechanisms set forth in Title 17C or Title 17D of the Utah Code. City agrees that in obtaining the Infrastructure Funds, no mills, tax levies, or assessments shall be placed on the Property or the Project without the express written consent of the Developer.

5.5. Prior to commencement of construction on the Project, City will deposit the Infrastructure Funds into a mutually agreed escrow account (the "**Infrastructure Escrow**"). Disbursement of Infrastructure Funds from such Infrastructure Escrow during construction, including progress payments, retainage, payment for materials delivered to the Project, and final release following acceptance, shall be governed by Section 6 of this Agreement.

5.6. The Parties agree that the intent of the Infrastructure Funds is to fully fund the Public Infrastructure without placing any obligation for such costs directly on Developer, as set forth in Paragraph 5.8 below. Notwithstanding any other term or obligation in this Agreement, Developer's obligation to provide Public Infrastructure is limited to the expenditure of the

Infrastructure Funds. Developer is not obligated to expend Developer's funds for Public Infrastructure. City shall not require Developer to oversize any Public Infrastructure or to provide Public Infrastructure beyond what would be required to pay for Developer's proportionate share, as defined in Utah Code § 10-20-911 and in the *Nollan/Dolan* line of United States Supreme Court cases, unless such oversized and excess Public Infrastructure shall also be paid for in full out of Infrastructure Funds.

5.7. If the total amount of Infrastructure Funds exceed amounts needed to provide Public Infrastructure, City may, to the extent doing so is permitted by the financing terms, request that Developer utilize such funds to:

5.7.1. perform additional improvements;

5.7.2. pay off bonds early; or

5.7.3. provide the City with the excess funds.

5.8. The City acknowledges that the provision of the Infrastructure Funds, in sufficient amounts to reimburse or otherwise pay the Developer for costs and expenses incurred in providing the Public Infrastructure, is a material, integral term of this Agreement and development of the Project. If the Infrastructure Funds are not provided in sufficient amounts, Developer may (1) elect to proceed with the Project under the terms herein, or (2) elect to terminate this Agreement by delivering written notice thereof to the City. Upon delivery of such notice, this Agreement shall automatically terminate whereupon the Parties shall have no further rights or obligations hereunder.

5.9. In the event that any dispute arises with regard to the terms of this Section 5, including but not limited to a dispute over invoices, inspections, or whether a particular improvement is a Public Improvement, the parties will within ten (10) days of the dispute arising, exchange their basis for the dispute, and arguments regarding resolution of the dispute, to one another in writing. Within ten (10) days of such exchange, the Parties shall then meet and confer in good faith in an effort to resolve such dispute. The Parties may, but are not obligated to, employ the services of a mediator.

6. Infrastructure Fund Disbursements.

6.1. Developer's obligation to provide public infrastructure or any improvements hereunder is expressly conditional upon City's approval of the Project and issuance of permits required for construction of the applicable improvements.

6.2. Developer, using Infrastructure Funds, shall make public improvements to roads within the Project Area, as shown on Exhibit M in accordance with this Agreement. Developer will complete improvements associated with identified public streets. The road right-of-way is currently owned by the City.

6.3. The Infrastructure Funds described in Section 5 shall be held in the Infrastructure

Escrow. The Parties agree the Infrastructure Escrow shall serve as the Improvement Completion Assurance in accordance with Utah Code 10-20-807, for completion of required public improvements funded therefrom (the "**Public Improvements**") and shall be funded in an amount equal to **one hundred ten percent (110%)** of the City Engineer-approved Engineer's Opinion of Probable Construction Cost ("**OPCC**") for the Public Improvements required to be guaranteed under this Agreement.

6.3.1. Notwithstanding the extent that Utah State law, Eagle Mountain City Code Section 16.30.060(C), or other City policy dictates the procedure and timing of the release of improvement completion assurance or other bond funds, including but not limited to requiring City Council action to approve escrow or bond releases during construction, the Parties agree that release of the Infrastructure Funds will occur in accordance with the procedure and timing set forth in this Section.

6.3.2. **All progress releases and payments from the Infrastructure Escrow shall be authorized administratively by the Mayor, City Manager, and City Attorney.** Developer (or its contractor) may submit requests for releases and payment from the Infrastructure Escrow directly to the City no more frequently than **once every thirty (30) days**, unless otherwise approved by the Mayor, City Manager, and City Attorney. Upon submission of a request for release and payment, the City will promptly inspect and verify the work completed. The City will immediately release the funds when work is determined to pass inspection.

6.3.3. The Mayor, City Manager, and City Attorney will also immediately authorize the release of funds for materials delivered for the Public Improvements upon confirmation of delivery. The Mayor, City Manager, and City Attorney may authorize partial payment for materials delivered to the Project site but not installed, subject to inspection, verification, lien protection, and secure storage. Unless otherwise approved in writing by the Mayor, City Manager, and City Attorney, payment for delivered-but-not-installed materials shall not exceed **seventy-five percent (75%)** of invoiced cost, with the balance payable upon installation.

6.3.4. At the completion of the Project, City may retain not more than ten percent (10%) of the Infrastructure Funds owed to Developer for no more than one year as an improvement warranty, which shall be managed in accordance with Utah Code 10-20-807.

6.3.5. Final acceptance of the Public Improvements shall occur following completion of the Project, City Engineer inspection confirming compliance, and submission of required closeout documentation (including as-builts and final lien releases). After final acceptance, the escrow agent shall release remaining escrow funds, subject to any improvement warranty holdback required by the City.

6.4. Developer and City acknowledge that timely payment of contractors and suppliers is necessary for efficient construction of the Public Improvements. Accordingly, the Parties intend that payment releases from the Infrastructure Escrow be processed through the administrative process authorized in this Section 6 without requiring City Council approval.

6.5. Third Party Inspections.

6.5.1. Developer shall have the option, at Developer's discretion, to retain a qualified third-party to perform inspections of Public Improvements, including final inspections.

6.5.2. City may provide reasonable input regarding the acceptability and qualifications of any third-party inspector retained by Developer; provided, however, City shall not be entitled to disqualify an inspector chosen by Developer without good cause.

7. Default.

7.1. If Developer, a Subdeveloper, or City fails to perform their respective obligations hereunder or to comply with the terms hereof, the Party believing that a Default has occurred shall provide notice to the other Party. If City believes that the Default has been committed by a Subdeveloper, then that City shall also provide a courtesy copy of the notice to Developer.

7.2. The notice of Default shall:

7.2.1. Specify the claimed event of Default;

7.2.2. Identify with particularity the provisions of any applicable law, rule, regulation or provision of this Agreement that is claimed to be in Default;

7.2.3. Identify why the Default is claimed to be material;

7.2.4. Propose a method and time for curing the Default which shall be of no less than sixty (60) days duration.

7.3. If the Parties are not able to resolve the Default, then the Parties have all rights and remedies available at law and in equity, including, but not limited to, injunctive relief and/or specific performance.

7.4. The Party prevailing in any action arising from an uncured default shall be awarded its reasonable legal expenses, including its reasonable attorney fees.

7.5. The Party allegedly in Default shall be afforded the right to attend a public meeting before the City Council and address the City Council regarding the claimed Default.

7.6. If any Default cannot be reasonably cured within sixty (60) days, then such cure period may be extended at the discretion of the Party asserting Default so long as the defaulting Party is pursuing a cure with reasonable diligence.

7.7. A default of any obligations assumed by an assignee or Subdeveloper shall not be deemed a default of Developer.

7.8. All notices required or permitted under this Agreement shall, in addition to any other means of transmission, be given in writing either by certified mail, hand delivery, overnight courier service, or email to the following addresses:

To Developer:
Terra Smith's Eagle Mountain I, LLC
c/o Terra Strada
P.O. Box 377
Kaysville, UT 84037
Attn: J. Stuart Adams

With a copy to:

Smith's Food & Drug Centers, Inc.
c/o The Kroger Co.
1014 Vine Street
Cincinnati, OH 45202
Attn: Law Department, Jennifer K. Gothard, Senior Attorney (Smith's 208)

With a copy to:
Dentons Durham Jones Pinegar
c/o Brent N. Bateman
1557 Innovation Way, Ste 400
Lehi, UT 84043
brent.bateman@dentons.com

To City:
Eagle Mountain City
Attn: City Recorder
1650 Stagecoach Run
Eagle Mountain, UT 84005
recorder@eaglemountain.gov

7.9. Notwithstanding the termination of this Agreement for any reason, any applications, development entitlements, approvals, or improvements, on any portion of the Property in accordance with this Agreement and the Project Plan ("**Development Activities**") shall remain fully vested under this Agreement, and the fee owner of the Parcels on which such Development Activities pertain shall be entitled to continue the Development Activities on its Parcel in accordance herewith.

8. Assignability.

8.1. The rights and responsibilities of Developer hereunder may be assigned in whole or in part, by Developer. Developer shall give the City notice of any assignment within ten (10) days after the event has occurred. Such Notice shall include providing the City with all necessary

contact information for the newly responsible party. Developer's assignment of all or any part of the Developer's rights and responsibilities hereunder to any entity not "related" to Developer (as defined by regulations of the Internal Revenue Service in Section 165), shall be subject to the City's approval, which shall not be unreasonably withheld, conditioned or delayed.

8.2. If any proposed assignment is for less than all of Developer's rights and responsibilities, then the assignee shall be responsible for the performance of each of the obligations contained in this Agreement to which the assignee succeeds. Upon any such partial assignment, Developer shall be released from any future obligations as to those obligations that are assigned.

8.3. Any assignee of all or any part of Developer's rights and responsibilities under this Agreement shall consent in writing to be bound by the assigned terms and conditions of this Agreement as a condition precedent to the effectiveness of the assignment.

9. General Provisions.

9.1. The initial term of this Agreement shall be twenty (20) years beginning on the Effective Date.

9.2. This Agreement has been reviewed and revised by legal counsel for the Developer and City, and no presumption or rule that ambiguities shall be against the drafting Party shall apply to the interpretation or enforcement of this Agreement.

9.3. Each Party hereto agrees to cooperate in good faith with the other, and to execute and deliver such further documents and to take all further acts reasonably necessary in order to carry out the intent and purposes of this Agreement and the actions contemplated hereby. All provisions and requirements of this Agreement shall be carried out by each Party as allowed by law.

9.4. Both Parties understand that any legislative action by the City Council is subject to referral or challenge by individuals or groups of citizens, including approval of development Agreements and a rezone of the Property. If a referendum or challenge relates to the approval of this Agreement or the adoption of the New Zone, and the referendum or challenge is submitted to a vote of the people pursuant to Utah Code § 20A-7-601, then Developer may deliver a Notice of rescission to the City to terminate that portion of this Agreement applicable to the City. Upon Developer's delivery of a Notice of rescission pursuant to this Section, this Agreement shall automatically terminate with respect to that City only, whereupon the Parties shall have no further rights or obligations hereunder.

9.5. The Parties intend that the administration, but not the approval, of this Agreement and any amendments, shall be processed through administrative land use applications to be decided by the land use authority, as those terms are defined in Utah law.

9.6. The rights of City under this Agreement shall not be assigned, but City is authorized to enter into any contract with a third party to perform obligations of City to operate

and maintain any infrastructure improvement so long as such Party adequately and reasonably maintains and operates such facility or improvement.

9.7. This Agreement shall be recorded in its entirety, at Developer's expense, in the Official Records of Utah County, Utah. This Agreement shall run with the land.

9.8. This Agreement shall be governed by and construed in accordance with the laws of the State of Utah.

9.9. This Agreement is made and entered into for the sole protection and benefit of the Parties and their assigns. No other person shall have any right of action based upon any provision of this Agreement whether as third-party beneficiary or otherwise.

9.10. This Agreement may be executed in multiple counterparts, each of which is deemed to be an original.

9.11. If City elects to consider terminating this Agreement due to any uncured Default by Developer, then City shall give to the Developer written notice of City's intent to terminate this Agreement and the matter shall be scheduled for consideration and review by City's legislative body at a duly noticed public meeting. Developer shall have the right to offer written and oral evidence prior to or at the time of said public meeting. If City's legislative body determines that a Default has occurred and is continuing, and elects to terminate this Agreement, City shall send written notice of termination of this Agreement to Developer by certified mail and this Agreement shall thereby be terminated. City may thereafter pursue any and all remedies at law or equity.

9.12. Developer's sole and exclusive remedy under this Agreement shall be specific performance of the rights granted in this Agreement and Eagle Mountain's obligations under this Agreement. IN NO EVENT SHALL EAGLE MOUNTAIN CITY BE LIABLE TO DEVELOPER, ITS SUCCESSORS OR ASSIGNS, FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS, COSTS OF DELAY, OR LIABILITIES TO THIRD PARTIES.

9.13. No delay in exercising any right or remedy shall constitute a waiver thereof, and no waiver by City or Developer for the breach of any covenant of this Agreement shall be construed as a waiver of any preceding or succeeding breach of the same or any other covenant or condition of this Agreement.

9.14. If City's approval of the Project is held invalid by a court of competent jurisdiction this Agreement shall be null and void. If any provision of this Agreement shall be held to be unconstitutional, invalid or unenforceable by a court of competent jurisdiction or as a result of any legislative action, such holding or action shall be strictly construed.

9.15. Developer shall not be liable for any delay or failure in the keeping or performance of its obligations under this Agreement during the time and to the extent that any such failure is due to causes beyond the control and without the fault or negligence of the Party affected, including but not limited to, acts of God, acts of the United States Government or the

State of Utah, fires, floods, strikes, unanticipated materials shortages exceeding six months, embargoes, wars, terrorist acts or unusually adverse weather conditions. Upon the occurrence of any such cause, Developer shall notify City and shall promptly resume the keeping and performance of the affected obligations after such cause has come to an end.

9.16. Developer shall be the sole owner of all names, titles, plans, drawings, specifications, ideas, programs, designs and work products of every nature developed, formulated or prepared by or at the request of Developer in connection with the Project.

9.17. This Agreement shall not be modified or amended except in written form mutually agreed to and signed by each of the Parties.

9.18. In the event either Party hereto fails to perform any of its obligations under this Agreement or in the event a dispute arises concerning the meaning or interpretation of any provision of this Agreement, the party not prevailing in such dispute shall pay any and all reasonable and actual costs and expenses incurred by the other party in enforcing or establishing its rights hereunder, including, without limitation, court costs and attorneys' fees.

[Signature Page Follows]

THE PARTIES have executed this Agreement below, to be effective as of the Effective Date.

DEVELOPER:

TERRA SMITH'S EAGLE MOUNTAIN, LLC,
a Delaware limited liability company

By: _____

Name: _____

Title: _____

STATE OF UTAH)
:§.
COUNTY OF UTAH)

The foregoing instrument was acknowledged before me this _____day of _____, 2026, _____, the _____of Eagle Mountain City.

_____

NOTARY PUBLIC

My Commission Expires: (Seal) Residing at:

_____ _____

CITY:

EAGLE MOUNTAIN CITY,
a political subdivision of the State of Utah

By: _____

Name: _____

Title: _____

Approved as to form and legality:

City Attorney

Attest:

City Recorder

By: ___ By: ___

Exhibit A
Property Description

Exhibit B
Project Plan

Exhibit C
Streetscape Landscaping and Style

Exhibit D
Site Furnishings

Exhibit E
Landscape Treatments

Exhibit F
Anchor Tenant Architectural Elevations

Exhibit G
Fuel Center Architectural Elevations

Exhibit H
Sign Plans (Pylon and Monument) including the Sign Location Plan

Exhibit I
Site Lighting

Exhibit J
Outdoor Sales Display and Storage Plan

Exhibit K
Portion of the Old Airport Road right-of-way to be Purchased

Exhibit L
Outbuilding/Pad Architectural Elevations

Exhibit M
Public Road Improvements

Upcoming Staff Agenda Items for City Council Information (Tentative)

Development Projects

- PH Sunset Mountain Property Rezone
- PH Pinnacles Master Development Plan
- Gateway Park Plat 3 – Preliminary Plat
- Spring Run Plaza Lot 1
- Spring Run Plaza Lot 2

Code Amendments

- PH Amending EMMC 17.60.120.C – Barbed Wire Fencing
- PH Amending EMMC 17.25.040A – Residential Standards Table

Other Items

- PH Future Land Use Map – General Plan Amendment
- PH Pole Canyon Lot Split
- WS DISC - E-bikes/motorcycles on Trails
- WS DISC - Eagle Mountain Properties Phase 2, Part 1 - Rezone of 31 Properties (2/3)
- WS DISC - Lake Mountain School District – Report on Growth Projections for Nov/Dec

Redevelopment Agency

Please note all items are tentative and are subject to change.

Updated 08/13/2026 - LM