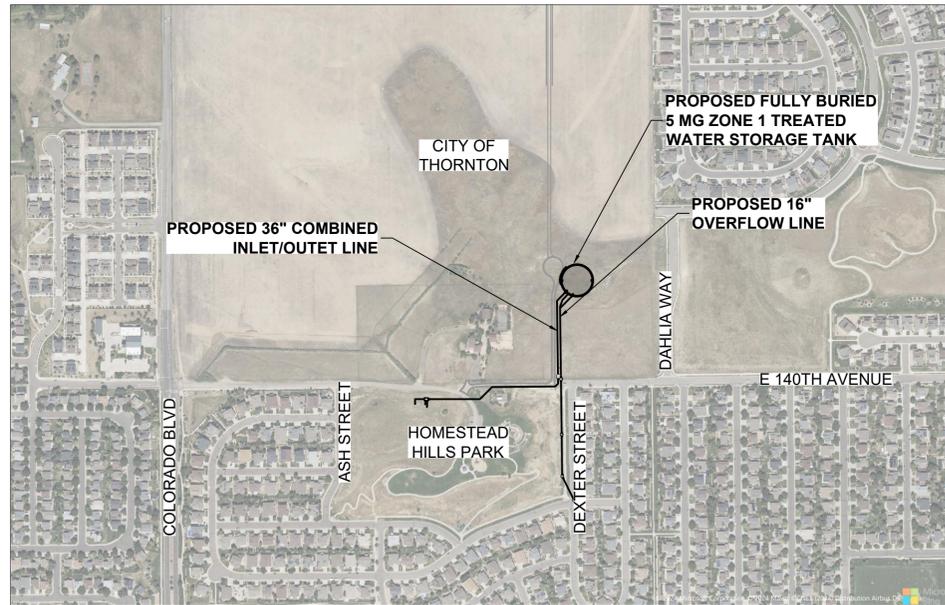




THORNTON
COLORADO

5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

PROJECT NO. 23-150



PROJECT VICINITY MAP
NOT TO SCALE

ISSUED FOR BID

OCTOBER 2024
City of Thornton Project No. 23-150
Burns & McDonnell Project No. 162116

KRISTIN SCHWARTZ, P.E. - SENIOR CIVIL ENGINEER, CITY OF THORNTON DATE

JASON PIERCE, P.E. - INFRASTRUCTURE ENGINEERING MANAGER, CITY OF THORNTON DATE

JOSH REDMAN - UTILITIES OPERATIONS MANAGER, CITY OF THORNTON DATE

KYLE LEBRASSE, P.E. - CIVIL ENGINEER, BURNS & MCDONNELL DATE

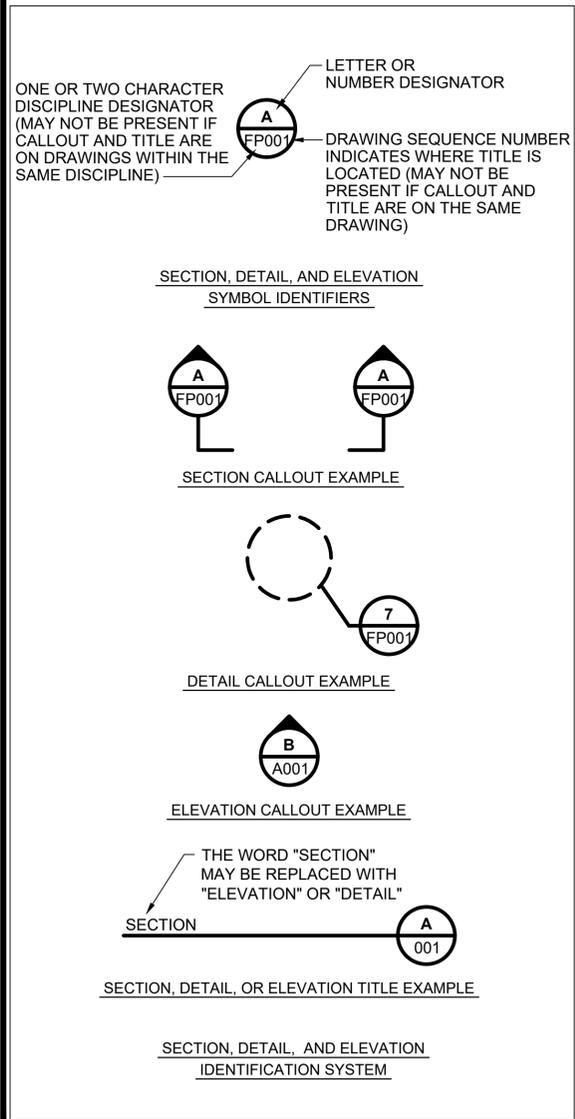
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0	10/02/24	VP	KL	ISSUED FOR BID



Cover



5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE PROJECT NO. 23-150



NUMBER	NAME
GENERAL	
0G-000	COVER SHEET
0G-001	INDEX
0G-002	ABBREVIATIONS AND SYMBOLS
0G-003	TESTHOLE DATA
0G-004	GENERAL NOTES
CIVIL	
0C-101	OVERALL SITE PLAN
0CX-101	TANK AREA EXISTING CONDITIONS PLAN
0CS-101	TANK AREA SITE PLAN
0CS-102	SITE CONTROL POINT PLAN
0CG-101	TANK EXCAVATION PLAN
0CG-102	TANK AREA GRADING PLAN
0CG-301	TANK EXCAVATION SECTIONS
0C-501	CIVIL DETAILS I
PROCESS	
0DP-101	36" STEEL COMBINED INLET/OUTLET LINE PLAN AND PROFILE STA. 0+00 TO STA. 7+00
0DP-102	36" STEEL COMBINED INLET/OUTLET LINE PLAN AND PROFILE STA. 7+00 TO STA. 12+25.40
0DP-103	ALTERNATE 36" STEEL COMBINED INLET/OUTLET LINE PLAN AND PROFILE STA. 6+00 TO STA. 12+25.40
0DP-104	24" ZONE 3A CONNECTION WATERLINE PLAN AND PROFILE STA. 0+00 TO STA. 0+40.40
0DP-105	24" ALTITUDE VALVE BYPASS WATERLINE PLAN AND PROFILE STA. 0+00 TO STA. 0+77.50
0DP-106	16" OVERFLOW WATERLINE PLAN AND PROFILE STA. 0+00 TO STA. 6+00
0DP-107	16" OVERFLOW WATERLINE PLAN AND PROFILE STA. 6+00 TO STA. 10+77.70
00D-001	STORAGE TANK AND 36" PIPELINE PROCESS GENERAL NOTES, LEGEND, AND ABBREVIATIONS
1D-100	TANK PIPING PLAN & SECTIONS
01D-300	PROCESS SECTIONS
0D-500	STEEL PIPE DETAILS
0D-501	PIPE EXCAVATION AND BACKFILL DETAILS
0D-502	CONNECTIONS TO EXISTING INFRASTRUCTURE TEES
0D-503	18" ACCESS MANWAY
0D-504	OVERFLOW MANHOLE
0D-505	MANHOLE CONNECTION DETAILS
0D-506	VALVE VAULT 1
0D-507	VALVE VAULT 2
0D-508	PROCESS DETAILS I
0D-509	PROCESS DETAILS II
0D-510	PROCESS DETAILS III
0D-511	CATHODIC PROTECTION DETAILS I
0D-512	CATHODIC PROTECTION DETAILS II
0D-513	CATHODIC PROTECTION DETAILS III

NUMBER	NAME
PROCESS CONT.	
0D-514	ADD ALTERNATE - TUNNELING DETAILS I
0D-515	ADD ALTERNATE - TUNNELING DETAILS II
STRUCTURAL	
0S-001	ABBREVIATIONS & LEGEND
0S-002	STATEMENT OF SPECIAL INSPECTIONS
0S-003	GENERAL STRUCTURAL NOTES
0S-500	STANDARD DETAILS I
0S-501	STANDARD DETAILS II
3S-100	TANK FOUNDATION PLAN
3S-101	TANK ROOF PLAN
3S-301	TANK SECTION
3S-500	TANK DETAILS I
3S-501	TANK DETAILS II
3S-502	VALVE VAULT 1 PLANS AND SECTION
3S-503	VALVE VAULT 2 PLANS AND SECTION
ELECTRICAL	
00E-001	STORAGE TANK AND 36" PIPELINE ELECTRICAL GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS
00E-300	STORAGE TANK AND 36" PIPELINE ELECTRICAL DETAILS I
00E-301	STORAGE TANK AND 36" PIPELINE ELECTRICAL DETAILS II
ES-100	OVERALL SITE PLAN
01E-101	STORAGE TANK AND 36" PIPELINE ELECTRICAL PLAN
01E-102	CONNECTION VALVE VAULT
01E-500	STORAGE TANK AND 36" PIPELINE ELECTRICAL ONE-LINE
01E-600	STORAGE TANK AND 36" PIPELINE ELECTRICAL SCHEDULES I
01E-601	STORAGE TANK AND 36" PIPELINE NETWORK ARCHITECTURE DIAGRAM
01E-602	STORAGE TANK AND 36" PIPELINE DUCT BANK AND CABLE SCHEDULE
01E-603	STORAGE TANK AND 36" PIPELINE CONNECTION DIAGRAM
00I-001	PROCESS AND INSTRUMENTATION LEGENDS AND ABBREVIATIONS I
00I-002	PROCESS AND INSTRUMENTATION LEGENDS AND ABBREVIATIONS II
00I-100	PROCESS INSTRUMENTATION DIAGRAM
00I-101	IO LIST
00I-102	INSTRUMENT LIST
EROSION AND SEDIMENT CONTROL	
0CE-002	EROSION AND SEDIMENT CONTROL NOTES ABBREVIATIONS AND LEGEND
0CE-101	INITIAL EROSION AND SEDIMENT CONTROL PLAN - NORTH
0CE-102	INITIAL EROSION AND SEDIMENT CONTROL PLAN - SOUTH
0CE-103	FINAL EROSION AND SEDIMENT CONTROL PLAN - NORTH
0CE-104	FINAL EROSION AND SEDIMENT CONTROL PLAN - SOUTH
0C-502	EROSION AND SEDIMENT CONTROL DETAILS I
0C-503	EROSION AND SEDIMENT CONTROL DETAILS II

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



Index

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ABBREVIATIONS

@	AT	ICV	IRRIGATION CONTROL VALVE
Ø	DIAMETER	ID	INNER DIAMETER
'	FOOT OR FEET	IN	INCH
"	INCH OR INCHES	INV	INVERT
#	NUMBER	LF	LINEAR FEET
%	PERCENT	MAX	MAXIMUM
APPROX	APPROXIMATE	MG	MILLION GALLON
ASPH	ASPHALT	MH	MANHOLE
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS	MIN	MINIMUM
ATG	ADJUST TO GRADE	MJ	MECHANICAL JOINT
AWWA	AMERICAN WATER WORKS ASSOCIATION	N	NORTH OR NORTHING
BC	BACK OF CURB	N/A	NOT APPLICABLE
BFV	BUTTERFLY VALVE	NPT	NATIONAL PIPE THREAD
BLDG	BUILDING	OC	ON CENTER
BO	BY OTHERS	OD	OUTER DIAMETER
BOP	BOTTOM OF PIPE	PE	PLAIN END
BSC	BOLTED SLEEVE COUPLING	PI	POINT OF INTERSECTION
C&G	CURB AND GUTTER	PCC	PORTLAND CEMENT CONCRETE
CATV	CABLE TELEVISION	PP	POWER POLE
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION	PRC	POINT OF REVERSE CURVATURE
CL	CENTERLINE	PROP	PROPOSED
CLSM	CONTROLLED LOW STRENGTH MATERIAL	PT	POINT OF TANGENCY
CIS	CENTER IN SLAB	PVMT	PAVEMENT
CML	CEMENT MORTAR LINING	R	RADIUS
CMP	CORRUGATED METAL PIPE	R&R	REMOVE AND REPLACE
CNTR	CENTER	R/W OR ROW	RIGHT-OF-WAY
CO	CLEAN-OUT	RCP	REINFORCED CONCRETE PIPE
CONC	CONCRETE	S	SOUTH
CONSTR	CONSTRUCTION	SAN	SANITARY
CP	CONTROL POINT	SCH	SCHEDULE
DESC	DESCRIPTION	SDWK	SIDEWALK
DIA OR DI	DIAMETER	SPEC	SPECIFICATION
DIP	DUCTILE IRON PIPE	SST OR ST	STORM
DND	DO NOT DISTURB	SS	SANITARY SEWER
DWG	DRAWING	STA	STATION
E	EAST OR EASTING	STD	STANDARD
EBOX	ELECTRIC BOX	STRUC	STRUCTURAL
EFF	EFFLUENT	TBA	TO BE ABANDONED
ELEC	ELECTRIC	TBD	TO BE DETERMINED
EL OR ELEV	ELEVATION	TBR	TO BE REMOVED
EOA	EDGE OF ASPHALT	TBR&R	TO BE REMOVED AND REPLACED
ESMT	EASEMENT	TBRBO	TO BE REMOVED BY OTHERS
ETC	ETCETERA	TBR&RBO	TO BE REMOVED AND REPLACED BY OTHERS
EXIST	EXISTING	TC	TOP OF CURB
EXP	EXPANSION	TH	THICKNESS
FC	FACE OF CURB	TOW	TOP OF WALL
FE	FLANGED END	TOC	TOP OF CONCRETE
FF	FINISHED FLOOR	TP	TOP OF PAVEMENT
FG	FINISHED GRADE	TS	TEST STATION
FH	FIRE HYDRANT	TPED	TELEPHONE PEDESTAL
FL	FLOWLINE	TRANSF	TRANSFORMER
FLG	FLANGED	TYP	TYPICAL
FT	FOOT OR FEET	UIP	USE IN PLACE
GA	GAUGE	W	WEST
GAL	GALLON	W/	WITH
GM	GAS METER	WL	WATERLINE
GS	GALVANIZED STEEL	WM	WATER METER
HMA	HOT MIX ASPHALT	WMH	WATER MANHOLE
		WTR	WATER
		WV	WATER VALVE
		WWF	WELDED WIRE FABRIC

HATCH LEGEND

SUBGRADE LEGEND

ROCK RIPRAP		STRUCTURAL FILL MATERIAL	
ROCK BACKFILL		STRUCTURE BACKFILL	
AGGREGATE BASE		SHALE	
GRAVEL		SANDSTONE	

Utility Contact Information

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City of Thornton Fire Department		303-538-7602		firedept@thorntonco.gov	
Burns & McDonnell	Kyle LeBrasse, PE	720-592-3417		kglebrasse@burnsmcd.com	
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Xcel Energy	TBD	TBD	811	TBD	TBD
Adams 12 Five Star Schools	Kenneth Dixon			kdixon@henkelswest.com	
CenturyLink					

LEGEND:

-----	INDEX CONTOUR (5' INTERVAL)
-----	INTERMEDIATE CONTOUR (1' INTERVAL)
-----	SECTION LINE
-----	PROPERTY LINE
-----	RIGHT OF WAY
-----	EXISTING EASEMENT
-----	FLOWLINE OF DITCH
-----	CENTER OF DITCH
-----	EXISTING ROAD CENTERLINE
-----	EXISTING STORM LINE
-----	EXISTING SEWER LINE
-----	EXISTING GAS LINE
-----	EXISTING TELEPHONE
-----	EXISTING OVERHEAD ELECTRIC
-----	EXISTING UNDERGROUND ELECTRICAL
-----	EXISTING FIBER OPTIC
-----	EXISTING BARBED WIRE FENCE
-----	EXISTING FENCE LINE (OTHER)
-----	EXISTING IRRIGATION LINES
-----	EXISTING WATERLINE
-----	PROPOSED WATERLINE
-----	PROPOSED PERMANENT EASEMENT
-----	PROPOSED TEMPORARY EASEMENT
-----	FLOODPLAIN EXTENTS
-----	WETLANDS
-----	PROPOSED PERMANENT FENCE
-----	PROPOSED LIMITS OF CONSTRUCTION
-----	TEMPORARY LIVESTOCK FENCE
-----	EXISTING WATER LINE (MAPPED)
-----	EXISTING GAS LINE (MAPPED)
-----	EXISTING STORM LINE (MAPPED)
-----	EXISTING FIBER OPTIC (MAPPED)
-----	EXISTING SANITARY SEWER LINE (MAPPED)
-----	EXISTING IRRIGATION LINE (MAPPED)

	SECTION		EXISTING TREE
	PROJECT CONTROL POINT		CONTROL POINT
	PIN		IRRIGATION VALVE
	EXISTING POWER POLE		GEOTECHNICAL HOLE LOCATION
	EXISTING GUY WIRE		TEST HOLE
	EXISTING LIGHT POLE		BOLLARDS
	EXISTING ELECTRICAL BOX		GATE VALVE
	EXISTING WATER MANHOLE		CUT OF WALL
	EXISTING WATER METER		REDUCER
	EXISTING WELL		METER BOX
	EXISTING WATER VALVE		BLOWOFF ASSEMBLY
	EXISTING FIRE HYDRANT		PROPOSED FIRE HYDRANT
	EXISTING SANITARY SEWER MANHOLE		LIMITS OF CONCRETE REMOVAL AND REPLACEMENT
	EXISTING STORM SEWER MANHOLE		CLSM EMBEDMENT
	EXISTING UNIDENTIFIED MANHOLE		
	EXISTING TELEPHONE PEDESTAL		
	EXISTING GAS METER		
	EXISTING GAS VALVE		
	SIGN AS DESIGNATED		
	TEST HOLE ANODES		

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Burns & McDonnell Engineering Co., Inc.	
date	designed
OCTOBER 2024	V. PONCE
designed	checked
A. CASHON	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
ABBREVIATIONS AND SYMBOLS

project	162116	contract	23-150
drawing	0G-002	rev.	0
sheet	3	of	74
file	162116_0G-002.dwg		

TESTHOLE POINT TABLE				
Test Hole	Depth to Top (in)	Northing	Easting	Description
TH-001	50"	1225193.98	3158930.03	6-INCH ELEC CONDUIT
TH-002	72"	1225183.21	3158926.48	16-INCH DI WATERLINE
TH-003	36"	1225146.01	3158912.00	4-INCH POLY GAS LINE
TH-004	84"	1225181.46	3158835.91	12-INCH DI WATERLINE
TH-005	60"	1225178.75	3158836.88	3/4-INCH ELEC CONDUIT
TH-006	57"	1225164.08	3158682.86	1-INCH ELEC CONDUIT
TH-007	41"	1225165.55	3158668.38	1-INCH ELEC CONDUIT
TH-008	128"	1225071.31	3158223.62	30-INCH STEEL WATERLINE
TH-009	54"	1225143.53	3158924.13	3/4-INCH ELEC CONDUIT
TH-010	29"	1224603.53	3158958.09	(2) 1-INCH ELEC LINE
TH-011	36"	1224603.49	3158953.32	(3) 1-INCH ELEC LINE
TH-012	36"	1225162.50	3158582.72	4-INCH FIBER OPTIC GREY CONDUIT
TH-013	128"	1225066.97	3158171.22	30-INCH STEEL WATERLINE
TH-014	78"	1225155.58	3158481.10	3-INCH STEEL WATERLINE
TH-015	168"	1225058.86	3158232.97	36-INCH STEEL WATERLINE

NOTES:

- TEST HOLE (SUE LEVEL A) INFORMATION BY KANTEX INDUSTRIES IS PROVIDED IN THESE TABLES AS REFERENCE ONLY. DATA FOR EACH TEST HOLE IS PROVIDED TO THE BEST OF THE ENGINEERS KNOWLEDGE AND HAS BEEN UPDATED IN THE PLANS IF ADDITIONAL INFORMATION WAS AVAILABLE. CONTRACTOR SHALL BE RESPONSIBLE FOR PHYSICAL VERIFICATION OF ALL UTILITIES PRIOR TO CONSTRUCTION SHOP DRAWING SUBMITTALS AND INSTALLATION.



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Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



THORNTON
COLORADO

ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
TESTHOLE DATA

project	162116	contract	23-150
drawing	0G-003	rev.	0
sheet	4	of	74 sheets

file 162116_0G-003.dwg

GENERAL NOTES:

- THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE; INCLUDING, SAFETY OF PERSONS AND PROPERTY DURING THE PERFORMANCE OF WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CITY CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.
- UNLESS NOTED IN THE CONTRACT DRAWINGS AND SPECS, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE CITY OF THORNTON'S STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC AND PRIVATE IMPROVEMENTS (LATEST EDITION) AND WORK SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY AUTHORIZED CITY OF THORNTON PERSONNEL.
- THE TYPE, SIZE, LOCATION, AND NUMBER OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO DATE OF CONSTRUCTION. FOR INFORMATION CONTACT: UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) - 1-800-922-1987. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY SIZE AND HORIZONTAL AND VERTICAL LOCATIONS OF EXISTING FACILITIES PRIOR TO CONSTRUCTION AND NOTIFY THE CITY / CONSTRUCTION COORDINATOR OF ANY DISCREPANCIES.
- MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE PROJECT STANDARDS AND SPECIFICATIONS AS WELL AS THE CITY OF THORNTON'S STANDARDS AND SPECIFICATIONS, INCLUDING PARKS, RECREATION, & COMMUNITY PROGRAMS DESIGN STANDARDS NOTED IN SPECIFICATIONS. WORK SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY AUTHORIZED CITY OF THORNTON REPRESENTATIVE.
- ALL TRENCHES SHALL BE ADEQUATELY SUPPORTED AND THE SAFETY OF WORKERS PROVIDED FOR AS REQUIRED BY THE MOST RECENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION." THESE REGULATIONS ARE DESCRIBED IN SUBPART P, PART 1926 OF THE CODE OF FEDERAL REGULATIONS. SHEETING AND SHORING SHALL BE UTILIZED WHERE NECESSARY TO PREVENT ANY EXCESSIVE WIDENING OR SLOUGHING OF THE TRENCH WHICH MAY BE DETRIMENTAL TO HUMAN SAFETY, TO THE PIPE BEING PLACED, TO TREES, OR TO ANY EXISTING STRUCTURE WHERE EXCAVATIONS ARE MADE UNDER SEVERE WATER CONDITIONS. THE CONTRACTOR MAY BE REQUIRED TO USE AN ENGINEER APPROVED PILING INSTEAD OF SHEETING AND SHORING.
- THE CONTRACTOR SHALL FURNISH THE ENGINEER THE "AS CONSTRUCTED" LOCATIONS OF FACILITIES INSTALLED, BY A COLORADO LICENSED PLS. SEE SPECIFICATIONS SECTION 01 12 00 FOR ADDITIONAL SURVEYING AND AS-BUILT REQUIREMENTS.
- IN ADDITION TO INSTALLATION OF TRACKING PAD BMP, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING AFFECTED PUBLIC STREETS OF MUD OR DEBRIS DUE TO CONSTRUCTION ACTIVITY INITIATED BY SAID CONTRACTOR ON A DAILY BASIS OR AS OTHERWISE DIRECTED BY AUTHORIZED CITY REPRESENTATIVE.
- AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE BEGINNING OF WORK, A PRECONSTRUCTION CONFERENCE SHALL BE HELD BETWEEN THE CITY AND THE CONTRACTOR WHO IS SCHEDULED TO PERFORM THE WORK, CONSTRUCTION COORDINATOR, THE CONSULTING ENGINEER, CONSTRUCTION COORDINATOR AND ANY OTHER ENTITIES INVOLVED IN THE CONSTRUCTION.
- THE MATERIALS USED IN PROJECTS SHALL BE NEW AND SUBJECT TO THE INSPECTION AND APPROVAL OF THE INSPECTOR AT ALL TIMES. THE INSPECTOR HAS THE RIGHT TO PERFORM ANY TESTING DEEMED NECESSARY TO ENSURE COMPLIANCE OF THE MATERIAL WITH THESE STANDARDS. NO MATERIAL SHALL BE USED BEFORE BEING INSPECTED AND APPROVED BY THE INSPECTOR. FAILURE OR NEGLECT ON THE PART OF THE INSPECTOR TO CONDEMN OR REJECT INFERIOR MATERIALS OR WORK SHALL NOT BE CONSTRUED TO IMPLY THEIR ACCEPTANCE SHOULD THEIR INFERIORITY BECOME EVIDENT AT ANY TIME PRIOR TO FINAL ACCEPTANCE OF THE WORK. INSPECTORS HAVE THE AUTHORITY TO REJECT DEFECTIVE OR INFERIOR MATERIALS AND/OR DEFECTIVE WORKMANSHIP AND TO SUSPEND WORK UNTIL SUCH TIME AS THE RESPONSIBLE PARTY SHALL CORRECT THE DISCREPANCIES IN QUESTION.
- WHENEVER DEFECTIVE MATERIALS AND WORK ARE REJECTED, THE CONTRACTOR SHALL PROMPTLY REMOVE SUCH DEFECTIVE MATERIALS AND CONSTRUCTION FROM THE JOB SITE AND REPLACE ALL DEFECTIVE PORTIONS TO THE SATISFACTION OF ENGINEER. IN THE EVENT THE RESPONSIBLE PARTY FAILS TO REMOVE REJECTED ITEMS FROM THE JOB SITE WITHIN ONE (1) WEEK, ENGINEER MAY ARRANGE FOR SUCH REMOVAL AT THE EXPENSE OF THE RESPONSIBLE PARTY.
- INSPECTION AND/OR OBSERVATION SHALL NOT RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK STRICTLY IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR ANY MODIFICATIONS THEREOF. WORK NOT SO CONSTRUCTED SHALL BE REMOVED AND CORRECTED BY THE RESPONSIBLE PARTY AT THEIR SOLE EXPENSE, WHENEVER SO ORDERED BY ENGINEER, WITHOUT REFERENCE TO ANY PREVIOUS ERROR OR OVERSIGHT IN INSPECTION.
- EXCEPT IN CASES OF EMERGENCY, MAINTENANCE, OR PROTECTION OF WORK ALREADY COMPLETED, NO WORK SHALL BE ALLOWED BETWEEN THE HOURS OF 8:00 AM AND 5:00 PM ON SATURDAY, SUNDAY, OR LEGAL HOLIDAYS UNLESS APPROVED BY THE CITY OF THORNTON, CONSTRUCTION COORDINATOR AND ADAMS COUNTY IN EACH CASE. WHEN ANY INSPECTOR IS REQUIRED TO WORK OUTSIDE THE HOURS OF 8:00 AM TO 5:00 PM ON REGULAR CITY OF THORNTON BUSINESS DAYS, OVERTIME SHALL BE CHARGED TO THE RESPONSIBLE PARTY. HOWEVER, SUCH INSPECTORS SHALL REMAIN EMPLOYEES OF THE CITY OF THORNTON FOR ALL PURPOSES. REQUESTS FOR OVERTIME SHALL BE MADE TO ENGINEER AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. PAYMENT FOR SUCH OVERTIME WORK SHALL BE MADE TO THE CITY OF THORNTON PRIOR TO FINAL ACCEPTANCE.
- THE WORK SHALL BE SURVEYED AND STAKED UNDER THE SUPERVISION OF A COLORADO LICENSED LAND SURVEYOR (PLS) IN ACCORDANCE WITH THE APPROVED CONTRACT DRAWINGS.
- COMPACTION OF ALL TRENCHES MUST BE ATTAINED TO CONTRACT SPECIFICATIONS AND COMPACTION TEST RESULTS SUBMITTED TO THE ENGINEER AND THE CITY OF THORNTON FOR ACCEPTANCE.
- ALL WORK, INCLUDING CORRECTION WORK, SHALL BE INSPECTED BY A CITY REPRESENTATIVE WHO SHALL HAVE THE AUTHORITY TO HALT CONSTRUCTION WHEN STANDARD CONSTRUCTION PRACTICES ARE NOT BEING ADHERED TO.

- ALL SITE GRADING (EXCAVATION, EMBANKMENT, AND COMPACTION) SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST SOILS INVESTIGATION FOR THIS PROJECT AND SHALL FURTHER BE IN CONFORMANCE WITH THE CONTRACT SPECIFICATIONS. A COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES SHALL BE OBTAINED PRIOR TO ANY GRADING BEING PERFORMED ON SITES ONE (1) ACRE OR LARGER IN SIZE. THESE PERMITS CAN BE OBTAINED FROM THE STATE WATER QUALITY CONTROL DIVISION.
- NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATION AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
- TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE REVEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROPER MEASURES TAKEN TO CONTROL EROSION AND SEDIMENT MOVEMENT.
- AT ALL TIMES, THE PROPERTY SHALL BE MAINTAINED AND/OR WATERED TO PREVENT WIND-CAUSED EROSION AND TO INSURE THE HEALTH OF EXISTING VEGETATION. EARTHWORK OPERATIONS SHALL BE DISCONTINUED WHEN DUST SIGNIFICANTLY IMPACTS ADJACENT PROPERTY. IF EARTHWORK IS COMPLETE OR DISCONTINUED AND DUST FROM THE SITE CONTINUES TO CREATE PROBLEMS, THE CONTRACTOR SHALL IMMEDIATELY INSTITUTE MITIGATIVE MEASURES AND SHALL CORRECT DAMAGE TO ADJACENT PROPERTY.
- PERMANENT SLOPES SHALL NOT EXCEED 4:1 (H:V) IN AREAS TO BE SEEDED OR SODDED.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED BY THE SPECIFIC LANDOWNER AND THEIR AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE PROPOSED EROSION CONTROL MEASURES DO NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS EROSION CONTROL PLAN AND THE OBLIGATION OF THE CONTRACTOR SHALL RUN WITH THE LAND UNTIL SUCH TIME AS THE EROSION CONTROL PLAN IS PROPERLY COMPLETED, OFFICIALLY MODIFIED, OR VOIDED.
- THERE SHALL BE A MINIMUM OF FOUR AND ONE-HALF (4.5) FEET OF COVER FROM FINISHED GRADE TO THE TOP OF WATER LINES EXCEPT WHERE DEEPER INSTALLATIONS ARE REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER THE LAND.
- BEDDING AND BACKFILL MATERIALS FOR THE WATER LINES SHALL CONFORM TO THE CONTRACT SPECIFICATIONS.
- RIM ELEVATIONS OF MANHOLES AND VAULTS SHOWN ON THE PLAN AND PROFILE SHEETS ARE APPROXIMATE ONLY AND ARE NOT TO BE TAKEN AS FINAL ELEVATIONS. THE PIPELINE CONTRACTOR SHALL FIELD VERIFY RIM ELEVATIONS AND WHERE POSSIBLE ALLOW APPROXIMATELY THE TOP ONE (1) FOOT OF RIM ELEVATION TO BE ADJUSTED EITHER UP OR DOWN IN ORDER TO MATCH FINISHED GRADE OR FINAL PAVEMENT ELEVATION(S). THE MAXIMUM ADJUSTMENT TO FINAL GRADE OR FINAL PAVEMENT ELEVATION(S) IS TWELVE (12) INCHES WITH CONCRETE RINGS.
- DURING CONSTRUCTION, CARE MUST BE TAKEN TO AVOID ANY GROUNDWATER, STORM WATER, CONSTRUCTION DEBRIS, SOIL, OR ANY OTHER FOREIGN MATERIALS FROM ENTERING ANY ACTIVE STORM SEWER.
- CONTRACTOR SHALL MAINTAIN EROSION AND WATER CONTROL MEASURES TO PROTECT THE PROJECT SITE, PUBLIC RIGHT-OF-WAY (ROW), AND PRIVATE PROPERTY, AND SHALL PREVENT SEDIMENT POLLUTION OF ADJACENT WATER COURSES AND PROPERTIES. CONTRACTOR SHALL FOLLOW ALL PERMITS, AS WELL AS LOCAL, STATE, AND FEDERAL CODES.
- ALL DEWATERING ASSOCIATED WITH CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, PLEASE CDPHE'S WATER QUALITY CONTROL DIVISION.
- AFTER ANY OVERLAY OF AN EXISTING ROADWAY, WHERE UTILITIES ARE PRESENT, THE CONTRACTOR SHALL OPEN ALL MANHOLES AND VALVE BOXES FOLLOWING THE PAVING OPERATION TO ENSURE THAT MANHOLE AND VALVES WERE NOT PAVED OVER NOR FILLED WITH ASPHALT.
- WHEN AN EXISTING ASPHALT STREET IS CUT, THE STREET MUST BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN ITS ORIGINAL CONDITION. THE EXISTING STREET CONDITION SHALL BE DOCUMENTED BY THE CITY OF THORNTON'S CONSTRUCTION COORDINATOR OR JURISDICTIONAL AUTHORITY'S REPRESENTATIVE BEFORE ANY CUTS ARE MADE. PATCHING AND PAVEMENT RESTORATION SHALL BE DONE IN CONFORMANCE WITH THE MAINTAINING AUTHORITY'S STANDARDS AND SPECIFICATIONS. THE FINISHED PATCH SHALL BLEND SMOOTHLY INTO THE EXISTING SURFACE. ALL LARGE PATCHES SHALL BE PAVED WITH AN ASPHALT LAY-DOWN MACHINE. IN STREETS WHERE MORE THAN ONE CUT IS MADE, AN OVERLAY OF THE TRAVEL LANE(S) WIDTH, INCLUDING THE PATCHED AREAS, MAY BE REQUIRED. THE DETERMINATION OF NEED FOR A COMPLETE OVERLAY SHALL BE MADE BY THE CITY OF THORNTON.
- PAVING AND FLATWORK SHALL NOT START UNTIL AN ASPHALT MIX DESIGN HAS BEEN SUBMITTED AND APPROVED BY THE ENGINEER AND SUBGRADE COMPACTION TEST AND PROOFROLL HAVE BEEN PERFORMED AND THE RESULTS HAVE MET WITH THE APPROVAL OF THE MAINTAINING AUTHORITY.
- ALL DAMAGED EXISTING CURB, GUTTER, AND SIDEWALK SHALL BE REPLACED PRIOR TO ACCEPTANCE OF COMPLETED IMPROVEMENTS.
- THE CONTRACTOR SHALL PROVIDE, ERECT, AND MAINTAIN PROPER TRAFFIC CONTROL DEVICES UNTIL THE SITE IS OPEN TO TRAFFIC. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN (TCP) TO THE LOCAL AUTHORITIES, JURISDICTIONS, AND THE CITY OF THORNTON FOR APPROVAL PRIOR TO CONSTRUCTION. ALL SIGNS, STRIPING, AND CONTROL DEVICES SHALL CONFORM TO, AND PLACEMENT SHALL BE PERFORMED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST EDITION, AND COLORADO DEPARTMENT OF TRANSPORTATION'S (CDOT) M&S STANDARDS, LATEST EDITION.
- REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS OR LANDSCAPING IS THE RESPONSIBILITY OF THE CONTRACTOR TO FULL SATISFACTION OF THE LANDOWNER AT NO ADDITIONAL COST. THE CONTRACTOR SHALL RESTORE ANY DISTURBED AREAS TO EQUAL OR BETTER CONDITION THAN EXISTED BEFORE CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE APPROPRIATE ENTITIES, INCLUDING, BUT NOT LIMITED TO, ADAMS COUNTY, SPECIAL UTILITY DISTRICTS AND FIRE, POLICE, AND SCHOOL DISTRICTS, OF ALL STREET CLOSINGS AND SERVICE INTERRUPTIONS AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO THE INITIATION OF THE INTERRUPTION.

- ANY MONUMENT SET FOR THE PURPOSE OF LOCATING OR PRESERVING THE LINES OF ANY STREET OR PROPERTY SUBDIVISION, OR A PRECISE SURVEY REFERENCE POINT OR PERMANENT SURVEY BENCHMARK, SHALL NOT BE REMOVED OR DISTURBED OR CAUSED TO BE REMOVED OR DISTURBED WITHOUT FIRST OBTAINING PERMISSION IN WRITING FROM THE LOCAL AUTHORITY TO DO SO. CONTRACTOR SHALL PAY ALL EXPENSES INCIDENT TO THE PROPER REPLACEMENT OF SUCH MONUMENT.
- THE CONSTRUCTION WORK SHALL BE PERFORMED AND CONDUCTED SO AS NOT TO INTERFERE WITH ACCESS TO FIRE HYDRANTS, FIRE STATIONS, FIRE ESCAPES, WATER GATES, UNDERGROUND VAULTS, VALVE HOUSING STRUCTURES AND ANY OTHER VITAL EQUIPMENT AS MAY BE DESIGNATED BY THE LOCAL JURISDICTIONS.
- NOTIFY OWNERS OF ADJACENT PROPERTY AND UTILITIES WHEN PROSECUTION OF THE WORK MAY AFFECT THEM AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO THE EXPECTED DISTURBANCE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR SWEEPING AND MAINTAINING AFFECTED STREETS AND SIDEWALKS, AND KEEPING THEM CLEAN AND FREE OF DUST, MUD, SNOW AND DEBRIS DURING CONSTRUCTION. SWEEPING AND CLEANING SHALL BE PERFORMED DAILY.
- THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ACCESS TO FIRE HYDRANTS THROUGHOUT ALL PHASES OF CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE FIRE DEPARTMENT AT LEAST 24 HOURS IN ADVANCE OF PLACING ANY FIRE HYDRANTS OUT OF SERVICE. CALL THE FIRE DEPARTMENT AT (303) 651-8437 DURING NORMAL BUSINESS HOURS, 8:00 AM - 5:00 PM. SUCH OUT OF SERVICE HYDRANTS SHALL BE APPROPRIATELY BAGGED TO VISIBLY INDICATE THEIR OUT OF SERVICE STATUS.
- CONTRACTOR IS RESPONSIBLE FOR THE SAFE AND SECURE STORAGE OF GOODS, MATERIALS, AND EQUIPMENT ONSITE. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF STORAGE AND STAGING AREAS WITH THE OWNER PRIOR TO CONSTRUCTION.

XCEL ENERGY GENERAL NOTES

- CONTRACTOR SHALL NOTIFY THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) 1-800-922-1987 (811 WHEN CALLING WITHIN COLORADO) FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION AROUND PUBLIC SERVICE COMPANY OF COLORADO (PSCo/XCEL) UTILITIES.
- A PSCo FIELD OPERATOR MUST BE ON SITE DURING TESTHOLING, EXCAVATION, SITE GRADING, BACKFILL OPERATIONS, COMPACTION, AND INSTALLATION OF PROPOSED WORK WITHIN THE PSCo EASEMENTS AND/OR WITHIN A MINIMUM OF FIFTEEN (15) FEET FROM THE OUTER LIMITS OF THE LOCATE MARKS FOR THE PSCo POWER LINE(S).
- CONTRACTOR SHALL MAINTAIN A MINIMUM SIX (6) FEET CLEARANCE FROM UNDERGROUND ELECTRIC LINES AND TWENTY (20) FEET FROM OVERHEAD ELECTRIC LINE(S) WHEN CONSTRUCTING IN PARALLEL.

REGIONAL/LOCAL FIRE DEPARTMENT NOTES:

- CONTRACTOR SHALL NOTIFY ALL AFFECTED REGIONAL AND LOCAL FIRE DEPARTMENTS OF FULL OR PARTIAL LANE CLOSURES FOR ALL ROAD(S) IMPACTED.
- ACCESS ON AFFECTED ROADWAYS SHALL BE CAPABLE OF SUPPORTING FORTY (40) TONS DURING CONSTRUCTION TO FACILITATE EMERGENCY RESPONSE.
- CODE COMPLIANT ACCESS TO ALL PARTS OF THE PIPELINE INSTALLATION ACTIVITIES SHALL BE CLEARLY IDENTIFIED IN THE EMERGENCY OPERATIONAL PLAN PREPARED BY THE CONTRACTOR. PLAN SHALL BE PROVIDED TO AFFECTED FIRE DISTRICTS.
- NO ON-SITE FUEL STORAGE SHALL BE PERMITTED. FUELING OPERATIONS SHALL COMPLY WITH THE CURRENT FIRE CODE.

no.	date	by	ckd	description
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Millimeters

Scale For Microfinishing

Inches

A

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D

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F

G

H

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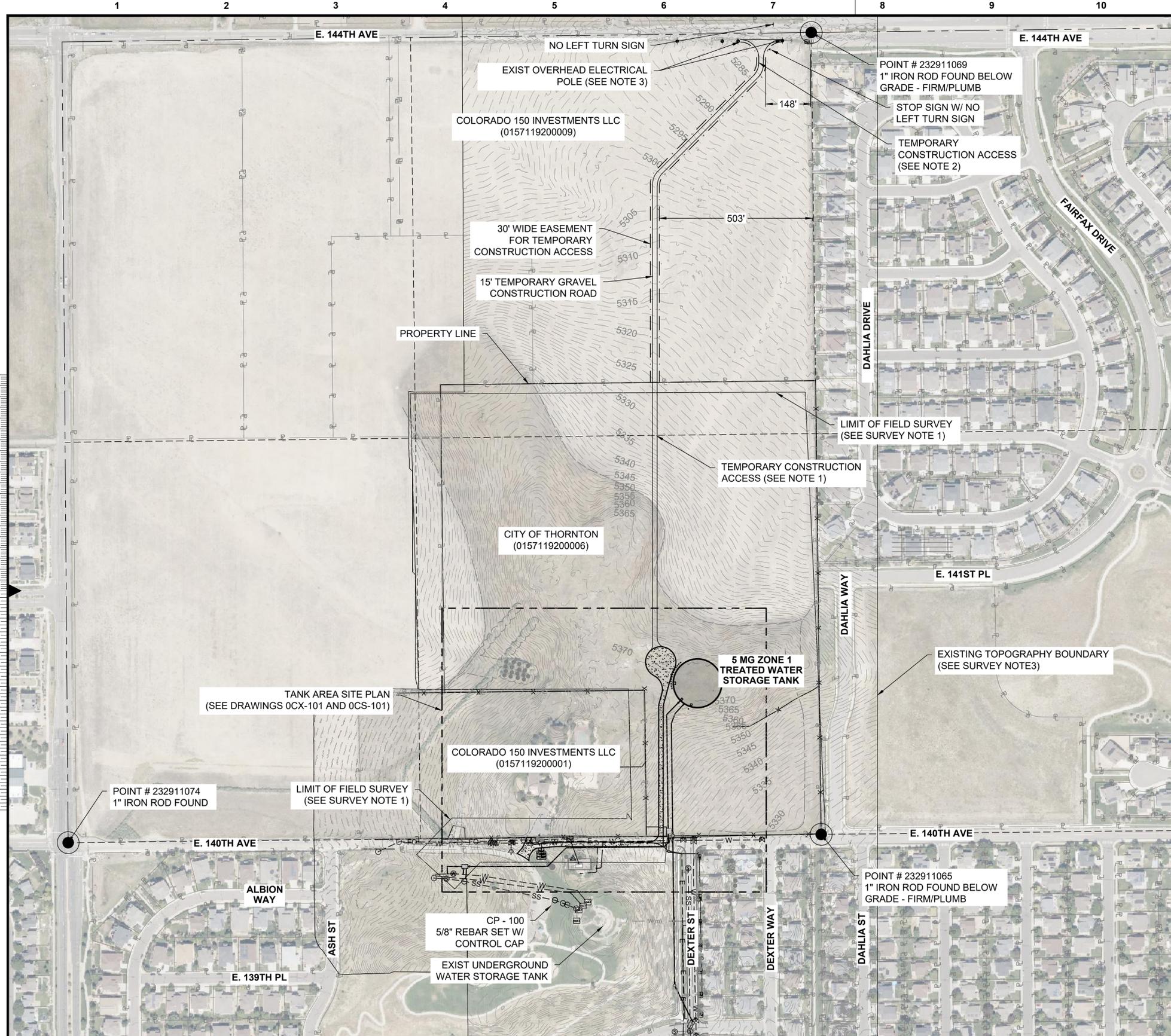
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



THORNTON COLORADO

ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

GENERAL NOTES			
project	162116	contract	23-150
drawing	0G-004		rev. 0
sheet	5	of	74 sheets
file	162116_0G-004.dwg		



- NOTES:**
- ROUTING OF TEMP ACCESS ROAD WITHIN COLORADO 150 INVESTMENTS LLC PROPERTY SHALL BE LIMITED WITHIN THE TEMPORARY CONSTRUCTION EASEMENT. TEMP ROAD SHALL BE REMOVED AND RESTORED TO EXISTING CONDITIONS POST-CONSTRUCTION.
 - SITE SHALL BE ENTERED WITH AN EASTBOUND TO SOUTHBOUND RIGHT TURN FROM 144TH AVENUE INTO THE TEMPORARY CONSTRUCTION ENTRANCE AND EXITED WITH A NORTHBOUND TO EASTBOUND RIGHT TURN OUT OF THE TEMPORARY CONSTRUCTION EXIT. DUE TO LIMITED SIGHT VISIBILITY AND HIGH APPROACH SPEEDS, NORTHBOUND TO WESTBOUND FROM THE SITE ONTO 144TH AVENUE AND WESTBOUND TO SOUTHBOUND LEFT TURNS FROM 144TH AVENUE INTO THE SITE ARE PROHIBITED.
 - CONTRACTOR SHALL COORDINATE WITH XCEL ENERGY FOR THE CROSSING OF THE EXISTING POWER LINES ALONG E. 144TH AVE.
- SURVEY NOTES:**
- TOPOGRAPHIC AND PLANIMETRIC DATA WITHIN THE LIMIT OF FIELD SURVEY SHOWN HEREON WERE ACQUIRED BY DRONE LIDAR SURVEY PERFORMED OCTOBER 6, 2023 BY ENCOMPASS SERVICES LLC
 - DRAWING HORIZONTAL CONTROL IS BASED ON THE NORTH AMERICAN DATUM 1983 (NAD83) COLORADO STATE PLANE NORTH ZONE GRID COORDINATES - U.S. SURVEY FEET.
 - VERTICAL CONTROL IS BASED ON NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
NGS BENCHMARK: AB3296 EASTLAKE
 - A GRID TO GROUND COMBINED SCALE FACTOR OF (1.00028352) CAN BE USED TO CONVERT TO STATE PLANE GROUND COORDINATES.
 - THE EXISTING SURFACE OUTSIDE THE SURVEY LIMITS WAS OBTAINED FROM THE COLORADO HAZARD MAPPING & RISK MAP PORTAL. DATA WAS COLLECTED BY SANBORN MAP COMPANY, INC. ON 05/14/2020

no.	date	by	ckd	description
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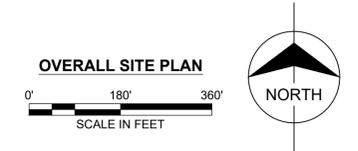
date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

OVERALL SITE PLAN	
project	contract
162116	23-150
drawing	rev.
0C-101	0
sheet 6 of 74 sheets	file 162116_0C-101.dwg

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
232911061	5268.99	1227870.89	3162005.18	1" IRON ROD FOUND BELOW GRADE-FIRM/PLUMB
232911065	5322.48	1225203.28	3159403.10	1" IRON ROD FOUND BELOW GRADE
232911069	5281.02	1227838.04	3159370.30	1" IRON ROD FOUND BELOW GRADE-FIRM/PLUMB
232911074	5289.07	1225176.12	3156923.64	1" IRON ROD FOUND

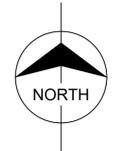


Scale For Microfilming
Millimeters
Inches



Scale For Microfilming
Millimeters
Inches

TANK AREA EXISTING CONDITIONS PLAN
0 50' 100'
SCALE IN FEET



no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

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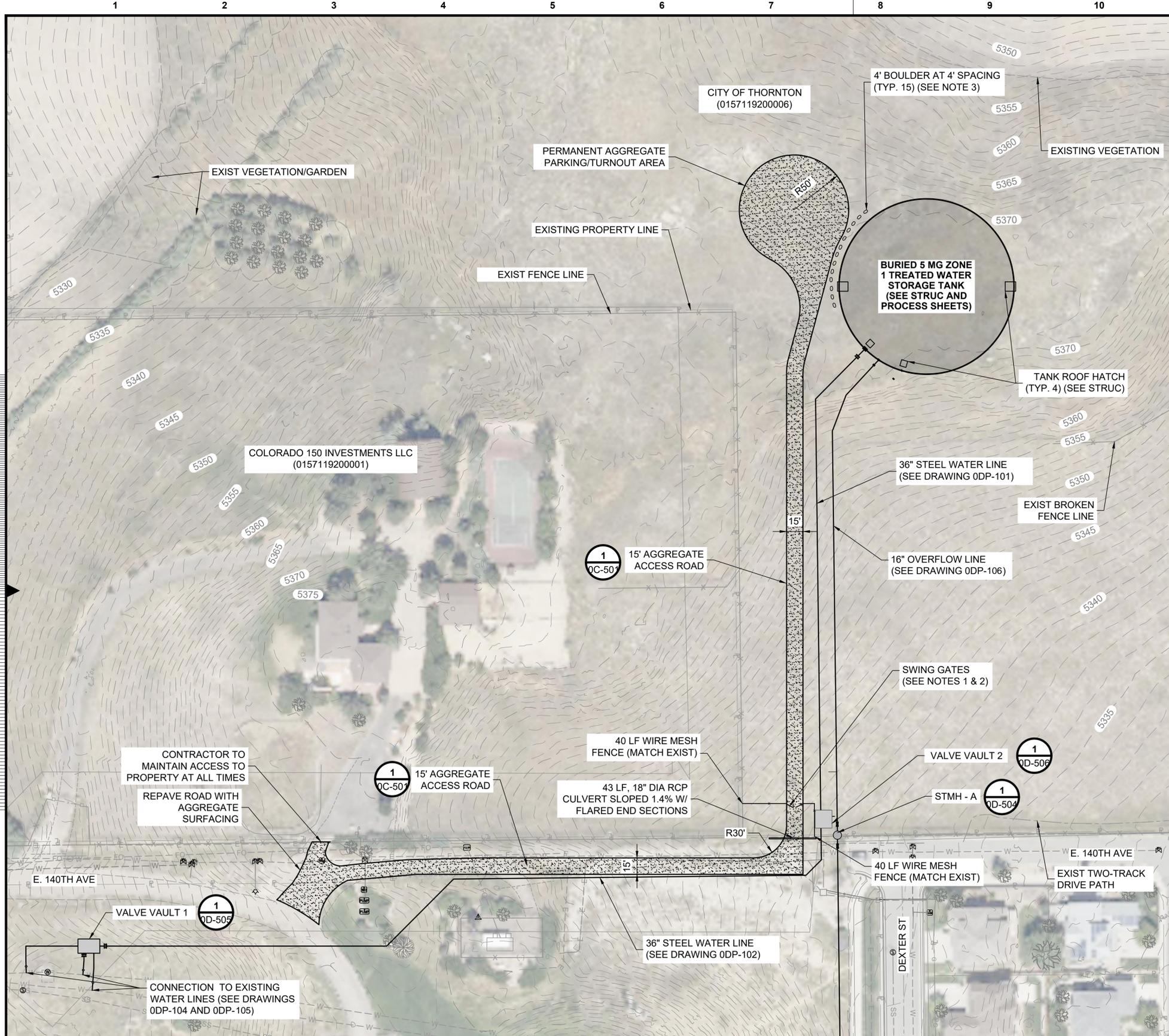
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date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

TANK AREA EXISTING CONDITIONS PLAN			
project	162116	contract	23-150
drawing	OCX-101 - 0		rev.
sheet	7	of	74 sheets
file	162116_OCX-101.dwg		



- NOTES:**
1. SITE ENTRANCE GATE SHALL BE TWO COUNTY LINE 8 LF SWINGING UTILITY TUBE GATES SECURED WITH CHAIN AND PADLOCK.
 2. FENCE CORNERS AND GATE POSTS SHALL BE FASTENED WITH 6" WOODEN POSTS TO MATCH EXISTING FENCE.
 3. BOULDERS SHALL BE IN ACCORDANCE WITH BOULDER CLASSIFICATION B-48 OF MILE HIGH FLOOD DISTRICT SPEC 31 37 00.

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

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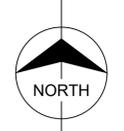
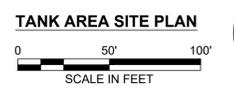
Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

TANK AREA SITE PLAN			
project	162116	contract	23-150
drawing	OCS-101 - 0		rev.
sheet	8	of	74 sheets
file	162116_OCS-101.dwg		



Scale For Microfilming
Millimeters
Inches



CONTROL POINT TABLE				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	1225699.9296	3158996.0037	5381.37	CENTER OF 5 MG TANK
2	1225140.2218	3158401.7215	5368.36	EDGE OF GRAVEL ROAD
3	1225193.1055	3158434.0252	5374.17	EDGE OF GRAVEL ROAD
4	1225192.7641	3158449.7616	5374.13	EDGE OF GRAVEL ROAD
5	1225183.7652	3158445.9559	5374.00	EDGE OF GRAVEL ROAD
6	1225171.0595	3158460.3588	5374.16	EDGE OF GRAVEL ROAD
7	1225176.7550	3158520.8165	5370.30	EDGE OF GRAVEL ROAD
8	1225178.4421	3158591.3180	5365.36	EDGE OF GRAVEL ROAD
9	1225178.4421	3158838.0150	5348.00	EDGE OF GRAVEL ROAD
10	1225208.4778	3158868.0150	5346.80	EDGE OF GRAVEL ROAD
11	1225621.3335	3158868.0037	5376.59	EDGE OF GRAVEL ROAD
12	1225634.2744	3158869.7075	5377.54	EDGE OF GRAVEL ROAD
13	1225667.2223	3158878.5358	5380.00	EDGE OF GRAVEL ROAD
14	1225723.4645	3158855.2395	5380.00	EDGE OF GRAVEL ROAD
15	1225744.9296	3158918.0614	5380.01	EDGE OF GRAVEL ROAD
16	1225723.2234	3158909.0702	5380.00	EDGE OF GRAVEL ROAD
17	1225632.2494	3158884.6940	5377.12	EDGE OF GRAVEL ROAD
18	1225619.2514	3158882.9903	5376.17	EDGE OF GRAVEL ROAD
19	1225163.4421	3158883.0009	5346.00	EDGE OF GRAVEL ROAD
20	1225163.4421	3158591.4668	5365.13	EDGE OF GRAVEL ROAD
21	1225163.4421	3158529.3070	5369.56	EDGE OF GRAVEL ROAD
22	1225157.9179	3158466.4566	5373.60	EDGE OF GRAVEL ROAD
23	1225117.5226	3158440.2114	5370.13	EDGE OF GRAVEL ROAD
24	1225769.9294	3158874.7598	5381.00	CENTER OF GRAVEL TURNAROUND
25	1225228.0310	3158827.6643	5347.62	WIRE MESH FENCE CORNER
26	1225228.0310	3158867.5037	5348.08	SWING GATE POST
27	1225228.0401	3158883.5037	5347.60	SWING GATE POST
28	1225228.0401	3158893.5037	5345.10	WIRE MESH FENCE CORNER
29	1225198.0359	3158893.5829	5343.59	WIRE MESH FENCE CORNER
30	1225196.2687	3158895.0703	5343.20	18" RCP CULVERT INVERT
31	1225196.2687	3158852.0703	5343.30	18" RCP CULVERT INVERT
32	1225199.2804	3158914.5253	5341.97	STMH - A
33	1225091.4423	3158219.8457	5346.73	VALVE VAULT 1
34	1225104.4423	3158239.8457	5348.08	VALVE VAULT 1
35	1225091.4423	3158239.8457	5347.34	VALVE VAULT 1
36	1225201.8254	3158909.4095	5342.16	VALVE VAULT 2
37	1225217.8254	3158909.4095	5342.58	VALVE VAULT 2
38	1225217.8254	3158894.4095	5344.13	VALVE VAULT 2

NOTES:
 1. ELEVATIONS SHOWN ARE TO FINISH GRADE UNLESS OTHERWISE DESIGNATED
 2. CONTROL POINTS FOR CAST-IN-PLACE VAULTS ARE TO THE OUTSIDE CORNERS OF THE VAULT.

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

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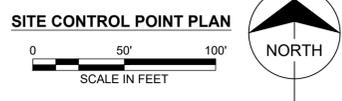
BURNS MEDONNELL
 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

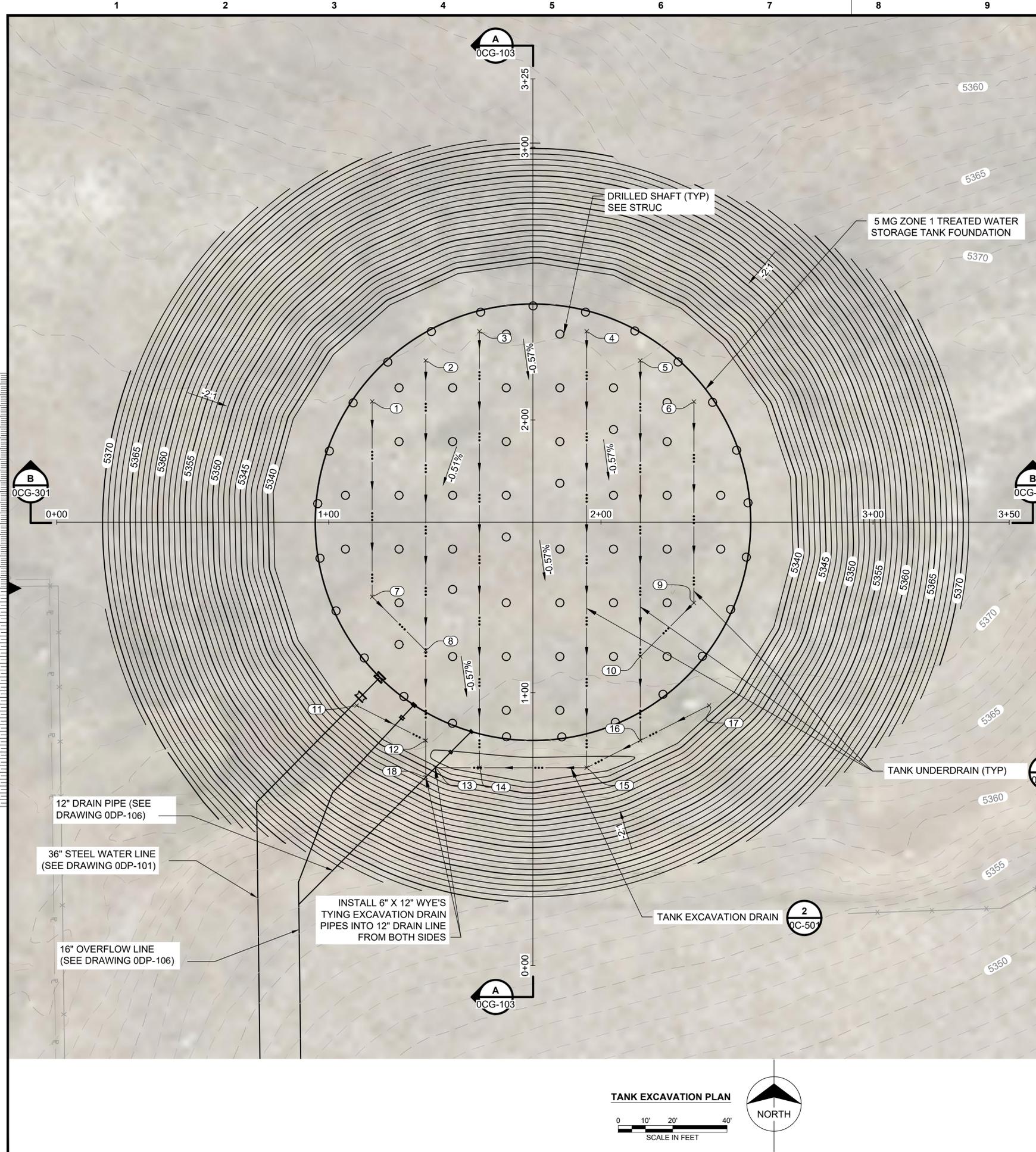
Burns & McDonnell Engineering Co., Inc.	
date	OCTOBER 2024
designed	M. STROBEL
checked	J. LEE
detailed	M. STROBEL

THORNTON COLORADO

ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

SITE CONTROL POINT PLAN	
project	162116
contract	23-150
drawing	OCS-102 - 0
sheet	9 of 74 sheets
file	162116_OCS-102.dwg





NOTES:

- EXCAVATION GRADES ASSUME TANK SLAB TOP ELEVATION OF 5341.5 AND A THICKNESS OF 2-FEET. CONTRACTOR TO VERIFY ACTUAL SLAB THICKNESS AND ADJUST ELEVATIONS OF PIPES BASED ON 1-FOOT MINIMUM DIMENSION BELOW BOTTOM OF SLAB. TOP OF TANK SLAB TO REMAIN 5341.5 REGARDLESS OF SLAB THICKNESS.

CONTROL POINT TABLE

POINT	NORTHING	EASTING	DESCRIPTION
1	1225744.2189	3158936.9412	TANK UNDERDRAIN
2	1225759.2136	3158956.6277	TANK UNDERDRAIN
3	1225769.9225	3158976.3477	TANK UNDERDRAIN
4	1225769.9245	3159015.7498	TANK UNDERDRAIN
5	1225759.2074	3159035.4509	TANK UNDERDRAIN
6	1225744.1485	3159055.1508	TANK UNDERDRAIN
7	1225672.5844	3158936.9349	TANK UNDERDRAIN 45 BEND
8	1225652.8982	3158956.6196	TANK UNDERDRAIN WYE FITTING
9	1225670.3682	3159055.1342	TANK UNDERDRAIN 45 BEND
10	1225650.6730	3159035.4596	TANK UNDERDRAIN WYE FITTING
11	1225632.7312	3158931.2568	EXCAVATION DRAIN
12	1225619.9030	3158956.6145	TANK UNDERDRAIN TO EXCAVATION DRAIN CONNECTION
13	1225609.9550	3158960.0935	6" X 12" WYE FITTING
14	1225609.9274	3158976.3335	TANK UNDERDRAIN TO EXCAVATION DRAIN CONNECTION
15	1225609.9245	3159015.7356	TANK UNDERDRAIN TO EXCAVATION DRAIN CONNECTION
16	1225619.9189	3159035.4386	TANK UNDERDRAIN TO EXCAVATION DRAIN CONNECTION
17	1225632.7473	3159060.7269	EXCAVATION DRAIN
18	1225606.4739	3158956.6124	6" X 12" WYE FITTING

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

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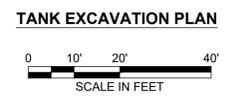
Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

TANK EXCAVATION PLAN	
project	contract
162116	23-150
drawing	rev.
OCG-101	0
sheet	of
10	74
file 162116_OCG-101.dwg	

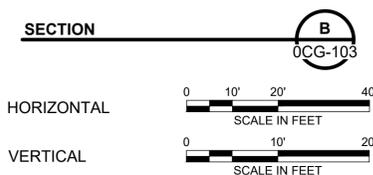
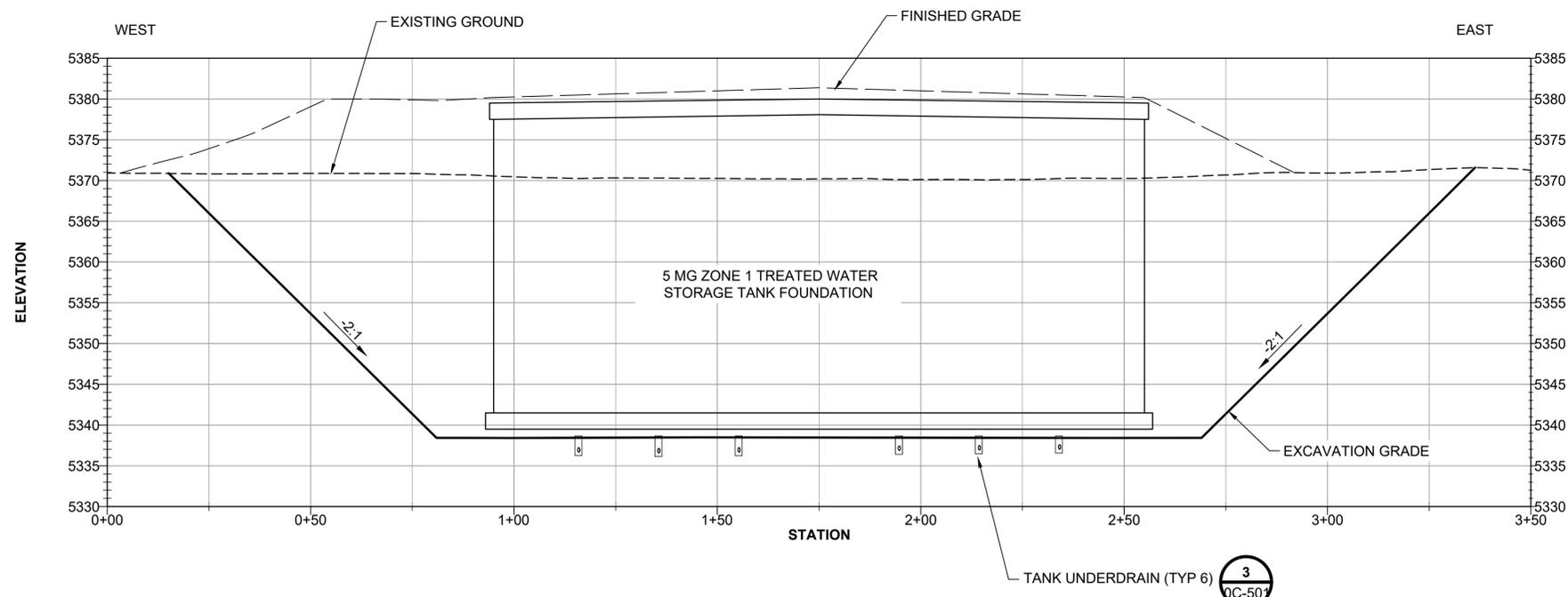
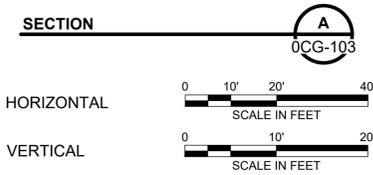
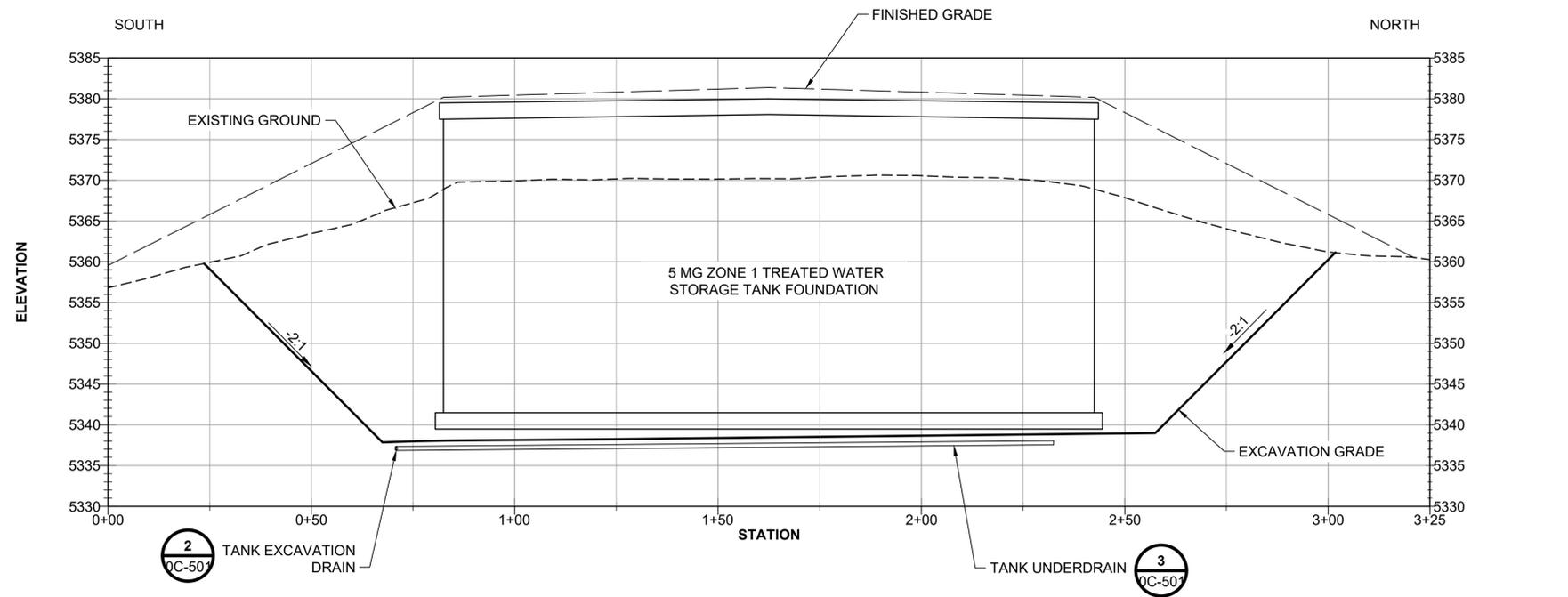


Scale For Microfining

Inches

Millimeters

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID



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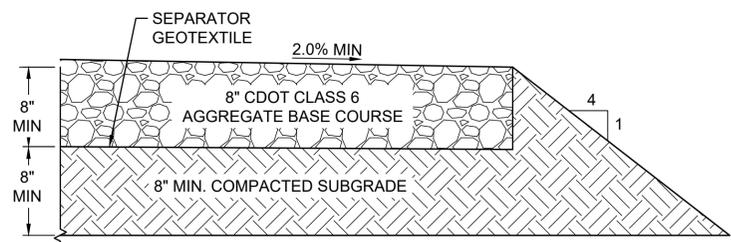
Burns & McDonnell Engineering Co., Inc.	
date	detailed
OCTOBER 2024	M. STROBEL
designed	checked
M. STROBEL	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE

TANK EXCAVATION SECTIONS	
project	contract
162116	23-150
drawing	rev.
OCG-301	0
sheet	of
12	74
sheets	
file 162116_OCG-101.dwg	

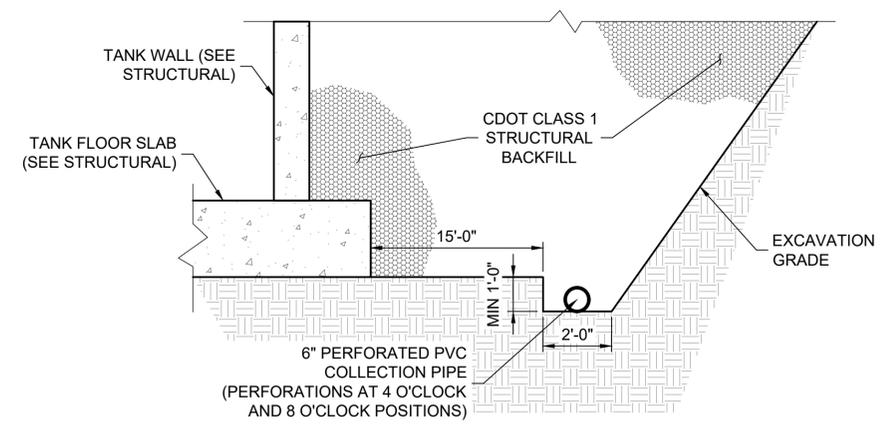
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Millimeters
Inches



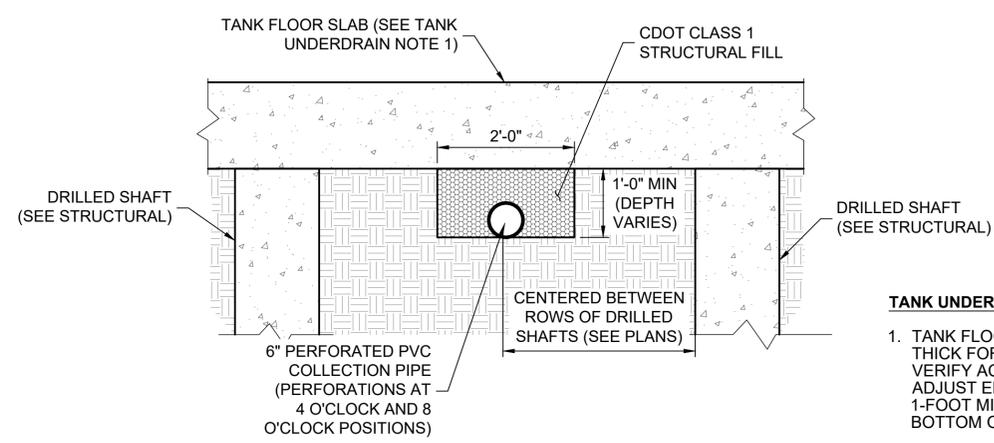
NOTES:

1. AGGREGATE BASE COURSE REPLACEMENT SHALL BE IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 505.2.
2. GEOTEXTILE SHALL BE IN ACCORDANCE WITH CDOT SECTION 712.08.

AGGREGATE ROAD SECTION 1
NOT TO SCALE C-500



TANK EXCAVATION DRAIN 2
NOT TO SCALE OC-501



TANK UNDERDRAIN NOTES:

1. TANK FLOOR SLAB ASSUMED TO BE 2-FOOT THICK FOR DESIGN. CONTRACTOR TO VERIFY ACTUAL SLAB THICKNESS AND ADJUST ELEVATIONS OF PIPES BASED ON 1-FOOT MINIMUM DIMENSION BELOW BOTTOM OF SLAB.
2. UNDERDRAIN PIPES SHALL BE SLOPED AT A MINIMUM OF 0.5%

TANK UNDERDRAIN 3
NOT TO SCALE OC-501



no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.

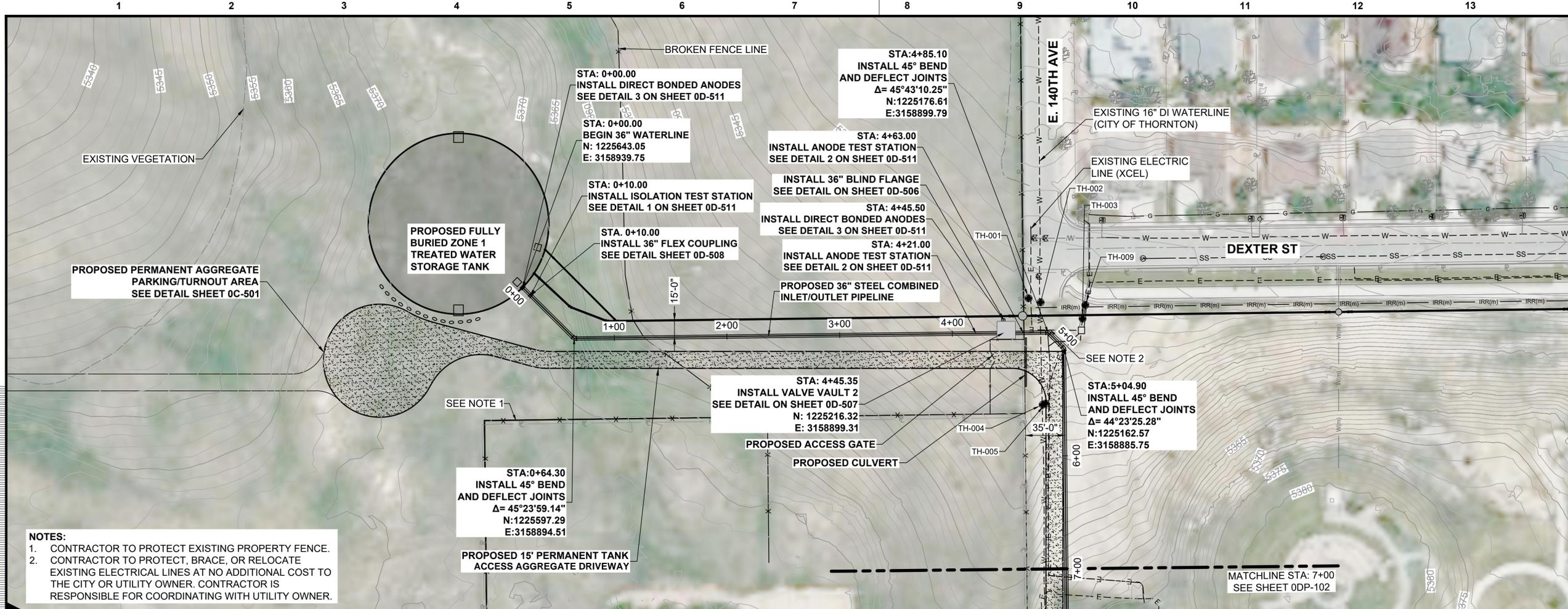
date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



THORNTON
COLORADO

ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
CIVIL DETAILS I

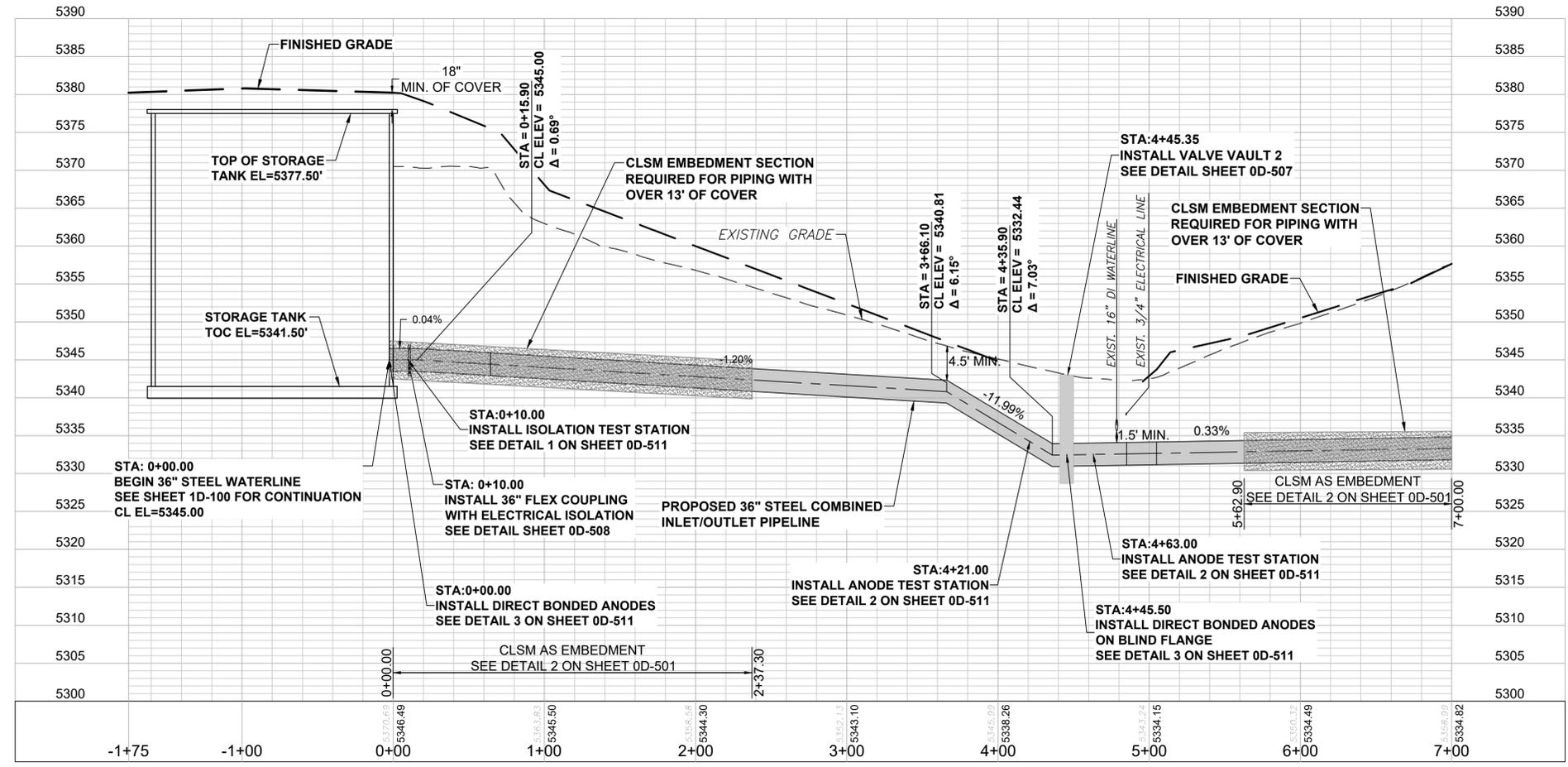
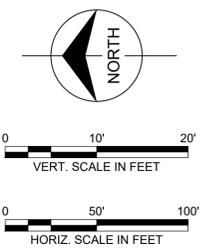
project	162116	contract	23-150
drawing	OC-501	rev.	0
sheet	13	of	74 sheets
file 162116_OC-501.dwg			



- NOTES:**
- CONTRACTOR TO PROTECT EXISTING PROPERTY FENCE.
 - CONTRACTOR TO PROTECT, BRACE, OR RELOCATE EXISTING ELECTRICAL LINES AT NO ADDITIONAL COST TO THE CITY OR UTILITY OWNER. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH UTILITY OWNER.

Scale For Microfining
Millimeters
Inches

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



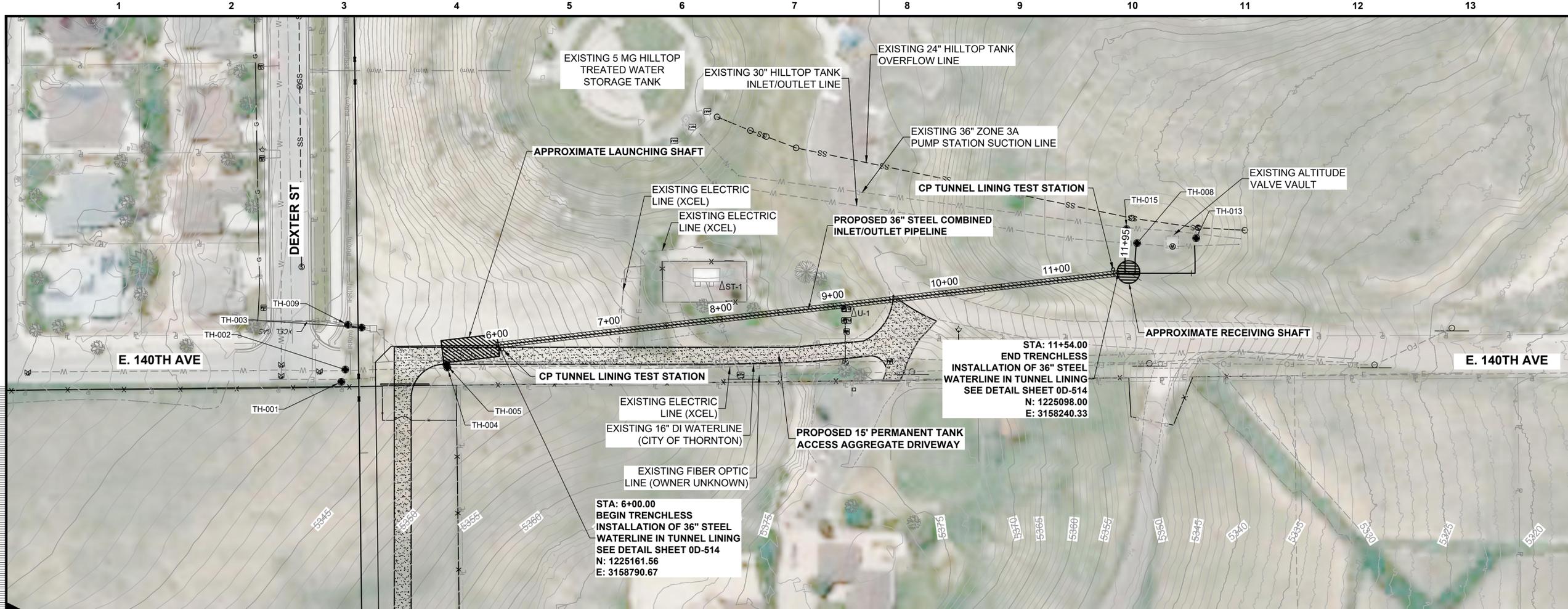
PRELIMINARY - NOT FOR CONSTRUCTION



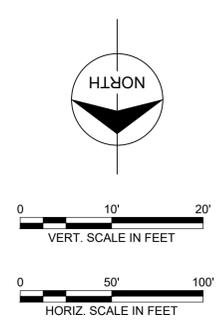
Burns & McDonnell Engineering Co., Inc.	
date	OCTOBER 2024
designed	A. CASHON
detailed	V. PONCE
checked	K. LEBRASSE



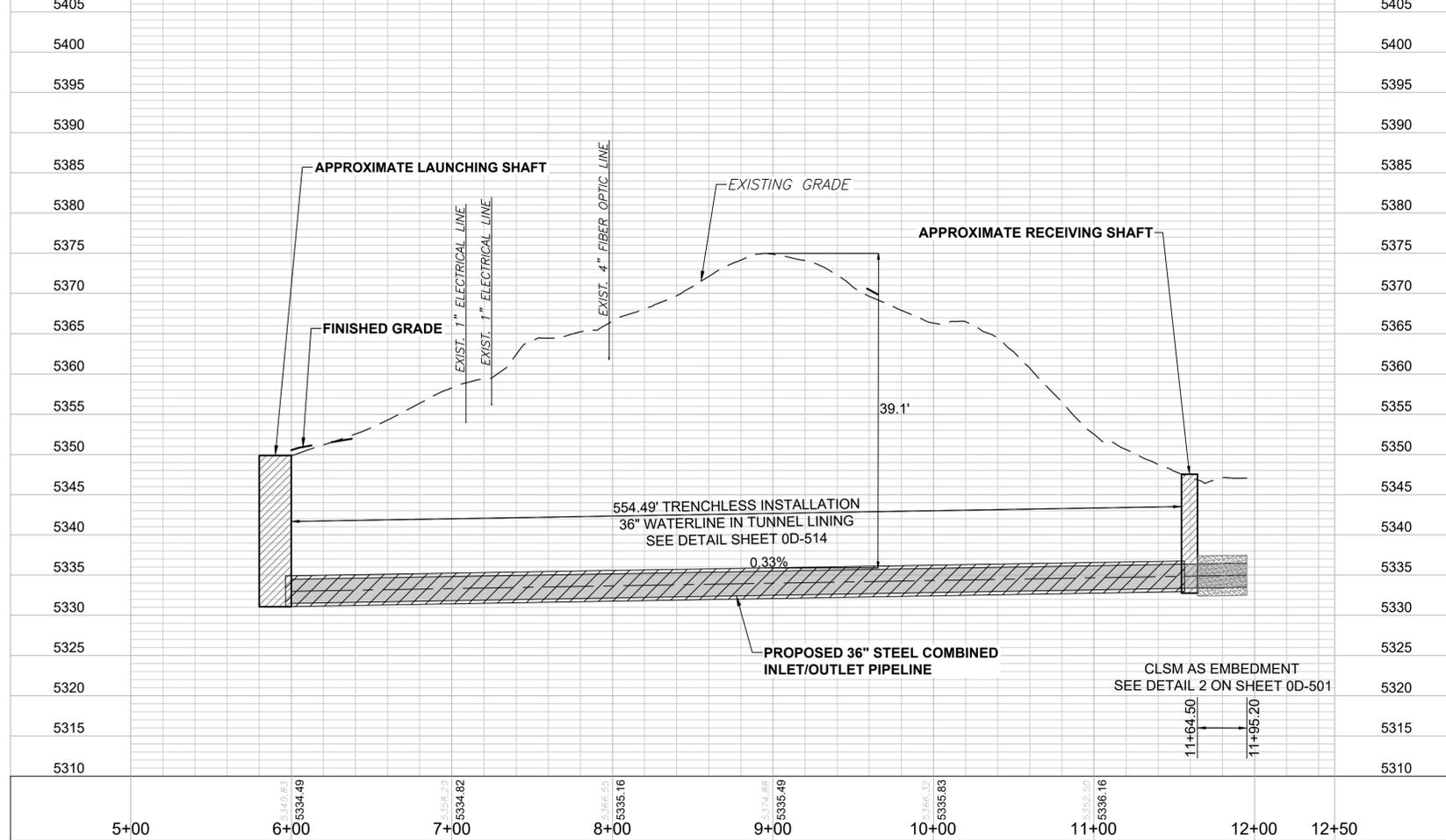
ADAMS COUNTY, COLORADO	
CITY OF THORNTON	
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE	
36" STEEL COMBINED INLET/OUTLET LINE PLAN AND PROFILE STA. 0+00 TO STA. 7+00	
project	162116
contract	23-150
drawing	ODP-101 - 0
sheet	14 of 74 sheets
file	162116_ODP-101.dwg



no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



Scale For Microfining
Millimeters
Inches



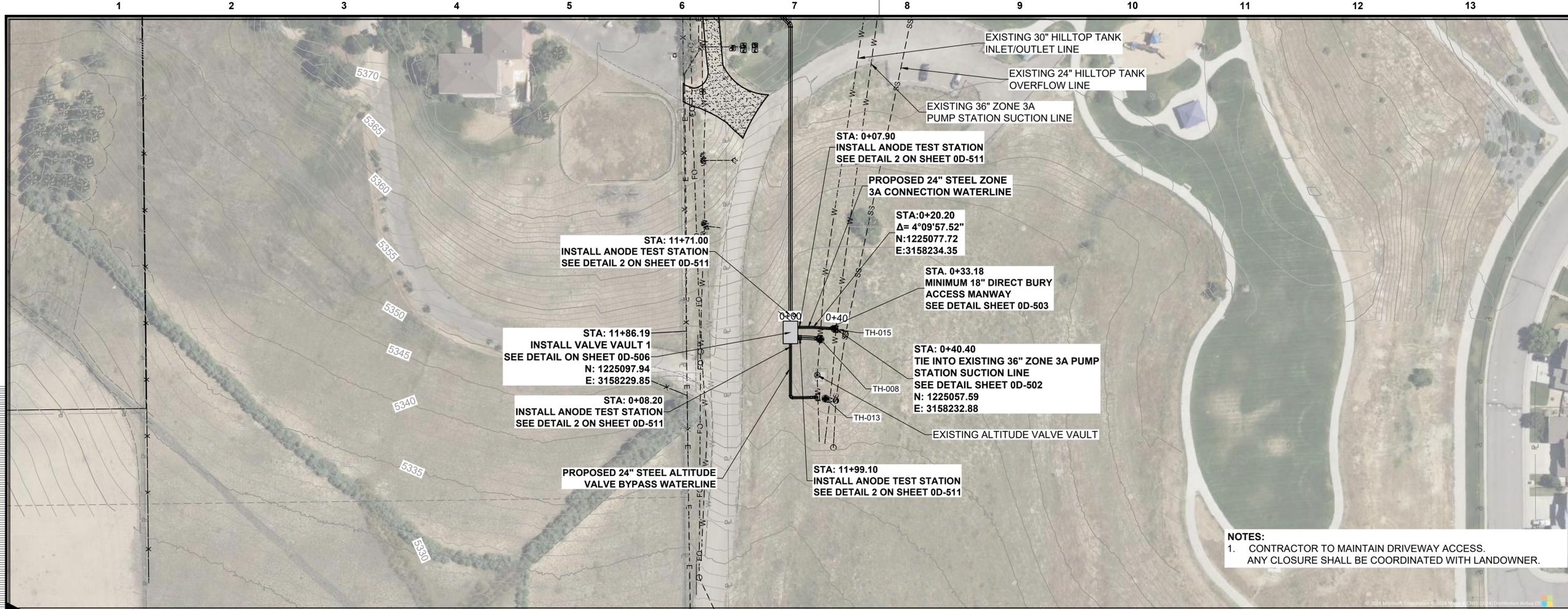
PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.	
date OCTOBER 2024	detailed V. PONCE
designed A. CASHON	checked K. LEBRASSE



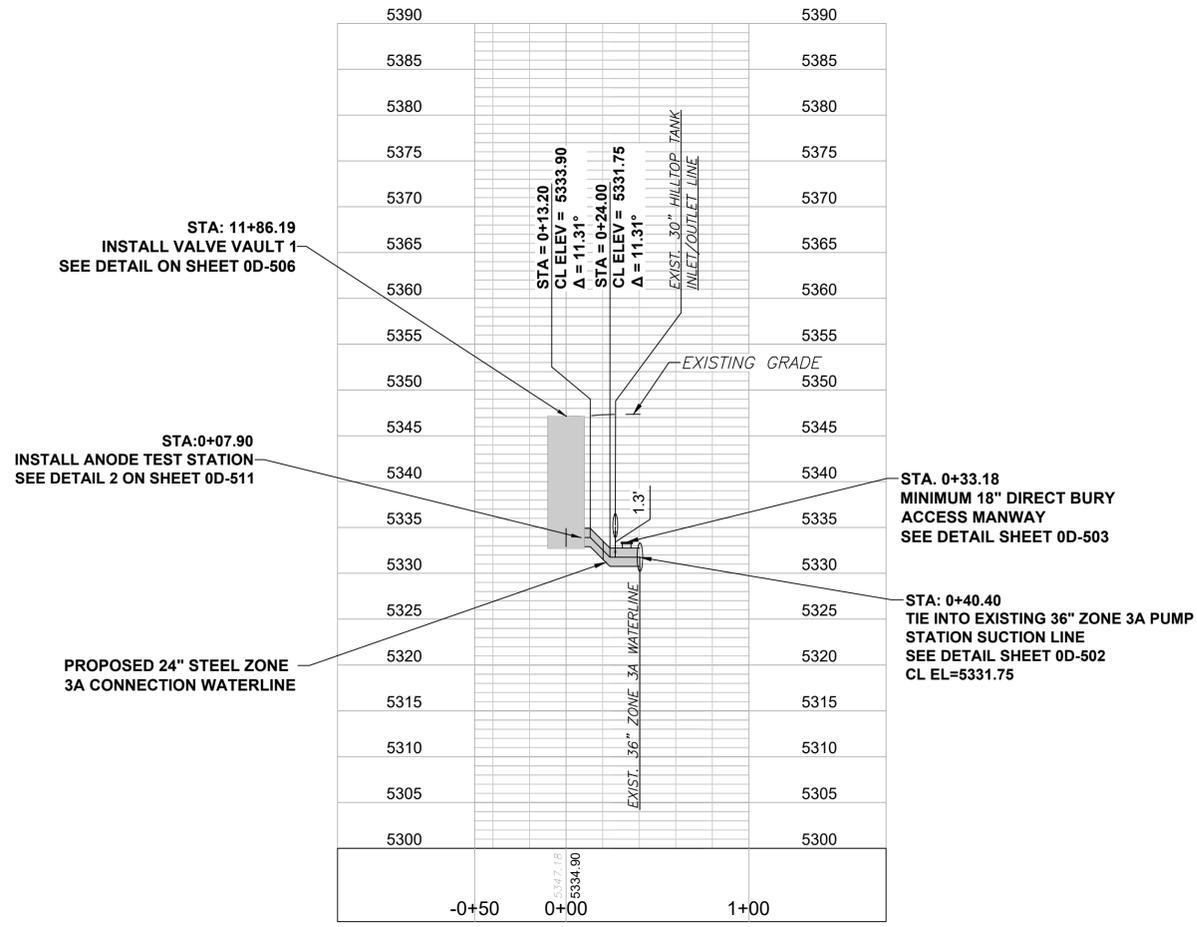
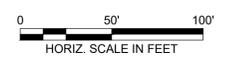
ADAMS COUNTY, COLORADO	
CITY OF THORNTON	
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE	
ALTERNATE 36" STEEL COMBINED INLET/OUTLET LINE PLAN AND PROFILE STA. 6+00 TO STA. 12+25.40	
project 162116	contract 23-150
drawing ODP-103	rev. 0
sheet 16 of 74 sheets	file 162116_ODP-102.dwg



no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID

Scale For Microfining
Millimeters
Inches

NOTES:
1. CONTRACTOR TO MAINTAIN DRIVEWAY ACCESS.
ANY CLOSURE SHALL BE COORDINATED WITH LANDOWNER.



PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



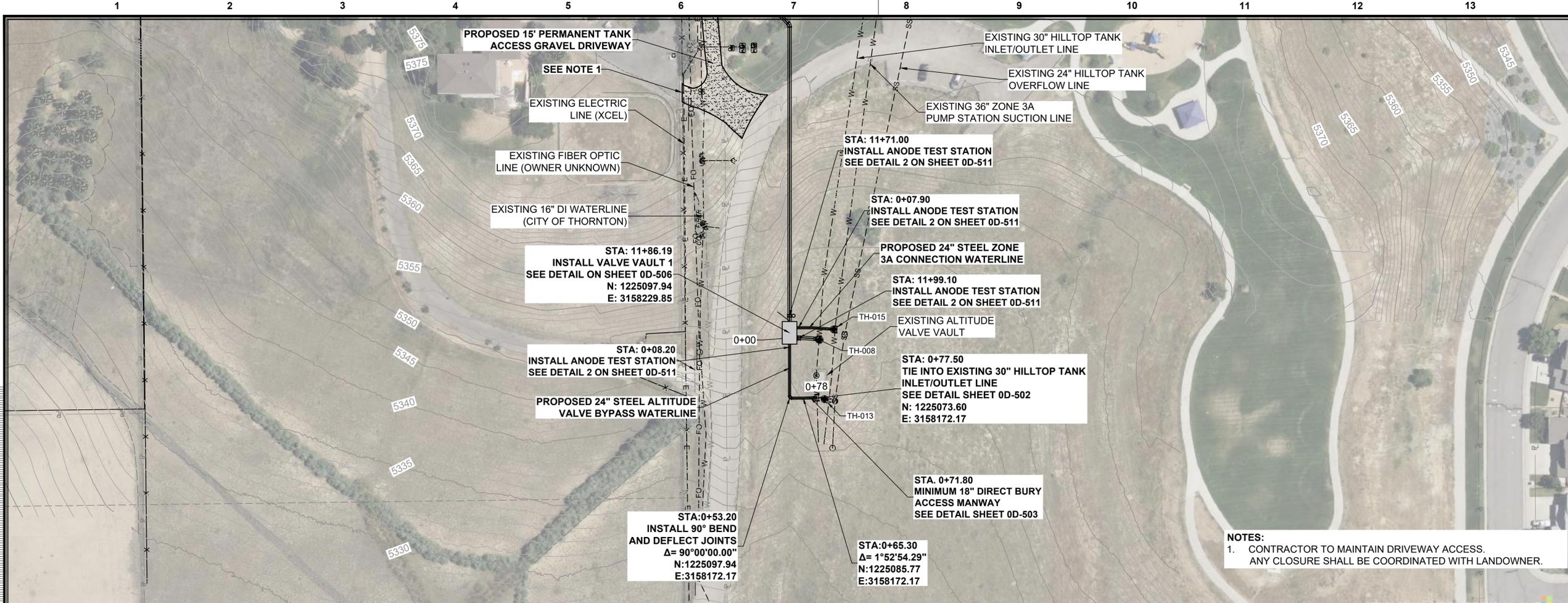
ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
24" ZONE 3A CONNECTION WATERLINE PLAN
AND PROFILE STA. 0+00 TO STA. 0+40.40

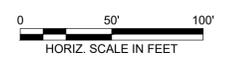
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drawing **ODP-104** rev. **0**

sheet 17 of 74 sheets
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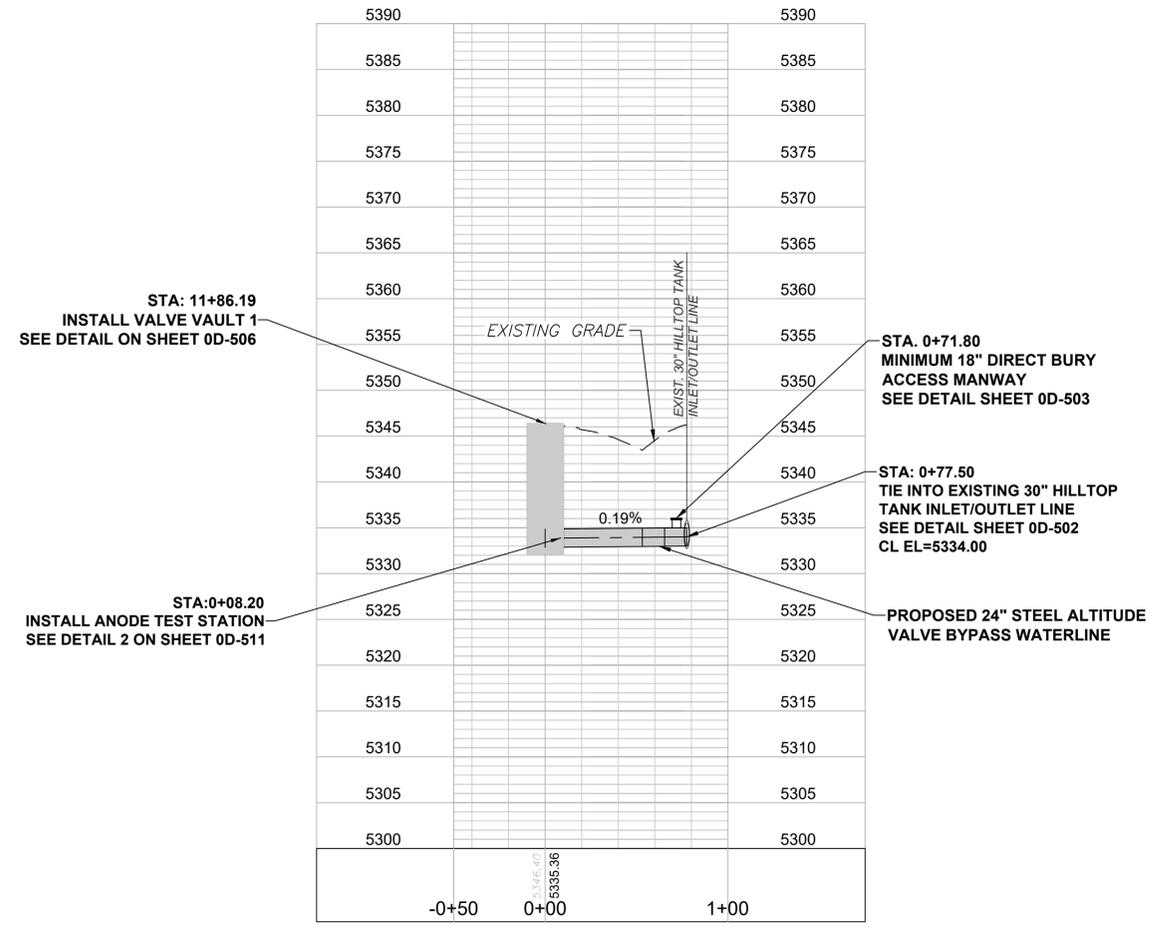
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0	10/02/24	VP	KL	ISSUED FOR BID



NOTES:
 1. CONTRACTOR TO MAINTAIN DRIVEWAY ACCESS. ANY CLOSURE SHALL BE COORDINATED WITH LANDOWNER.

Scale For Microfining

Inches



PRELIMINARY - NOT FOR CONSTRUCTION



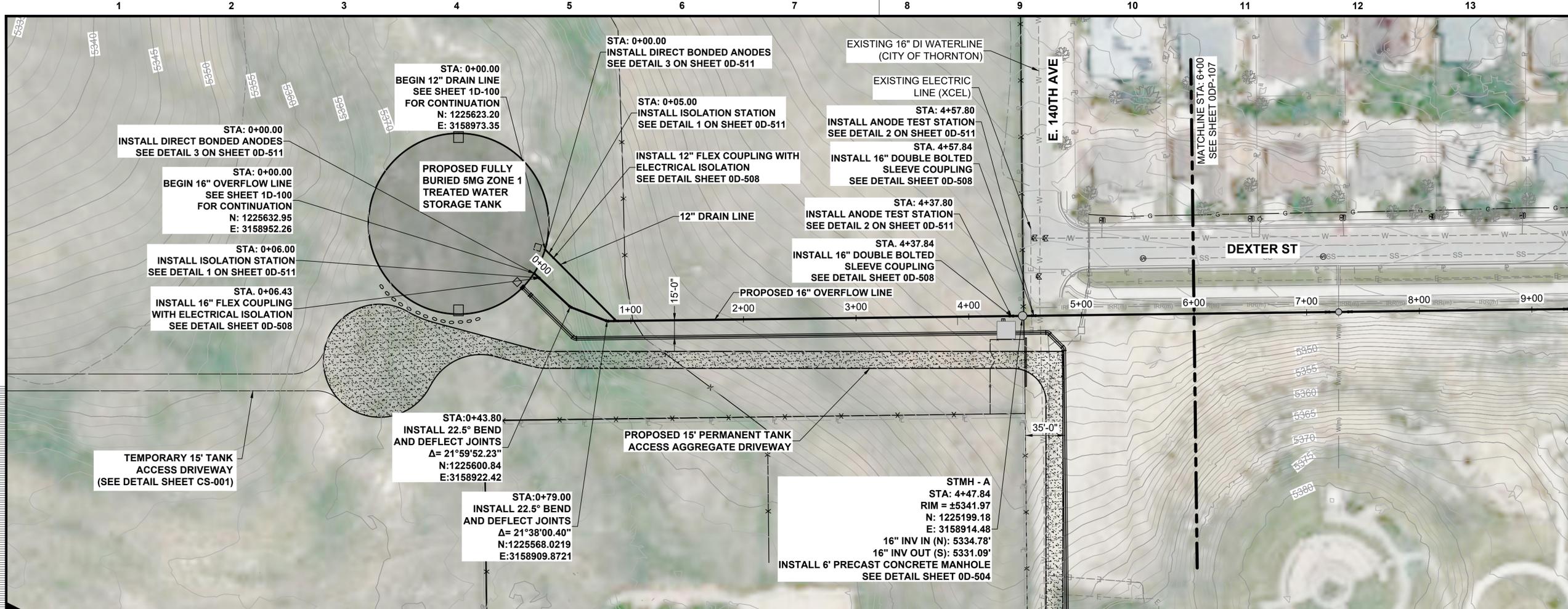
Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE

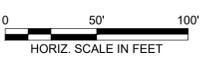


ADAMS COUNTY, COLORADO
CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 24" ALTITUDE VALVE BYPASS WATERLINE
 PLAN AND PROFILE STA. 0+00 TO STA. 0+77.50

project	162116	contract	23-150
drawing	ODP-105	rev.	0
sheet	19	of	74 sheets
file	162116_ODP-105.dwg		

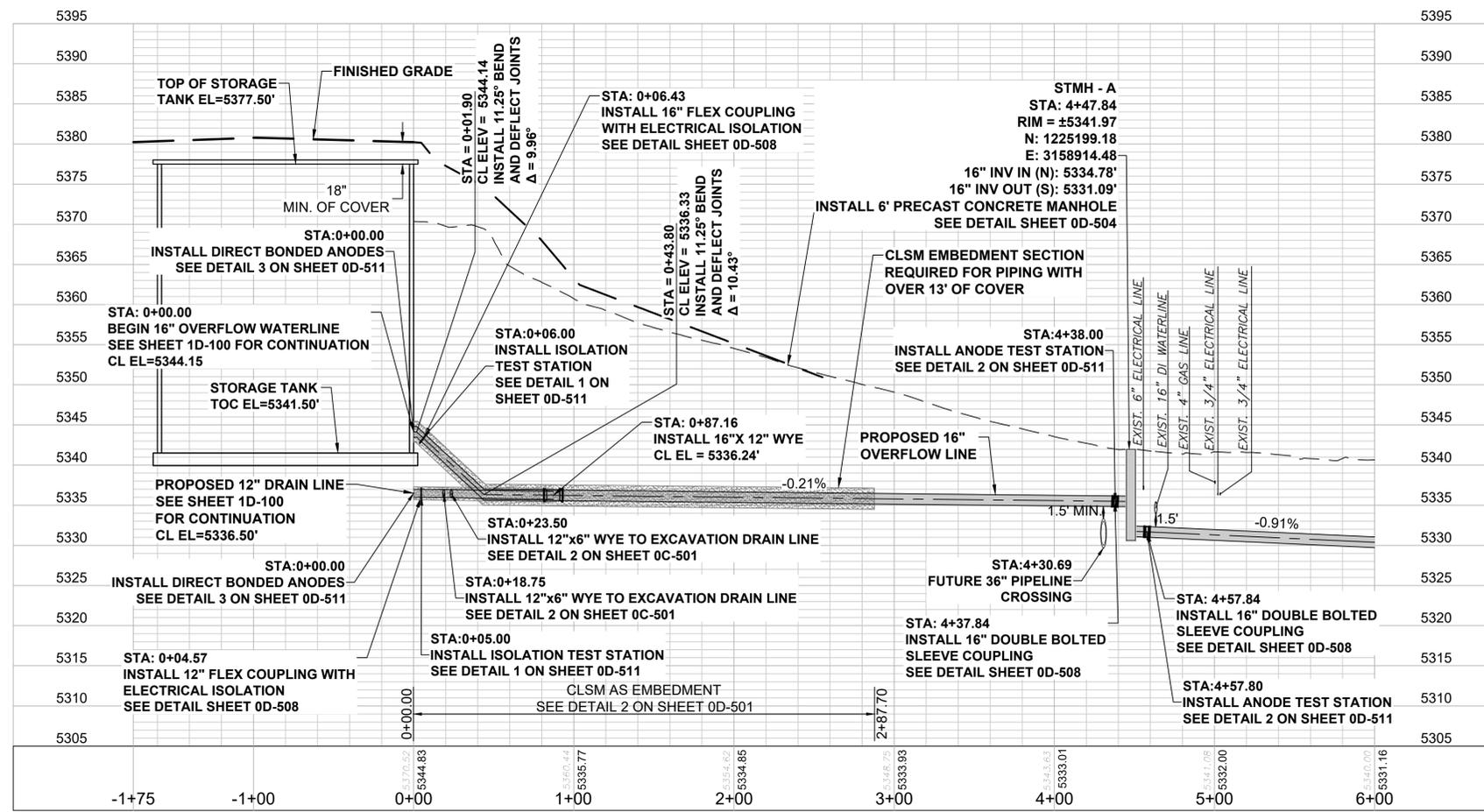


no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



Scale For Microfining
Millimeters

Inches



PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.

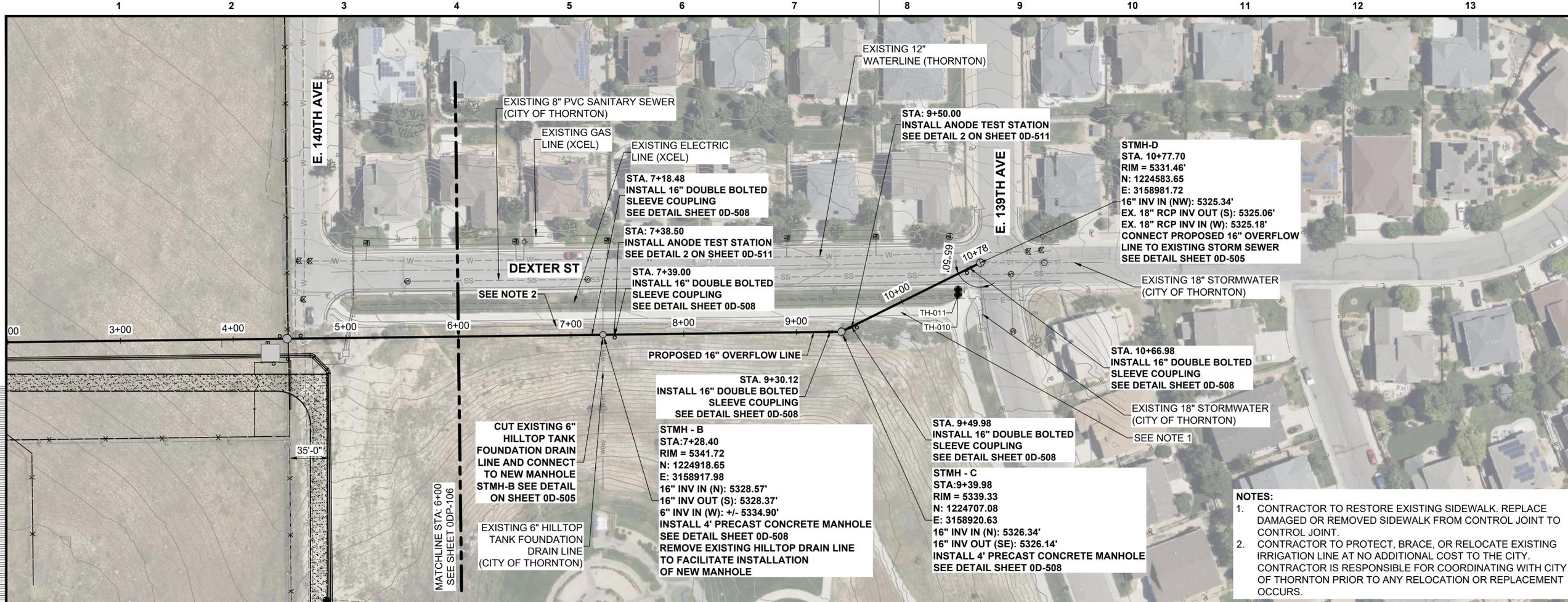
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



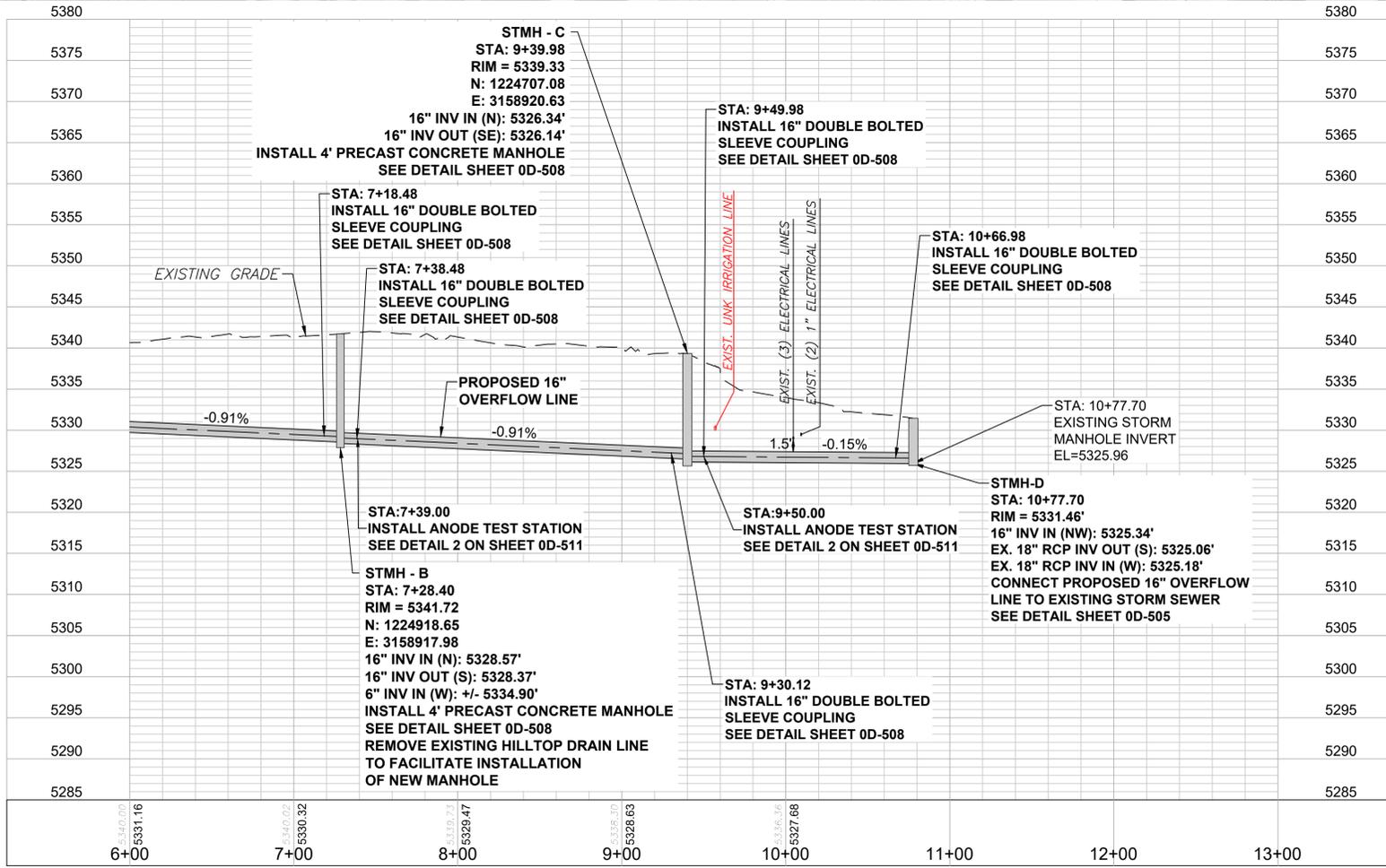
ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE 16" OVERFLOW WATERLINE
PLAN AND PROFILE STA. 0+00 TO STA. 6+00

project	162116	contract	23-150
drawing	ODP-106	rev.	0

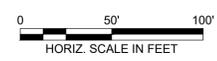
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file	162116_ODP-106.dwg			



Scale For Microfining
Millimeters
Inches



no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



- NOTES:**
- CONTRACTOR TO RESTORE EXISTING SIDEWALK. REPLACE DAMAGED OR REMOVED SIDEWALK FROM CONTROL JOINT TO CONTROL JOINT.
 - CONTRACTOR TO PROTECT, BRACE, OR RELOCATE EXISTING IRRIGATION LINE AT NO ADDITIONAL COST TO THE CITY. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH CITY OF THORNTON PRIOR TO ANY RELOCATION OR REPLACEMENT OCCURS.

PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
16" OVERFLOW WATERLINE
PLAN AND PROFILE STA. 6+00 TO STA. 10+77.70

project	162116	contract	23-150
drawing	ODP-107	rev.	0
sheet	12	of	sheets
file	162116_ODP-107.dwg		

SINGLE LINE PIPING

DOUBLE LINE PIPING

GENERAL ABBREVIATIONS

PROCESS AREA IDENTIFICATION:

no.	date	by	ckd	description
0	10/02/24	CAK	KL	ISSUED FOR BID

18" →	PIPE SIZE AND DIRECTION OF FLOW		IN-LINE FLOW METER
	GATE VALVE (GV) OR MUD VALVE (MV)		CLEANOUT (CO)
	GLOBE VALVE		DISCHARGE ELBOW ASSEMBLY
	BUTTERFLY VALVE (BFV)		STRAIGHTENING VANE
	CHECK VALVE (CV)		REMOVABLE PLUG
	STOP CHECK VALVE		REMOVABLE CAP
	PLUG VALVE (PV)		WELDED CAP
	3-WAY VALVE		BLIND FLANGE
	ANGLE VALVE		DRIP POCKET ASSEMBLY
	RELIEF OR BACKPRESSURE VALVE		STEAM TRAP ASSEMBLY
	HOSE GATE DRAIN VALVE		AIR COCK
	PINCH VALVE		HOSE BIBB
	NEEDLE VALVE		WALL HYDRANT
	DIAPHRAGM VALVE		PIPE ANCHOR
	BALL VALVE (BV)		PIPE GUIDE
	SELF-CONTAINED PRESSURE REDUCING (REGULATING VALVE)		REDUCER
	SOLENOID VALVE		UNION
	BACKFLOW PREVENTER		QUICK DISCONNECT COUPLING
	VACUUM BREAKER		VENT THROUGH ROOF
	MOISTURE SEPARATOR		INJECTOR
	IN-LINE TOTALIZING FLOW METER		CENTRIFUGAL PUMP
	LOCKED OPEN		PROGRESSIVE CAVITY PUMP
	LOCKED CLOSED		BLOWER
	NORMALLY OPEN		POSITIVE DISPLACEMENT BLOWER
	NORMALLY CLOSED		FAN
	FLEXIBLE HOSE		DIAPHRAGM METERING PUMP
	EXPANSION ELEMENT (JOINT)		VACUUM TRAP
	FLEXIBLE BALL JOINT		WATER SURFACE (WS)
	BASKET TYPE STRAINER		PULSATION DAMPENERS W/ ISOLATION BALL VALVE
	TEE TYPE STRAINER		STATIC MIXER
	Y-TYPE STRAINER		GAUGE SEAL
	FLANGED COUPLING ADAPTER (FCA)		DIAPHRAGM PROTECTED PRESSURE SWITCH
	RETAINER FLANGE		CHEMICAL APPLICATION POINT
	DRAINER ASSEMBLY		PIPE SUPPORT LOCATION
	INSULATING FLANGE (I.F.)		PRESSURE REDUCING VALVE
	RESTRICTING ORIFICE		AIR RELEASE VALVE
	SIGHT FLOW INDICATOR		
	ELBOW TURNING DOWN		
	ELBOW TURNING UP		
	TYPICAL PIPE BREAK		
	PIPES IN SECTION		
	TEE TURNING DOWN		
	TEE TURNING UP		
	PIPES CROSSING		
	PIPES CROSSING WITH BREAK-OUT TO SHOW PIPES OR EQUIPMENT BELOW		
	PIPES IN SECTION		

	GATE VALVE		AIR VAC
	BUTTERFLY VALVE		GLOBE VALVE
	FLANGED COUPLING ADAPTOR		STRAINER
	REDUCER		MAG METER
	FLANGED PIPING		BLIND FLANGE
	DOUBLE BOLTED SLEEVE COUPLING		WALL PIPE PENETRATION
	EXPANSION JOINT		
	MECHANICAL JOINT PIPING		
	HARNESSED SLEEVE COUPLING		
	CHECK VALVE		
	BALL VALVE		
	AIR/OIL CYLINDER		
	PLUG VALVE		
	INLINE STRAINER		
	DISMANTLING JOINT		
	ELBOW TURNING DOWN		
	ELBOW TURNING UP		
	PIPES CROSSING		
	TYPICAL PIPE BREAK		
	PIPES CROSSING WITH BREAK-OUT TO SHOW PIPES OR EQUIPMENT BELOW		
	PIPES IN SECTION		

LINETYPES

	EXISTING
	NEW CONSTRUCTION
	FUTURE CONSTRUCTION

MARKER

	EQUIPMENT MARKER
	VALVE MARKER

PROCESS TAGGING SYSTEM:

AREA EQUIPMENT LOOP NUMBER

XXXX-XXXX-####

LOOP NUMBER:

SYSTEM TRAIN QUANTITY/SEQUENCE

#

GENERAL ABBREVIATIONS

AAG	ABOVE AT GRADE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
BD	BLOWDOWN
BOC	BOTTOM OF CONCRETE
BOW	BOTTOM OF WEIR
CI	CAST IRON
CL	CENTERLINE
CO	CLEANOUT
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRAIN
DV	DRAIN VALVE
EL	ELEVATION
FCA	FLANGED COUPLING ADAPTER
FF	FINISHED FLOOR
FM	FORCE MAIN
FP	FIRE PROTECTION
FRP	FIBER REINFORCED PLASTIC
HGL	HYDRAULIC GRADE LINE
HWL	HIGH WATER LEVEL
ID	INNER DIAMETER
IE	INVERT ELEVATION
INV	INVERT
LWL	LOWER WATER LEVEL
MAX	MAXIMUM
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MIN	MINIMUM
NG	NATURAL GAS
NIC	NOT IN CONTRACT
OC	ON CENTER
OVE	OVERHEAD ELECTRIC
OVF	OVERFLOW
PCW	POTABLE COLD WATER
PD	PROCESS DRAIN
PS	PIPE SUPPORT
PSI	POUNDS PER SQUARE INCH
PV	PLUG VALVE
RED	REDUCER
SS	SANITARY SEWER
SCH	SCHEDULE
SQ	SQUARE
SST	STAINLESS STEEL
TBD	TO BE DETERMINED
TBR	TO BE REMOVED
TEMP	TEMPORARY
THRU	THROUGH
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TOW	TOP OF WALL
UGE	UNDERGROUND ELECTRIC
UGT	UNDERGROUND TELEPHONE
UNO	UNLESS NOTED OTHERWISE
VT	VERTICAL TURBINE
W	WATER SUPPLY LINE
WS	WATER SURFACE

PROCESS PIPE IDENTIFICATION:

AIR	AIR PIPING
FA	FOUL AIR
BFF	BIOFILTER FILTRATE
CA	COMPRESSED AIR
DS	DIGESTED SOLIDS
DF	DEWATERING FEED
FCI	FINAL CLARIFIER INFLUENT
FCU	FINAL CLARIFIER UNDERFLOW
FEFF	FINAL EFFLUENT
GINF	GRIT INFLUENT
GR	GRIT RETURN
INF	PLANT INFLUENT
IRW	IRRIGATION WATER
ML	MIXED LIQUOR
NPW	NON-POTABLE WATER
POS	POLYMER SOLUTION
PR	PRESSATE RETURN
PW	POTABLE WATER
RAS	RETURN ACTIVATED SLUDGE
SC	SCUM
SEFF	SECONDARY EFFLUENT
SINF	SECONDARY INFLUENT
SNT	SUPERNATANT
SSW	SANITARY SEWER
UR	UV RETURN STREAM
WAS	WASTE ACTIVATED SLUDGE
WSC	COMBINED WAS AND SCUM

PROCESS AREA IDENTIFICATION:

AB	AERATION BASIN
ADMN	ADMINISTRATION BUILDING
BLWR	BLOWER BUILDING
BIOF	BIOFILTER
GEN	BACKUP GENERATOR SYSTEM
DIG	DIGESTOR
EFFL	EFFLUENT STRUCTURE
SITE	GENERAL SITE
HDWK	HEADWORKS BUILDING
INFL	INFLUENT LIFT STATION
OD	OXIDATION DITCH
PCLR	PRIMARY CLARIFIER
SCLR	SECONDARY CLARIFIER
SB	STORAGE BUILDING
SLDS	SOLIDS HANDLING AND DEWATERING BUILDING
SPB	SLUDGE PUMPING BUILDING
UV	UV BUILDING
WHLD	WAS HOLDING TANK

PROCESS SYSTEM IDENTIFICATION:

1 = CFS	COARSE AND FINE SCREEN
2 = GR	GRIT REMOVAL
3 = INF	INFLUENT CONTROL
4 = PC	PRIMARY CLARIFICATION
5 = AB	AERATION BASIN
6 = OD	OXIDATION DITCH
7 = SC	SECONDARY CLARIFICATION
8 = DIS	UV DISINFECTION
9 = AER	AEROBIC DIGESTION
10 = RAS	RETURN ACTIVATED SLUDGE
11 = WAS	WASTE ACTIVATED SLUDGE
12 = SCR	SCUM REMOVAL
13 = SR	SLUDGE THICKENING
14 = DW	DEWATERING
15 = EL	ELECTRICAL
16 = HVAC	HEATING, VENTILATION, AND AIR CONDITIONING

PROCESS EQUIPMENT IDENTIFICATION:

AER	AERATOR
AC	AIR COMPRESSOR
AR	AIR RECIEVER
ARV	AIR RELEASE VALVE
ATS	AUTOMATIC TRANSFER SWITCH
AVR	AIR VACUUM RELIEF VALVE
BDP	BIOFILTER DRAIN PUMP
BST	BASKET STRAINER
BFV	BUTTERFLY VALVE
BNK	UV BANK
BT	BLADDER TANK
BV	BALL VALVE
CP	PROCESS CONTROL PANEL
CV	CHECK VALVE
FT	FLOCCULATION TANK
FE	FLOW ELEMENT
G	GENERATOR
GV	GATE VALVE
GR	GRINDER
HCS	HYDRAULIC CLEANING SYSTEM
LP	208/120V POWER DISTRIBUTION
M	MOTOR
MCC	MOTOR CONTROL CENTER
MIX	MIXER
PP	480 V POWER DISTRIBUTION
PDC	POWER DISTRIBUTION CENTER
P	PUMP
PRV	PRESSURE REDUCING VALVE
PV	PLUG VALVE
RDR	RADAR
RTU	REMOTE TERMINAL UNIT WIT OIT
SG	SLIDE GATE
SP	STOP PLATE
SV	SURGE RELIEF VALVE
UF	UNIVERSAL AIR FILTER
VFD	VARIABLE FREQUENCY DRIVE
WG	WEIR GATE
XFM	TRANSFORMER

PRELIMINARY - NOT FOR CONSTRUCTION



date OCTOBER 2024	detailed N. KROUSS
designed C. KISSNER	checked K. LEBRASSE



CITY OF THORNTON
5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 PROCESS GENERAL NOTES, LEGEND, AND ABBREVIATIONS

project 162116	contract 23-150
drawing 00D-001	rev. 0
sheet 21	of 74
of 74	sheets

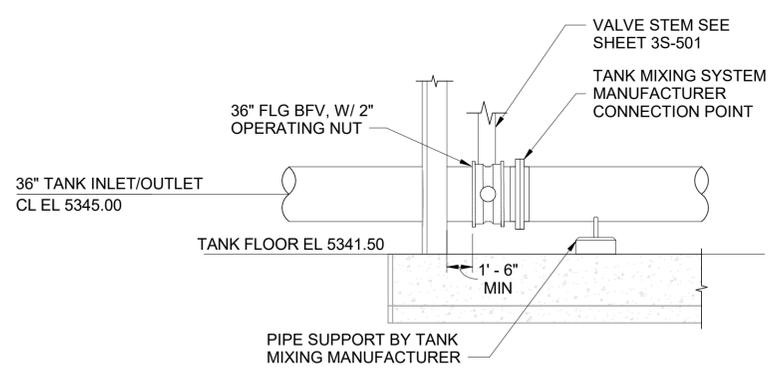
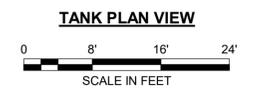
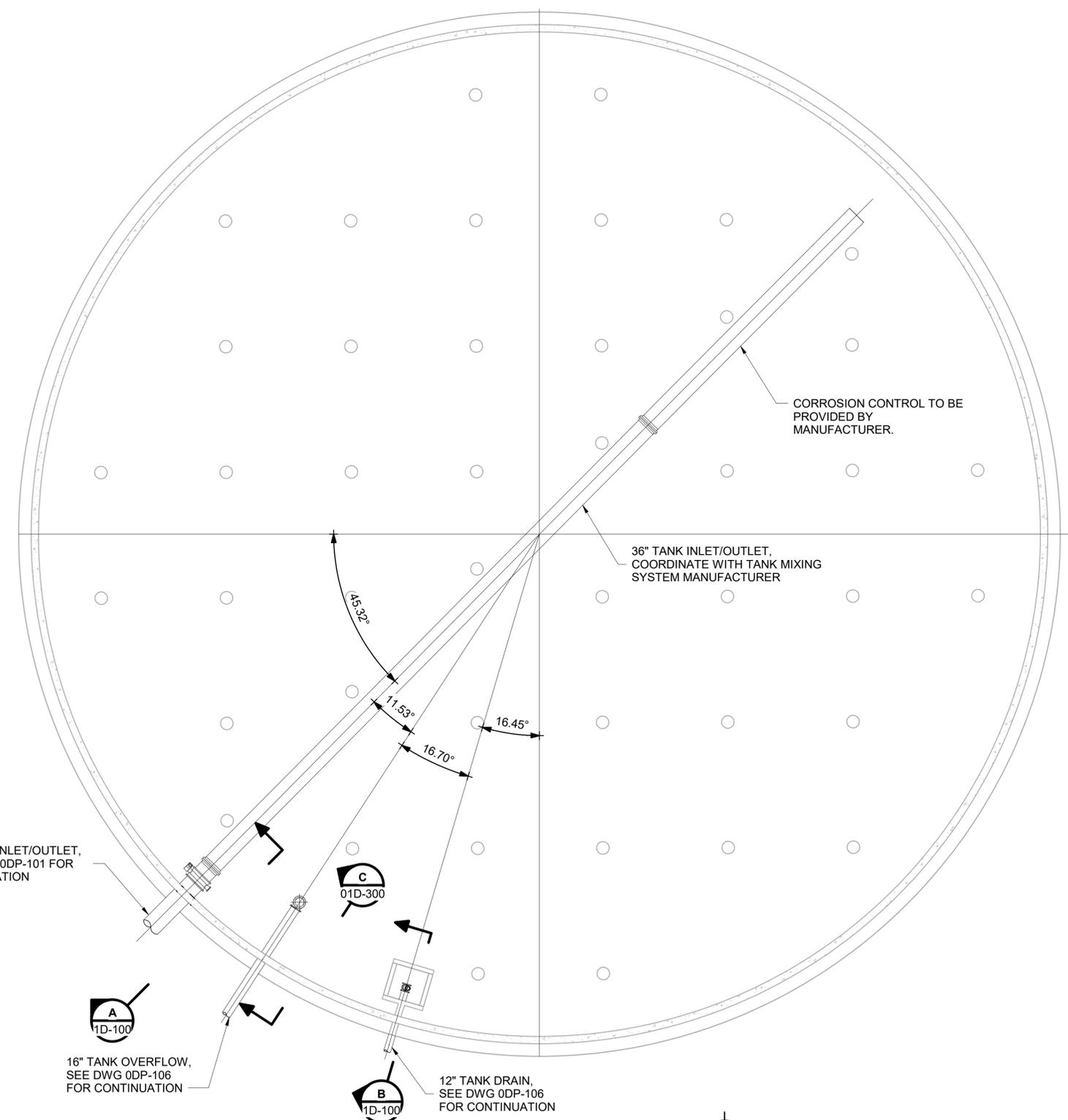
- NOTES:**
- THIS IS A STANDARD PROCESS LEGEND AND NOT ALL ITEMS OR EQUIPMENT AS DESIGNATED HEREON ARE USED ON THIS PROJECT.
 - THIS SHEET APPLIES TO PROCESS DRAWINGS LABELED DXXX AND PROCESS AND INSTRUMENTATION DRAWINGS LABELED IXXX.

Millimeters
Scale For Microfilming

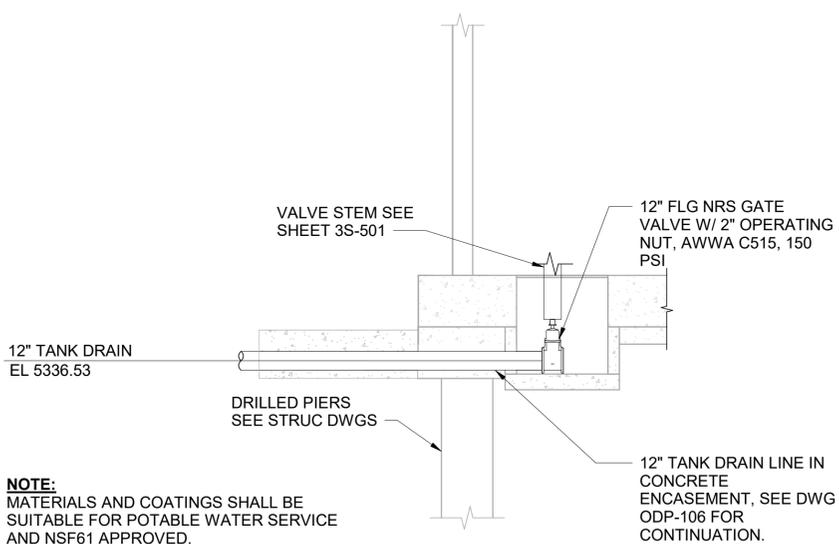
Inches

10/2/2024 12:25:29 PM

Millimeters
Scale For Microfilming
Inches



SECTION A
NOT TO SCALE
1D-100



SECTION B
NOT TO SCALE
1D-100

NOTE:
MATERIALS AND COATINGS SHALL BE SUITABLE FOR POTABLE WATER SERVICE AND NSF61 APPROVED.

no.	date	by	ckd	description
0	10/02/24	CAK	KL	ISSUED FOR BID

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS & MCDONNELL
9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed N. KROUSS
designed C. KISSNER	checked K. LEBRASSE



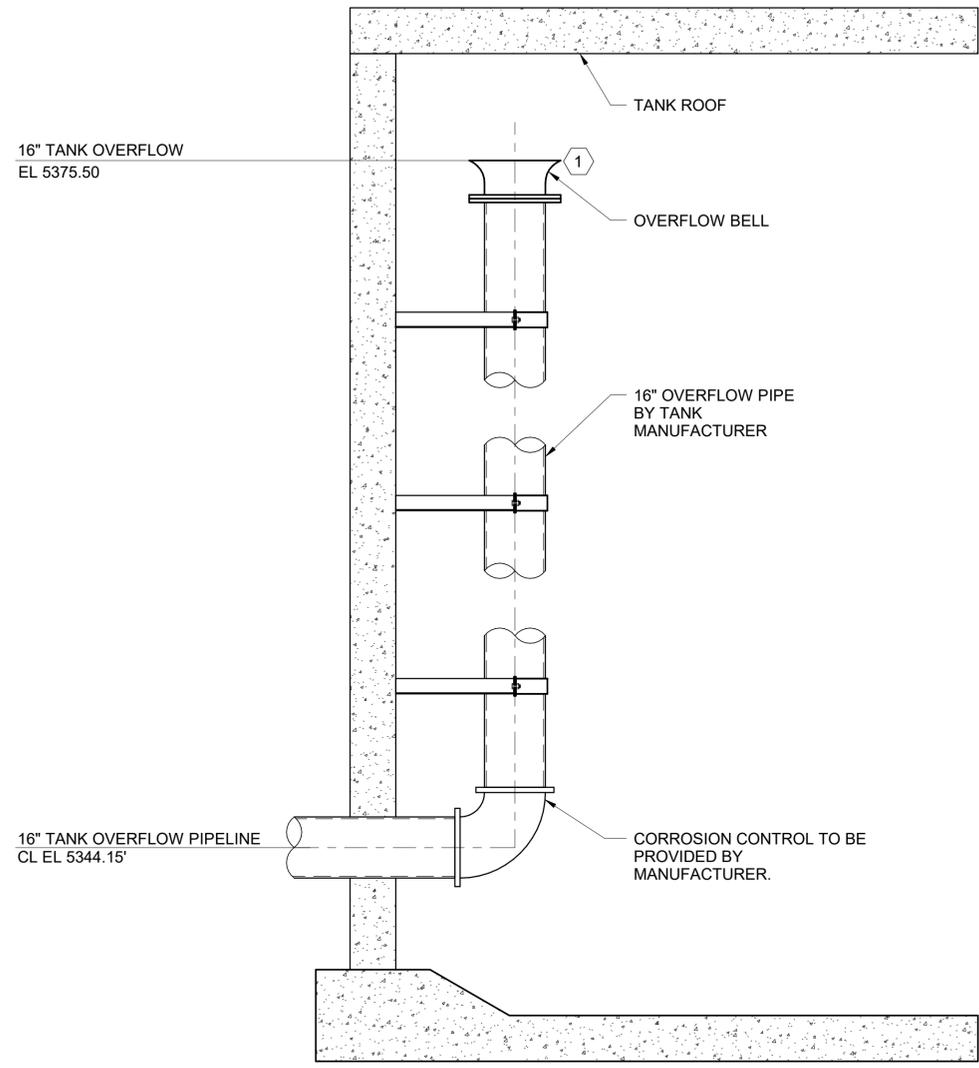
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
TANK PIPING PLAN & SECTIONS

project 162116	contract 23-150
drawing 1D-100	rev. 0
sheet 22	of 74
of 74	sheets

no.	date	by	ckd	description
0	10/02/24	CAK	KL	ISSUED FOR BID

KEYED NOTES:

- CONTRACTOR TO SURVEY EXISTING HILLTOP TANK OVERFLOW ELEVATION PRIOR TO CONSTRUCTION OF OVERFLOW PIPE. ELEVATIONS MUST MATCH. IF ELEVATIONS DIFFER PLEASE INFORM ENGINEER PRIOR TO CONSTRUCTION OF OVERFLOW PIPELINE.



SECTION C
NOT TO SCALE 1D-100

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS & MCDONNELL
9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed N. KROUSS
designed C. KISSNER	checked K. LEBRASSE

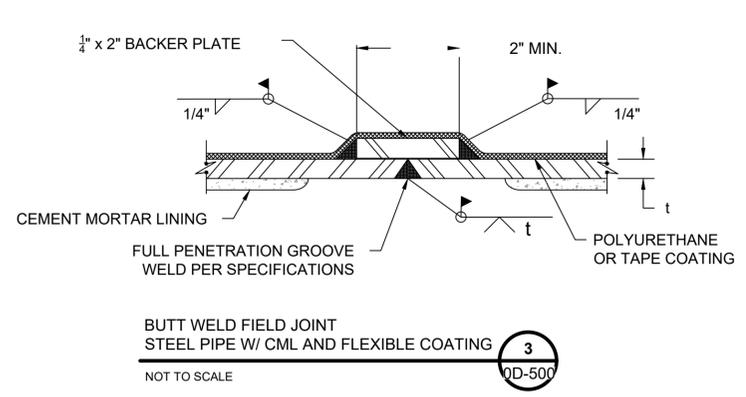
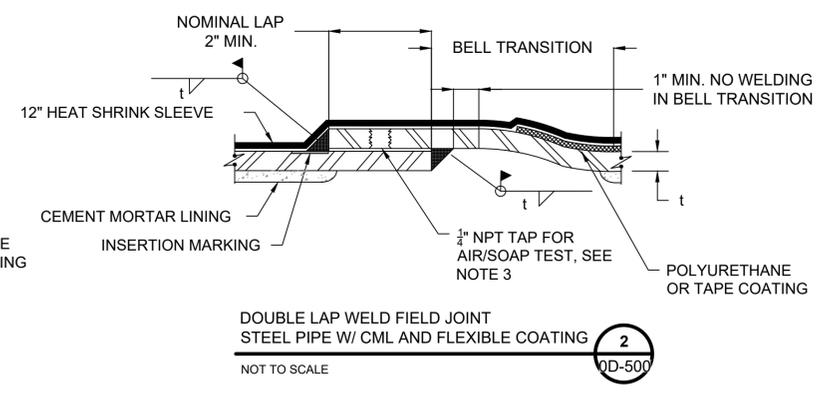
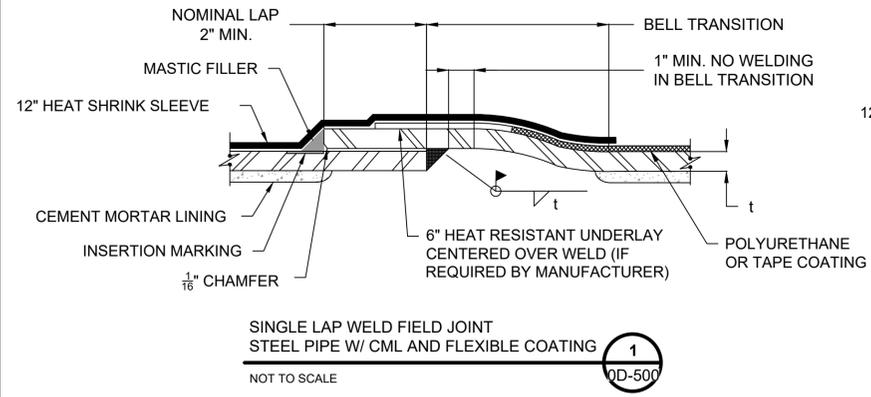


CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
PROCESS SECTIONS

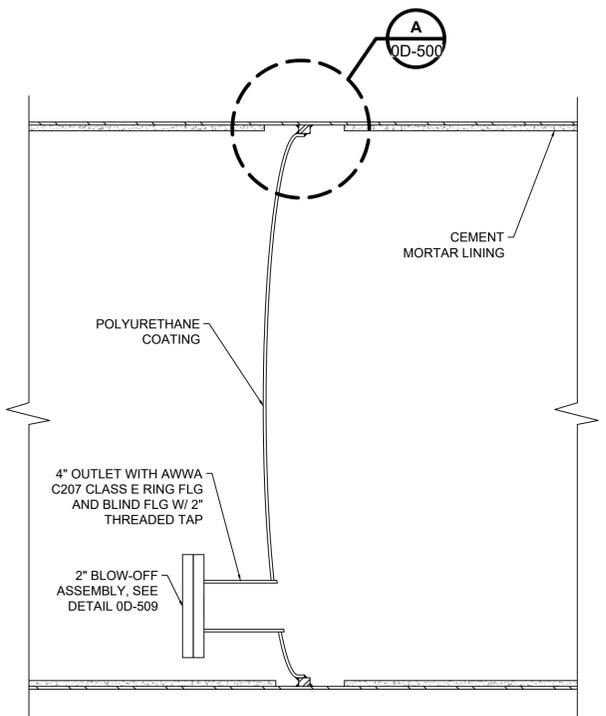
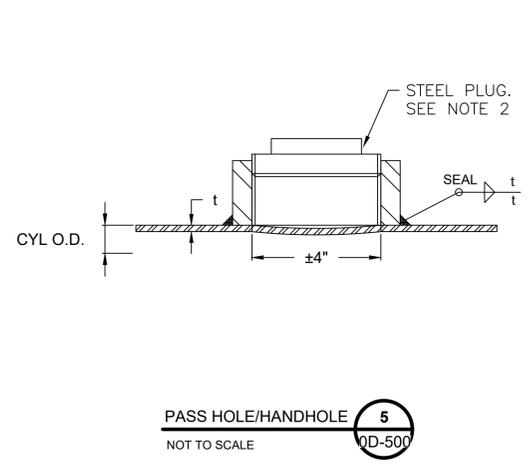
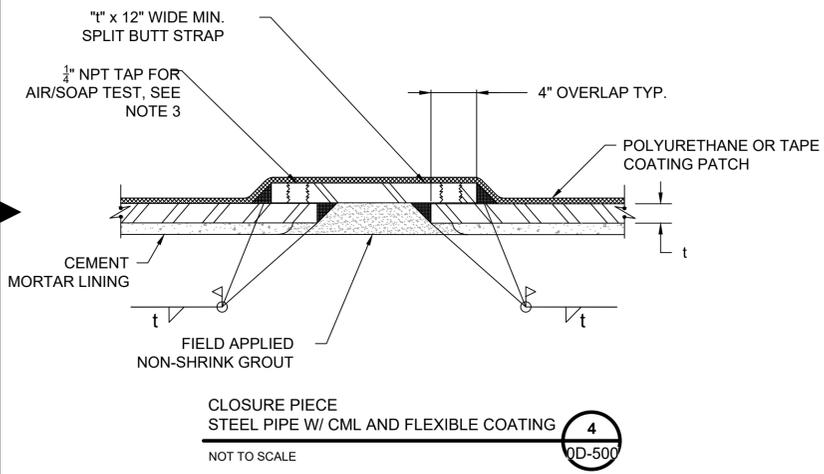
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drawing 01D-300	rev. 0
sheet 23 of 74 sheets	

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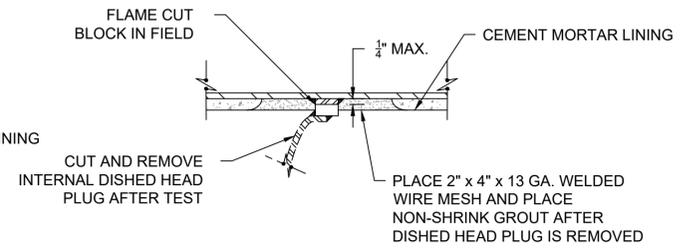
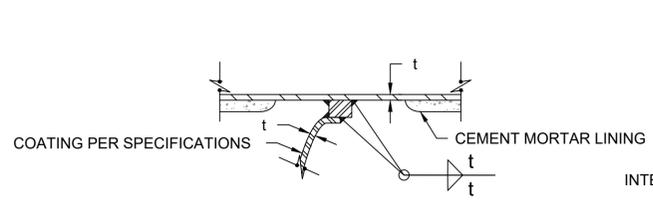
- NOTES:**
1. FIELD WELD IN ACCORDANCE WITH SPECIFICATIONS.
 2. PROVIDE NECESSARY COATING AND LINING HOLD BACK FOR FIELD WELDING IN ACCORDANCE WITH SPECIFICATIONS.
 3. AIR TEST JOINT BETWEEN THE TWO FILLET WELDS TO 40 PSI. PAINT WELDS WITH SOAP SOLUTION AND MARK LEAKS INDICATED BY ESCAPING GAS BUBBLES AND REPAIR. CLOSE THREADED OPENINGS WITH FLUSH PIPE PLUGS OR BY PLUG WELDING THEM. PERFORM TEST PER AWWA C206 REQUIREMENTS.



- NOTES:**
1. FIELD WELD IN ACCORDANCE WITH SPECIFICATIONS.
 2. PLACE FIELD APPLIED NON SHRINK GROUT AFTER WELDING AND AIR/SOAP TEST.
 3. WELD SIZE SHALL MATCH THICKNESS OF BUT STRAP AND CARRIER PIPE, OR AS RECOMMENDED BY THE PIPE MANUFACTURER.
 4. NO ANGULAR DEFLECTION.

- NOTES:**
1. ALL DIMENSIONS ARE IN INCHES.
 2. SHIP WITH PLUG INSTALLED. SEAL WELD AND COAT IN FIELD AFTER USE AND PRIOR TO BACKFILL OPERATIONS.
 3. COATING AT COUPLING/PIPE INTERFACE TO BE COVERED WITH HEAT SHRINK SLEEVE OR APPROVED EQUAL.
 4. FINISH LINING TO ID OF ITEM.
 5. OUTLET AND PLUG MADE FROM ASTM A105 STEEL, CL 3000, NPT, OR APPROVED EQUAL.

1. DISHED HEAD PLUGS SHALL BE CAPABLE OF WITHSTANDING HYDROSTATIC TEST PRESSURE FROM EITHER SIDE, WITH OPPOSITE SIDE EXPOSED TO ATMOSPHERIC CONDITIONS.



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date OCTOBER 2024	detailed V. PONCE
designed A. CASHON	checked K. LEBRASSE

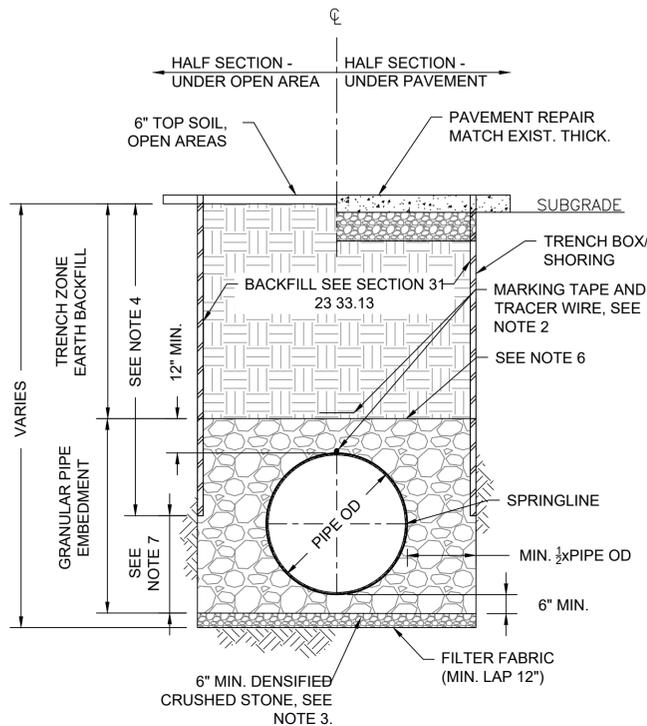


ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
STEEL PIPE DETAILS

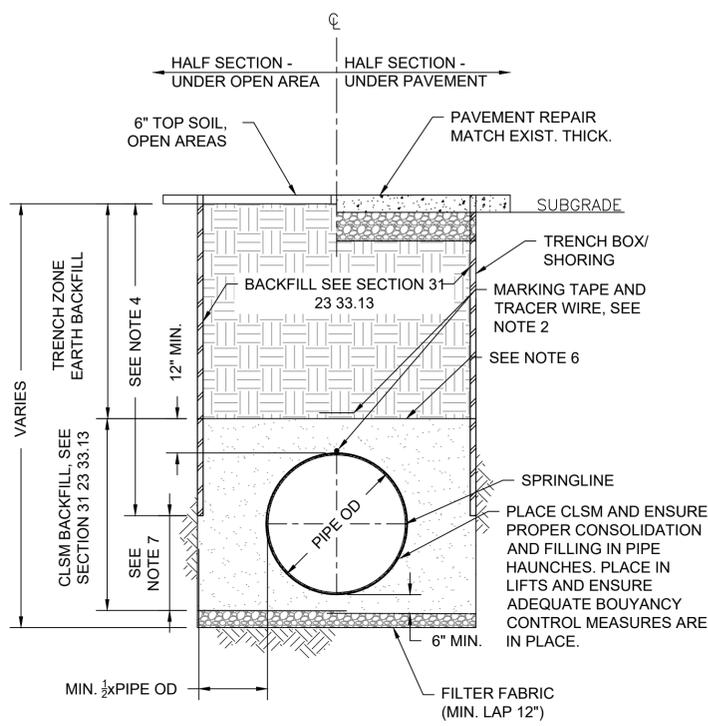
project 162116	contract 23-150
drawing 0D-500	rev. 0
sheet 24	of 74
sheets	
file 162116_0D-500.dwg	

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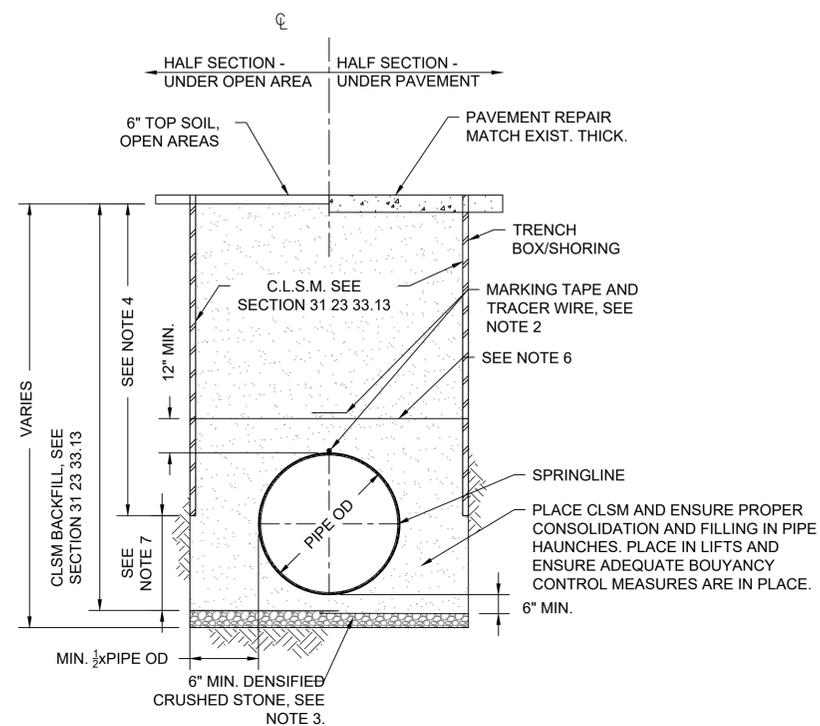
1. REFER TO TRENCHING AND BACKFILLING FOR UTILITIES SPECIFICATION FOR TRENCH BOX/SHORING REQUIREMENTS OR SLOPE TRENCH WALLS IN ACCORDANCE WITH CURRENT OSHA REQUIREMENTS.
2. INSTALL MARKING TAPE 8 TO 12" ABOVE TOP OF PIPE, AS SHOWN. REFER TO SECTION 33 05 97 - UTILITY IDENTIFICATION FOR ADDITIONAL INFORMATION.
3. OVER EXCAVATE AND USE STABILIZATION MATERIAL WHEN WET AND UNSUITABLE OR UNEXPECTED TRENCH CONDITIONS ARE FOUND DURING CONSTRUCTION.
4. PIPE EMBEDMENT ZONE MUST BE FILLED AND RECOMPACTED TO SPECIFIED DENSITIES UPON REMOVAL OR MOVEMENT OF TRENCH SAFETY SYSTEM.
5. USE POLYETHYLENE WRAP AS BOND BREAKER BETWEEN CONCRETE OR C.L.S.M. AND PIPE, BOLTS, AND FLANGES.
6. INSTALL ORANGE HDPE FENCE ACROSS ENTIRE TRENCH WIDTH, OVERLAP ENDS MIN. OF 4 FEET.
7. ADJUST HEIGHT OF UNSUPPORTED TRENCH AS NEEDED FOR SAFE CONDITIONS IN ACCORDANCE WITH CURRENT OSHA REQUIREMENTS.



TYPICAL EXCAVATION AND BEDDING/BACKFILL DETAIL
NOT TO SCALE



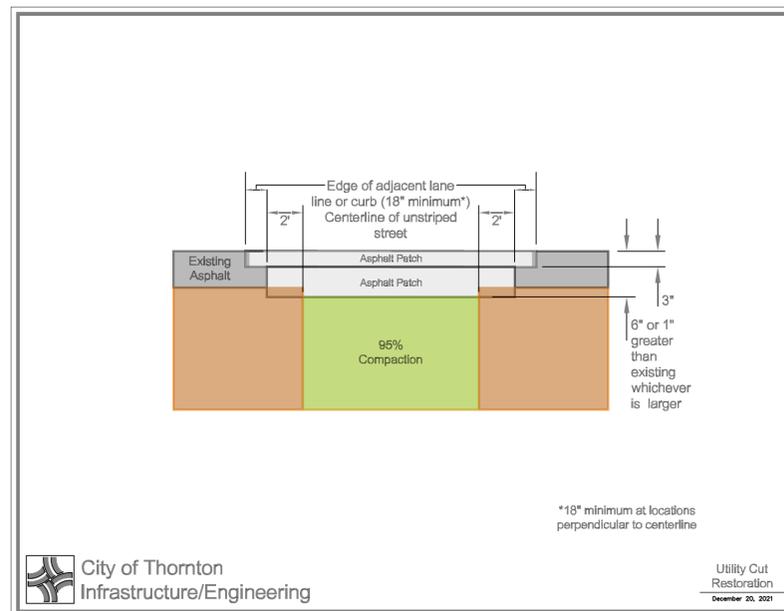
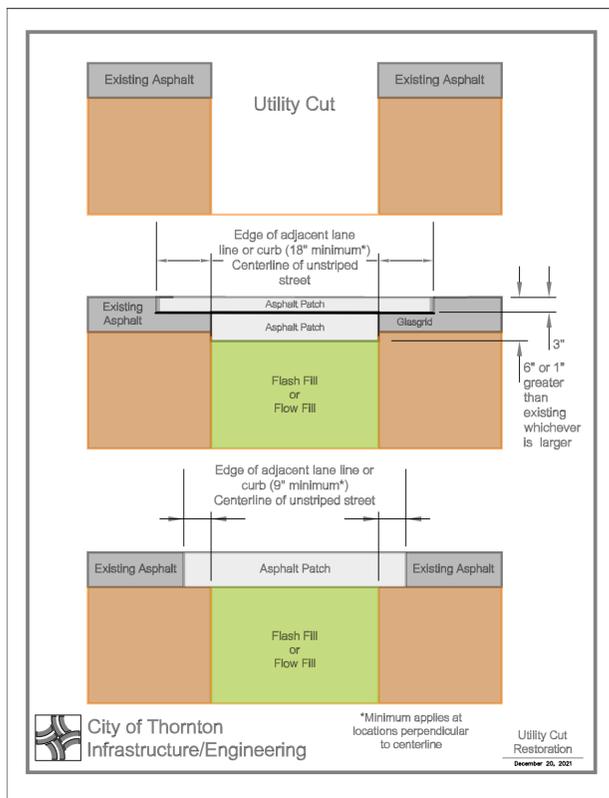
TYPICAL EXCAVATION AND CLSM BEDDING DETAIL
NOT TO SCALE



TYPICAL EXCAVATION AND CLSM BEDDING/BACKFILL DETAIL
NOT TO SCALE

Scale For Microfinishing
Millimeters

Inches



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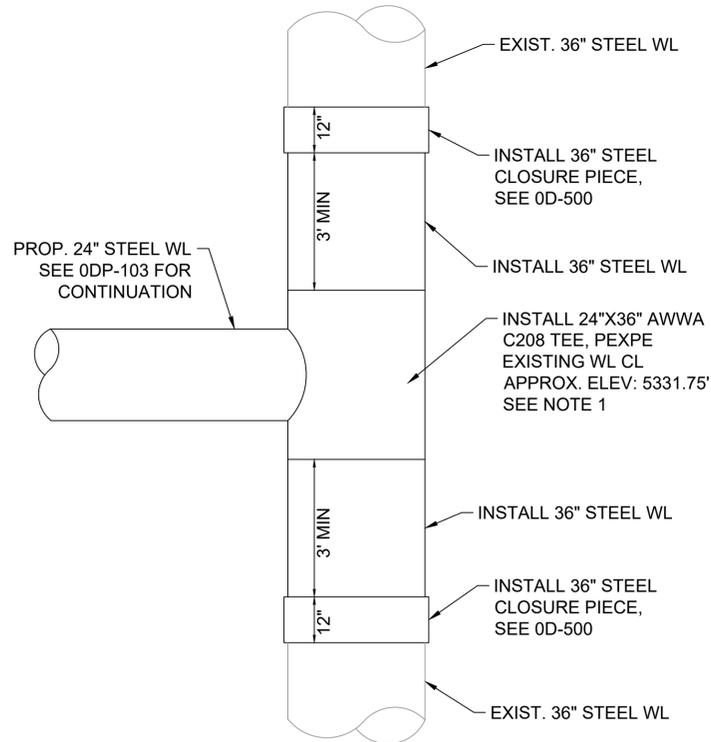
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
PIPE EXCAVATION AND BACKFILL DETAILS

project	162116	contract	23-150
drawing	OD-501	rev.	0
sheet	25	of	74 sheets
file	162116_OD-501.dwg		



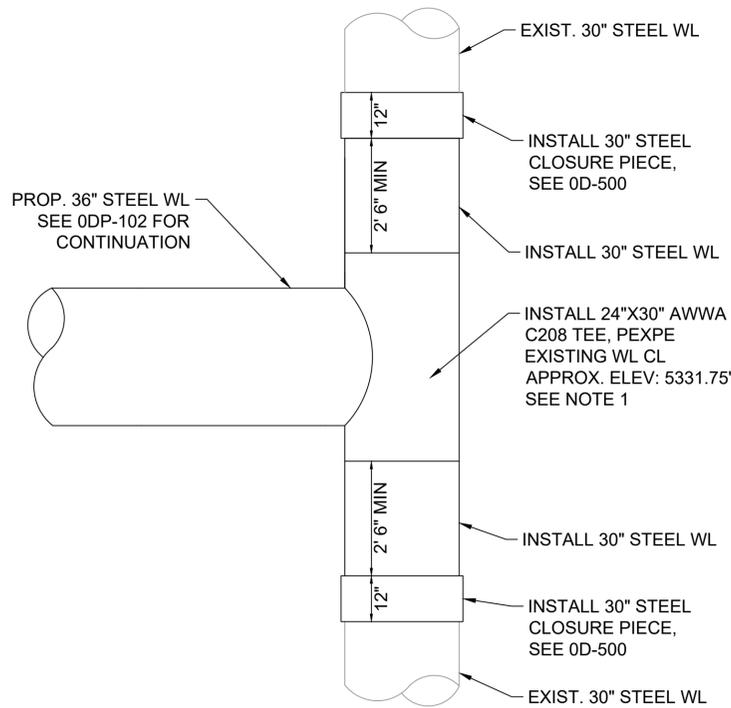
CONNECTION TO EXISTING 36" ZONE 3A PUMP STATION SUCTION LINE



SCALE: 1/2" = 1' 0"

NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING 36" WL ELEVATION PRIOR TO CONNECTION. ROTATE TEE AS NEEDED TO MAKE CONNECTION.
2. REMOVE EXISTING STEEL PIPE COATING 2" EITHER SIDE OF CLOSURE PIECE (TAPER EXISTING COATING BACK), FIELD WELD CLOSURE PIECE, RECOAT EXISTING EXPOSED STEEL WITH LIQUID EPOXY OR HEAT SHRINK SLEEVE IN THE FIELD IN ACCORDANCE WITH AWWA C214.
3. EXCAVATE AND EXPOSE MIN. EXISTING PIPE NECESSARY TO INSTALL TEES. CONTRACTOR TO BRACK/SUPPORT EXISTING PIPE AS NECESSARY AND IMMEDIATELY BACKFILL UNDER PIPE AND OUTLET TEE TO REDUCE STRESS TO EXISTING PIPE.
4. WATERLINE MAY BE SHUT DOWN FOR CONNECTION DURING LOW DEMAND PERIODS. SEE SUMMARY OF WORK FOR MORE INFORMATION.



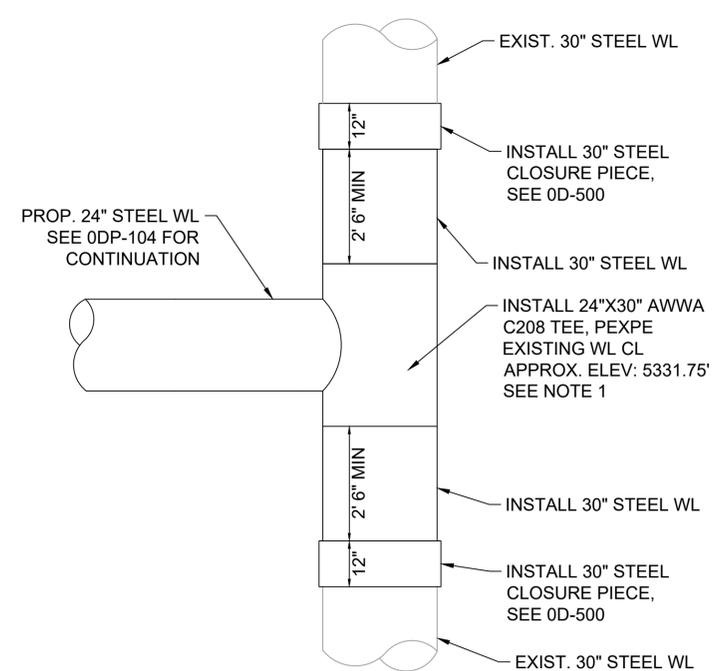
CONNECTION TO EXISTING 30" HILLTOP TANK INLET/OUTLET PIPELINE



SCALE: 1/2" = 1' 0"

NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING 30" WL ELEVATION PRIOR TO CONNECTION. ROTATE TEE AS NEEDED TO MAKE CONNECTION.
2. REMOVE EXISTING STEEL PIPE COATING 2" EITHER SIDE OF CLOSURE PIECE (TAPER EXISTING COATING BACK), FIELD WELD CLOSURE PIECE, RECOAT EXISTING EXPOSED STEEL WITH LIQUID EPOXY OR HEAT SHRINK SLEEVE IN THE FIELD IN ACCORDANCE WITH AWWA C214.
3. EXCAVATE AND EXPOSE MIN. EXISTING PIPE NECESSARY TO INSTALL TEES. CONTRACTOR TO BRACK/SUPPORT EXISTING PIPE AS NECESSARY AND IMMEDIATELY BACKFILL UNDER PIPE AND OUTLET TEE TO REDUCE STRESS TO EXISTING PIPE.
4. WATERLINE MAY BE SHUT DOWN FOR CONNECTION DURING LOW DEMAND PERIODS. SEE SUMMARY OF WORK FOR MORE INFORMATION.



ALTITUDE BYPASS PIPELINE CONNECTION TO EXISTING 30" PIPELINE



SCALE: 1/2" = 1' 0"

NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING 30" WL ELEVATION PRIOR TO CONNECTION. ROTATE TEE AS NEEDED TO MAKE CONNECTION.
2. REMOVE EXISTING STEEL PIPE COATING 2" EITHER SIDE OF CLOSURE PIECE (TAPER EXISTING COATING BACK), FIELD WELD CLOSURE PIECE, RECOAT EXISTING EXPOSED STEEL WITH LIQUID EPOXY OR HEAT SHRINK SLEEVE IN THE FIELD IN ACCORDANCE WITH AWWA C214.
3. EXCAVATE AND EXPOSE MIN. EXISTING PIPE NECESSARY TO INSTALL TEES. CONTRACTOR TO BRACK/SUPPORT EXISTING PIPE AS NECESSARY AND IMMEDIATELY BACKFILL UNDER PIPE AND OUTLET TEE TO REDUCE STRESS TO EXISTING PIPE.
4. WATERLINE MAY BE SHUT DOWN FOR CONNECTION DURING LOW DEMAND PERIODS. SEE SUMMARY OF WORK FOR MORE INFORMATION.

no.	date	by	ckd	description
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Millimeters
Scale For Microfitting
Inches

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COLORADO

ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE CONNECTIONS TO EXISTING INFRASTRUCTURE TEES

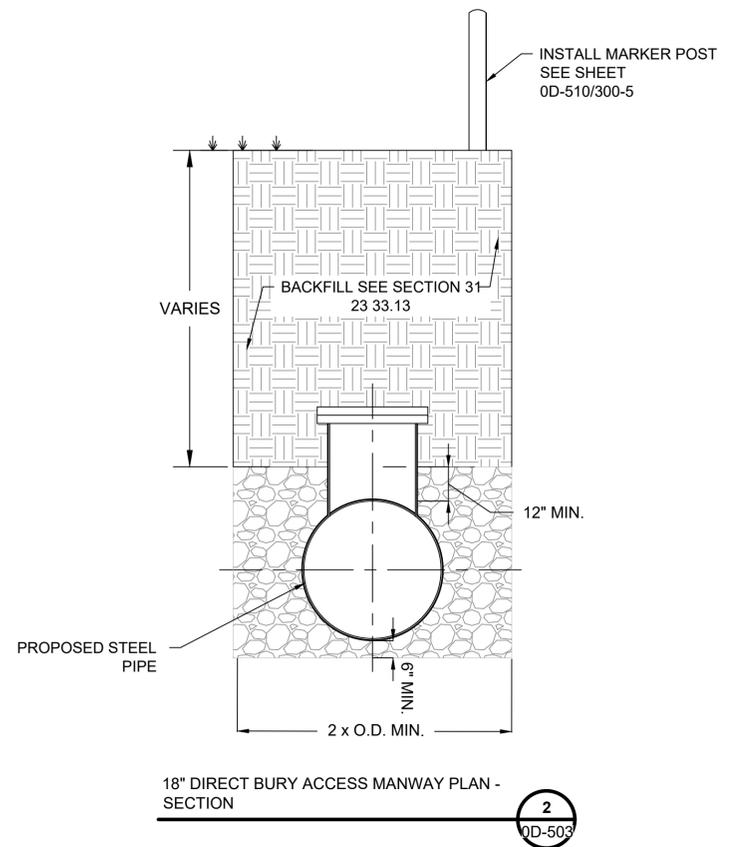
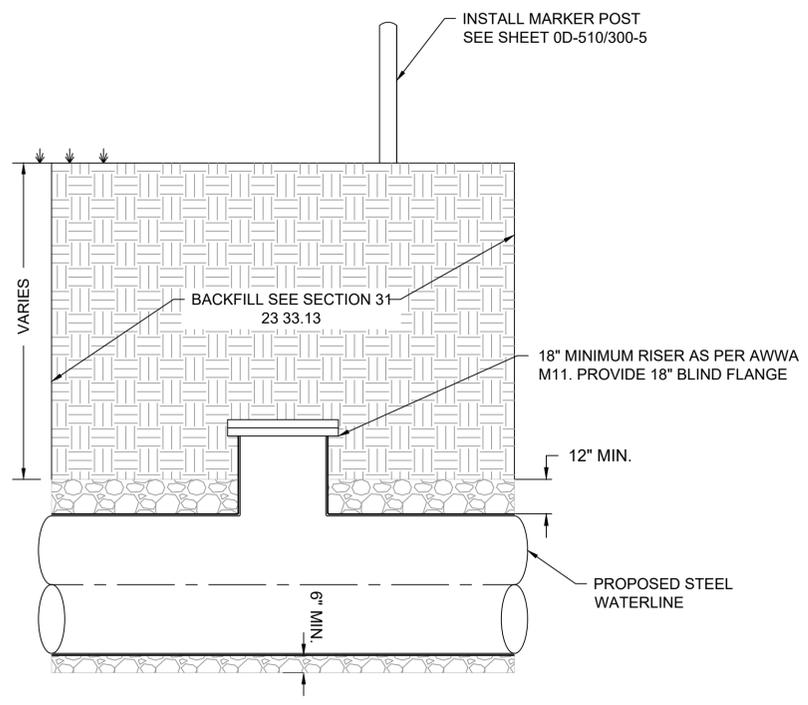
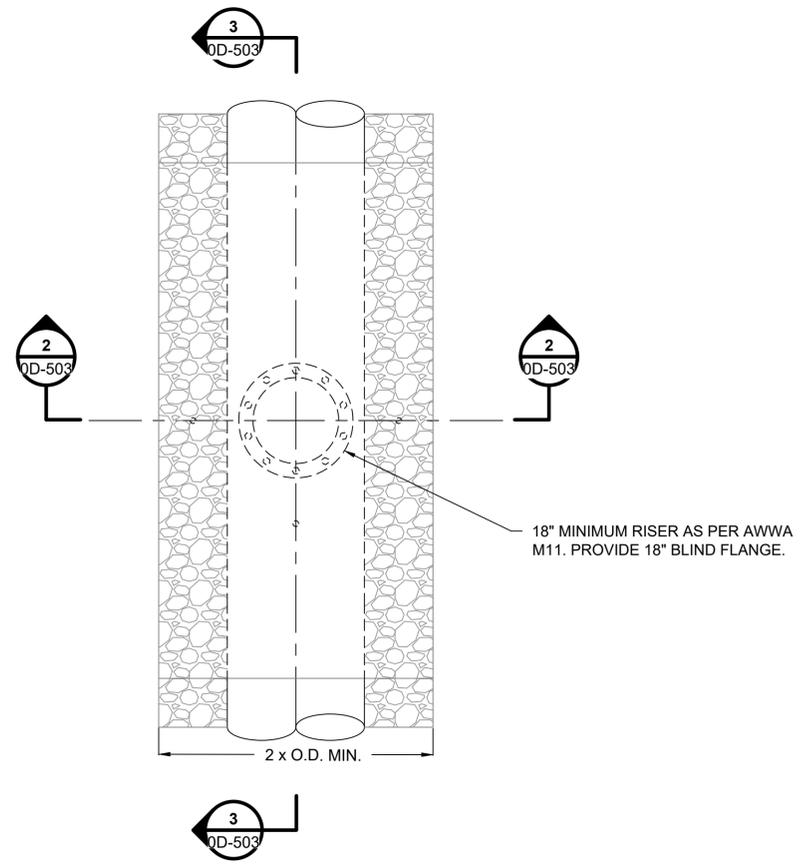
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sheet	26	of	74	sheets
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Scale For Microfitting

Inches

Millimeters

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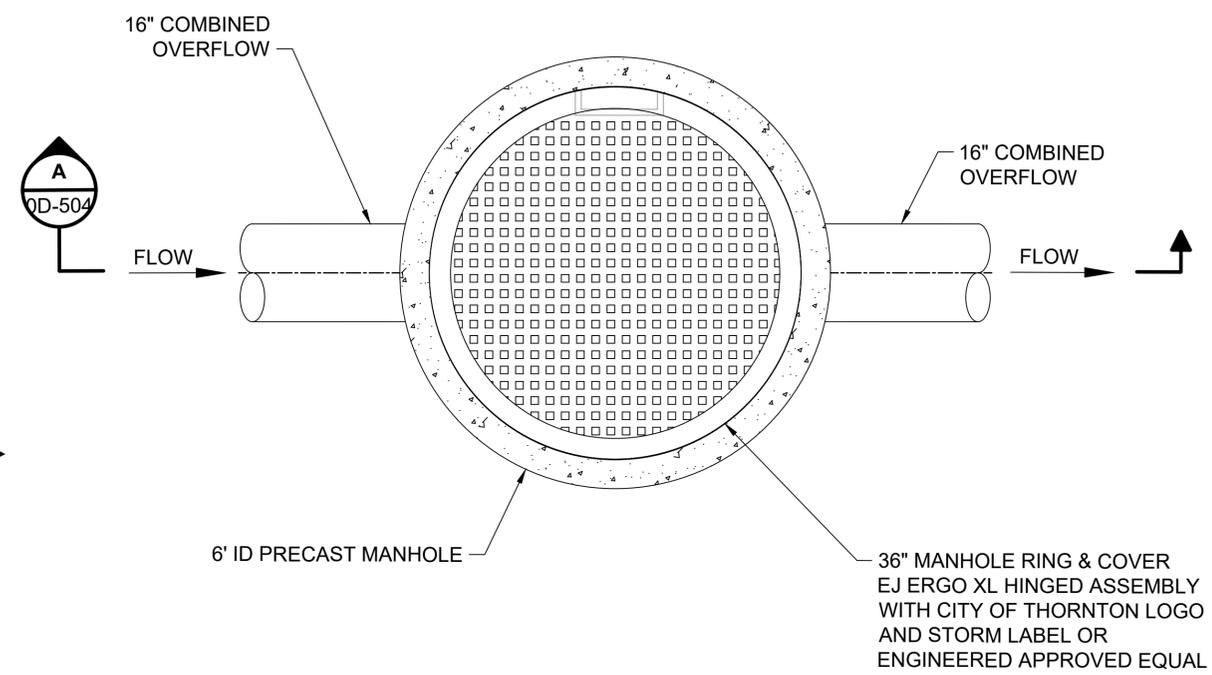
THORNTON COLORADO

ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
18" ACCESS MANWAY

project	162116	contract	23-150
drawing	OD-503	rev.	0
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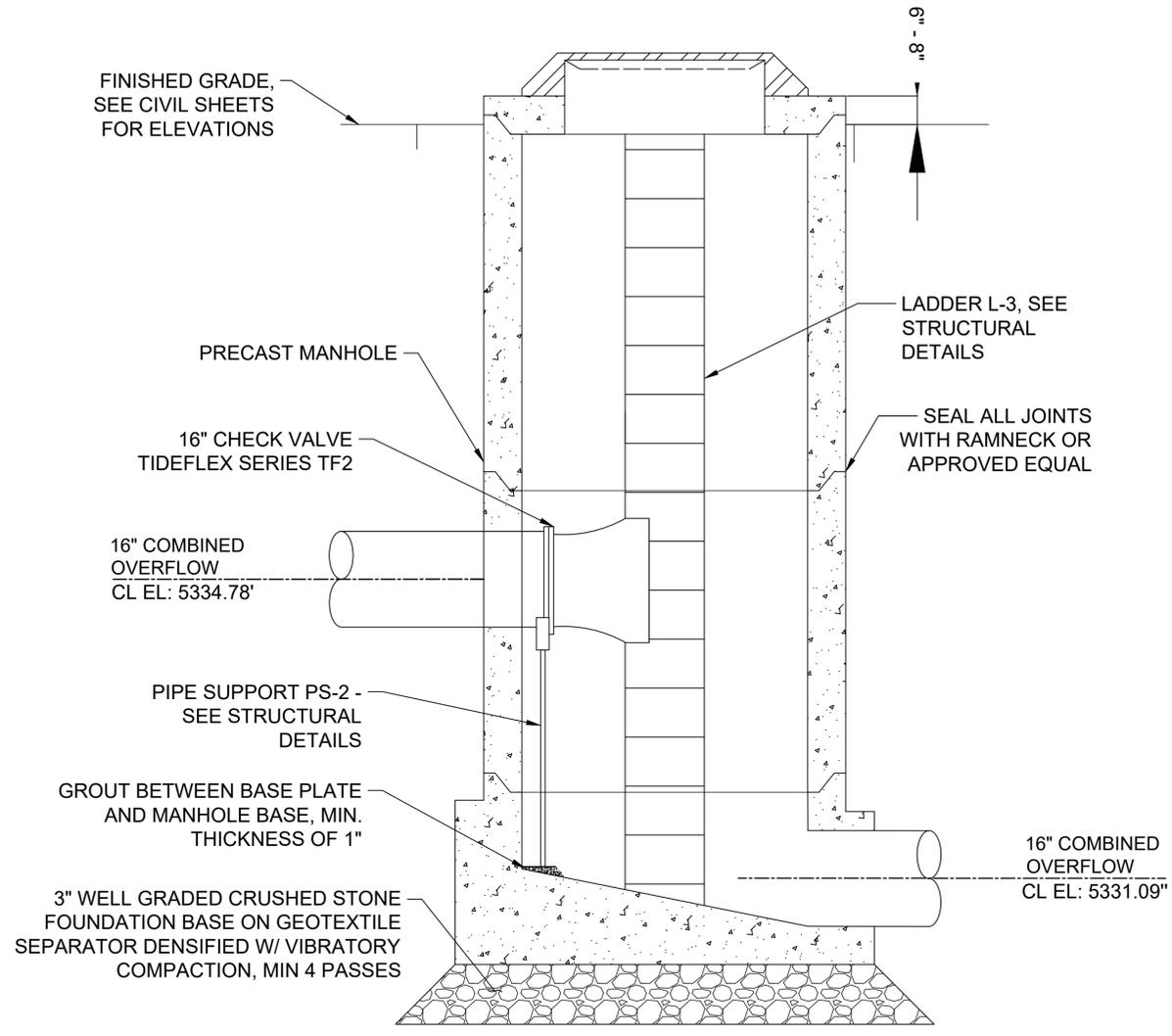
Scale For Microfinishing
Millimeters
Inches



1 STMH-A: OVERFLOW MANHOLE PLAN VIEW
DETAIL
OD-504 NOT TO SCALE

NOTES:

1. PRECAST VAULT STRUCTURAL CALCULATIONS TO BE PROVIDED BY SUPPLIER AND DESIGNED AND STAMPED BY A COLORADO PE.
2. MANHOLE BENCH HEIGHT SHALL EQUAL 1/2 PIPE DIAMETER, MINIMUM.
3. MANHOLE BENCHES SHALL BE BRUSHED AND INVERTS SHALL BE SMOOTH.
4. MANHOLE LIDS SHALL IDENTIFY ENCLOSED SPACE.
5. REFER TO PLAN VIEW FOR INTENDED PIPE PENETRATION LOCATIONS. SECTION VIEW DETAIL IS FOR ELEVATION ONLY.



A STMH-A: OVERFLOW MANHOLE SECTION
VIEW DETAIL
OD-504 NOT TO SCALE

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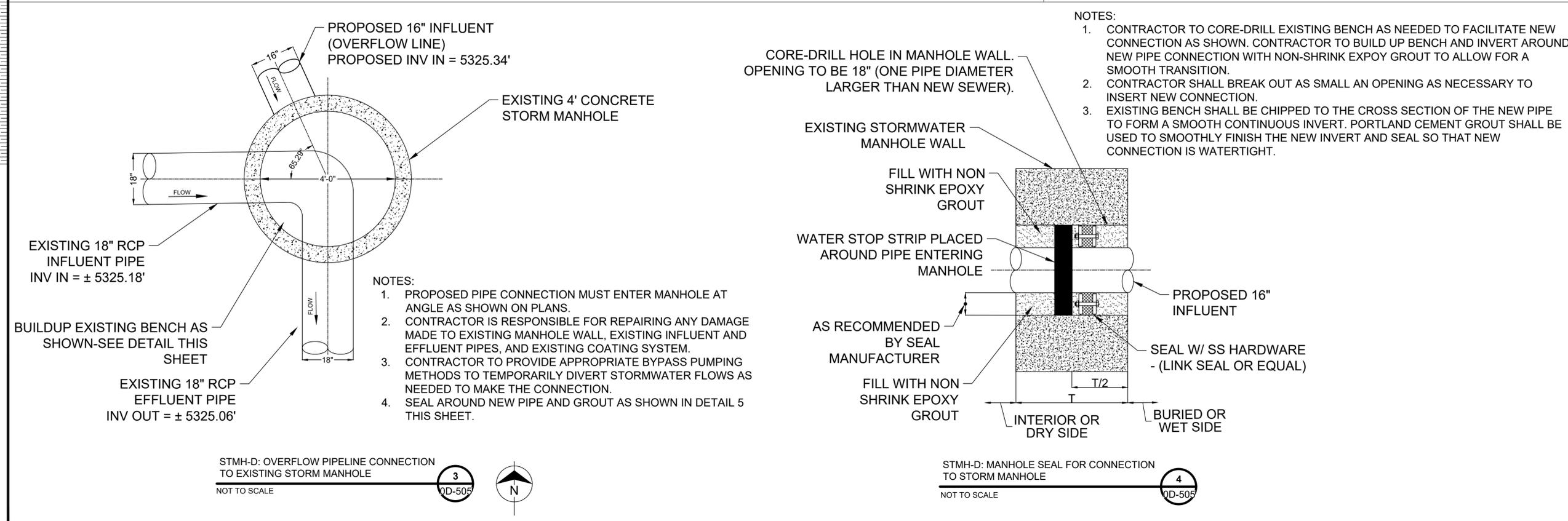
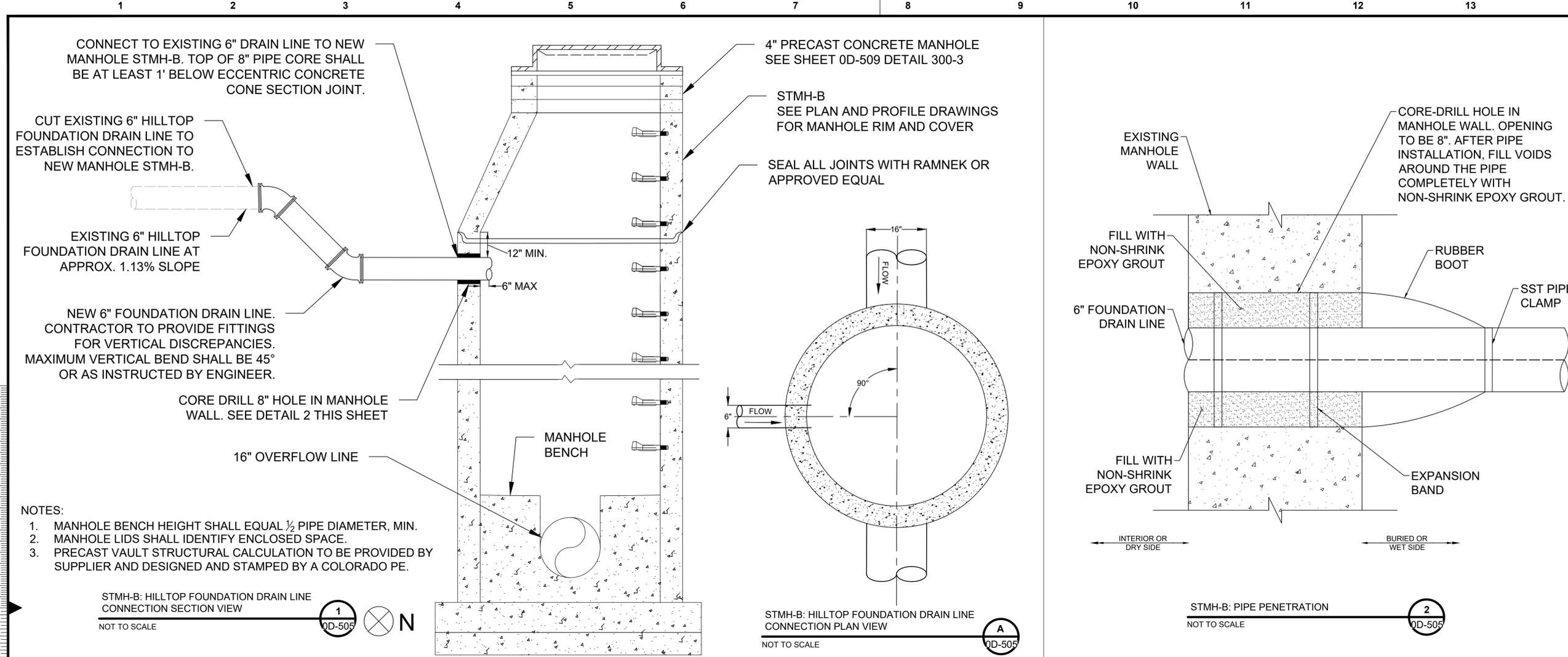
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designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
OVERFLOW MANHOLE

project	162116	contract	23-150
drawing	OD-504	rev.	0
sheet	28	of	74 sheets
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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

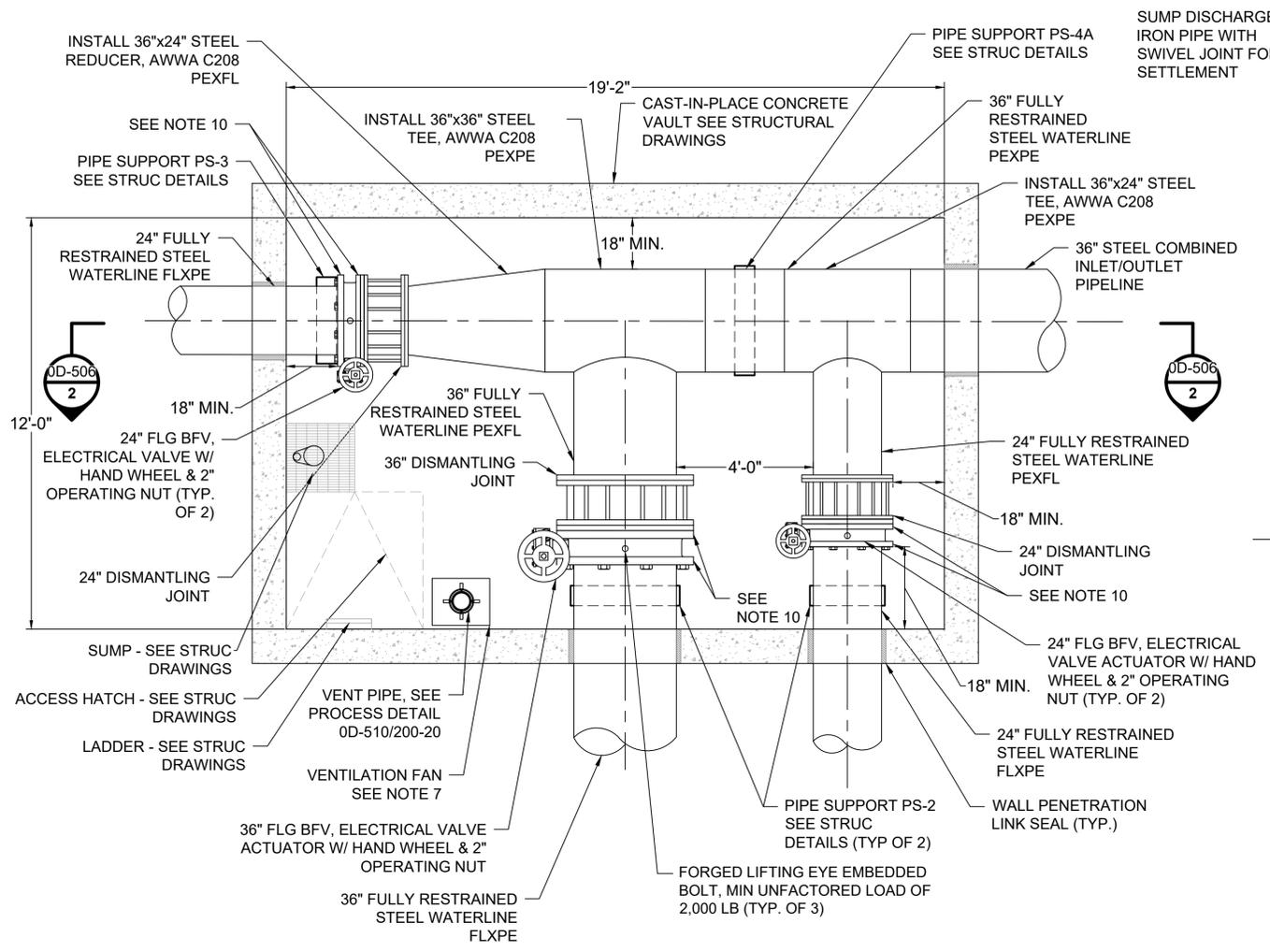
Burns & McDonnell Engineering Co., Inc.	
date	designed
OCTOBER 2024	A. CASHON
detailed	checked
V. PONCE	K. LEBRASSE



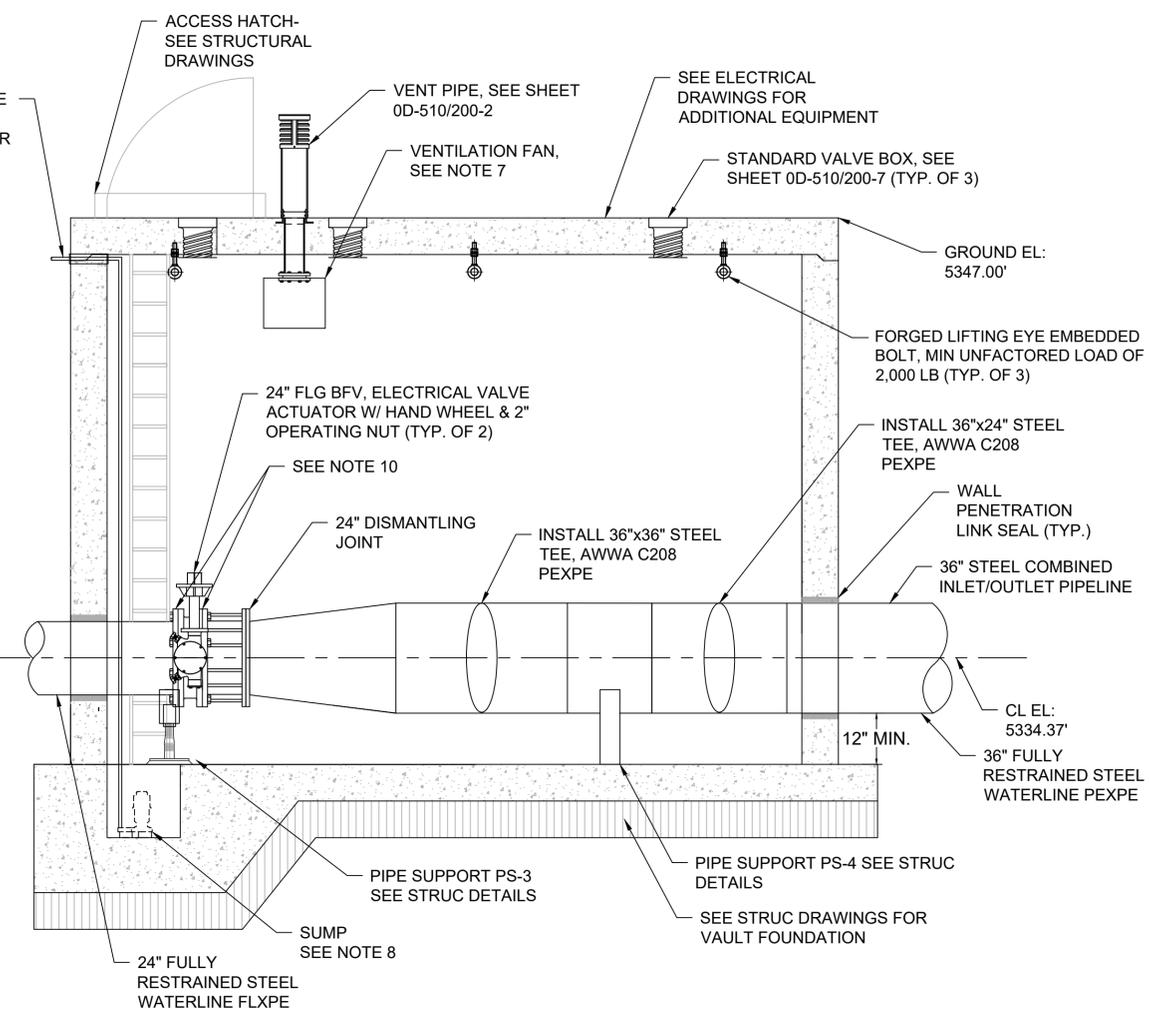
ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 MANHOLE CONNECTION
 DETAILS

project	contract
162116	23-150
drawing	rev.
0D-505	0
sheet 29 of 74 sheets	file 162116_0D-505.dwg

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



VALVE VAULT 1 - PLAN VIEW
SCALE: 1" = 2'-6"
1
JD-506



VALVE VAULT 1 - SECTION VIEW
SCALE: 1" = 2'-6"
2
JD-506

NOTES:

- COAT ALL INTERIOR PIPE USING SYSTEM AS SPECIFIED IN SECTION 09.
- VALVE OPERATORS GREATER THAN 6' FROM GRADE MUST HAVE OPERATOR EXTENSION INSTALLED.
- PROVIDE DAMPROOFING ON THE OUTSIDE OF THE VAULT AS SPECIFIED.
- PROVIDE WEATHERPROOF WHILE-IN-USE RECEPTACLE FOR SUMP PUMP. REFER TO ELECTRICAL PLANS FOR ADDITIONAL REQUIREMENTS.
- SEE STRUCTURAL SHEETS FOR ADDITIONAL VAULT DETAILS.
- CONTRACTOR SHALL VERIFY DIMENSIONS W/ MANUFACTURER AND PROVIDE VAULT W/ PROPERLY ALIGNED PENETRATIONS
- VENTILATION FAN SHALL BE MANUFACTURED BY ILG, OR AN APPROVED EQUIVALENT, MODEL PTD DIRECT-DRIVE TUBEAXIAL DUCT FAN SIZE PTD 123 (811 CFM @3/8" S.P.) WITH ONE-SIXTH (1/6) HP, 120-VOLT CONSTANT SPEED, SINGLE PHASE, 60HZ ELECTRIC MOTOR. CONTROL SWITCH FOR THE FAN SHALL BE MOUNTED NEXT TO THE ENTRYWAY SO THAT IT CAN BE OPERATED WITHOUT COMPLETELY ENTERING THE VAULT. THE DISCHARGE OF THE VENT FAN SHALL BE TOTALLY ENCLOSED AND ATTACHED TO THE OPENING OF THE EXHAUST VENT PIPE.
- SUMP PUMPS SHALL BE HYDRO-MATIC OSP50AB, OR AN APPROVED EQUIVALENT. A PIPE UNION SHALL BE INSTALLED IN THE DISCHARGE LINE BETWEEN THE PUMP AND CHECK VALVE. DISCHARGE LINE SHALL BE MADE OF IRON AND SHALL DIRECT FLOWS TO A LOCATION APPROVED BY THE CITY OF THORNTON.
- ALL CONTROL LINES AND FITTINGS SHALL BE STAINLESS STEEL.
- INSTALL FLANGE ISOLATION KITS (FIK) ON BOTH SIDES OF ELECTRICAL VALVES BETWEEN TANK AND FLEXIBLE COUPLING.

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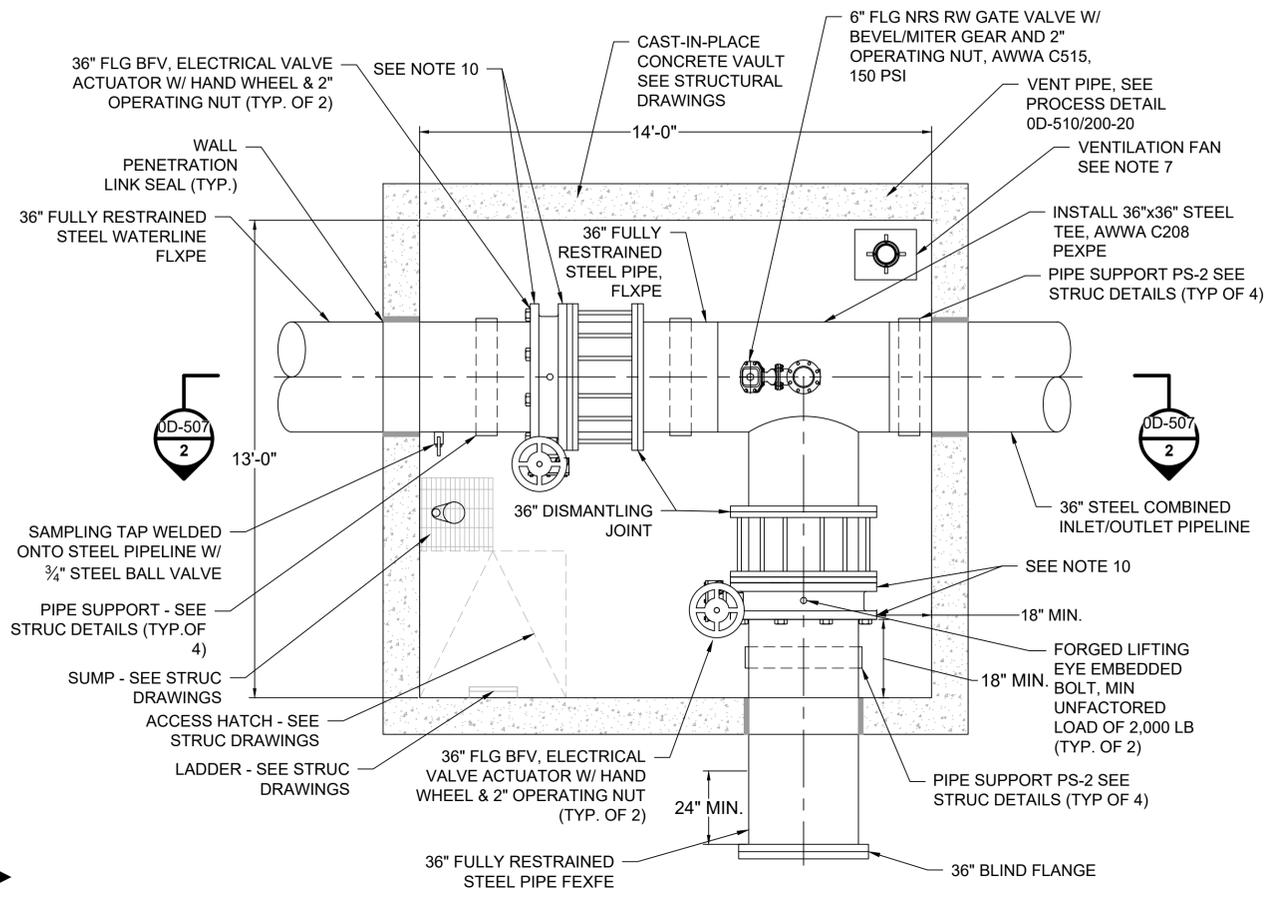
ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
VALVE VAULT 1

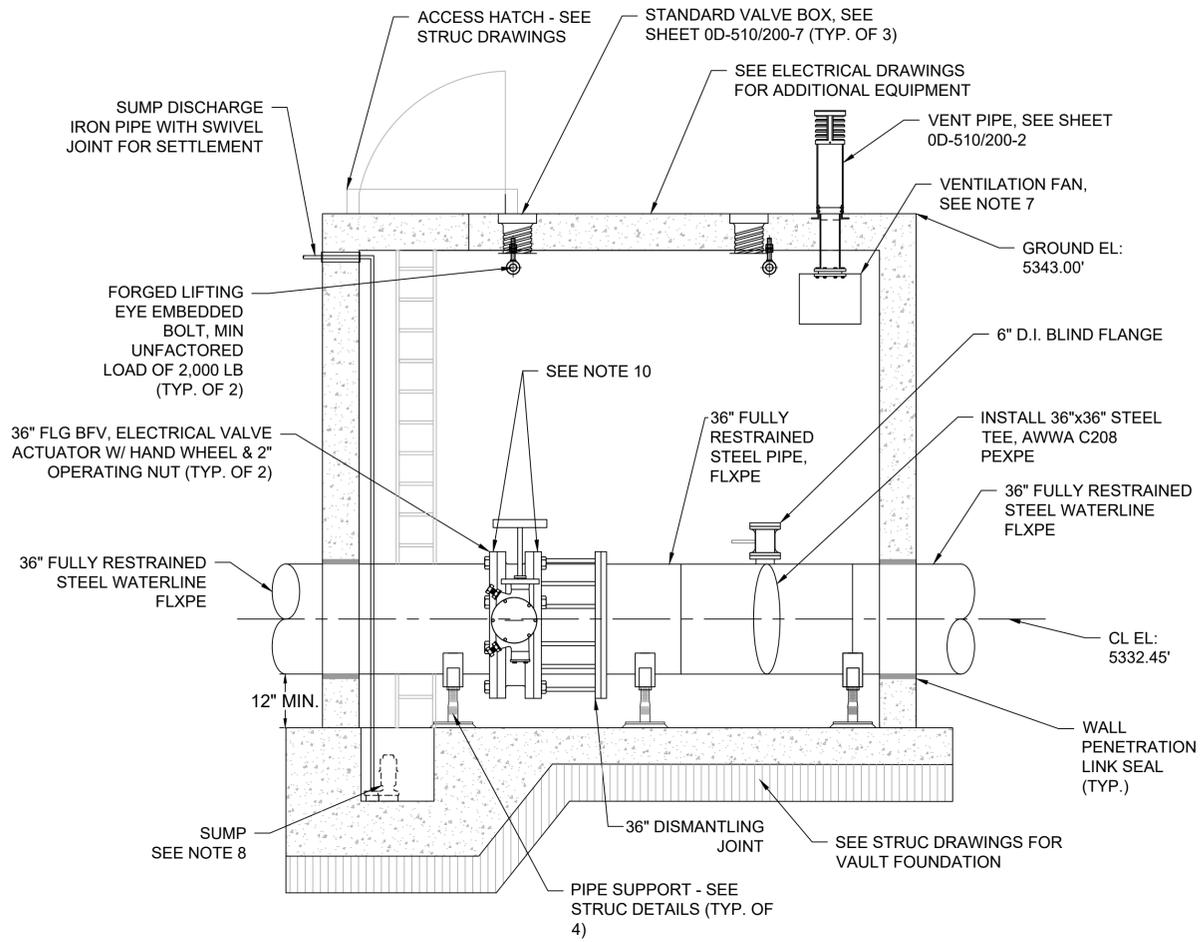
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Scale For Microfitting
Millimeters
Inches

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VALVE VAULT 2 - PLAN VIEW
SCALE: 1" = 2'-6"
1
0D-507



VALVE VAULT 2 - SECTION VIEW
SCALE: 1" = 2'-6"
2
0D-507

NOTES:

- COAT ALL INTERIOR PIPE USING SYSTEM AS SPECIFIED IN SECTION 09.
- VALVE OPERATORS GREATER THAN 6' FROM GRADE MUST HAVE OPERATOR EXTENSION INSTALLED.
- PROVIDE DAMPROOFING ON THE OUTSIDE OF THE VAULT AS SPECIFIED.
- PROVIDE WEATHERPROOF WHILE-IN-USE RECEPTACLE FOR SUMP PUMP. REFER TO ELECTRICAL PLANS FOR ADDITIONAL REQUIREMENTS.
- SEE STRUCTURAL SHEETS FOR ADDITIONAL VAULT/STRUCTURAL DETAILS.
- CONTRACTOR SHALL VERIFY DIMENSIONS W/ MANUFACTURER AND PROVIDE VAULT W/ PROPERLY ALIGNED PENETRATIONS
- VENTILATION FAN SHALL BE MANUFACTURED BY ILG, OR AN APPROVED EQUIVALENT, MODEL PTD DIRECT-DRIVE TUBEAXIAL DUCT FAN SIZE PTD 123 (811 CFM @3/8" S.P.) WITH ONE-SIXTH (1/6) HP, 120-VOLT CONSTANT SPEED, SINGLE PHASE, 60HZ ELECTRIC MOTOR. CONTROL SWITCH FOR THE FAN SHALL BE MOUNTED NEXT TO THE ENTRYWAY SO THAT IT CAN BE OPERATED WITHOUT COMPLETELY ENTERING THE VAULT. THE DISCHARGE OF THE VENT FAN SHALL BE TOTALLY ENCLOSED AND ATTACHED TO THE OPENING OF THE EXHAUST VENT PIPE.
- SUMP PUMPS SHALL BE HYDRO-MATIC OSP50AB, OR AN APPROVED EQUIVALENT. A PIPE UNION SHALL BE INSTALLED IN THE DISCHARGE LINE BETWEEN THE PUMP AND CHECK VALVE. DISCHARGE LINE SHALL BE MADE OF IRON AND SHALL DIRECT FLOWS TO A LOCATION APPROVED BY THE CITY OF THORNTON.
- ALL CONTROL LINES AND FITTINGS SHALL BE STAINLESS STEEL.
- INSTALL FLANGE ISOLATION KITS (FIK) ON BOTH SIDES OF ELECTRICAL VALVES BETWEEN TANK AND FLEX COUPLING.

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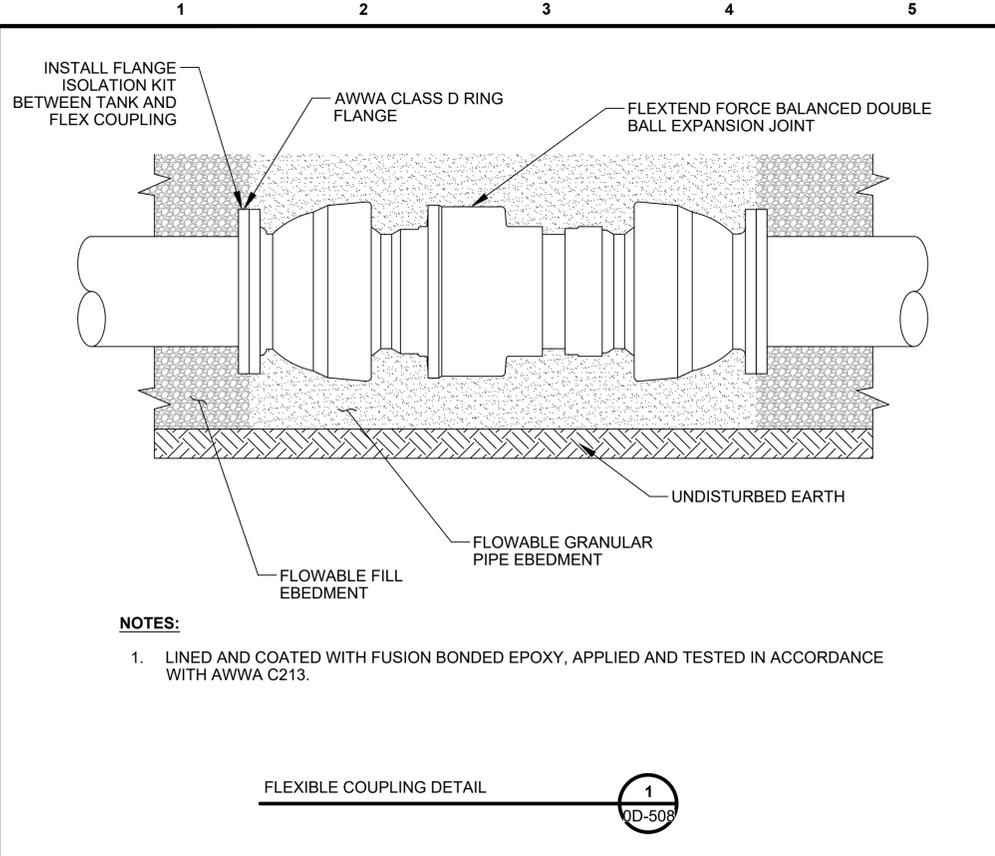
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



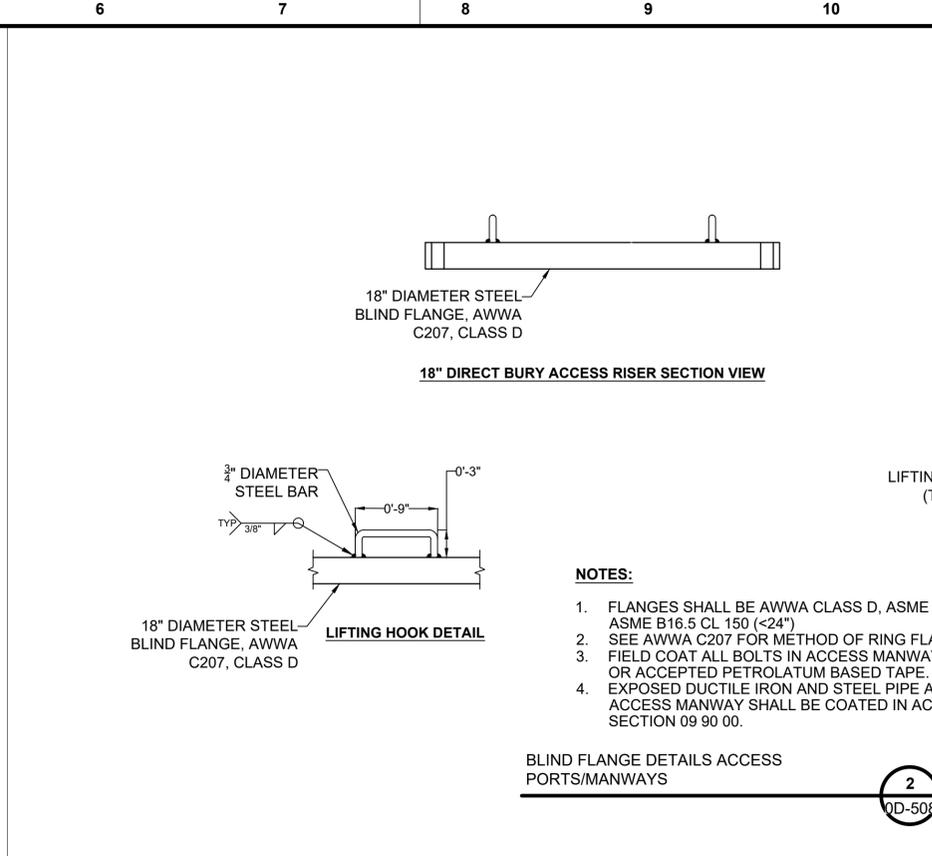
THORNTON COLORADO

ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
VALVE VAULT 2

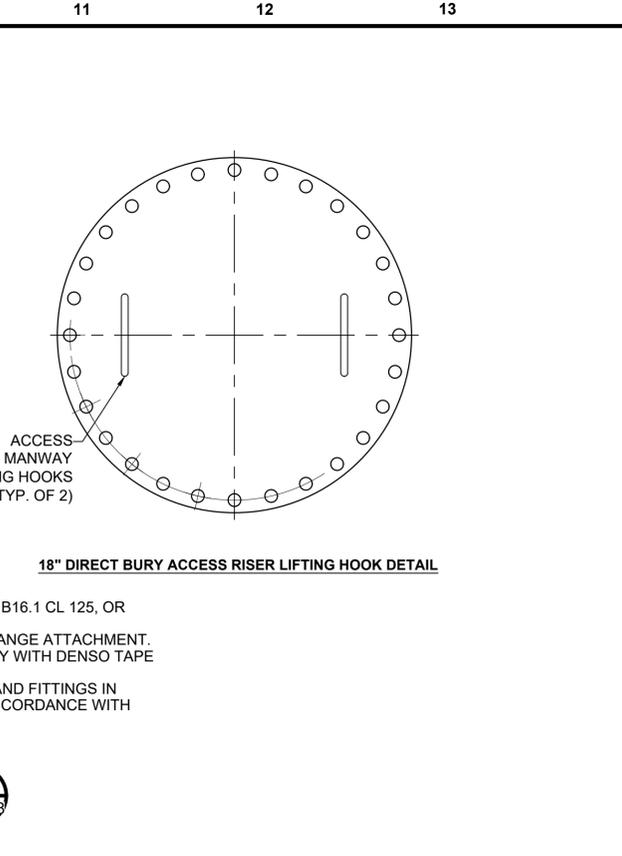
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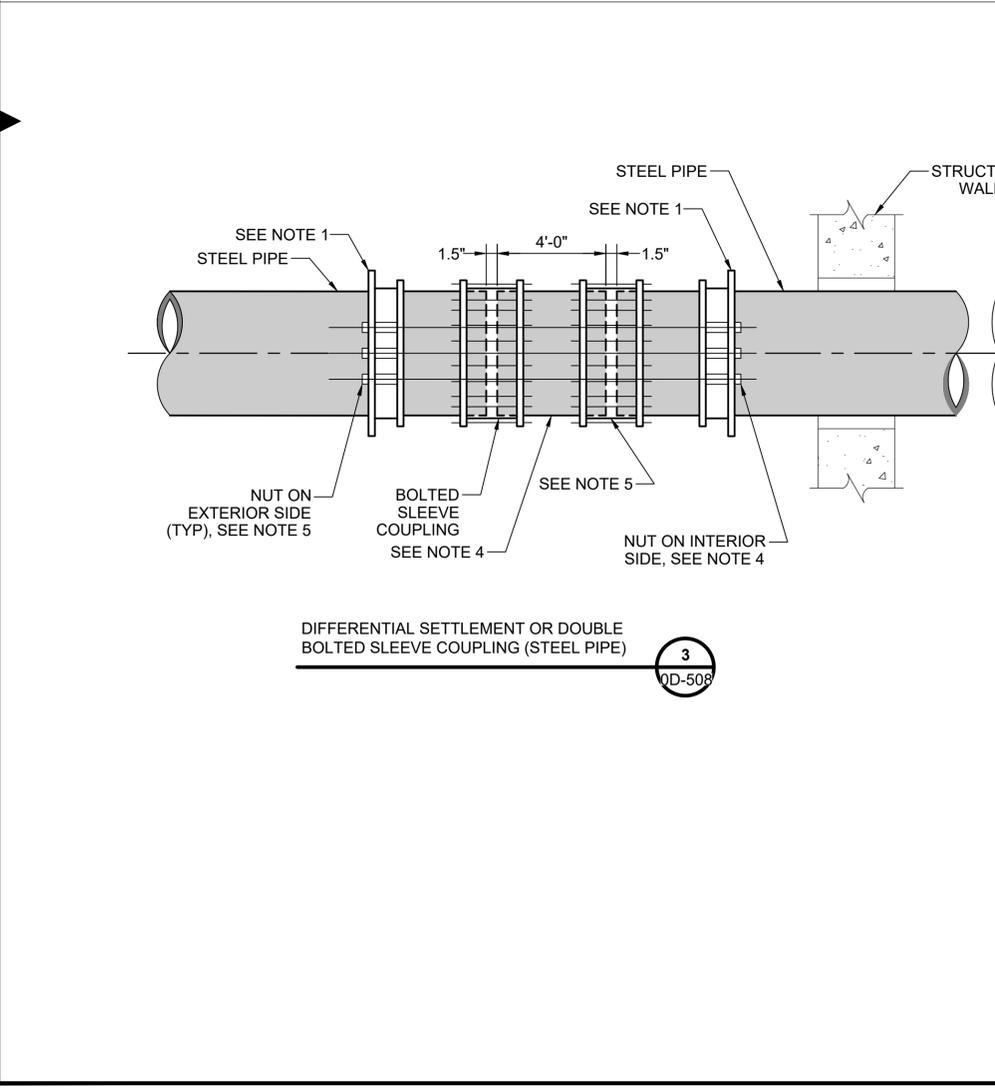
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0D-508



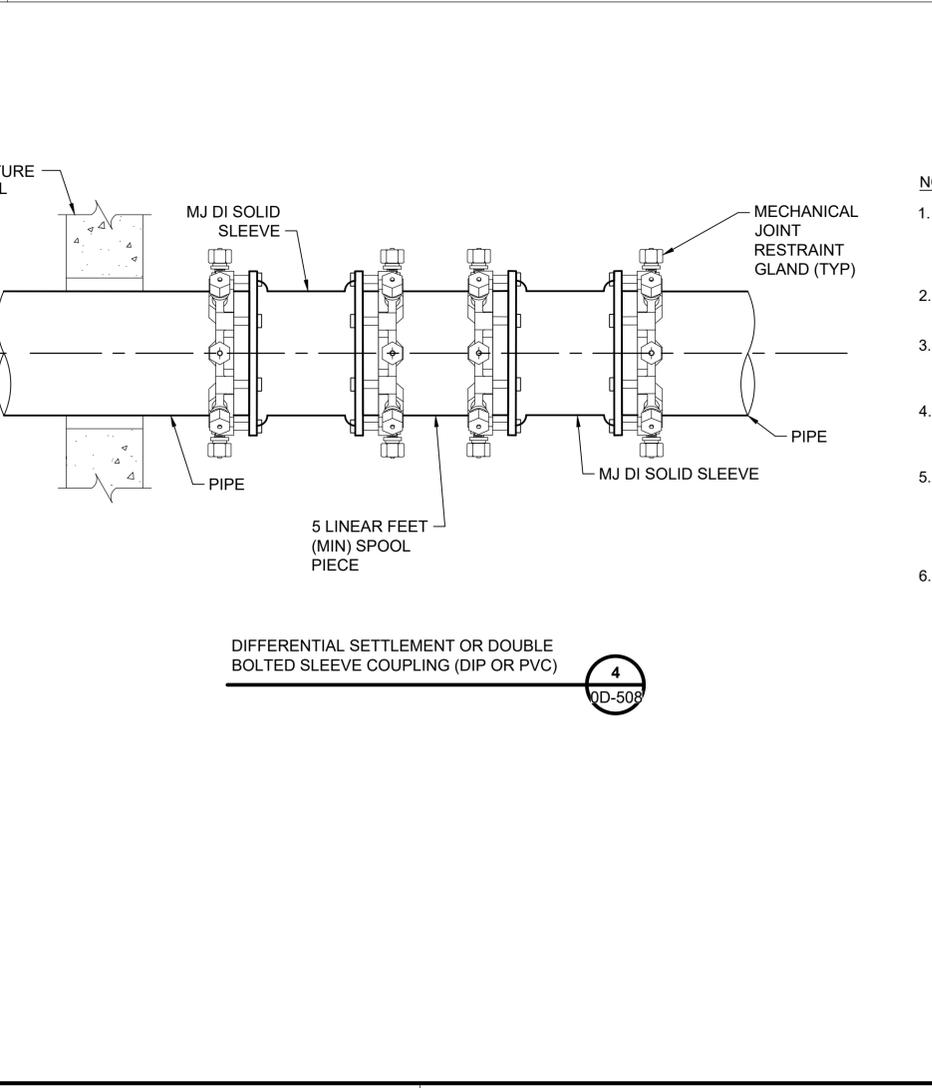
BLIND FLANGE DETAILS ACCESS PORTS/MANWAYS **2**
0D-508



18\"/>



DIFFERENTIAL SETTLEMENT OR DOUBLE BOLTED SLEEVE COUPLING (STEEL PIPE) **3**
0D-508



DIFFERENTIAL SETTLEMENT OR DOUBLE BOLTED SLEEVE COUPLING (DIP OR PVC) **4**
0D-508

- NOTES FOR DIFFERENTIAL SETTLEMENT COUPLINGS:**
- RESTRAINT CONNECTION TO PIPE VARIES BY PIPE MATERIAL - STEEL PIPE: PROVIDE AWWA M-11 HARNESS, LUG TYPE, TIE BOLT DIAMETER, AND NUMBER OF RETAINING RODS VARIES BY PIPE DIAMETER AND DESIGN PRESSURE. CONFORM TO AWWA-M11.
 - LUG TYPE, TIE BOLT DIAMETER, NUMBER OF RODS AND ROD ORIENTATION VARIES BY PIPE DIAMETER.
 - TIE RODS TO BE CENTERED ON PIPE SPRINGLINE, CONFORM TO AWWA M-11 (5TH ED) APPENDIX C. PROVIDE DOG EAR STYLE LUGS WHERE REQUIRED TO MATCH HARNESS BOLT LOCATION.
 - PROVIDE ISOLATION KIT WHERE INTERIOR AND EXTERIOR PIPES ARE DISSIMILAR METAL OR WHERE REQUIRED TO ISOLATE CATHODIC PROTECTION SYSTEM FROM INTERIOR PIPE.
 - BOLTED SLEEVE COUPLING. USE TRANSITION COUPLING WHERE EXTERIOR AND INTERIOR PIPE OUTSIDE DIAMETERS DO NOT MATCH. COUPLING SHALL BE INSULATING TYPE WHERE INTERIOR AND EXTERIOR PIPES ARE DISSIMILAR MATERIALS OR WHERE REQUIRED TO ISOLATE CATHODIC PROTECTION SYSTEM FROM INTERIOR PIPE.
 - PLAIN END x PLAIN END SPOOL PIECE MATERIAL SHALL MATCH THAT OF THE EXTERIOR YARD PIPING.

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID

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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE

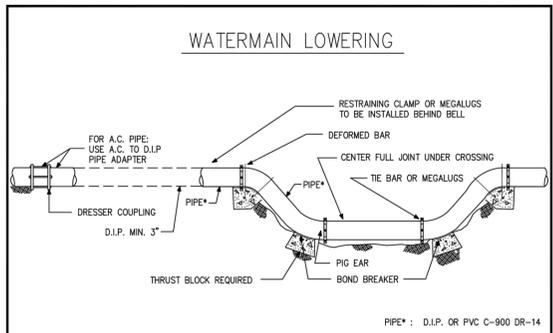
THORNTON COLORADO

ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 PROCESS DETAILS I

project	162116	contract	23-150
drawing	0D-508	rev.	0
sheet	32	of	74 sheets

file 162116_0D-508.dwg

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



DIP, STEEL PIPE, HARNESS RODS, STEEL CASING PIPE, FITTINGS, VALVES, AND VALVE BOXES SHALL BE HAND WRAPPED USING POLYETHYLENE WITH A MIN. THICKNESS OF EIGHT (8) MILS AND TWO (2) INCH WIDE, TEN (10) MIL THICK POLYETHYLENE PRESSURE SENSITIVE TAPE TO CLOSE SEAMS OR HOLD OVERLAPS. THE POLYETHYLENE SHALL BE APPLIED TO PREVENT THE CONTACT OF BACKFILL MATERIAL WITH THE FITTING. THE RAW MATERIAL USED TO MANUFACTURE POLYETHYLENE FILM SHALL BE TYPE I, CLASS A, GRADE E-1 IN ACCORDANCE WITH ASTM STANDARD DESIGNATION D-1248. POLYETHYLENE ENCASEMENT MATERIAL SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM STANDARD C-105.

BITUMINOUS MATERIAL IS TO BE USED FOR CORROSION PROTECTION ON ALL STEEL CASING PIPES. INSTALLATION SHALL BE IN ACCORDANCE WITH ESTABLISHED AWWA STANDARDS (AWWA C-600 OR C-603).

PIPE SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C-900. BEFORE THE PLACING OF PIPE IN THE TRENCH, EACH PIPE OR FITTING SHALL BE THOROUGHLY CLEANED OF FOREIGN MATERIAL, KEPT CLEAN AND EXAMINED FOR CRACKS OR DEFECTS BEFORE INSTALLATION. THE DEVELOPMENT ENGINEERING MANAGER MAY REJECT ANY PIPE WHICH SHOWS DISCOLORATION DUE TO THE SUN.

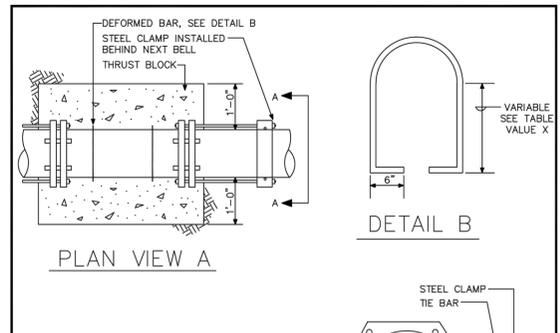
JOINT LUBRICANT SHALL BE SUPPLIED BY THE PIPE MANUFACTURER.

WHEN LAYING PIPE ON CURVES, THE PIPE SHALL BE KEPT IN ALIGNMENT BY DEFLECTING JOINTS OR USING SHORT LENGTHS OF PIPE. IF USING DEFLECTING JOINTS, RECOMMENDED PRACTICES AND ALLOWANCES AS STIPULATED BY THE MANUFACTURER MUST BE ADHERED TO. PIPE SHALL BE LAID WITH THE BELL ENDS FACING IN THE DIRECTION OF LAYING UNLESS DIRECTED OTHERWISE BY THE DEVELOPMENT ENGINEERING MANAGER.

WHENEVER THE PIPE IS LEFT UNATTENDED, TEMPORARY PLUGS SHALL BE INSTALLED AT OPENINGS. TEMPORARY PLUGS SHALL BE WATER-TIGHT, STANDARD CAST IRON AND SHALL BE SUBJECT TO APPROVAL BY THE DEVELOPMENT ENGINEERING MANAGER.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 1992 REVISED: APRIL 2010
	WATERMAIN LOWERING DETAIL	DRAWING NO. 200-3A

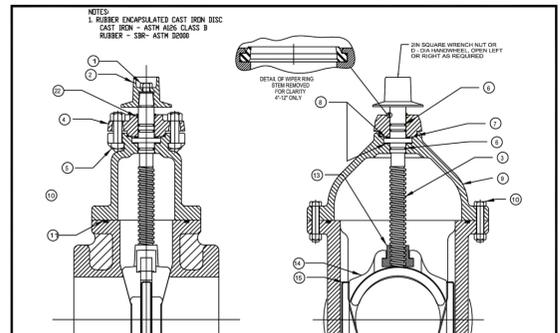


MAIN SIZE	DEFORMED BAR		TIE BAR	
	DIA.	X	DIA.	AMOUNT
8"	—	—	.375	2
12"	.500	18"	.500	2
16"	.750	20"	.750	2
24"	1.000	24"	1.000	2

NOTES:
 1. PIPE USED IN LOWERING SHALL BE DUCTILE IRON PIPE WITH EIGHT (8) MIL POLYWRAP.
 2. FITTINGS, PIPES & TIE BARS TO BE WRAPPED SEPARATELY IN POLYETHYLENE.
 3. 45° FITTINGS SHALL BE USED.
 4. FITTINGS SHALL BE RODDED TO NEXT BELL & NO JOINTS ARE ALLOWED BETWEEN FITTINGS OR UTILIZE MEGALUG CONNECTIONS.
 5. FITTINGS SHALL BE M.J.
 6. MEGALUG CONNECTIONS OR PIGEARS SHALL BE USED ON RODDING FOR FITTINGS UNLESS OTHERWISE APPROVED BY THE DEVELOPMENT ENGINEERING MANAGER.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 1992 REVISED: APRIL 2010
	WATERMAIN LOWERING CROSS-SECTION DETAIL	DRAWING NO. 200-3B

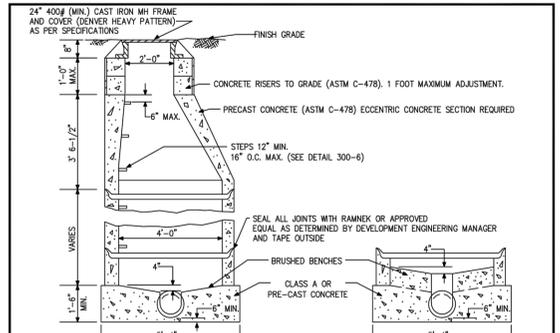


ITEM	DESCRIPTION	QTY	MATERIAL	ASTM
1	CAP SCREW	1	304 STAINLESS STEEL	A193 GRADE B8
2	WASHER	1	CAST IRON	A126 CLASS B
3	STEM	1	BRONZE	B138 ALLOY C83600
4	STUFFING BOX	1	CAST IRON	A126 CLASS B
5	STUFFING BOX BOLTS	2	304 STAINLESS STEEL	A193 GRADE B8
6	STUFFING BOX NUTS	2	304 STAINLESS STEEL	F594 GRADE B8
7	ORING	3	RUBBER	20000 NITRILE
8	ANTI-FRCTION WASHER	2	CELCON	
9	BOONET	1	CAST IRON	A126 CLASS B
10	BOONET BOLTS	2	304 STAINLESS STEEL	A193 GRADE B8
11	BOONET NUTS	2	304 STAINLESS STEEL	F594 GRADE B8
12	BOONET GASKET (ORING)	1	RUBBER	20000 NITRILE
13	DISC NUT	1	BRONZE	B82 ALLOY C83600
14	DISC	1	SEE NOTE 1	
15	GLIDE CAP	2	CELCON	
16	BRUSHED BENCHES	1	CAST IRON	A126 CLASS B
17	HANDWHEEL	1	CAST IRON	A126 CLASS B
18	BODY - ALUMINUM	1	CAST IRON	A126 CLASS B
19	BODY - BRONZE	1	CAST IRON	A126 CLASS B
20	BODY - FLANGE x 1/2 END	1	CAST IRON	A126 CLASS B
21	BODY - FLANGE x 3/4 ON END	1	CAST IRON	A126 CLASS B
22	WASHER	1	RUBBER	

NOTES:
 1. PIPE USED IN LOWERING SHALL BE DUCTILE IRON PIPE WITH EIGHT (8) MIL POLYWRAP.
 2. FITTINGS, PIPES & TIE BARS TO BE WRAPPED SEPARATELY IN POLYETHYLENE.
 3. 45° FITTINGS SHALL BE USED.
 4. FITTINGS SHALL BE RODDED TO NEXT BELL & NO JOINTS ARE ALLOWED BETWEEN FITTINGS OR UTILIZE MEGALUG CONNECTIONS.
 5. FITTINGS SHALL BE M.J.
 6. MEGALUG CONNECTIONS OR PIGEARS SHALL BE USED ON RODDING FOR FITTINGS UNLESS OTHERWISE APPROVED BY THE DEVELOPMENT ENGINEERING MANAGER.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 2010 REVISED:
	GATE VALVE DETAIL	DRAWING NO. 200-6A



NOTES:
 1. TOP ELEVATION OF THE MANHOLE SHALL BE ADJUSTED TO EXACTLY MATCH FINAL STREET GRADE PRIOR TO THE INITIATION OF THE ONE (1) YEAR WARRANTY PERIOD.
 2. IF MANHOLES ARE LOCATED IN OPEN FIELDS, THEY SHALL BE LEFT SIX (6) INCHES TO EIGHT (8) INCHES ABOVE GRADE WHERE PRACTICAL.
 3. FLAT TOP SECTIONS MAY BE USED ON SHALLOW LINES WHERE CONE SECTIONS ARE IMPRACTICAL, TO USE AS SPECIFIED BY THE DEVELOPMENT ENGINEERING MANAGER.
 4. SEMI-DROP MANHOLES SHALL BE USED FOR DROPS OF 2'-0" OR LESS.
 5. MANHOLE RINGS SHALL BE 30 INCH DIAMETER, WITH 24 INCH INSERT AND COVER, FOR 60 INCH AND 72 INCH DIAMETER MANHOLE BARRIS.
 6. MANHOLE INVERTS SHALL BE FORMED AS INDICATED BELOW TO ENSURE SMOOTH FLOW THROUGH MANHOLE.
 7. WHERE MORE THAN ONE SEWER ENTERS A MANHOLE, THE SMALLER OF THE LINES SHALL BE INSTALLED AT THE CROWN ELEVATION OF THE LARGER SEWER.
 8. WATERPROOFING IS REQUIRED WHERE GROUNDWATER IS PRESENT AS REQUIRED BY THE DEVELOPMENT ENGINEERING MANAGER.
 9. A LOCKING RING AND COVER SHALL BE INSTALLED ON MANHOLES LOCATED OUTSIDE OF ROADWAYS. THE LOCKING LIDS SHALL HAVE INWARD INTERLOCK MANHOLES MODEL NUMBER 112011 (2 PER MANHOLE).
 10. THE CONCENTRIC CONE OF THE MANHOLE SHALL BE ROTATED SO THAT THE MANHOLE ACCESS IS TOWARDS THE CENTERLINE OF THE STREET.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS SSMH-B, SSMH-C, AND SSMH-D	ISSUED: APRIL 1992 REVISED: APRIL 2010
	STANDARD AND SEMI-DROP MANHOLE DETAIL	DRAWING NO. 300-3

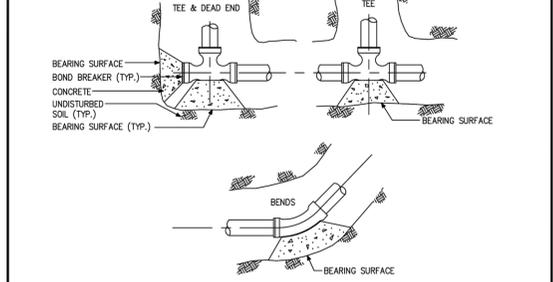
THRUST BLOCKS SHALL BE CONSTRUCTED AT BONDS AND FITTINGS WHICH RESULT IN UNBALANCED LINE THRUST. CARE SHALL BE TAKEN NOT TO BLOCK OUTLETS OR TO COVER BOLTS, NUTS, CLAMPS OR OTHER FITTINGS OR TO MAKE THEM INACCESSIBLE.

A BOND BREAKER SHALL BE PLACED BETWEEN THE FITTING AND THE THRUST BLOCK TO AID IN EASE OF FUTURE REMOVAL. THE VERTICAL SIDES OF THE CONCRETE THRUST BLOCKS SHALL BE FORMED TO ALLOW FOR SYMMETRICAL THRUST. WHEN IT IS IMPOSSIBLE THROUGH OVER EXCAVATION OR OTHER CAUSES TO POUR A THRUST BLOCK AGAINST UNDISTURBED EARTH, HARNESS RODS SHALL BE REQUIRED TO ANCHOR THE FITTINGS TO THE MAIN UPON APPROVAL OF THE DEVELOPMENT ENGINEERING MANAGER.

BACKFILL MAY BE PLACED OVER THE THRUST BLOCK ONCE THE SURFACE HAS SET SUFFICIENTLY TO RESIST THE WEIGHT OF THE BACKFILL.

NO DRY KICKERS SHALL BE ALLOWED.

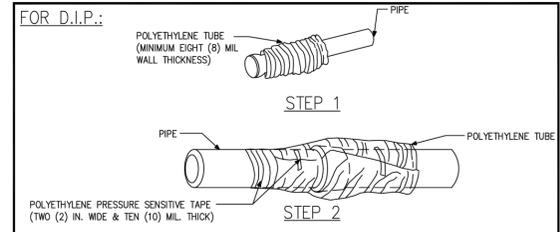
NO DRY MIXED CONCRETE SHALL BE ALLOWED.



NOTES:
 1. THRUST BLOCKS MUST BE CAST IN PLACE CONCRETE.
 2. NO TAMING OR COMPACTING SHALL BE ALLOWED ABOVE THRUST BLOCK FOR A MINIMUM OF TWENTY-FOUR (24) HOURS AFTER PLACEMENT.
 3. CONCRETE MUST SET A MINIMUM OF FORTY-EIGHT (48) HOURS PRIOR TO THE PERFORMANCE OF A HYDROSTATIC TEST.
 4. BEARING SURFACE BASED ON BEARING STRENGTH OF 3000 P.S.F. AND MAIN PRESSURE OF 200 P.S.I. FOR MAINS GREATER THAN 16" OR VERTICAL THRUSTS, SHOW AREA REQUIREMENT ON STANDARD DETAILS.
 5. BOND BREAKER TO BE MINIMUM OF 8 MIL POLYETHYLENE PLASTIC.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 1992 REVISED: APRIL 2010
	THRUST BLOCK DETAIL	DRAWING NO. 200-11



NOTE: POLYETHYLENE ENCASEMENT MATERIAL SHALL BE MANUFACTURED IN ACCORDANCE WITH CURRENT ASTM STANDARD. THE RAW MATERIAL USED TO MANUFACTURE POLYETHYLENE FILM SHALL BE TYPE I, CLASS A, GRADE E-1 IN ACCORDANCE WITH CURRENT ASTM STANDARD.

STEP 1 - PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO TRENCH.

STEP 2 - PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT, FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC TUBE IN PLACE.

STEP 3 - OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE, EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPED IN PLACE.

FOR STEEL:
 BITUMINOUS MATERIAL IS TO BE USED FOR CORROSION PROTECTION ON ALL STEEL PIPES.

SOIL RESISTIVITY TESTS:
 SOIL RESISTIVITY TESTS AND/OR ANY OTHER SOIL TESTS ARE REQUIRED WITH THE UTILIZATION OF METAL PIPING OR AT THE SOLE DISCRETION OF THE DEVELOPMENT ENGINEERING MANAGER. OTHER MEANS OF CORROSION PROTECTION MUST BE SPECIFICALLY APPROVED BY THE DEVELOPMENT ENGINEERING MANAGER. THE RESPONSIBLE PARTY SHALL INCUR THE COSTS OF ALL SOIL TESTING AS REQUIRED.

N.T.S.

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 1992 REVISED: APRIL 2010
	CORROSION PROTECTION DETAIL	DRAWING NO. 200-15

GATE VALVES
 VALVES SHALL BE MANUFACTURED AND TESTED IN ACCORDANCE WITH AWWA STANDARD C-600, "METAL-SEATED GATE VALVES FOR WATER" OR AWWA C-609, "RESILIENT-SEATED GATE VALVES, 3 THROUGH 12 IPS, FOR WATER AND SEWAGE SYSTEMS" WITH THE FOLLOWING ADDITIONAL REQUIREMENTS OR EXCEPTIONS:
 VALVES MEETING AWWA STANDARD C-600 SHALL BE OF A MODIFIED WEDGE DISC CONSTRUCTION, COATED BOTH INSIDE AND OUT WITH A TOUGH DURABLE EPOXY TO PREVENT CORROSION. CAST IRON BODY, FULLY BRONZE MOUNTED WITH NON-RISING STEMS.
 VALVES SHALL BE SUITABLE FOR FREQUENT OPERATION, AS WELL AS SERVICE INVOLVING LONG PERIODS OF INACTIVITY. THE OPERATING PRESSURE FOR VALVES SIX (6) INCHES THROUGH TWELVE (12) INCHES SHALL BE 200 PSI.
 VALVE STEMS SHALL BE MADE OF BRONZE AND THREADED SO THAT VALVES SHALL OPEN BY TURNING TO THE LEFT (COUNTERCLOCKWISE). EACH VALVE SHALL BE FURNISHED WITH A TWO (2) INCH SQUARE OPERATING NUT. THE OPERATING NUT SHALL HAVE AN ARROW SHOWING THE DIRECTION OF OPERATING AND THE WORD "OPEN" CAST ON THE NUT. THE STEM SEAL SHALL CONSIST OF TWO (2) O-RINGS, ONE OR BOTH POSITIONED ABOVE THE THRUST COLLAR WITH THE VALVE UNDER PRESSURE IN THE FULL OPEN POSITION.
 BOLTS AND HEX NUTS USED ON THE BONNET OF THE VALVE SHALL BE THE MANUFACTURER'S STANDARD FABRICATED FROM A LOW ALLOY STEEL FOR CORROSION RESISTANCE.
 FLANGES SHALL BE SIZED AND DRILLED IN ACCORDANCE WITH ANSI B16.1 CLASS 150 SPECIFICATIONS. FLANGES SHALL BE MACHINED IN A FLAT FACE OR MACHINED TO A FLAT SURFACE WITH A SERRATED FINISH IN ACCORDANCE WITH AWWA STANDARD C-207 "STEEL PIPE FLANGES".
 THE COMPONENTS OF THE MECHANICAL JOINT SHALL CONFORM TO ANSI A21.11 (AWWA STANDARD C-111). THE TEE-HEAD BOLTS AND HEXAGON NUTS SHALL BE FABRICATED FROM A HIGH STRENGTH, STAINLESS STEEL, OR AN APPROVED EQUIVALENT.
 AFTER APPROVED FACTORY ASSEMBLY, EACH VALVE SHALL BE GIVEN THE OPERATION AND HYDROSTATIC TESTS IN ACCORDANCE WITH THE REFERENCED SPECIFICATIONS.
 WEDGE DISC VALVES SHALL BE LIMITED TO THE FOLLOWING MANUFACTURERS OR APPROVED EQUIVALENT: WATERLOUS SERIES-500, MUELLER-A-200, KENSAL, CLOFFIN. RESILIENT SEATED GATE VALVES SHALL BE LIMITED TO THE AMERICAN "DIP" GATE VALVE OR THE U.S. PIPE "METROSEAL" GATE VALVE.
 THE MANUFACTURER SHALL FURNISH A CERTIFIED STATEMENT THAT THE INSPECTION AND SPECIFIED TESTS HAVE BEEN MADE AND THE RESULTS THEREOF COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE STANDARDS HEREIN SPECIFIED. A COPY OF THE CERTIFICATION SHALL BE SENT TO THE DEVELOPMENT ENGINEERING MANAGER UPON REQUEST.
 CORROSION PROTECTION SHALL BE COVERED IN SUBSECTION 204.2 OF THESE STANDARDS AND SPECIFICATIONS.
 VALVES SHALL BE HANDLED IN SUCH A MANNER AS TO PREVENT ANY INJURY OR DAMAGE AND SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION. VALVES SHALL BE SET IN SUCH A MANNER THAT THE VALVE STEMS ARE PLUMB. VALVES SHALL BE LOCATED AT POINTS AS SPECIFIED IN SUBSECTION 203.8 OF THESE STANDARDS AND SPECIFICATIONS.

VALVE BOXES
 VALVE BOX PARTS SHALL BE MANUFACTURED BY TYLER, SERIES 6860 OR AN APPROVED EQUIVALENT MANUFACTURER AND MADE OF GRAY CAST IRON, BUFFALO TYPE WITH NO. 140 OVAL BASE. A FIVE AND ONE-QUARTER (5 1/4) INCH SCREW-TYPE SHAFT SHALL BE ADJUSTABLE FROM 45 INCHES TO 80 INCHES. VALVE BOX LIDS SHALL BE MARKED WITH THE WORD "WATER" AND SHALL HAVE A LIP OR FLANGE EXTENDING INTO THE VALVE BOX SHAFT. NO SLIP-TYPE BOXES SHALL BE ALLOWED. THE VALVE BOX SHALL BE OF A DESIGN WHICH SHALL NOT TRANSMIT SHOCK OR STRESS TO THE VALVE AND SHALL BE CENTERED AND PLUMB OVER THE OPERATING NUT OF THE VALVE WITH THE BOX COVER FLUSH WITH THE SURFACE OF THE PAVEMENT. IN UNPAVED AREAS, A 24 INCH SQUARE CONCRETE COLLAR IS REQUIRED AROUND VALVE BOX COVER AS PER THE STANDARD DETAIL. IN SECTION 200 OF THESE STANDARDS AND SPECIFICATIONS, IN UNIMPROVED ROADWAYS THE VALVE BOX COVER SHALL BE SET SIX (6) INCHES BELOW FINAL GRADE WITH A MANHOLE POST INDICATING THE LOCATION AS PER THE STANDARD DETAIL DRAWING.
 THE MANUFACTURER SHALL FURNISH A CERTIFIED STATEMENT THAT THE INSPECTION AND SPECIFIED TESTS HAVE BEEN MADE AND THE RESULTS THEREOF COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE STANDARDS HEREIN SPECIFIED. A COPY OF THE CERTIFICATION SHALL BE SENT TO THE DEVELOPMENT ENGINEERING MANAGER UPON REQUEST.
 FOR VALVE BOXES ALONG FIRE SPRINKLER LINES THE LID SHALL BE LABELED "FIRE".
 CORROSION PROTECTION SHALL BE COVERED IN SUBSECTION 204.2 OF THESE STANDARDS AND SPECIFICATIONS.
 FINAL ELEVATION OF VALVE BOXES SHALL BE LEFT TO THE DISCRETION OF THE DEVELOPMENT ENGINEERING MANAGER.
 VALVE BOXES SHALL BE INSTALLED PLUMB.
 VALVE BOXES WHICH HAVE SHIFTED DURING BACKFILL OPERATIONS AND ARE NO LONGER PLUMB, SHALL BE RE-EXCAVATED AND RE-ALIGNED TO THE SATISFACTION OF THE DEVELOPMENT ENGINEERING MANAGER.
 FOR GREENBELT AREA APPLICATION, REFER TO DETAIL 200-7.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

GATE VALVE AND VALVE BOX
NOTES

ISSUED:
APRIL 2010
REVISED:

DRAWING NO.
200-6B

	CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS	ISSUED: APRIL 2010 REVISED:
	GATE VALVE AND VALVE BOX NOTES	DRAWING NO. 200-6B

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS MEDONNELL
 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE

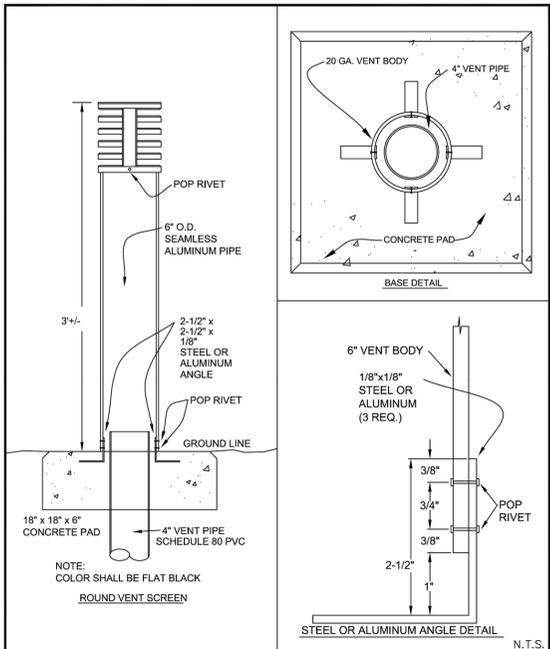


ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER
 STORAGE TANK AND 36" PIPELINE
 PROCESS DETAILS II

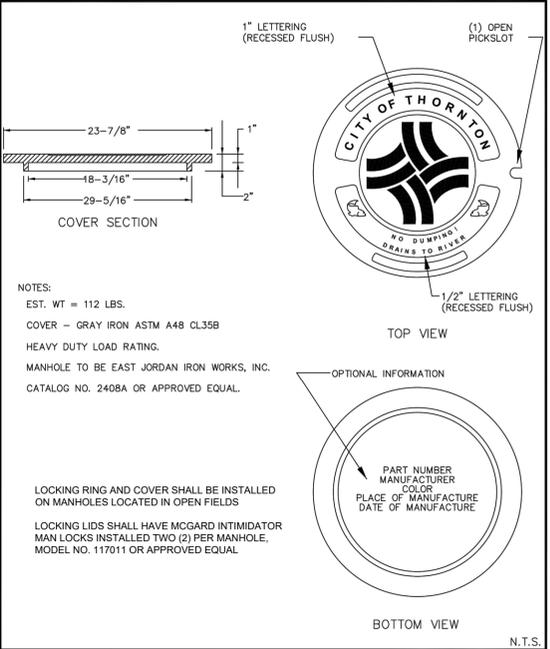
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drawing	OD-509	rev.	0
sheet	33 of 74 sheets		
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Scale For Microfinning
Millimeters
Inches

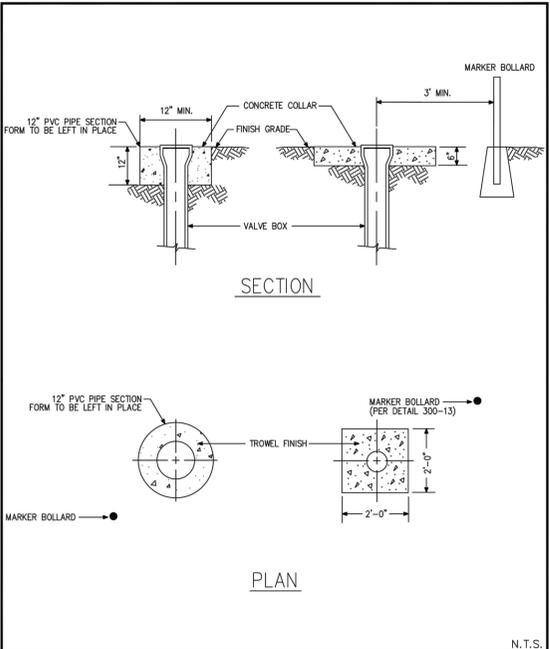
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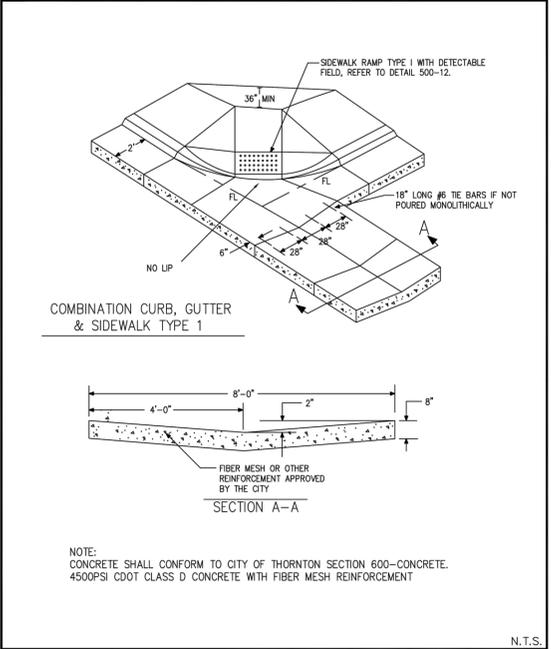
CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
TYPICAL AIR VENT DETAIL
 ISSUED: JANUARY 2005
 REVISED: APRIL 2010
 DRAWING NO. 200-20



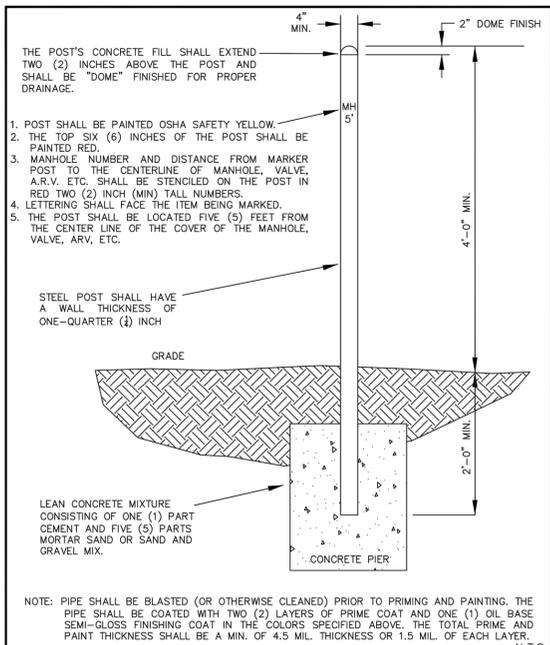
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STORM MANHOLE COVER
 ISSUED: NOVEMBER 2005
 REVISED: APRIL 2010
 DRAWING NO. 400-3



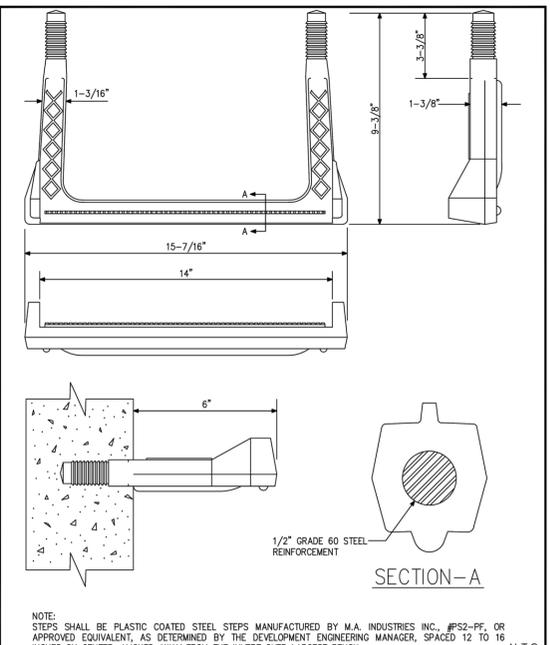
CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
VALVE BOX COLLAR FOR GREENBELT AREA DETAIL
 ISSUED: APRIL 1992
 REVISED: APRIL 2010
 DRAWING NO. 200-7



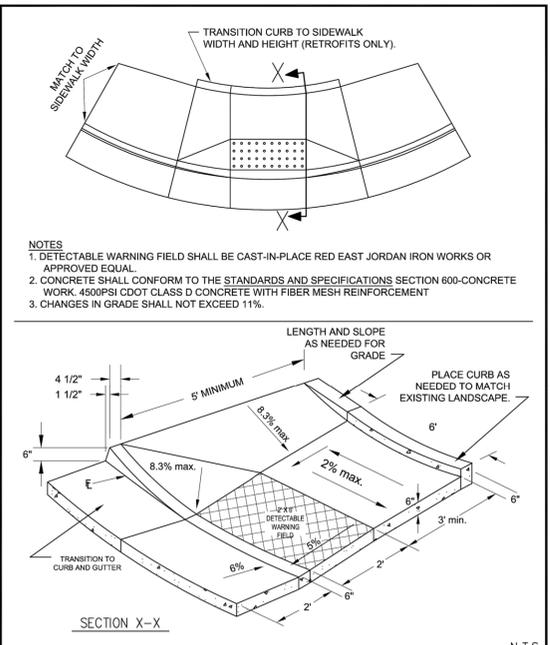
CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
SQUARED RADIUS WITH CROSS PAN FOR LOCAL STREETS
 ISSUED: APRIL 1992
 REVISED: APRIL 2010
 DRAWING NO. 500-11



CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
MARKER POST DETAIL
 ISSUED: JANUARY 2003
 REVISED: APRIL 2010
 DRAWING NO. 300-5



CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
PLASTIC MANHOLE STEP DETAIL
 ISSUED: APRIL 1992
 REVISED: APRIL 2010
 DRAWING NO. 300-6



CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS
TYPE I SIDEWALK RAMP - LOCAL STREETS (APEX)
 ISSUED: APRIL 2010
 REVISED: APRIL 2010
 DRAWING NO. 500-12

PRELIMINARY - NOT FOR CONSTRUCTION



Burns & McDonnell Engineering Co., Inc.
 date: OCTOBER 2024
 designed: A. CASHON
 detailed: V. PONCE
 checked: K. LEBRASSE



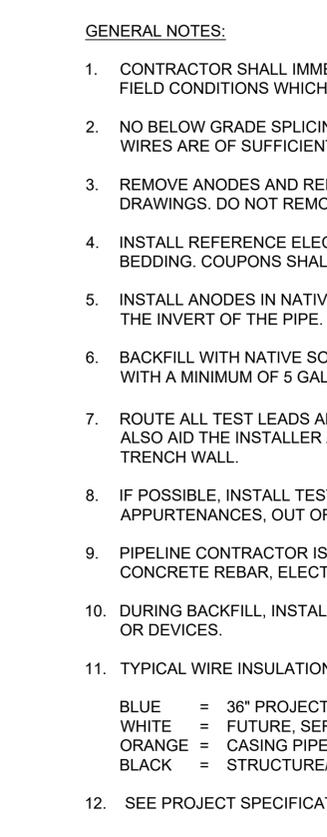
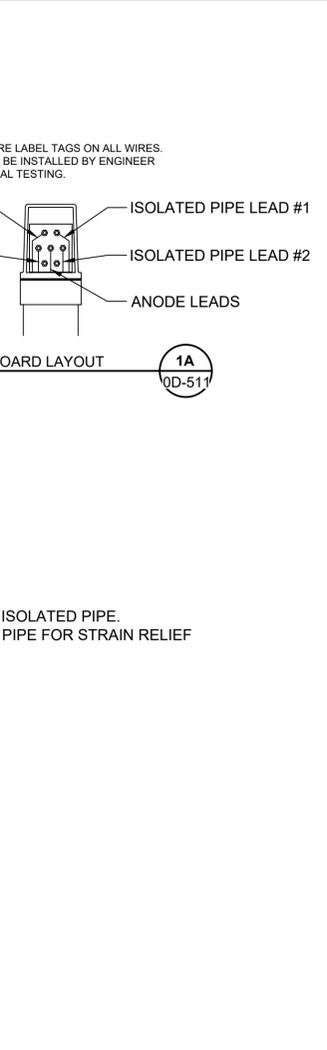
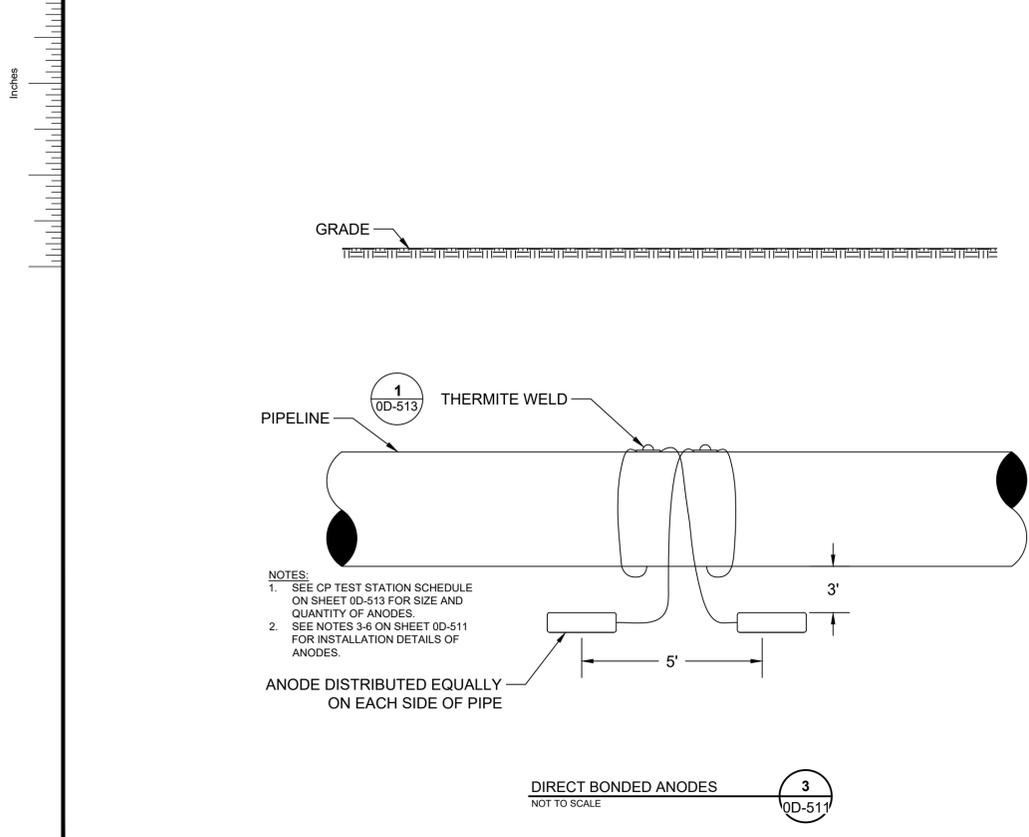
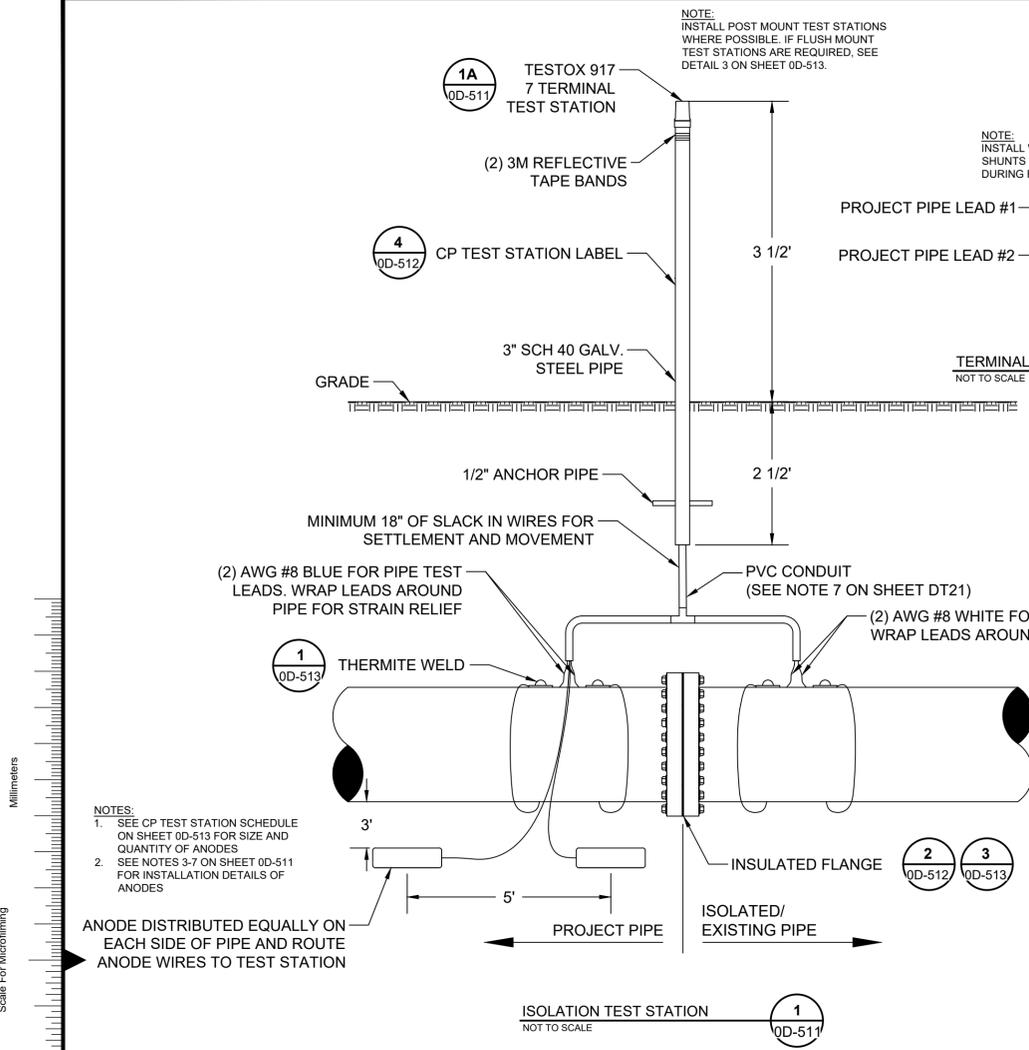
ADAMS COUNTY, COLORADO
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5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
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project	162116	contract	23-150
drawing	0D-510	rev.	0
sheet	34	of	74 sheets
file	162116_0D-510.dwg		

Scale For Microfinishing

Inches

Millimeters



GENERAL NOTES:

- CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN THE PLANS FOR THIS PROJECT AND ACTUAL FIELD CONDITIONS WHICH MAY INTERFERE WITH THIS PROJECT.
- NO BELOW GRADE SPLICING OF WIRES IS ALLOWED WITHOUT PRIOR APPROVAL FROM THE ENGINEER. CONTRACTOR SHALL ENSURE ALL WIRES ARE OF SUFFICIENT LENGTH FOR EACH INTENDED APPLICATION.
- REMOVE ANODES AND REFERENCE ELECTRODES FROM PLASTIC OR OTHER SHIPPING BAG AND POSITION ACCORDING TO DETAIL DRAWINGS. DO NOT REMOVE CLOTH SACK. DO NOT PLACE IN PIPE BEDDING.
- INSTALL REFERENCE ELECTRODES AND COUPONS IN NATIVE SOILS AND PLACE PARALLEL TO THE PIPE. DO NOT PLACE IN PIPE BEDDING. COUPONS SHALL CONSIST OF THE SAME MATERIAL AS THE PIPE AT THE LOCATION OF INSTALLATION.
- INSTALL ANODES IN NATIVE SOILS A MINIMUM OF 3 FEET FROM EDGE OF PIPE OR ANY OTHER METALLIC OBJECT AND PLACE AT OR BELOW THE INVERT OF THE PIPE.
- BACKFILL WITH NATIVE SOIL A MINIMUM OF 12 INCHES AROUND ANY REFERENCE ELECTRODES, COUPONS, OR ANODES THEN FLOOD EACH WITH A MINIMUM OF 5 GALLONS OF FRESH WATER. AFTER WATER ABSORPTION, CONTINUE BACKFILLING AS PER SPECIFICATIONS.
- ROUTE ALL TEST LEADS AND ANODE WIRES IN 1 1/2 INCH CONDUIT BETWEEN THE PIPE AND THE TEST STATION BASE. THE CONDUIT WILL ALSO AID THE INSTALLER AS THE PIPELINE IS PADDED AND BACKFILLED BY PROVIDING MEANS TO LEAN THE TEST STATION AGAINST THE TRENCH WALL.
- IF POSSIBLE, INSTALL TEST STATIONS OVER CENTERLINE OF PIPE. PLACE TEST STATIONS IN PROTECTED LOCATIONS (NEXT TO FENCES, APPURTENANCES, OUT OF ROADWAYS, ETC.) OR OTHER EASILY ACCESSIBLE AREAS.
- PIPELINE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ELECTRICAL ISOLATION OF THE NEW PIPELINE FROM EXISTING PIPELINES, CONCRETE REBAR, ELECTRICAL GROUNDING, TUNNEL LININGS, PIPE SUPPORTS, OR OTHER METALLIC STRUCTURES.
- DURING BACKFILL, INSTALL DETECTABLE CATHODIC PROTECTION WARNING TAPE 12-18 INCHES ABOVE ANY CATHODIC PROTECTION WIRES OR DEVICES.
- TYPICAL WIRE INSULATION COLORS:

BLUE = 36" PROJECT PIPE	GREEN = METALLIC COUPON
WHITE = FUTURE, SERVICE OUTLET OR FOREIGN PIPE	YELLOW = REFERENCE ELECTRODE
ORANGE = CASING PIPE OR TUNNEL LININGS	
BLACK = STRUCTURE/NEGATIVE CABLES, ANODE LEADS, JOINT/CONTINUITY BONDS	
- SEE PROJECT SPECIFICATIONS FOR FURTHER INFORMATION.

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID

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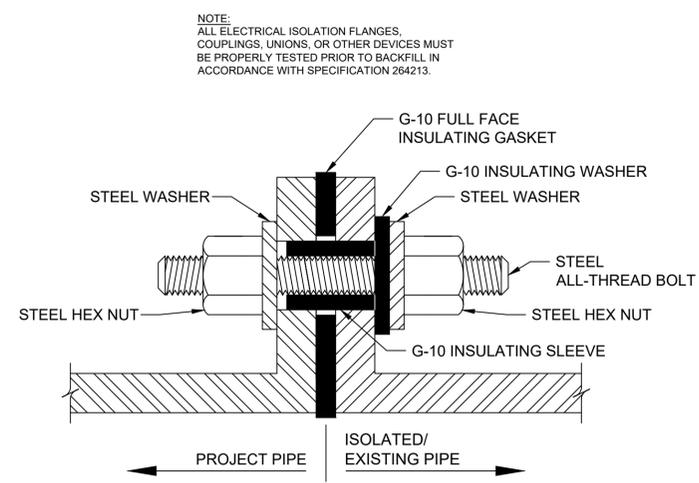
Burns & McDonnell Engineering Co., Inc.	
date OCTOBER 2024	detailed V. PONCE
designed A. CASHON	checked K. LEBRASSE



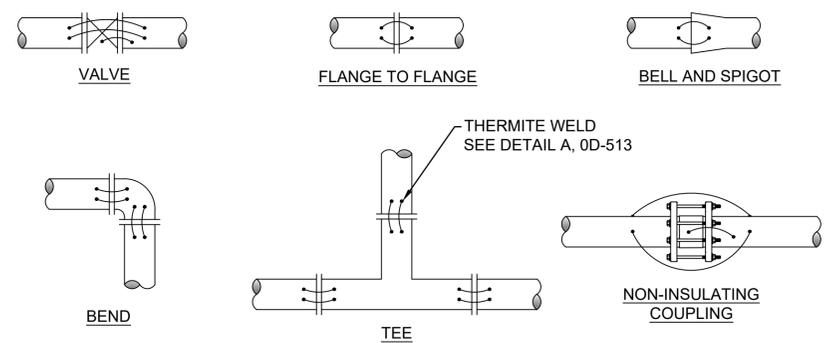
ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE CATHODIC PROTECTION DETAILS I

project 162116	contract 23-150
drawing 0D-511	rev. 0
sheet 35	of 74
sheets	
file 162116_0D-511.dwg	

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



FLANGE ISOLATION KIT DETAIL (SINGLE WASHER SET FOR BURIED APPLICATIONS) NOT TO SCALE 2 OD-512



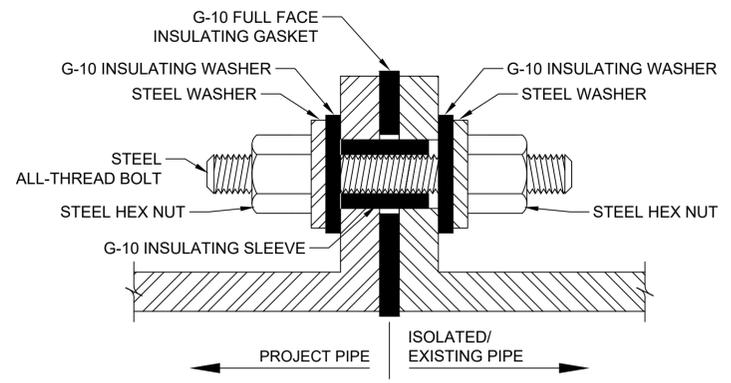
CONTINUITY BONDING NOTES:

1. TYPICAL FOR NON-WELDED PIPING OR WELDED PIPING WITH MECHANICAL COUPLINGS.
2. RHW OR HMWPE BLACK INSULATED STRANDED COPPER BOND WIRES SHALL BE SIZED ACCORDING TO THE FOLLOWING TABLE UNLESS OTHERWISE NOTED.
3. PROVIDE A MINIMUM OF 2" SLACK TO ACCOMMODATE PIPE MOVEMENT.
4. CLEAN PIPE PRIOR TO THERMITE WELDING.
5. ENSURE ALL BLOW-OFF AND HYDRANT PIPING ARE BONDED AND ELECTRICALLY CONTINUOUS WITH ADJACENT WATER MAIN (IF METALLIC).
6. DO NOT INSTALL CONTINUITY BONDS ACROSS ANY ISOLATION FLANGE, COUPLING, UNION, OR NON-METALLIC PIECE OF PIPE.
7. TEST EACH CONTINUITY BOND WITH A DLRO METER AFTER INSTALLATION.
8. WRAP ALL FITTINGS WITH PETROLATUM WAX TAPE AND OVERLAP PIPE BY 12". APPLY AFTER STEP 7.

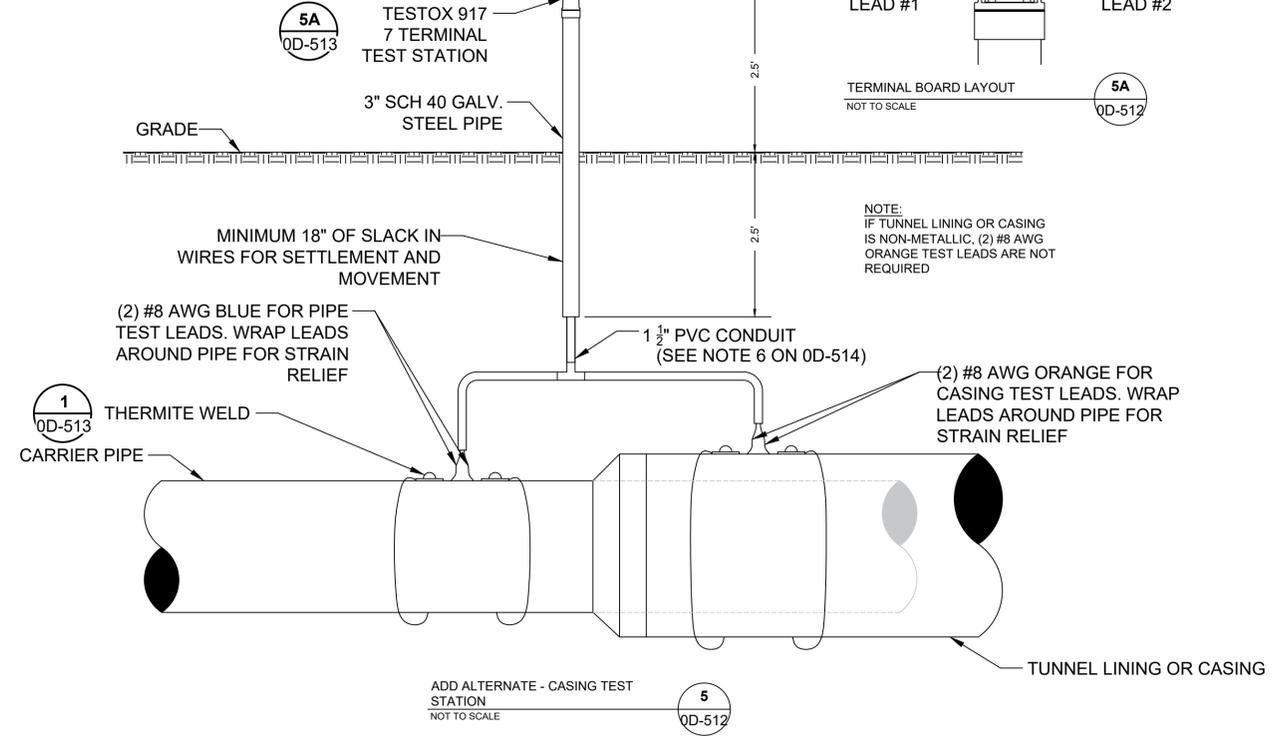
NOMINAL PIPE Ø	MIN WIRE SIZE	# OF WIRES
24" OR LESS	#6	2
25"-36"	#4	2
>36"	#2	3

CONTINUITY BONDING DETAILS NOT TO SCALE 1 OD-512

NOTE: ALL ELECTRICAL ISOLATION FLANGES, COUPLINGS, UNIONS, OR OTHER DEVICES MUST BE PROPERLY TESTED PRIOR TO BACKFILL IN ACCORDANCE WITH SPECIFICATION 264213.



FLANGE ISOLATION KIT DETAIL (DOUBLE WASHER SET FOR ABOVE GRADE OR VAULTED APPLICATIONS) NOT TO SCALE 3 OD-512



CP TEST STATION LABEL NOT TO SCALE 4 OD-512

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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

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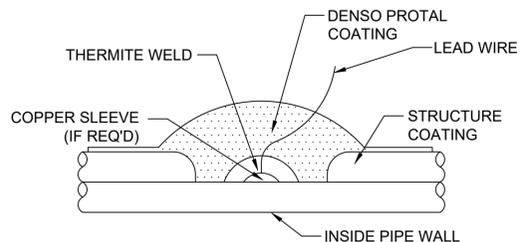
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE CATHODIC PROTECTION DETAILS II

project	162116	contract	23-150
drawing	OD-512	rev.	0
sheet	36	of	74 sheets
file 162116_OD-512.dwg			

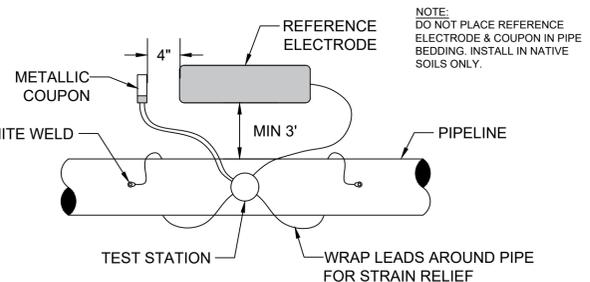
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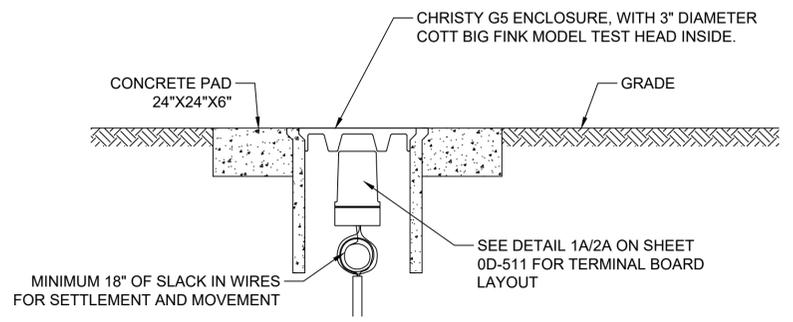
THERMITE WELDING INSTRUCTIONS

1. REMOVE APPROXIMATELY 4" DIAMETER CIRCLE OF PIPELINE COATING AT STRUCTURE CONNECTION LOCATION.
2. CLEAN AREA APPROXIMATELY 2" DIAMETER TO BRIGHT METAL.
3. REMOVE 2" OF INSULATION FROM END OF WIRE.
4. WELD CONDUCTOR TO PIPE. USE APPROPRIATE GRAPHITE MOLD AND CARTRIDGE CHARGE SIZE. COPPER SLEEVES ARE REQUIRED FOR #8 AWG OR SMALLER WIRES.
5. TEST THE THERMITE WELD CONNECTION BY STRIKING THE COMMON SEVERAL BLOWS ON THE SIDE USING A ONE POUND HAMMER. TOP OF WELD MAY BE HAMMERED FLAT IF REQUIRED.
6. APPLY DENSO PROTAL 7125 OR 7200 COATING REPAIR MATERIAL TO ALL EXPOSED METAL AT THERMITE WELD ATTACHMENT SITE PER MANUFACTURER INSTRUCTIONS..

THERMITE WELD DETAIL
NOT TO SCALE
1
0D-513



REFERENCE ELECTRODE AND METALLIC COUPON INSTALLATION DETAIL
NOT TO SCALE
2
0D-513



FLUSH MOUNT TYPE TEST STATION
NOT TO SCALE
3
0D-513

CITY OF THORTON - 5MG ZONE 1 TANK AND PIPELINE							
24" & 36" INLET/OUTLET PIPELINE - CATHODIC PROTECTION SCHEDULE							
PIPELINE	STATION	TS#	P&P SHEET	DETAIL/DRAWING	TYPE	TOTAL ANODES (32 LBS MAG)	NOTES/COMMENTS
36" INLET/OUTLET PIPE	0+00	N/A	0DP-101	3/OD-511	DIRECT BOND	2	DIRECT BOND 2 ANODES ON 16" DRAIN BETWEEN TANK AND MANHOLE
36" INLET/OUTLET PIPE	0+10	FW-1	0DP-101	1/OD-511	ISOLATION	4	INSTALL TEST STATION NEAR 16" MANHOLE
36" INLET/OUTLET PIPE	4+37	FW-2	0DP-101	2/OD-511	ANODE	4	INSTALL TEST STATION UPSTREAM OF VALVE VAULT
36" INLET/OUTLET PIPE	4+50.50	N/A	0DP-101	3/OD-511	DIRECT BOND	2	DIRECT BOND 2 ANODES ON 36" BLIND FLANGE
36" INLET/OUTLET PIPE	4+63	FW-3	0DP-101	2/OD-511	ANODE	4	INSTALL TEST STATION DOWNSTREAM OF VALVE VAULT
36" INLET/OUTLET PIPE	11+71	FW-4	0DP-102	2/OD-511	ANODE	4	INSTALL TEST STATION UPSTREAM OF VALVE VAULT
36" INLET/OUTLET PIPE	11+99	FW-5	0DP-102	2/OD-511	ANODE	4	INSTALL TEST STATION DOWNSTREAM OF VALVE VAULT
24" ZONE 3A CONNECTION PIPELINE	0+07.90	FW-6	0DP-103	2/OD-511	ANODE	4	INSTALL TEST STATION ON 24" ZONE 3A CONNECTION PIPELINE
24" ALTITUDE VALVE BYPASS WATERLINE	0+08.20	FW-7	0DP-104	2/OD-511	ANODE	4	INSTALL TEST STATION ON 24" ALTITUDE VALVE BYPASS WATERLINE
36" INLET/OUTLET PIPE	N/A	N/A	0DP-103 - ADD ALTERNATE	5/OD-512	CASING	4	ADD ALTERNATE - INSTALL ON WEST SIDE OF BORED PIPELINE CASING
36" INLET/OUTLET PIPE	N/A	N/A	0DP-103 - ADD ALTERNATE	5/OD-512	CASING	4	ADD ALTERNATE - INSTALL ON EAST SIDE OF BORED PIPELINE CASING

* ENSURE ANODE LEADS ARE LONG ENOUGH TO REACH PIPELINE AT LOCATIONS WITH DEEP GROUND COVER.

CITY OF THORTON - 5MG ZONE 1 TANK AND PIPELINE							
12" DRAIN & 16" OVERFLOW WATER PIPELINE - CATHODIC PROTECTION SCHEDULE							
PIPELINE	STATION	TS#	P&P SHEET	DETAIL/DRAWING	TYPE	TOTAL ANODES (32 LBS MAG)	NOTES/COMMENTS
12" DRAIN PIPE	0+00	N/A	0DP-105	3/OD-511	DIRECT BOND	2	DIRECT BOND 2 ANODES ON 12" DRAIN UPSTREAM OF FLEX COUPLING
12" DRAIN PIPE	0+05	DR-1	0DP-105	1/OD-511	ISOLATION	4	
16" OVERFLOW PIPE	0+00	N/A	0DP-105	3/OD-511	DIRECT BOND	2	DIRECT BOND 2 ANODES ON 16" OVERFLOW UPSTREAM OF FLEX COUPLING
16" OVERFLOW PIPE	0+06	OF-1	0DP-105	1/OD-511	ISOLATION	4	
16" OVERFLOW PIPE	4+38	OF-2	0DP-105	2/OD-511	ANODE	4	INSTALL TEST STATION UPSTREAM OF MANHOLE
16" OVERFLOW PIPE	4+58	OF-3	0DP-105	2/OD-511	ANODE	4	INSTALL TEST STATION DOWNSTREAM OF MANHOLE
16" OVERFLOW PIPE	7+39	OF-4	0DP-106	2/OD-511	ANODE	4	INSTALL TEST STATION DOWNSTREAM OF MANHOLE
16" OVERFLOW PIPE	9+50	OF-5	0DP-106	2/OD-511	ANODE	4	INSTALL TEST STATION DOWNSTREAM OF MANHOLE

* ENSURE ANODE LEADS ARE LONG ENOUGH TO REACH PIPELINE AT LOCATIONS WITH DEEP GROUND COVER.

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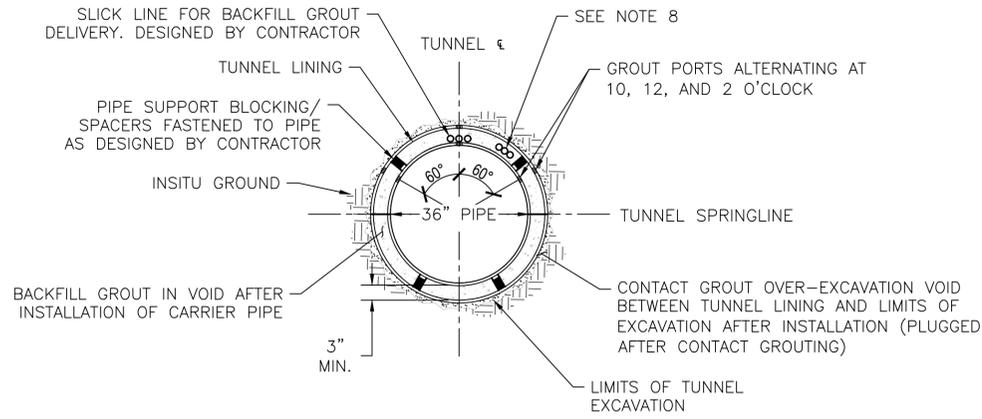


Burns & McDonnell Engineering Co., Inc.	
date	OCTOBER 2024
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designed	A. CASHON
checked	K. LEBRASSE

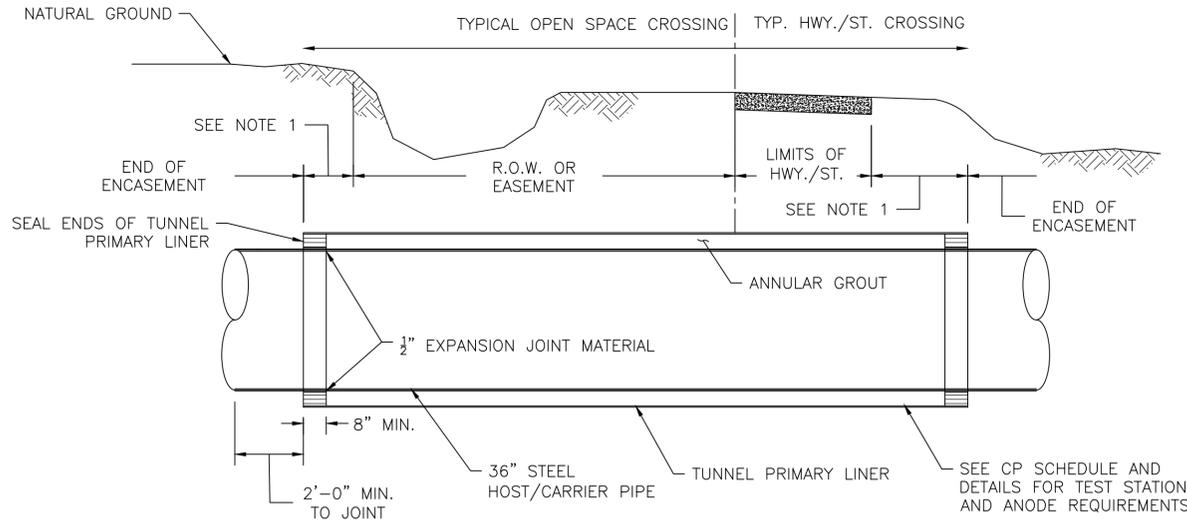


ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE CATHODIC PROTECTION DETAILS III

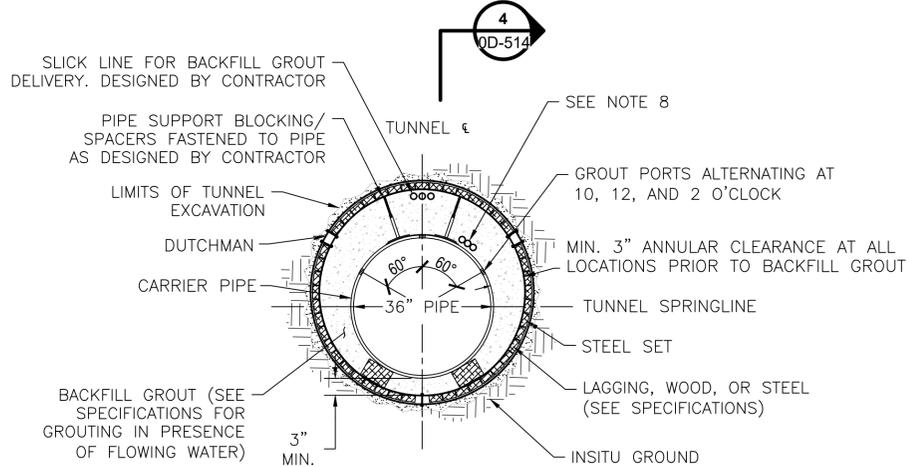
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drawing	0D-513	rev.	0
sheet	37	of	74 sheets
file 162116_0D-513.dwg			



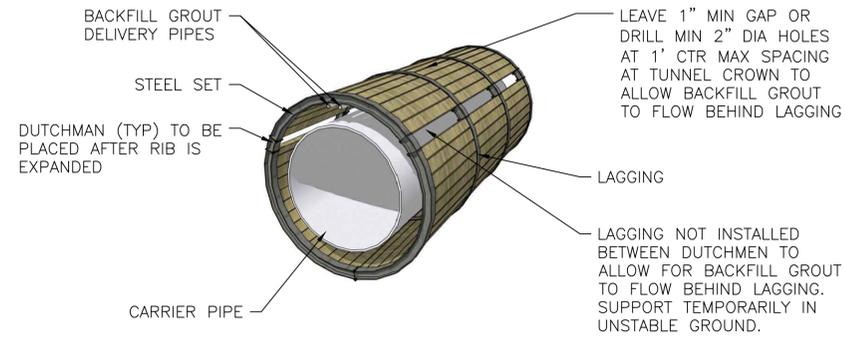
TUNNEL CROSS SECTION - STEEL PIPE OR LINER PLATE
NOT TO SCALE



TYPICAL TUNNEL INSTALLATION DETAIL
NOT TO SCALE



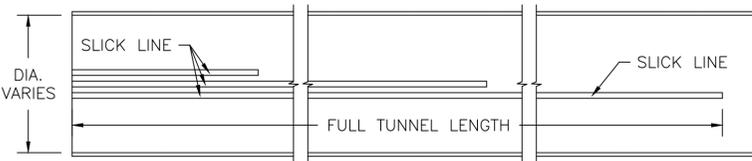
TUNNEL CROSS SECTION - RIBS AND LAGGING
NOT TO SCALE



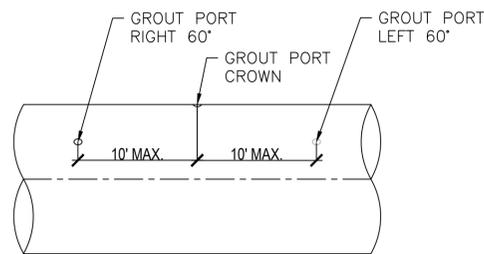
RIBS AND LAGGING SUPPORT - ELEVATION VIEW
NOT TO SCALE

NOTES:

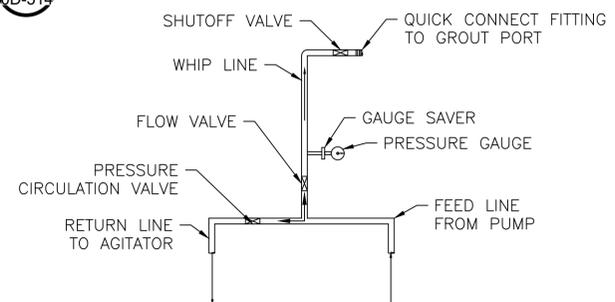
1. LENGTH OF TUNNEL SHALL BE AS SHOWN ON PLAN AND PROFILE DRAWINGS.
2. CARRIER PIPE SHALL BE ISOLATED FROM TUNNEL PRIMARY LINER OR METAL SUPPORTS/METAL WEDGES A MINIMUM OF 3-INCHES.
3. ALL ITEMS WELDED TO TUNNEL PRIMARY LINER DURING CONSTRUCTION SHALL BE REMOVED AND GROUND DOWN TO PREVENT UNINTENDED CONTACT WITH CARRIER PIPE.
4. INSTALL HOLD DOWN JACKS, BLOCKING, OR CASING SPACERS BETWEEN TUNNEL PRIMARY LINER AND CARRIER PIPE ON EACH JOINT TO RESIST FORCES/MOVEMENTS DURING ANNULAR GROUTING PLACEMENT AND PRIOR TO BACKFILLING TUNNEL SHAFTS. HOLD DOWN JACKS, BLOCKING, OR CASING SPACERS SHALL BE NON-CONDUCTING SYSTEM THAT WILL NOT CORRODE OR DAMAGE THE CARRIER PIPE.
5. TUNNEL PRIMARY LINER END SEALS/BULKHEADS SHALL BE SIZED TO ACCOMMODATE DIAMETER OF THE TUNNEL PRIMARY LINER PIPE. THESE SEALS SHALL BE INSTALLED USING NON-CONDUCTIVE MATERIALS THAT WILL NOT CORRODE OR DAMAGE THE CARRIER PIPE. SECURE/STABILIZE THE END SEALS DURING GROUTING TO PREVENT SPILLOUT OF ANNULAR GROUT.
6. MIN. CLEARANCES SHOWN ON THE PLAN AND PROFILE DRAWINGS ARE TO THE O.D. OF THE TUNNEL PRIMARY LINER. ADJUST PROFILE AS REQUIRED TO MAINTAIN CLEARANCES IDENTIFIED TO O.D. OF TUNNEL PRIMARY LINER OR TO MAINTAIN ELEVATION OF CROWN OF TUNNEL PRIMARY LINER AS SHOWN ON THE PLAN AND PROFILE DRAWINGS.
7. TEST CARRIER/HOST PIPE AND TUNNEL PRIMARY LINER PIPE FOR ELECTRICAL ISOLATION BY CERTIFIED CATHODIC PROTECTION TECHNICIAN, BEFORE AND AFTER ANNULAR GROUTING PLACEMENT AND PRIOR TO BACKFILLING THE SHAFTS. RIB AND LAGGING SYSTEMS SHALL BE MADE ELECTRICALLY CONTINUOUS.
8. INSTALL THREE (3) FLEXIBLE HDPE CONDUITS MANUFACTURED ACCORDING TO ASTM F2160 AND MEETING UL651A. CONDUITS SHALL BE SDR-11 RIBBED INTERIOR/SMOOTH EXTERIOR TYPE, NOMINAL 2-INCH INSIDE DIAMETER. REFER TO SPECIFICATION SECTION 26 05 33 - RACEWAYS, BOXES, SEALS AND FITTINGS FOR ELECTRICAL SYSTEMS FOR MORE INFORMATION.



BACKFILL GROUT SLICK LINE LAYOUT (PLAN)
NOT TO SCALE



GROUT PORT LAYOUT PROFILE
NOT TO SCALE



CONTACT GROUT HEADER ASSEMBLY
NOT TO SCALE

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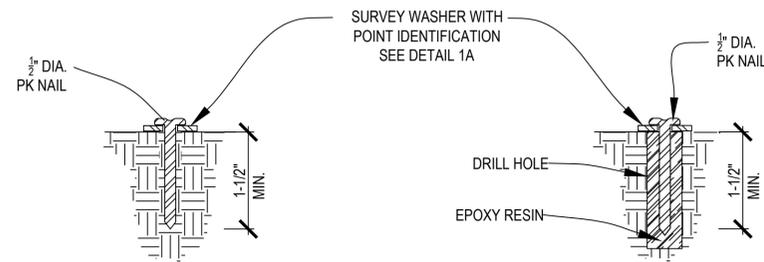
date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
ADD ALTERNATE - TUNNELING
DETAILS I

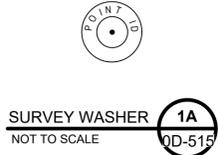
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drawing	0D-514	rev.	0
sheet	38	of	74 sheets
file	162116_0D-514.dwg		

no.	date	by	ckd	description
0	10/02/24	VP	KL	ISSUED FOR BID



- NOTES:
1. CONTRACTOR MAY INSTALL BY EITHER METHOD, DEPENDING ON PAVEMENT MATERIAL.
 2. OPTICAL PRISMS OR REFLECTORS MAY BE SUBSTITUTED FOR THE SURVEY POINTS SHOWN.

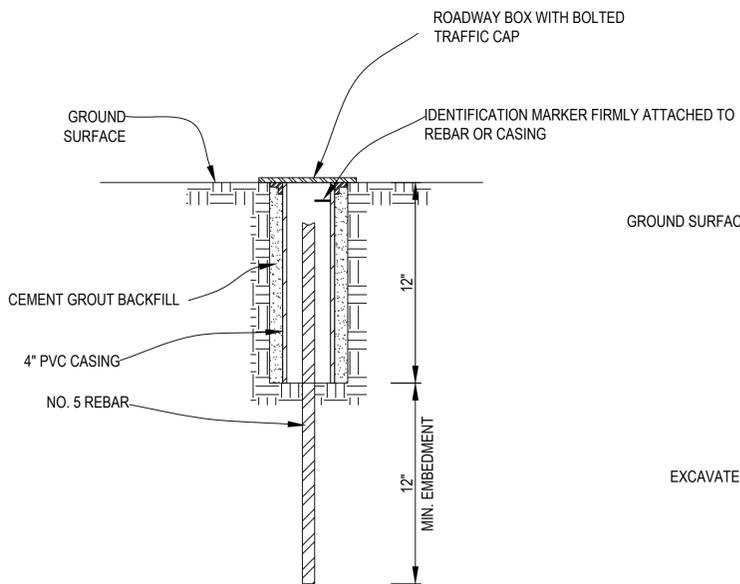
SURFACE SURVEY POINTS IN PAVEMENT (1)
NOT TO SCALE



SURVEY WASHER (1A)
NOT TO SCALE

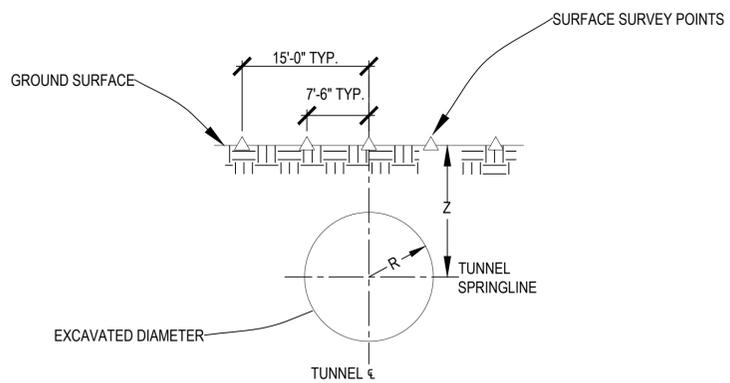
MONITORING POINT ARRAY & UTILITY MONITORING POINTS		
NO.	STATION	NOTES
ST-1	N/A	PLACE ON NORTHWEST CORNER OF BUILDING
U-1	9+15	PLACE ON PUMP

- NOTES:
1. MONITORING POINTS FOR GROUND MOVEMENTS AS SHOWN FOR TRENCHLESS AND SHAFT EXCAVATION. MONITORING POINTS FOR OPEN CUT SECTIONS PER SPECIFICATION.
 2. SEE SECTION 31 09 13 FOR FREQUENCY OF MEASUREMENT.
 3. STATIONING IS WITHIN ±2 FEET.
 4. LOCATIONS OF INDIVIDUAL GEOTECHNICAL INSTRUMENTATION ITEMS SHOWN ON DRAWINGS ARE APPROXIMATE. ACTUAL LOCATIONS AND ELEVATIONS WILL BE DETERMINED IN THE FIELD BY THE ENGINEER AND COORDINATED WITH THE CONTRACTOR.
 5. STRUCTURE MONITORING POINTS MAY CONSIST OF ANY MARK OR ATTACHED POINT THAT ALLOWS REPEATABLE MEASUREMENT OF MOVEMENT OF THE STRUCTURE AT THAT POINT.



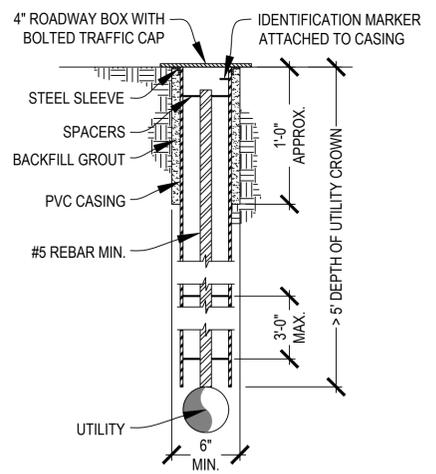
- NOTES:
1. DRIVE REBAR OR DRILL AND GROUT EMBEDMENT TO ACHIEVE FIRM ANCHORAGE.
 2. IF ONLY VERTICAL MONITORING REQUIRED, POINT OR BEVEL TOP OF REBAR. IF HORIZONTAL MONITORING ALSO REQUIRED, PROVIDE CENTER MARK ON TOP OF REBAR TO ACCEPT SURVEY ROD.

SURFACE SURVEY POINTS IN SOIL (2)
NOT TO SCALE



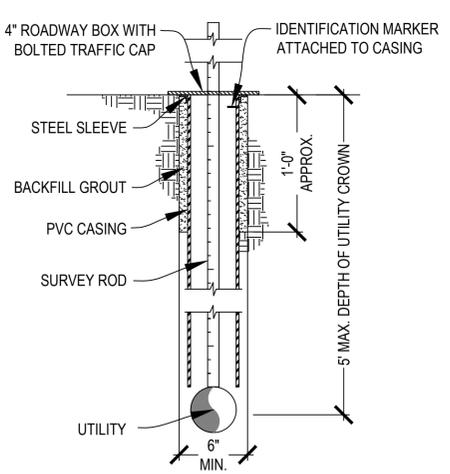
- NOTES:
1. SURFACE SURVEY POINT LOCATIONS SHALL BE IN ACCORDANCE WITH INSTRUMENTATION SCHEDULE. DIMENSIONS AND LOCATIONS SHOWN ON THIS DETAIL SHALL BE USED TO DETERMINE ACTUAL SURFACE SURVEY POINT LOCATIONS FOR ARRAYS ASSOCIATED WITH VARYING TUNNEL DEPTHS.

MONITORING POINT ARRAY (3)
NOT TO SCALE



- FOR DEEPER UTILITIES (> 5' CROWN DEPTH):
1. SPACERS AT 3'-0" MAX. VERTICAL OR 2 SPACERS MIN.
 2. UTILITY LOCATION AND DEPTH SHALL BE VERIFIED BY THE CONTRACTOR.
 3. CONTACT BETWEEN THE BAR AND THE UTILITY SHALL BE VERIFIED PRIOR TO SURVEY.
 4. PLACE MONITORING POINTS AT THE CENTERLINE OF THE CROSSING ALIGNMENT FOR ALL MONITORED UTILITIES.

UTILITY MONITORING POINT (4)
NOT TO SCALE



- FOR SHALLOWER UTILITIES (< 5' CROWN DEPTH):
1. SURVEY ROD MAY BE PLACED DIRECTLY IN CONTACT WITH UTILITY CROWN.
 2. UTILITY LOCATION AND DEPTH SHALL BE VERIFIED BY THE CONTRACTOR.
 3. PLACE MONITORING POINTS AT THE CENTERLINE OF THE CROSSING ALIGNMENT FOR ALL MONITORED UTILITIES.

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date	OCTOBER 2024	detailed	V. PONCE
designed	A. CASHON	checked	K. LEBRASSE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
ADD ALTERNATE - TUNNELING
DETAILS II

project	162116	contract	23-150
drawing	0D-515	rev.	0

sheet	39	of	74	sheets
file	162116_0D-515.dwg			

STRUCTURAL LEGEND

MATERIAL HATCH PATTERNS

	UNDISTURBED EARTH OR NATIVE SOIL		BRICK (COMMON/FACE)
	COMPACTED FILL		STEEL
	ROCK		ALUMINUM
	GRANULAR FILL		GRATING
	CONCRETE		CHECKERED PLATE
	GROUT		VOID FORM
	CONCRETE MASONRY UNITS (PLAN/SECTION)		EPS (GEOFOAM)
	CONCRETE MASONRY UNIT (ELEVATION)		DEMOLITION

COMMON SYMBOLS

GENERAL	
	KEYNOTES
	GRID - COLUMN CENTERLINE
	GRID - WALL FACE
WATERSTOPS (SEE SPECIFICATION SECTION 03 30 00)	
	PLASTIC, EXPANSIVE
	MASTIC, NON-EXPANSIVE
	PVC, DUMBELL TYPE
	PVC, BASE SEAL TYPE
PLAN VIEW SYMBOLS	
	FLOOR SPAN
	SLAB STEP OR SLOPE TRANSITION
	SCHEDULED BEAM TAG (SEE SCHEDULE)
	BEAM TAG (STEEL IF NO MATERIAL INDICATED)
	SCHEDULED COLUMN TAG (SEE SCHEDULE)
	COLUMN TAG (STEEL IF NO MATERIAL INDICATED)
SECTION/ELEVATION/DETAIL VIEW SYMBOLS	
	POST-INSTALLED EPOXY EMBED ANCHOR
	POST-INSTALLED EXPANSION ANCHOR
	STRUCTURAL SHAPES (STEEL, ALUMINUM, FRP)
	TYPICAL WALL TYPE • DESIGNATES REINFORCING & JOINT DETAILS FOR SIMILAR NUMBERED WALLS

STANDARD STRUCTURAL ABBREVIATIONS

#	NUMBER OR POUND(S)	EJ	EXPANSION JOINT	MBMA	METAL BUILDING MANUFACTURERS ASSOCIATION	SLV	SLEEVE
%	PERCENT	EL	ELEVATION	MBS	METAL BUILDING SYSTEM	SP	SPACE(S)
&	AND	EL	EARTHQUAKE LOAD	MC	MISCELLANEOUS CHANNEL SHAPE OR MOMENT CONNECTION	SPEC	SPECIFICATION(S)
@	AT	ELEC	ELECTRICAL	MECH	MECHANICAL	SQ	SQUARE
AA	ALUMINUM ASSOCIATION	ELEV	ELEVATOR	MEZZ	MEZZANINE	SSL	SHORT-SLOT HOLE(S)
AB	ANCHOR BOLT	EMBED	EMBEDMENT	MFR	MANUFACTURER	SST	STAINLESS STEEL
ACI	AMERICAN CONCRETE INSTITUTE	ENGR	ENGINEER	MIN	MINIMUM	ST	SNUG-TIGHT JOINT
ADDL	ADDITIONAL	EOD	EDGE OF DECK	MISC	MISCELLANEOUS	STD	STANDARD
ADH	ADHESIVE	EOS	EDGE OF SLAB	MSL	MEAN SEA LEVEL	STIF	STIFFENER
ADJ	ADJACENT	EQ	EQUAL	MTL	METAL	STIR	STIRRUP
AFF	ABOVE FINISH FLOOR	EQUIP	EQUIPMENT	N	NORTH	STL	STEEL
AGGR	AGGREGATE	EQUIV	EQUIVALENT	NA	NOT APPLICABLE	STR	STRAIGHT
AHJ	AUTHORITY HAVING JURISDICTION	ETC	AND SO FORTH	NAAMM	NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS	STRUCT	STRUCTURAL
AHR	ANCHOR	EW	EACH WAY	NAVD	NORTH AMERICAN VERTICAL DATUM	SUB	SUBSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	EXP	EXPANSION	NCMA	NATIONAL CONCRETE MASONRY ASSOCIATION	SUPT	SUPPORT
AISI	AMERICAN IRON AND STEEL INSTITUTE	EXST	EXISTING	NE	NORTHEAST	SW	SOUTHWEST
ALT	ALTERNATE	EXT	EXTERIOR OR EXTERNAL	NF	NEAR FACE	SYMM	SYMMETRICAL
ALUM	ALUMINUM	EXTN	EXTENSION	NO	NUMBER	T	TON(S) OR TREAD(S)
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	FAB	FABRICATE	NOM	NOMINAL	T&B	TOP AND BOTTOM
APPD	APPROVED	FD	FLOOR DRAIN	NS	NEAR SIDE	TB	THROUGH BOLT
APPROX	APPROXIMATE	FDTN	FOUNDATION	NTS	NOT TO SCALE	TD	TRENCH DRAIN
ARCH	ARCHITECT(URAL)	FF	FAR FACE	OC	ON CENTER	TEMP	TEMPORARY
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	FIN	FINISH	OD	OUTSIDE DIAMETER	THD	THREAD(ED)
ASTM	ASTM INTERNATIONAL	FLG	FLANGE	OF	OUTSIDE FACE	THK	THICK(NESS)
AWS	AMERICAN WELDING SOCIETY	FLR	FLOOR	OPH	OPPOSITE HAND	THRU	THROUGH
B/B	BACK TO BACK	FR	FRAME	OPNG	OPENING	TMS	THE MASONRY SOCIETY
BC	BOLT CIRCLE	FRMG	FRAMING	OR	OPPOSITE	TOC	TOP OF CONCRETE
BFF	BELOW FINISH FLOOR	FRP	FIBER-REINFORCED POLYMER	OSH	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	TOM	TOP OF MASONRY
BLDG	BUILDING	FS	FAR SIDE	OVS	OVERSIZE HOLE(S)	TOS	TOP OF STEEL
BLW	BELOW	FT	FOOT (FEET)	PAR	PARALLEL	TOW	TOP OF WALL
BM	BEAM	FTG	FOOTING	PCA	PORTLAND CEMENT ASSOCIATION	TYP	TYPICAL
BOS	BOTTOM OF STEEL	FUT	FUTURE	PCC	PRECAST CONCRETE	UNO	UNLESS NOTED OTHERWISE
BOT	BOTTOM	GA	GAGE	PCF	POUND(S) PER CUBIC FOOT	VAR	VARIES
BRCG	BRACING	GALV	GALVANIZE(D)	PCI	POUND(S) PER CUBIC INCH OR PRECAST/PRESTRESSED CONCRETE INSTITUTE	VB	VAPOR BARRIER
BRDG	BRIDGING	GB	GRADE BEAM	PED	PEDESTAL	VERT	VERTICAL
BRG	BEARING	GC	GENERAL CONTRACTOR	PERP	PERPENDICULAR	VNR	VENEER
BTWN	BETWEEN	GDR	GUARDRAIL	PH	PHASE	VR	VAPOR RETARDER
C	CHANNEL SHAPE	GEN	GENERAL	PL	PLATE	W	WEST OR WIDE (WIDTH) OR WIDE FLANGE SHAPE
C/C	CENTER TO CENTER	GOVT	GOVERNMENT	PLB	PLUMBING	W/	WITH
CAP	CAPACITY	GR	GRADE	PLC	PLACE(S)	W/O	WITHOUT
CFS	COLD-FORMED STEEL	GRG	GRATING	PLF	POUND(S) PER LINEAR FOOT	WH	WEEP HOLE
CHFR	CHAMFER	GT	GROUT	PREFAB	PREFABRICATE(D)	WL	WIND LOAD
CIP	CAST-IN-PLACE	H	HIGH (HEIGHT)	PREP	PREPARATION	WLD	WELD(ED)
CIR	CIRCLE	HC	HOLLOW CORE	PS	PIPE SUPPORT	WP	WORKING POINT
CJ	CONSTRUCTION JOINT	HDG	HOT-DIP GALVANIZED	PSF	POUND(S) PER SQUARE FOOT	WS	WATERSTOP
CJP	COMPLETE JOINT PENETRATION	HGR	HANGER	PT	PRETENSIONED JOINT	WT	WEIGHT OR WIDE FLANGE TEE SHAPE
CL	CENTER LINE	HORIZ	HORIZONTAL	PUR	PURLIN	WWR	WELDED WIRE REINFORCEMENT
CLJ	CONTROL JOINT	HP	BEARING PILE SHAPE	QA	QUALITY ASSURANCE	X	EXTRA STRONG
CLL	COLUMN LINE	HPT	HIGH POINT	QC	QUALITY CONTROL	XX	DOUBLE EXTRA STRONG
CLR	CLEAR	HS	HIGH STRENGTH	R	RADIUS OR RISER(S)		
CMPST	COMPOSITE	HSS	HOLLOW STRUCTURAL SECTION	RD	ROOF DRAIN		
CMU	CONCRETE MASONRY UNIT	I	MOMENT OF INERTIA	REBAR	REINFORCING STEEL BAR(S)		
CNR	CORNER	IBC	INTERNATIONAL BUILDING CODE	REF	REFERENCE		
COL	COLUMN	ID	INSIDE DIAMETER	REINF	REINFORCE(D)		
CONC	CONCRETE	IF	INSIDE FACE	REQD	REQUIRED		
CONN	CONNECTION	IJ	ISOLATION JOINT	REV	REVISION		
CONSTR	CONSTRUCTION	IN	INCH(ES)	RF	ROOF		
CONT	CONTINUOUS	INFO	INFORMATION	RM	ROOM		
CONTR	CONTRACTOR	INT	INTERIOR	RST	REINFORCING STEEL		
COORD	COORDINATE	INV	INVERT	S	SECTION MODULUS OR SOUTH OR AMERICAN STANDARD BEAM SHAPE		
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE	IR	INSIDE RADIUS	SB	SHEAR BAR		
		JST	JOIST	SC	SLIP-CRITICAL JOINT		
		JT	JOINT	SCHED	SCHEDULE		
		KB	KNEE BRACE	SDI	STEEL DECK INSTITUTE		
		KIP	THOUSAND POUNDS	SE	SOUTHEAST		
		KLF	KIP(S) PER LINEAR FOOT	SECT	SECTION		
		KPL	KICK PLATE	SEI	STRUCTURAL ENGINEERING INSTITUTE		
		KSF	KIP(S) PER SQUARE FOOT	SF	SWAY FRAME		
		KSI	KIP(S) PER SQUARE INCH	SHT	SHEET		
		L	ANGLE SHAPE OR LENGTH	SIM	SIMILAR		
		LAD	LADDER	SJI	STEEL JOIST INSTITUTE		
		LBS	POUND(S)	SLNT	SEALANT		
		LD	DEVELOPMENT LENGTH	SLO	SHORT LEG OUTSTANDING		
		LG	LONG				
		LL	LIVE LOAD				
		LLH	LONG LEG HORIZONTAL				
		LLO	LONG LEG OUTSTANDING				
		LLV	LONG LEG VERTICAL				
		LONG	LONGITUDINAL				
		LPT	LOW POINT				
		LSL	LONG-SLOT HOLE(S)				
		LTWT	LIGHTWEIGHT				
		MATL	MATERIAL				
		MAX	MAXIMUM				

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9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed N. KROUSS
designed B. SIVARAMAKRISHNAN	checked J. ZEMLIKA



THORNTON COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
ABBREVIATIONS & LEGEND

project 162116	contract 23-150
drawing 0S-001	rev. 0
sheet 40	of 74
of 74	sheets

Millimeters
Scale For Microfilming
Inches

10/2/2024 12:44:32 PM

NOTES:

1. STATEMENT OF SPECIAL INSPECTIONS AND TESTING REQUIREMENTS
 - A. THIS "STATEMENT OF SPECIAL INSPECTIONS" HAS BEEN PREPARED IN ACCORDANCE WITH IBC 2021, SECTION 1704.
 - B. OWNER SHALL RETAIN PRE-COORDINATED AND GOVERNMENT-APPROVED THIRD-PARTY QUALITY ASSURANCE AGENCIES TO PROVIDE SPECIAL INSPECTIONS DURING CONSTRUCTION IN ACCORDANCE WITH IBC REQUIREMENTS.
 - C. EACH SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE CONTRACTING OFFICER'S REPRESENTATIVE, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.
 - D. SPECIAL INSPECTION AGENCY SHALL SUBMIT INSPECTION REPORTS DURING CONSTRUCTION FOR VERIFICATION, INCLUDING FINAL REPORTS IN ACCORDANCE WITH IBC SECTION 1704.2.4.
 - E. SPECIAL INSPECTOR SHALL USE THE LATEST ISSUE OF THE STRUCTURAL DRAWINGS FOR ALL INSPECTIONS. SHOP FABRICATION DRAWINGS SHALL NOT BE USED FOR SUCH PURPOSES.
 - F. THE TABLE ON THIS SHEET IDENTIFIES THE MATERIALS, SYSTEMS, AND COMPONENTS FOR WHICH SPECIAL INSPECTION IS REQUIRED.
 - G. CONTRACTOR SHALL RETAIN PRE-COORDINATED AND GOVERNMENT-APPROVED THIRD-PARTY TESTING AGENCIES TO PROVIDE STRUCTURAL TESTING DURING CONSTRUCTION IN ACCORDANCE WITH IBC REQUIREMENTS.
 - H. TESTING AGENCY SHALL SUBMIT TEST RESULTS DURING CONSTRUCTION FOR VERIFICATION INCLUDING A FINAL REPORT IN ACCORDANCE WITH IBC SECTION 1704.2.4.
 - I. THE TABLE ON THIS SHEET IDENTIFIES THE STRUCTURAL TESTS REQUIRED FOR THIS PROJECT.
2. STRUCTURAL OBSERVATIONS
 - A. A REGISTERED DESIGN PROFESSIONAL SHALL PROVIDE STRUCTURAL OBSERVATIONS DURING CONSTRUCTION IN ACCORDANCE WITH IBC REQUIREMENTS.
 - B. EACH STRUCTURAL OBSERVER SHALL SUBMIT WRITTEN STATEMENTS IDENTIFYING FREQUENCY AND EXTENT OF STRUCTURAL OBSERVATIONS AND ANY REPORTED DEFICIENCIES WHICH, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.

SPECIAL INSPECTION REQUIREMENTS				
MATERIAL/SYSTEM	TYPE & EXTENT OF SPECIAL INSPECTION	CONT/PERIODIC	TYPE & EXTENT OF TESTING	CODE REFERENCE
		INSPECTION		
CONCRETE FORM WORK	SHAPE, LOCATION, AND DIMENSIONS OF CONCRETE MEMBER	P		
REINFORCEMENT	SIZE AND PLACEMENT	P		ACI 318
CONCRETE MIX DESIGN	VERIFICATON OF PROPERTIES	P		ACI 318
CAST-IN-PLACE CONCRETE	PLACEMENT OF CONCRETE	C	TEMPERATURE, STRENGTH, SLUMP, AIR ENTRAINMENT	ACI 318
CONCRETE CURING	MAINTENANCE OF CURING TEMPERATURE AND TECHNIQUES	P		ACI 318
ANCHORS CAST IN CONCRETE	SIZE AND PLACEMENT	P		ACI 318
ANCHORS POST INSTALLED IN HARDENED CONCRETE	SIZE, PLACEMENT, AND CONFORMANCE TO MFR'S INSTALLATION PROCEDURES	C		ACI 318
DRILLED SHAFT FOUNDATIONS	DRILLING OPERATIONS LOG FOR EACH ELEMENT. VERIFY LOCATIONS, PLUMBNESS, ELEMENT DIAMETERS, LENGTHS, BEDROCK EMBEDMENT AND ADEQUATE END-BEARING STRATA CAPACITY	C		IBC TABLE 1705.8

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THORNTON
COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
STATEMENT OF SPECIAL INSPECTIONS

project 162116	contract 23-150
drawing 0S-002	rev. 0
sheet 41 of 74 sheets	

STRUCTURAL GENERAL NOTES

1. THESE NOTES, AND OTHER DRAWING NOTES CONTAINED WITHIN, ARE PROVIDED TO MEET SPECIFIC REQUIREMENTS AND TO SUPPLEMENT THE CONTRACT SPECIFICATIONS. THESE NOTES NEITHER REPLACE NOR OVERRIDE THE PROVISIONS AND REQUIREMENTS OF THE CONTRACT SPECIFICATIONS.
2. COORDINATE ALL STRUCTURAL WORK WITH WORK SHOWN ON ALL OTHER DRAWINGS.
3. VERIFY ALL DIMENSIONS OF EXISTING CONSTRUCTION AND REPORT ANY DISCREPANCIES FROM THE CONTRACT DRAWINGS TO THE ENGINEER PRIOR TO COMMENCING WITH WORK. IN NO CASE SHALL WORKING DIMENSIONS BE SCALED FROM THE STRUCTURAL DRAWINGS.
4. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, SHORING AND TEMPORARY BRACING TO PROVIDE STRUCTURAL STABILITY DURING CONSTRUCTION.
5. IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR ON THE CONTRACT DRAWINGS OR SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE SHOWN OR CALLED FOR, WITH THE APPROVAL OF THE ENGINEER. WHERE SECTIONS VARY, CONTRACTOR SHALL PROVIDE FOR SMOOTH TRANSITIONS BETWEEN THEM, UNLESS NOTED OTHERWISE.
6. ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN INSTRUCTIONS AND RECOMMENDATIONS, UNLESS NOTED OTHERWISE.
7. DIMENSIONS ARE TO FACE OF WALL UNLESS NOTED OTHERWISE.

REINFORCED CAST-IN-PLACE CONCRETE

1. ALL CONCRETE SHALL BE PREPARED AND PLACED IN ACCORDANCE WITH ACI MANUAL OF CONCRETE PRACTICE, ACI 318 & ACI 350 AS MODIFIED BY CONTRACT DOCUMENTS.
2. ALL CONCRETE SHALL MEET THE FOLLOWING REQUIREMENTS (UNO):
 - MINIMUM 28-DAY COMPRESSIVE STRENGTH (f_c): 4,500 PSI
 - NORMAL WEIGHT CONCRETE SHALL BE USED, UNO
3. DO NOT AIR-ENTRAIN CONCRETE USED FOR INTERIOR SLABS WITH A TROWEL FINISH.
4. BEFORE CONCRETE WORK BEGINS, THE PROPOSED CONCRETE MIX DESIGN, ALONG WITH COLLABORATING DATA SHOWING COMPLIANCE WITH PROJECT REQUIREMENTS, SHALL BE SUBMITTED FOR APPROVAL.

REINFORCING STEEL

1. ALL REINFORCING BARS SHALL BE ASTM A615, GRADE 60.
2. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A1064 AND SHALL BE FLAT SHEET. ROLLED FABRIC WILL NOT BE ALLOWED.
3. REINFORCE ALL CONCRETE UNLESS SPECIFICALLY MARKED "NOT REINFORCED" OR "UNREINFORCED".
4. DETAIL AND PLACE REINFORCEMENT IN ACCORDANCE WITH ACI SP-66, ACI 301, ACI 318 AND CRSI MANUAL OF STANDARD PRACTICE.
5. DO NOT INSERT REINFORCEMENT INTO FRESH OR PARTIALLY HARDENED CONCRETE.
6. THE FOLLOWING CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT (UNLESS OTHERWISE NOTED). SEE ACI 117 FOR CONSTRUCTION TOLERANCES:
 - A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH..... 3"
 - B. CONCRETE EXPOSED TO EARTH, LIQUID, WEATHER OR CAST AGAINST A CONCRETE WORK MAT:
 - a. SLABS, WALLS & FOOTINGS..... 2"
 - b. BEAMS & COLUMNS:
 - STIRRUPS, SPIRALS & TIES..... 2"
 - PRIMARY REINFORCEMENT..... 2 1/2"
 - C. CONDITIONS NOT COVERED IN "A" OR "B":
 - a. SLABS AND WALLS..... 1 1/2"
 - b. BEAMS AND COLUMNS:
 - STIRRUPS, SPIRALS & TIES..... 1 1/2"
 - PRIMARY REINFORCEMENT..... 2"
7. THE MINIMUM LENGTH OF LAP SPLICES AND EMBEDMENT SHALL BE AS NOTED IN THE TABLES AND DETAILS ON THE CONTRACT DRAWINGS.
8. HEATING OF REINFORCING BARS SHALL NOT BE ALLOWED.
9. PROVIDE ADDITIONAL REINFORCEMENT AT OPENINGS AND CORNER BARS AT WALLS GRADE BEAMS AND CURBS IN ACCORDANCE WITH DETAILS PROVIDED ON THE CONTRACT DOCUMENTS.
10. REPOSITIONING OF REINFORCING TO AVOID INTERFERENCE WITH EMBEDDED ITEMS SHALL BE APPROVED BY THE ENGINEER PRIOR TO WORK.

CONCRETE FORMWORK

1. CONTRACTOR IS RESPONSIBLE FOR DESIGN, ENGINEERING, STRUCTURAL ADEQUACY AND CONSTRUCTION OF CONCRETE FORMWORK IN ACCORDANCE WITH CONTRACT SPECIFICATIONS.
2. COORDINATE CONCRETE WORK WITH PLACEMENT OF PIPING, INSERTS, FLOOR DRAINS AND OTHER EMBEDDED ITEMS INDICATED ON CONTRACT DRAWINGS OR IN CONTRACT SPECIFICATIONS.
3. SLEEVE NEW OR EXISTING PIPING OR UTILITIES PASSING THROUGH NEW CONCRETE, UNLESS NOTED OTHERWISE. SEE OTHER DISCIPLINE DRAWINGS FOR SLEEVE DETAILS. ENSURE SLEEVES REMAIN FREE OF DEBRIS AND WATER DURING CONSTRUCTION.
4. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNO.

CONCRETE JOINTS

1. LOCATE JOINTS AS INDICATED IN STANDARD DETAILS, AS SPECIFIED ON THE DRAWINGS OR AS APPROVED BY THE PRIOR TO PLACEMENT OF CONCRETE.
2. PRIOR TO PLACING NEW CONCRETE CLEAN CONSTRUCTION JOINT SURFACES OF LAITANCE. IMMEDIATELY BEFORE PLACING NEW CONCRETE WET SURFACE AND REMOVE ANY STANDING WATER.
3. INTENTIONALLY ROUGHEN SURFACE OF JOINTS AS SPECIFIED ON THE CONTRACT DOCUMENTS.
4. PROVIDE WATERSTOPS AT ALL CONCRETE JOINTS, UNLESS NOTED OTHERWISE.

POST-INSTALLED ANCHORS

1. POST INSTALLED CONCRETE ANCHOR MANUFACTURERS AND ADHESIVES FOR POST INSTALLED REINFORCING BARS SHALL BE PROVIDED AND INSTALLED PER SPECIFICATION 05 05 19.
2. ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
3. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. REINFORCING BARS SHALL NOT BE CUT UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT. CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD WHEN INTERFERENCES OCCUR.
4. ADHESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS AT TIME OF ANCHOR INSTALLATION. APPROVAL OF THE ENGINEER OF RECORD IS REQUIRED FOR INSTALLATIONS IN CONCRETE LESS THAN 21 DAYS OF AGE.

GRATING

1. METAL GRATING AND STAIR TREADS SHALL CONFORM TO THE "METAL BAR GRATING MANUAL" OF THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS.
 - A. WHERE INDICATED TO BE ALUMINUM, GRATING SHALL BE I-BAR SHAPE WITH SWAGE LOCKED CROSS BARS SPACED AT 4" OC. GRATING SHALL BE 1 1/2" DEEP UNLESS NOTED OTHERWISE ON THE DRAWINGS. TOP SURFACE OF GRATING SHALL BE GROOVED FOR SLIP RESISTANCE.
 - B. WHERE INDICATED TO BE STAINLESS STEEL, GRATING SHALL BE TYPE 316L STAINLESS STEEL. BEARING BARS SHALL BE 3/16" WIDE, SPACED AT 1 3/16" ON CENTER WITH CROSS BARS AT 4" ON CENTER. GRATING BEARING BARS SHALL BE 1 1/2" DEEP UNLESS NOTED OTHERWISE ON THE DRAWINGS. TOP SURFACE OF GRATING SHALL BE SERRATED FOR SLIP RESISTANCE.
2. TOP SURFACE OF FRP GRATING SHALL HAVE A MECHANICALLY ADHERED NON-SKID GRIT SURFACE.
3. ALL FIELD CUT EDGES OF FRP GRATING SHALL BE SMOOTH AND SEALED WITH A CATALYZED RESIN OF EQUAL OR SUPERIOR CORROSION RESISTANCE TO THE MANUFACTURED PRODUCT.
4. PROVIDE GRATING WITH SADDLE CLIP TYPE FASTENERS. PROVIDE 316 STAINLESS STEEL FOR FRP AND STAINLESS STEEL GRATING AND ALUMINUM FOR ALUMINUM GRATING. MINIMUM ANCHORAGE OF EACH PANEL WILL BE TWO ANCHORS AT EACH END.

MISCELLANEOUS MATERIALS

1. GROUT FOR EQUIPMENT BASE PLATES SHALL BE NON-SHRINK NON-METALLIC HIGH STRENGTH GROUT. GROUT SHALL BE FIVE STAR GROUT BY U.S. GROUT CORPORATION OR APPROVED EQUAL. ALL GROUTING REQUIRES CURING THE EXPOSED SURFACE WITH CURING AND SEALING COMPOUND IMMEDIATELY AFTER INSTALLATION.
2. BONDING AGENT SHALL BE SIKADUR 32, HI-MOD BY SIKA CORPORATION OR APPROVED EQUAL.

GEOTECHNICAL INFORMATION

1. STRUCTURAL FILL ADJACENT TO STRUCTURES:
 - A. STRUCTURAL FILL SHOULD CONSIST OF MOISTURE CONDITIONED ON-SITE SOILS (EXCLUDING CLAYSTONE) OR, IF NECESSARY, IMPORTED NON-EXPANSIVE SOILS WITH 30 TO 80 PERCENT PASSING THE NO. 200 SIEVE, WITH A MAXIMUM LIQUID LIMIT OF 35 AND A MAXIMUM PLASTICITY INDEX OF 12.
 - B. THE SWELL POTENTIAL OF NON-EXPANSIVE FILL MATERIALS WHEN REMOLDED TO 95% OF THE STANDARD PROCTOR (ASTM D698) MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT SHOULD BE LESS THAN 1% WHEN WETTED UNDER A 200 PSF SURCHARGE PRESSURE.
 - C. ALL FILL MATERIAL SHOULD BE FREE OF VEGETATION, BRUSH, SOD, AND OTHER ELETERIOUS SUBSTANCES AND SHOULD NOT CONTAIN ROCKS, DEBRIS OR LUMPS HAVING A DIAMETER OF MORE THAN 4 INCHES.
 - D. FILL MATERIALS SHOULD BE COMPACTED WITH MOISTURE CONTENTS BETWEEN 1 AND 4% POINTS ABOVE OPTIMUM MOISTURE FOR CLAYEY SOILS AND BETWEEN +/- 2% FOR GRANULAR SOILS. THE ON-SITE SOILS MAY BECOME SOMEWHAT UNSTABLE AND DEFORM UNDER WHEEL LOADS IF PLACED NEAR THE UPPER END OF THE RECOMMENDED MOISTURE RANGE, SO THE UPPER 2 FEET OF SUBGRADE FILL SHOULD BE PLACED TOWARDS THE LOWER END OF THIS RANGE.
 - E. TO REDUCE SURFACE WATER INFILTRATION INTO THE BACKFILL, THE UPPER 2 FEET OF THE BACKFILL SHOULD CONSIST OF A RELATIVELY IMPERVIOUS IMPORTED SOIL WITH AT LEAST 30% PASSING THE NO. 200 SIEVE.
 - F. DEGREE OF COMPACTION SHALL BE AS FOLLOWS
 - a. FOUNDATION WALL BACKFILL 95%
 - G. COMPACTED FILL SHALL BE PLACED IN MAXIMUM 8-INCH THICK LOOSE LIFTS.
2. LATERAL EARTH PRESSURES, ON-SITE MOISTURE-CONDITIONED OVERBURDEN CLAY BACKFILL (DRAINED):
 - A. ACTIVE = 55 PCF
 - B. AT-REST = 70 PCF

STRUCTURAL DESIGN LOADING/CRITERIA

- STRUCTURAL DESIGN WAS PREPARED USING THE FOLLOWING CODES AND DATA:
- A. INTERNATIONAL BUILDING CODE, 2021 EDITION
 - B. ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
 - C. ACI 350 BUILDING CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
 - D. ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
1. RISK CATEGORY: IV (TYPICAL FOR ALL STRUCTURES WITHIN PROJECT SCOPE)
 2. DEAD LOADS:
 - A. SELF WEIGHT OF MATERIALS OF CONSTRUCTION
 - B. WEIGHT OF FIXED SERVICE EQUIPMENT
 - a. AS INDICATED ON THE STRUCTURAL DRAWINGS FOR EQUIPMENT WEIGHING IN EXCESS OF 300 LBS. FRAMING AND FOUNDATIONS ARE DESIGNED FOR EQUIPMENT WHICH SATISFIES THE CONTRACT SPECIFICATIONS.
 - b. IF EQUIPMENT FURNISHED IS HEAVIER THAN THE WEIGHTS INDICATED, OR REQUIRES STRUCTURAL CHANGES FOR ANY OTHER REASONS, PROVIDE ENGINEERING DESIGN CALCULATIONS AND ADDITIONAL STRUCTURAL WORK NECESSARY TO SUPPORT ALL LOADS IN ACCORDANCE WITH THE DESIGN STANDARDS SPECIFIED ABOVE, AT NO ADDITIONAL COST TO THE OWNER AND WITH NO INCREASE IN CONTRACT TIME.
 - C. SUPERIMPOSED DEAD LOAD..... VARIES
 3. LIVE LOADS:
 - A. STAIRS, WALKWAYS, PLATFORMS..... 100 PSF, UNIFORM
 4. ROOF LIVE LOAD 20 PSF
 5. SNOW LOADS:
 - A. SNOW LOAD IMPORTANCE FACTOR (I_s)..... 1.36
 - B. GROUND SNOW LOAD (P_g)..... 40 PSF
 - C. FLAT-ROOF SNOW LOAD..... 46 PSF
 - D. SNOW EXPOSURE FACTOR (C_e)..... 1.0
 - E. THERMAL FACTOR (C_t)..... 1.2
 - F. SLOPE FACTOR (C_s)..... 1.1
 6. WIND DESIGN DATA:
 - A. BASIC WIND SPEED (V_{ult})..... 117 MPH
 - B. NOMINAL DESIGN WIND SPEED (V_{asd})..... 91 MPH
 - C. EXPOSURE CATEGORY..... C
 7. SEISMIC DESIGN DATA:
 - A. SEISMIC IMPORTANCE FACTOR (I_e)..... 1.5
 - B. MAPPED SPECTRAL RESPONSE PARAMETERS:
 - a. S_s..... 0.193
 - b. S₁..... 0.056
 - C. SOIL SITE CLASS..... C
 - D. DESIGN SPECTRAL RESPONSE PARAMETERS:
 - a. S_{DS}..... 0.167
 - b. S_{D1}..... 0.056
 - E. SEISMIC DESIGN CATEGORY..... C

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sheet 42 of 74 sheets	

Millimeters

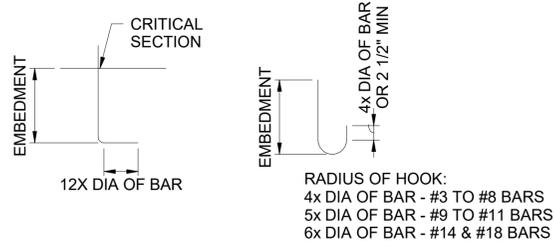
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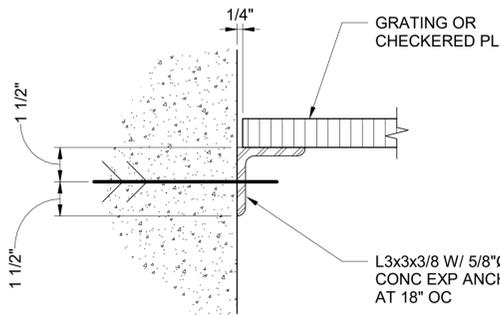
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CONCRETE REINFORCEMENT SPLICE AND EMBEDMENT TABLE (ACI 318-14, $f_c = 4000$ PSI)					
BAR SIZE	SPLICES (IN)		EMBEDMENT (IN)		
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	HOOKE BARS
3	16	12	12	12	6
4	21	16	16	13	8
5	26	20	20	16	9
6	31	24	24	19	11
7	51	40	40	31	13
8	65	50	50	39	15
9	80	61	61	47	17
10	98	75	75	58	19
11	116	90	90	69	21
14	NOT ALLOWED		121	93	35
18	NOT ALLOWED		192	148	46

- REINFORCING SPLICE AND EMBEDMENT TABLE NOTES:**
- REINFORCING BAR EMBEDMENT AND LAP SPLICE LENGTHS SHALL BE AS SHOWN IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - THE LENGTHS SHOWN IN THE TABLE ARE BASED ON THE FOLLOWING CONCRETE COVERAGE AND REINFORCING C-C SPACING:
 - BEAMS OR COLUMNS: COVER $\geq 1-1/2"$ CENTER TO CENTER (C-C) SPACING $\geq 6"$
 - ALL OTHERS: COVER $\geq 1-1/2"$ CENTER TO CENTER SPACING $\geq 6"$
 - TOP BARS ARE DEFINED AS HORIZONTAL REINFORCEMENT PLACED SUCH THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
 - THE DEVELOPMENT AND SPLICE LENGTHS SHOWN SHALL NOT APPLY IF ANY OF THE FOLLOWING CONDITIONS OCCUR:
 - $f_c < 4000$ psi
 - $f_y > 60,000$ psi
 - THE COVER OR C-C BAR SPACING IS NOT AS LISTED ABOVE.
 - THE REINFORCING STEEL IS EPOXY COATED.
 - LIGHT WEIGHT CONCRETE IS USED.
 - WHERE BAR SPLICES ARE STAGGERED SUCH THAT ONE-HALF OR LESS OF TOTAL REINFORCEMENT IS SPLICED WITHIN REQUIRED LAP LENGTH, SPLICE LENGTH MAY EQUAL EMBEDMENT LENGTH.

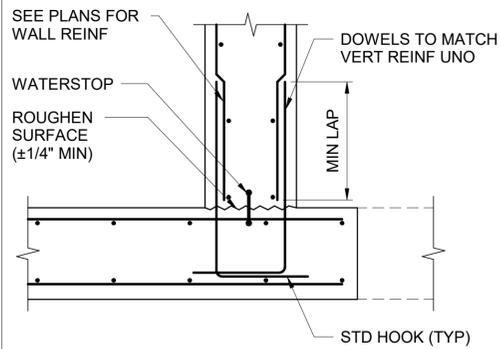


LAP SPLICE TABLE
NOT TO SCALE



NOTE:
1. ANGLE SHALL BE HOT-DIP GALVANIZED, UNO.

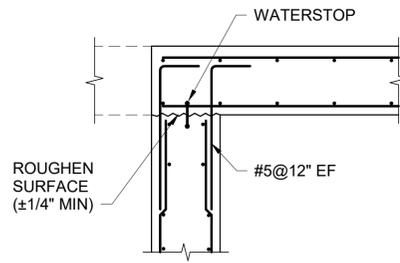
GS-1
NOT TO SCALE



NOTE:
1. WALL REINFORCEMENT MAY BE SINGLE LAYER, SEE PLANS.

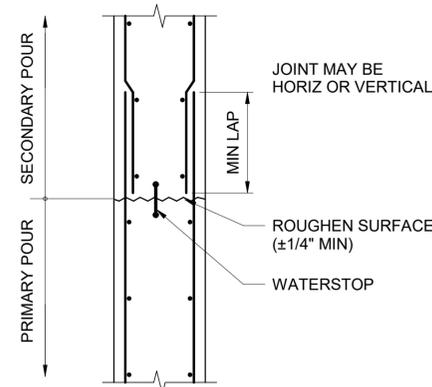
CJ-1 WITH WATERSTOP
CJ-2 WITHOUT WATERSTOP

CJ-1/CJ-2, WALL-TO-SLAB JOINT
NOT TO SCALE



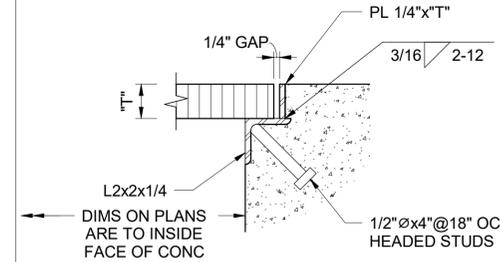
CJ-8 WITH WATERSTOP
CJ-9 WITHOUT WATERSTOP

CJ-8/CJ-9, WALL TO TOP SLAB JOINT
NOT TO SCALE



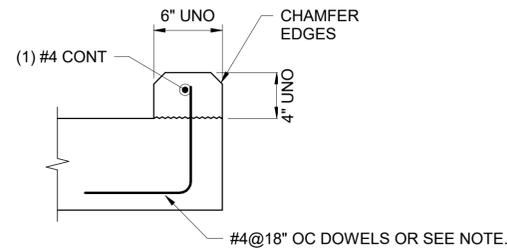
CJ-10 WITH WATERSTOP
CJ-11 WITHOUT WATERSTOP

CJ-10/CJ-11, WALL JOINT
NOT TO SCALE



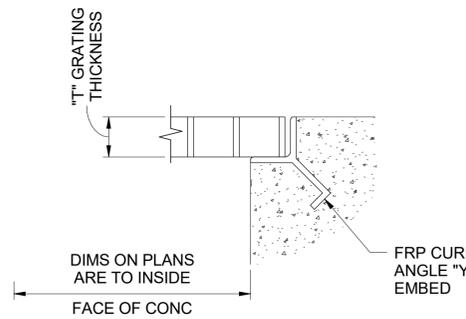
NOTES:
1. MITER, WELD, AND SMOOTH GRIND ANGLES AT ALL CORNERS.
2. EMBEDDED ANGLE ASSEMBLY SHALL BE HOT-DIP GALVANIZED, UNO.

CE-4
NOT TO SCALE

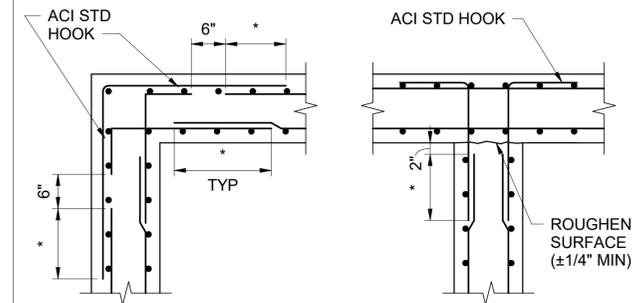


NOTE:
AT CONTRACTOR'S OPTION, DRILL AND EPOXY DOWELS WITH 4" MINIMUM DEPTH.

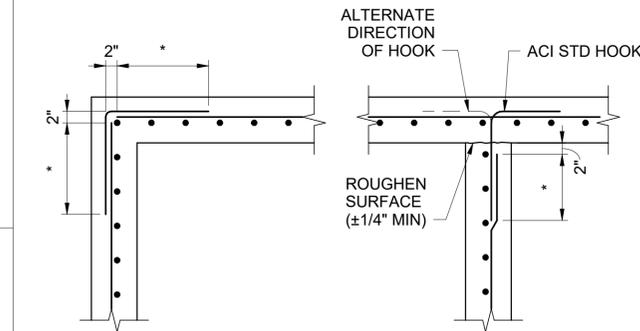
CE-8
NOT TO SCALE



CE-9
NOT TO SCALE



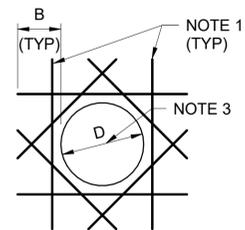
TWO LAYERS REINFORCING



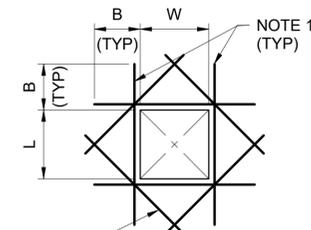
SINGLE LAYER REINFORCING

NOTES:
1. USE AT ALL CORNERS FOR ALL CONCRETE MEMBERS INCLUDING THICKENED SLAB ON GRADE, WALLS, CURBS, BEAMS, GRADE BEAMS AND SLABS, UNLESS INDICATED OTHERWISE.
2. *TYPICAL CONCRETE REINFORCEMENT LAP SLICE PER TABLE (THIS SHEET) UNLESS INDICATED OTHERWISE.

CORNER BAR DETAILS
NOT TO SCALE



CO-1



CO-2

OPENING REINFORCING NOTES:

- ADD BARS EQUAL TO THE TOTAL AREA OF REGULAR REINFORCING CUT BY THE OPENING EACH MAT. PLACE ONE HALF TOTAL AREA EACH SIDE OF OPENING EACH MAT.
- (1) #5 BAR x 3'-0" EACH CORNER EACH MAT FOR CONCRETE THICKNESS < 18"
- (1) #6 BAR x 4'-0" EACH CORNER EACH MAT FOR CONCRETE THICKNESS $\geq 18"$
- (4) #5 BARS x D + 12" @ 45° TO REGULAR REINFORCING EACH MAT FOR CONCRETE THICKNESS < 18"
- (4) #6 BARS x D + 12" @ 45° TO REGULAR REINFORCING EACH MAT FOR CONCRETE THICKNESS $\geq 18"$
- B = TOP BAR LAP SPLICE
- CENTER ALL BARS ON OPENING.
- FOR OPENINGS (W, L, D) LESS THAN 12" NO ADD BARS REQUIRED IF NO REGULAR REINFORCING IS CUT BY THE OPENING, OTHERWISE SEE NOTE 1.
- REINFORCE OPENINGS WITH W, L, OR D LARGER THAN 54" AS INDICATED ON THE DRAWINGS. IF NOT INDICATED CONTACT THE ENGINEER.

CO-1/CO-2
NOT TO SCALE

no.	date	by	ckd	description
0	10/02/24	BS	JJZ	ISSUED FOR BID

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ENGLEWOOD, CO 80112
303-721-9292

date	OCTOBER 2024	detailed	N. KROUSS
designed	B. SIVARAMAKRISHNAN	checked	J. ZEMLICKA



THORNTON COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
STANDARD DETAILS I

project	162116	contract	23-150
drawing	OS-500	rev.	0
sheet	43 of 74	sheet	

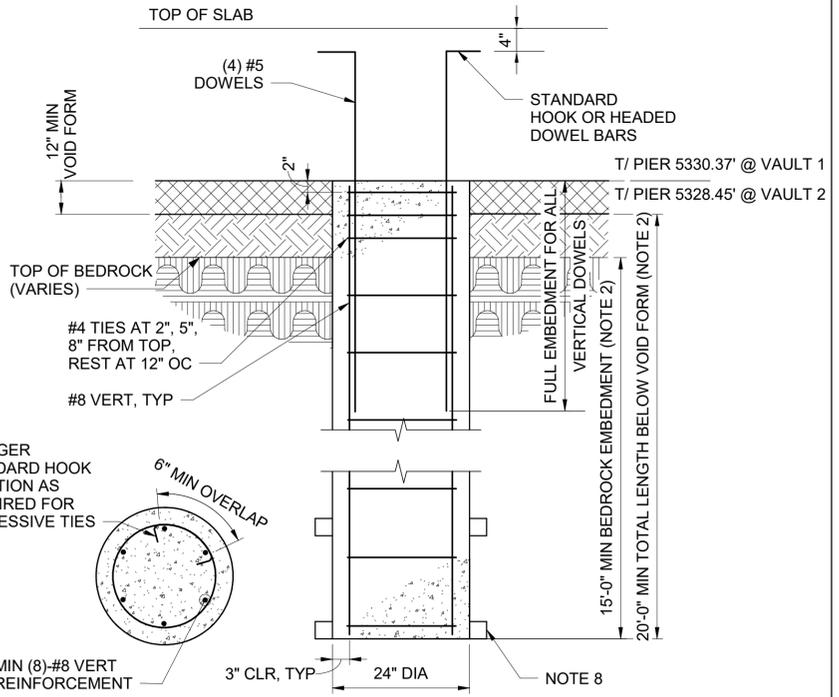
Millimeters

Inches

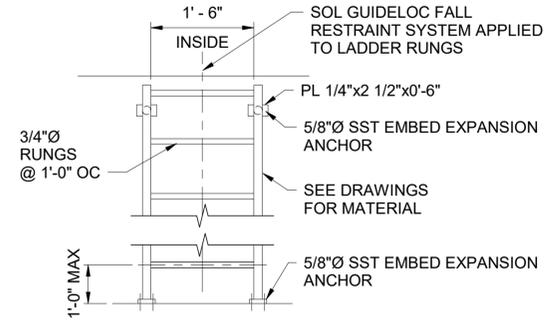
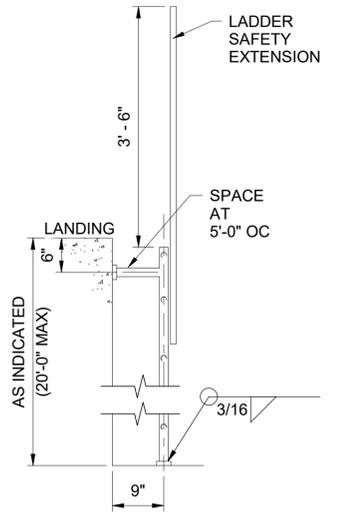
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DRILLED SHAFT NOTES:

- BASE OF SHAFT ELEVATIONS WILL VARY. EXTEND REINFORCEMENT FULL DEPTH OF SHAFT.
- BOTH SPECIFIED BEDROCK EMBEDMENT AND MINIMUM TOTAL EMBEDMENT LENGTH BELOW VOID FORM PER DETAIL MUST BE SATISFIED.
- REPRESENTATIVE FROM A GEOTECHNICAL TESTING FIRM SHALL BE PRESENT FULL TIME DURING DRILLING AND INSTALLING SHAFTS. THE GEOTECHNICAL REPRESENTATIVE SHALL VERIFY THE TOTAL DEPTH BELOW VOID FORM OF EACH SHAFT SO THAT BOTH THE MINIMUM TOTAL EMBEDMENT LENGTH BELOW VOID FORM AND MINIMUM BEDROCK EMBEDMENT ARE ATTAINED.
- IF THE GEOTECHNICAL REPRESENTATIVE REQUIRES INCREASE IN MINIMUM TOTAL EMBEDMENT LENGTH BELOW VOID FORM TO ATTAIN THE MINIMUM BEDROCK EMBEDMENT, THE REINFORCING CAGE SHALL BE EXTENDED TO INCLUDE THE ADDITIONAL DEPTH IF GREATER THAN 2FT. REINFORCING CAGE EXTENSION SHALL USE STANDARD LAP SPLICES AS INDICATED ON OS-500.
- REFER TO SPEC SECTION 31 63 29 FOR ADDITIONAL DRILLED SHAFT INSTALLATION REQUIREMENTS.
- THE USE OF TEMPORARY CASING OR DEWATERING EQUIPMENT IN THE SHAFT EXCAVATIONS TO REDUCE WATER INFILTRATION MAY BE REQUIRED. IN NO CASE SHALL CONCRETE BE PLACED IN MORE THAN 2 INCHES OF WATER.
- PLACE CONCRETE IMMEDIATELY AFTER FINAL INSPECTION AND APPROVAL BY GEOTECHNICAL REPRESENTATIVE. IF CONCRETE IS NOT PLACED IMMEDIATELY AFTER COMPLETION OF EXCAVATION, THE EXCAVATION SHALL BE CONTINUALLY DEWATERED AND THE BOTTOM OF THE EXCAVATION SHALL BE RE-AUGERED AS DIRECTED BY THE GEOTECHNICAL REPRESENTATIVE TO REMOVE ANY SOFTENED BEARING OR SIDEWALL MATERIAL AND RE-INSPECTED BY THE GEOTECHNICAL REPRESENTATIVE.
- SHEAR RINGS REQUIRED OVER BOTTOM 6FT OF DRILLED SHAFT. SHEAR RINGS MUST BE 3 INCHES HIGH AND 3 INCHES DEEP. SHEAR RINGS TO BE EITHER HORIZONTAL OR HELICAL. HORIZONTAL RINGS TO BE SPACED AT 18 INCHES. HELICAL RINGS TO BE INSTALLED AT 18-INCH PITCH.



TYPICAL DRILLED PIER
NOT TO SCALE

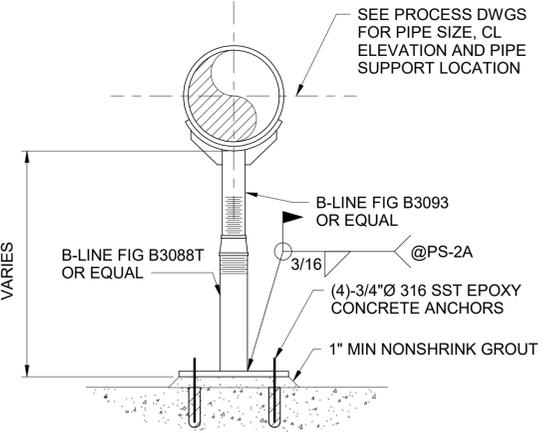


L-3
NOT TO SCALE

Millimeters

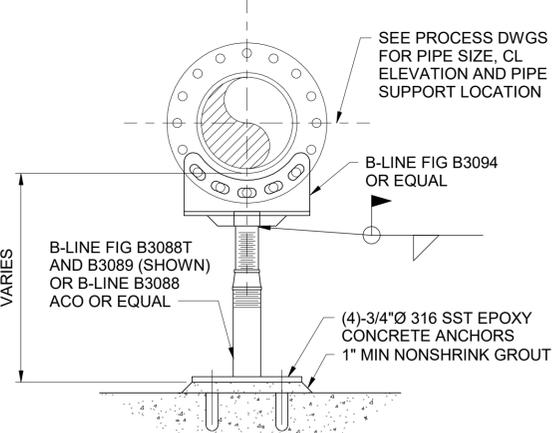
Scale For Microfilming

Inches



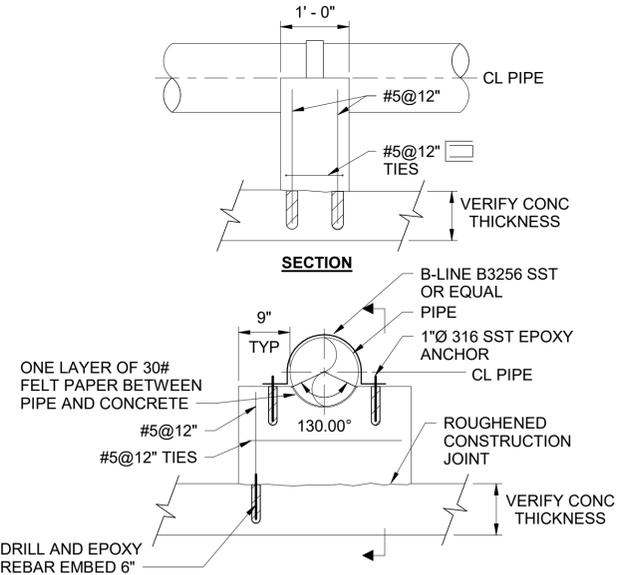
- NOTES:**
- COAT PIPE SYSTEM USING SYSTEM D-1 AS SPECIFIED IN SECTION 099000.
 - PROVIDE STAINLESS STEEL SYSTEM WHERE PIPE SUPPORT IS CONTINUOUSLY SUBMERGED.

PS-2
NOT TO SCALE

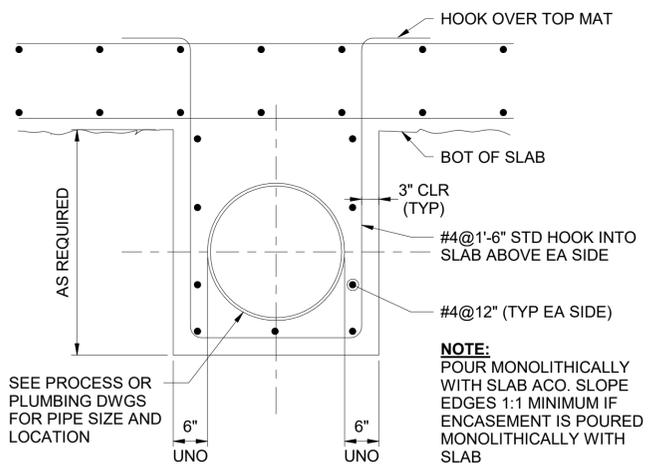


- NOTES:**
- COAT PIPE SYSTEM USING SYSTEM D-1 AS SPECIFIED IN SECTION 099000.
 - PROVIDE STAINLESS STEEL SYSTEM WHERE PIPE SUPPORT IS CONTINUOUSLY SUBMERGED.

PS-3
NOT TO SCALE



PS-4/PS-4A
NOT TO SCALE



PE-2
NOT TO SCALE

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designed B. SIVARAMAKRISHNAN	checked J. ZEMLIKA

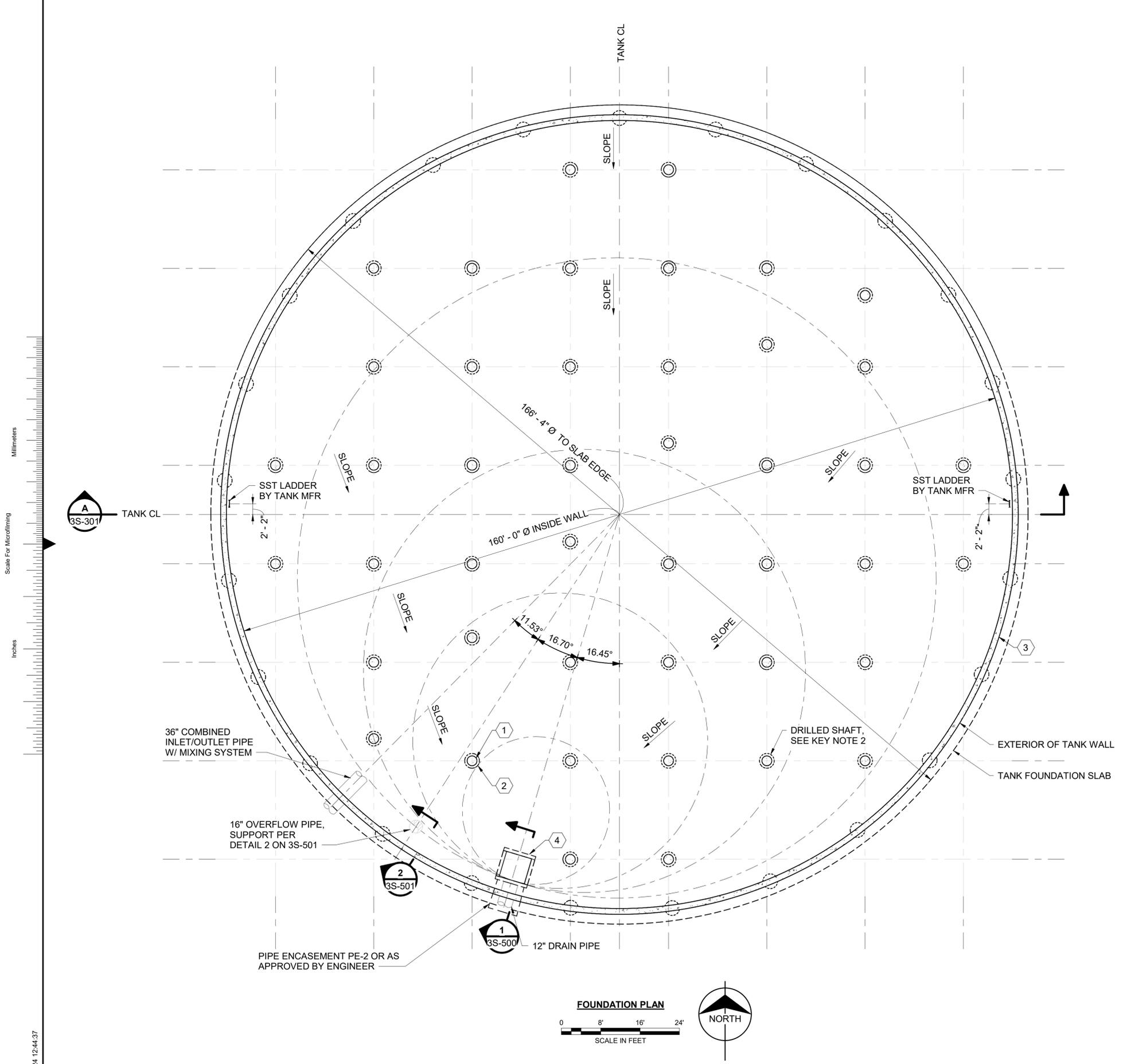


THORNTON
COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
STANDARD DETAILS II

project 162116	contract 23-150
drawing 0S-501	rev. 0
sheet 44	of 74 sheets

10/2/2024 12:44:36 PM



SHEET NOTES:

- SEE 0S-001 FOR ABBREVIATIONS AND LEGEND. SEE 0S-002 FOR SPECIAL INSPECTION REQUIREMENTS. SEE 0S-003 FOR STRUCTURAL GENERAL NOTES.
- SEE 0S-500 SERIES DRAWINGS FOR STANDARD STRUCTURAL DETAILS.
- WATER STORAGE TANK DESIGN IS A DELEGATED DESIGN SUBMITTAL. TANK SHALL BE AN AWWA D115 POST TENSIONED CONCRETE TANK OR AN AWWA D110 TYPE III WIRE- AND STRAND-WOUND PRESTRESSED CONCRETE TANK. ALL LOADS SHALL BE AS REFERENCED ON 0S-003 AND AS REQUIRED FOR DESIGN BY THE TANK MANUFACTURER TO MEET ALL APPLICABLE BUILDING CODES AND STANDARDS.
- TANK SHALL BE SUPPORTED ON DEEP FOUNDATION SYSTEM DESIGNED BY THE TANK MANUFACTURER. DRILLED SHAFT SIZE AND SPACING BY THE TANK MANUFACTURER. SEE NOTES ON 0S-003 FOR SUBGRADE PREPARATION REQUIREMENTS.
- ALL DIMENSIONS SHOWN ON TANK DRAWINGS SHALL BE CONSIDERED MINIMUM DIMENSIONS. TANK BUILDER MAY INCREASE SIZES WITH APPROVAL FROM THE ENGINEER. DIMENSIONS AND SIZES SHOWN SHALL NOT BE REDUCED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK ASSOCIATED WITH PROVIDING A FINISHED TANK. ANY DETAILS NOT SHOWN ON THESE DRAWINGS SHALL BE THE TANK MFR'S STANDARD AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
- ALL COMPONENTS AND APPURTENANCES TO THE STORAGE TANK SHALL BE DESIGNED BY THE TANK MANUFACTURER.
- CONTRACTOR SHALL PLACE THE BASE AND FLOOR SLAB AS REQUIRED IN THE SPECIFICATIONS. THE CONTRACTOR SHALL WATER CURE THE ENTIRE SLAB IMMEDIATELY FOLLOWING SLAB PLACEMENT AND FINISHING BY FLOODING SLAB USING WATER STOP AS DYKE. LEAVE SLAB FLOODED FOR AT LEAST 7 DAYS AND MAINTAIN WATER LEVEL. CONTRACTOR IS RESPONSIBLE FOR PROPER DISPOSAL OF WATER USED FOR CURING.
- FOR PIPING, OVERFLOW, DRAIN, AND ALL OTHER ELEVATIONS NOT SHOWN ON THE PLAN DRAWINGS, SEE CIVIL DRAWINGS. ANY PROPOSED PIPING CHANGES SHALL BE COORDINATED WITH THE ENGINEER. ANY ASSOCIATED COSTS (IE FITTINGS, PIPING CHANGES, GRADING, ENGINEERING, ETC) FOR CHANGES WILL BE PAID FOR BY THE CONTRACTOR.

KEY NOTES:

- CAST IN PLACE CONCRETE COLUMNS SUPPORTING CONCRETE ROOF ABOVE. SIZE, QUANTITY, AND LOCATION OF COLUMNS SHALL BE DETERMINED BY THE TANK MANUFACTURER. REFERENCE SPECIFICATIONS. LOCATION SHALL ACCOMMODATE PROCESS PIPING AND APPURTENANCES SHOWN OR AS REQUIRED. THICKEN FLOOR SLAB AT COLUMN LOCATIONS AS REQUIRED. PROVIDE 36" MINIMUM BETWEEN EDGE OF COLUMNS AND TANK SHELL.
- DRILLED CONCRETE PIERS. SIZE AND LOCATION TO BE AS DETERMINED BY THE TANK MANUFACTURER, DESIGN REQUIREMENTS, AND SPECIFICATIONS.
- THICKNESS AND DETAILS OF PERIMETER TANK WALL PER MANUFACTURER, IN ACCORDANCE WITH SPECIFICATIONS. WALL/FOUNDATION AND WALL/ROOF JOINTS SHALL PERMIT RADIAL, DIFFERENTIAL MOVEMENT, BUT SHALL RESTRAIN MOVEMENT TANGENTIALLY. THICKEN FLOOR SLAB BELOW PERIMETER WALL AS REQUIRED.
- DRAIN SUMP, REFERENCE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION. JOINTS BETWEEN SUMP AND TANK FOUNDATION SHALL CONTAIN WATERSTOP AND BE WATER-TIGHT.

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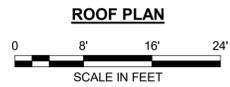
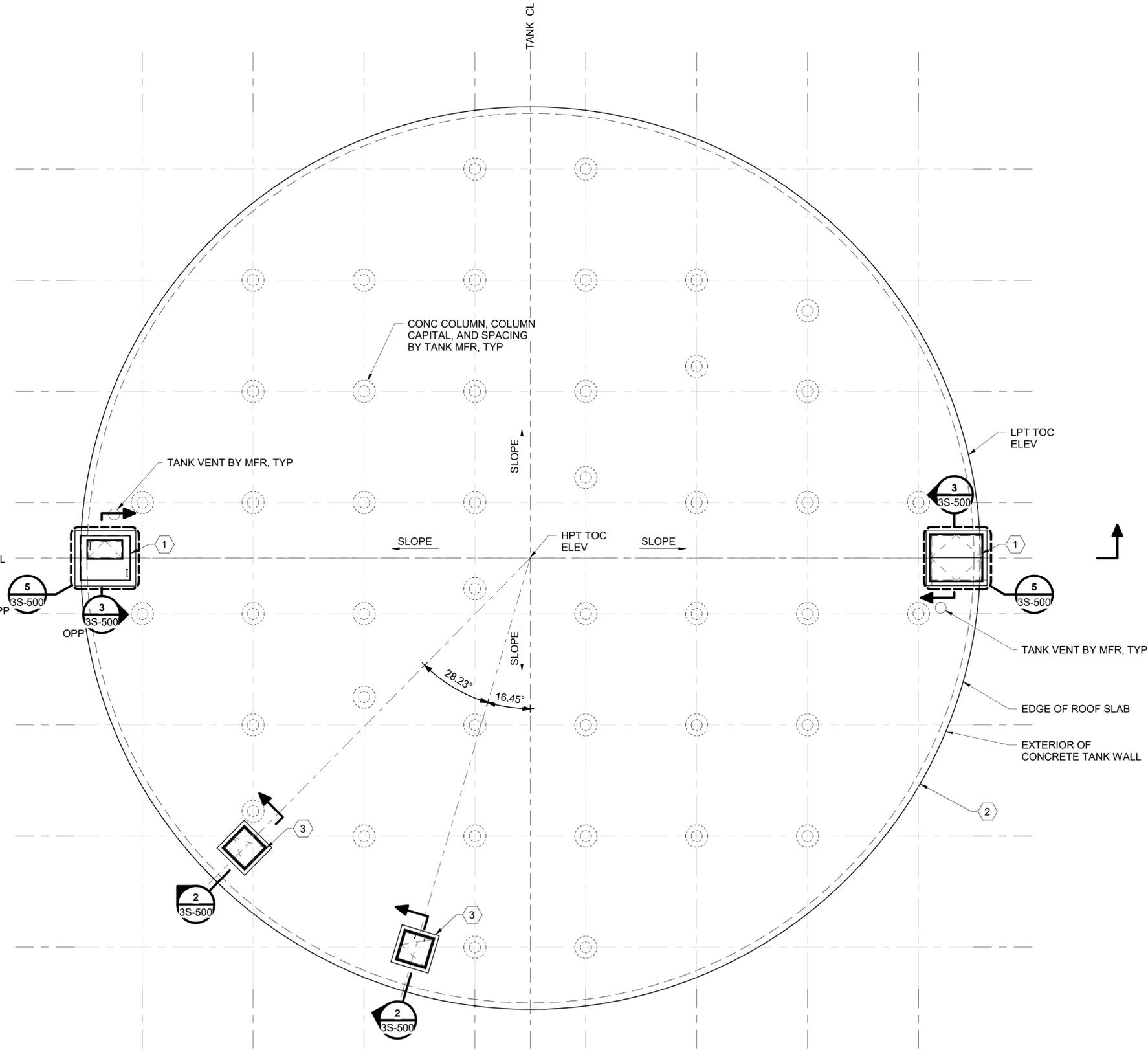
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
TANK FOUNDATION PLAN

project 162116	contract 23-150
drawing 3S-100	rev. 0
sheet 45	of 74
of 74	sheets

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Millimeters
Scale For Microfilming

Inches



SHEET NOTES:

- SEE 0S-001 FOR ABBREVIATIONS AND LEGEND. SEE 0S-002 FOR SPECIAL INSPECTION REQUIREMENTS. SEE 0S-003 FOR STRUCTURAL GENERAL NOTES.
- SEE 0S-500 SERIES DRAWINGS FOR STANDARD STRUCTURAL DETAILS.
- WATER STORAGE TANK IS A DELEGATED DESIGN SUBMITTAL. TANK SHALL BE AN AWWA D115 POST TENSIONED CONCRETE TANK OR AN AWWA D110 TYPE III WIRE- AND STRAND-WOUND PRESTRESSED CONCRETE TANK. ALL LOADS SHALL BE AS REFERENCED ON 0S-003 AND AS REQUIRED FOR DESIGN BY THE TANK MANUFACTURER TO MEET ALL APPLICABLE BUILDING CODES AND STANDARDS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK ASSOCIATED WITH PROVIDING A FINISHED TANK. ANY DETAILS NOT SHOWN ON THESE DRAWINGS SHALL BE THE TANK MFR'S STANDARD AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
- ALL COMPONENTS AND APPURTENANCES TO THE STORAGE TANK SHALL BE DESIGNED BY THE TANK MANUFACTURER.
- WALL AND ROOF SEGMENT SIZES SHALL BE DETERMINED BY THE TANK MFR TO ACCOMMODATE THE TANK APPURTENANCES AND ERECTIONS REQUIREMENTS.
- FOR PIPING, OVERFLOW, DRAIN, AND ALL OTHER ELEVATIONS NOT SHOWN ON THE PLAN DRAWINGS, SEE CIVIL DRAWINGS. ANY PROPOSED PIPING CHANGES SHALL BE COORDINATED WITH THE ENGINEER. ANY ASSOCIATED COSTS (IE FITTINGS, PIPING CHANGES, GRADING, ENGINEERING, ETC) FOR CHANGES WILL BE PAID FOR BY THE CONTRACTOR.

KEY NOTES:

- PERSONNEL ROOF ACCESS WITH 8'X9' ALUMINUM ROOF HATCH PER SPECIFICATION 08 31 13. DESIGN OF ACCESS STRUCTURE TO BE PERFORMED BY TANK MANUFACTURER.
- CONCRETE ROOF STRUCTURE, DESIGNED BY TANK MANUFACTURER. SLOPE ROOF FROM CENTER OF TANK TO EDGE OF TANK AT 1.5% MINIMUM.
- ROOF ACCESS FOR VALVE OPERATOR, UTILIZE 5'X5' ALUMINUM ROOF HATCH PER SPECIFICATION 08 31 13. DESIGN OF ACCESS STRUCTURE TO BE PERFORMED BY TANK MANUFACTURER. DISTANCE FROM TANK WALL TO BE COORDINATED WITH LOCATION OF VALVES BELOW.

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ENGLEWOOD, CO 80112
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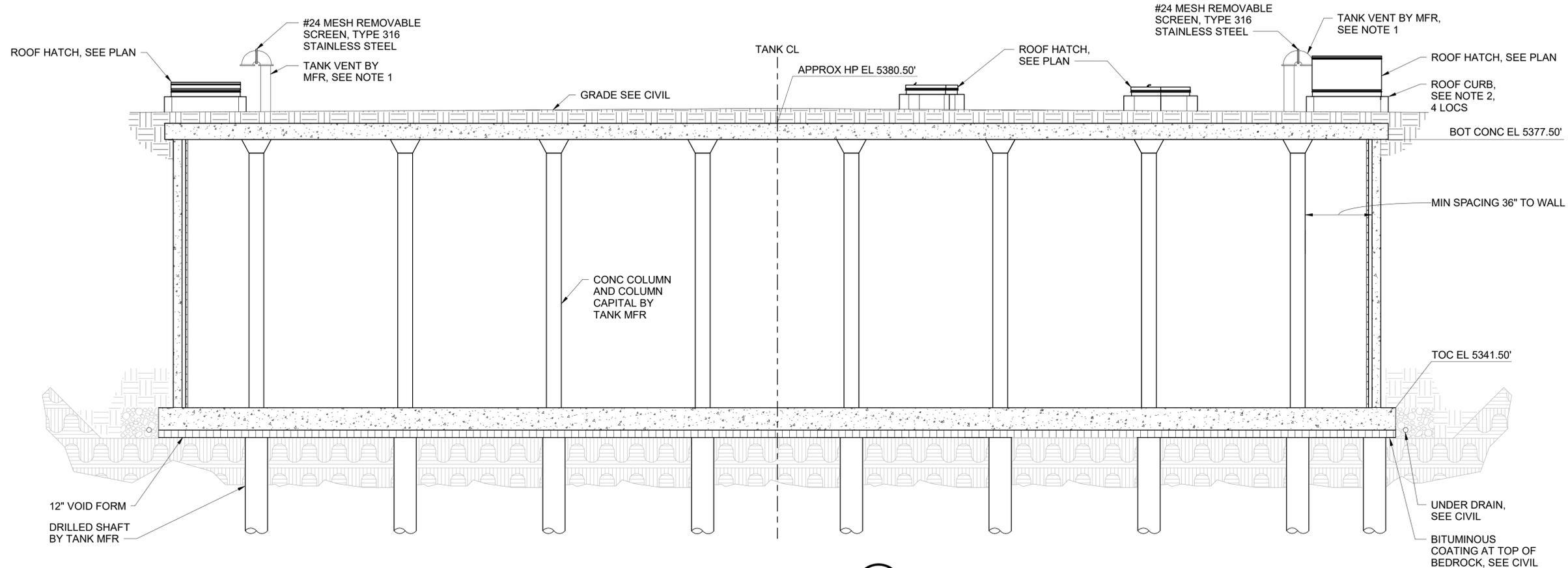
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
TANK ROOF PLAN

project 162116	contract 23-150
drawing 3S-101	rev. 0
sheet 46	of 74
of 74	sheets

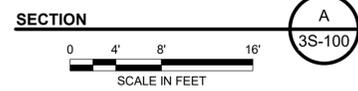
SHEET NOTES:

1. TANK MANUFACTURER TO DETERMINE REQUIRED VENT SIZE. VENT PIPE TO BE TYPE 316 STAINLESS STEEL.
2. PROVIDE ROOF CURBS AT ALL HATCH LOCATIONS. MINIMUM REVEAL ABOVE GRADE OF 2'-0". CONTRACTOR TO COORDINATE TOTAL HEIGHT OF CURBS WITH CIVIL GRADING.

no.	date	by	ckd	description
0	10/02/24	BS	JJZ	ISSUED FOR BID



Millimeters
Scale For Microfilming
Inches



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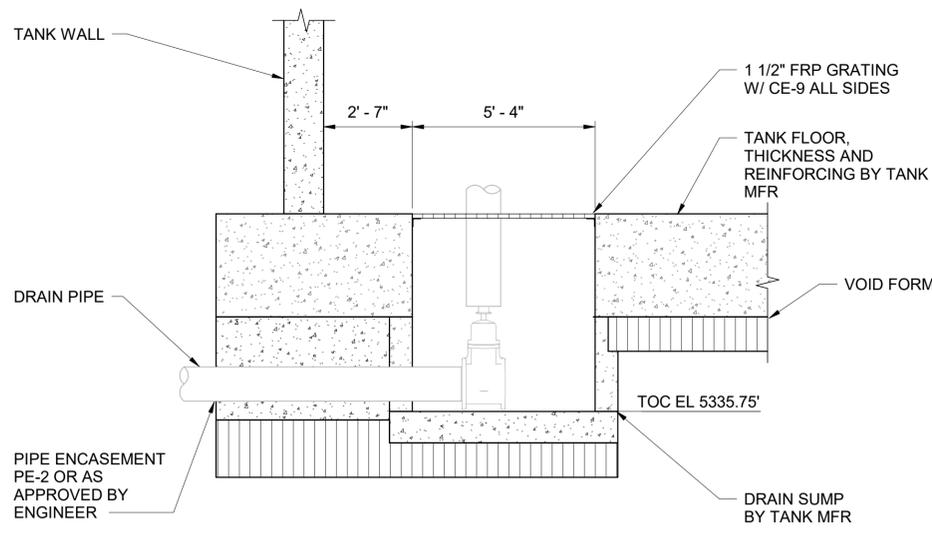
date OCTOBER 2024	detailed N. KROUSS
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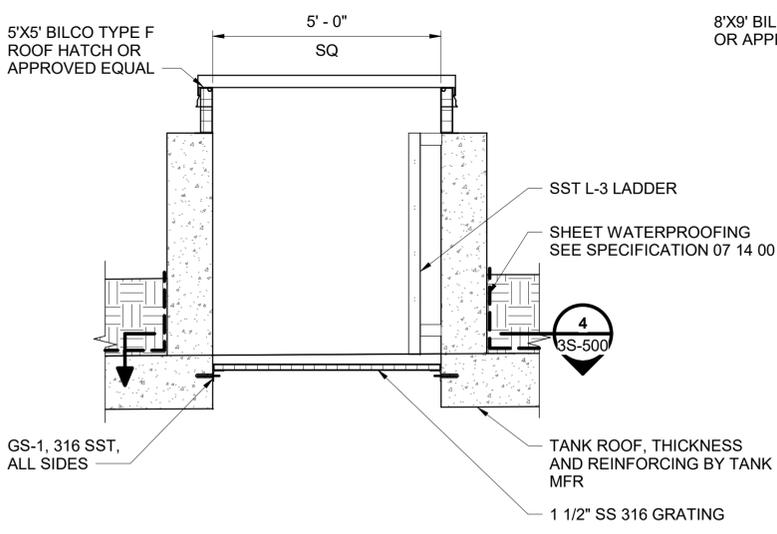
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
TANK SECTION

project 162116	contract 23-150
drawing 3S-301	rev. 0
sheet 47	of 74
of 74	sheets

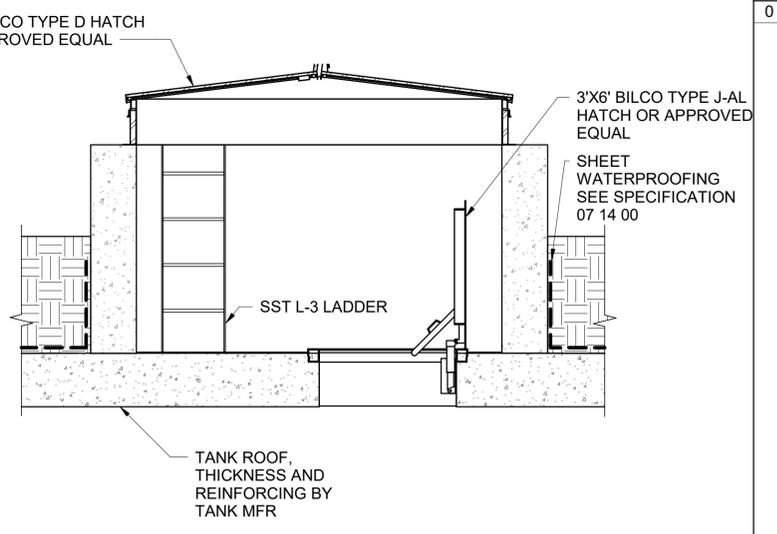
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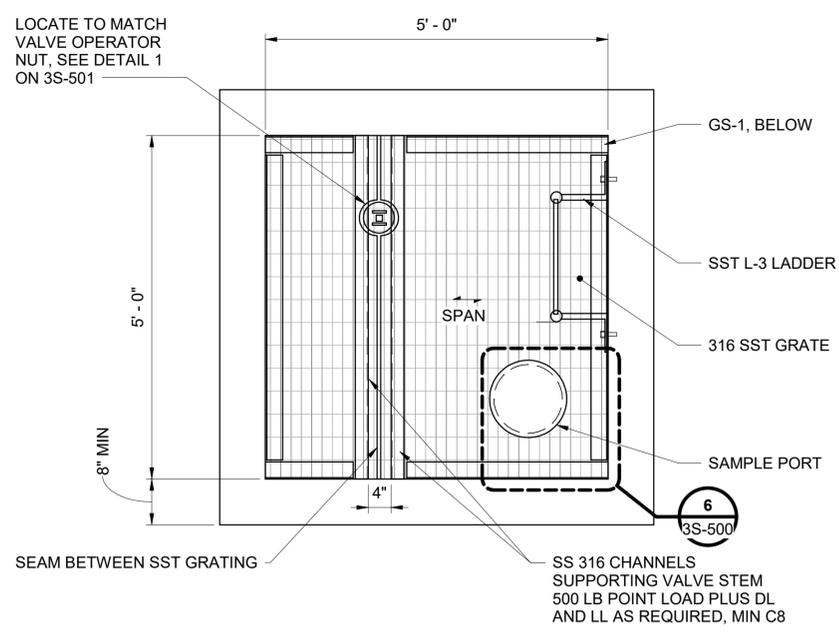
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SCALE IN FEET



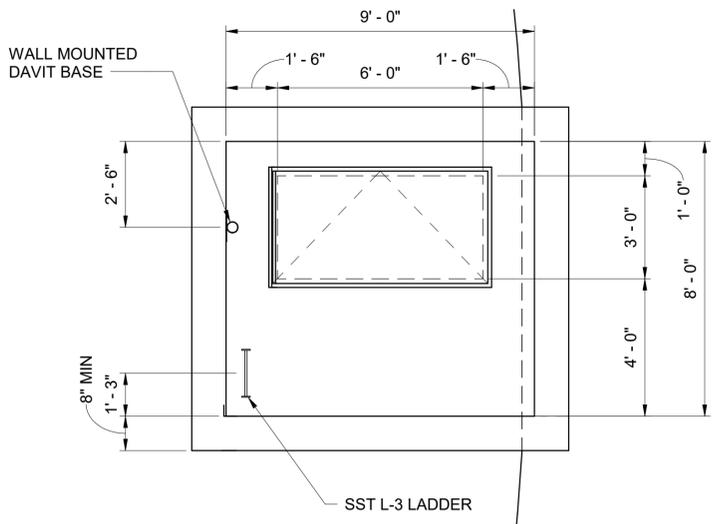
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3S-101
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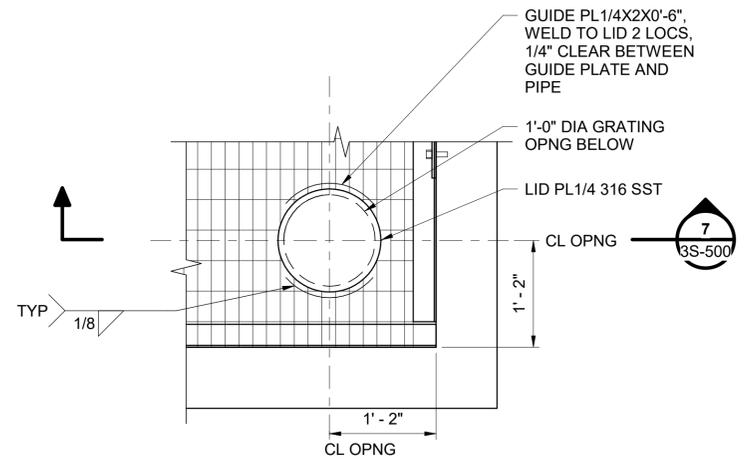
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3S-101
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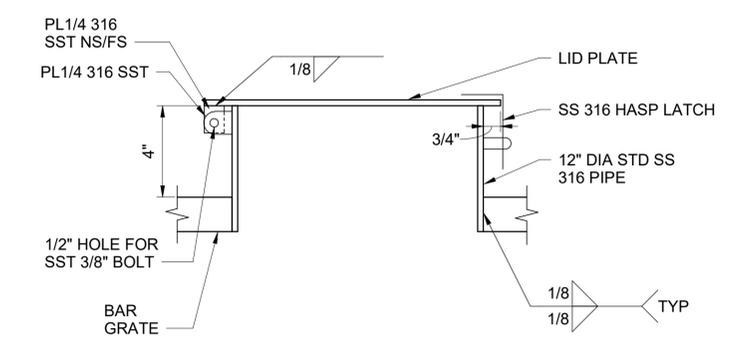
ENLARGED PLAN 4
3S-500
SCALE IN FEET



ENLARGED PLAN 5
3S-101
SCALE IN FEET



SECTION 6
3S-500
SCALE IN FEET



SECTION 7
3S-500
SCALE IN FEET

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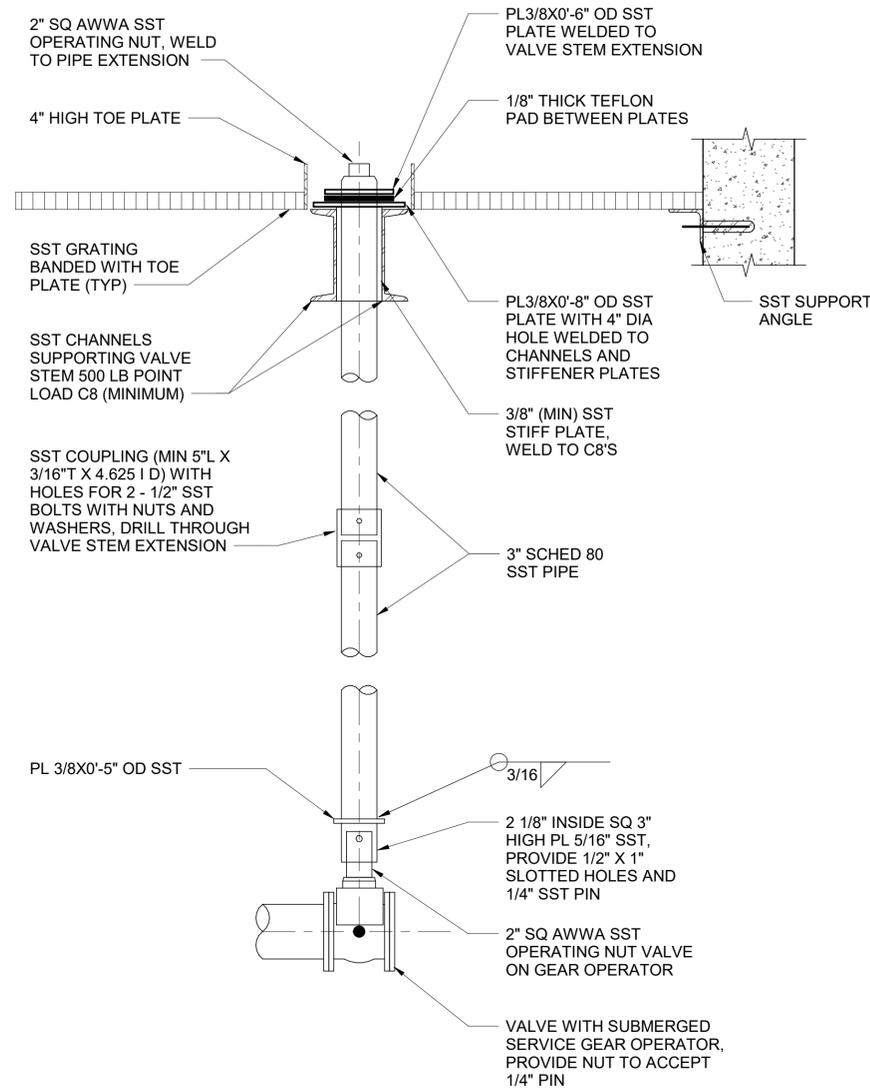


THORNTON COLORADO

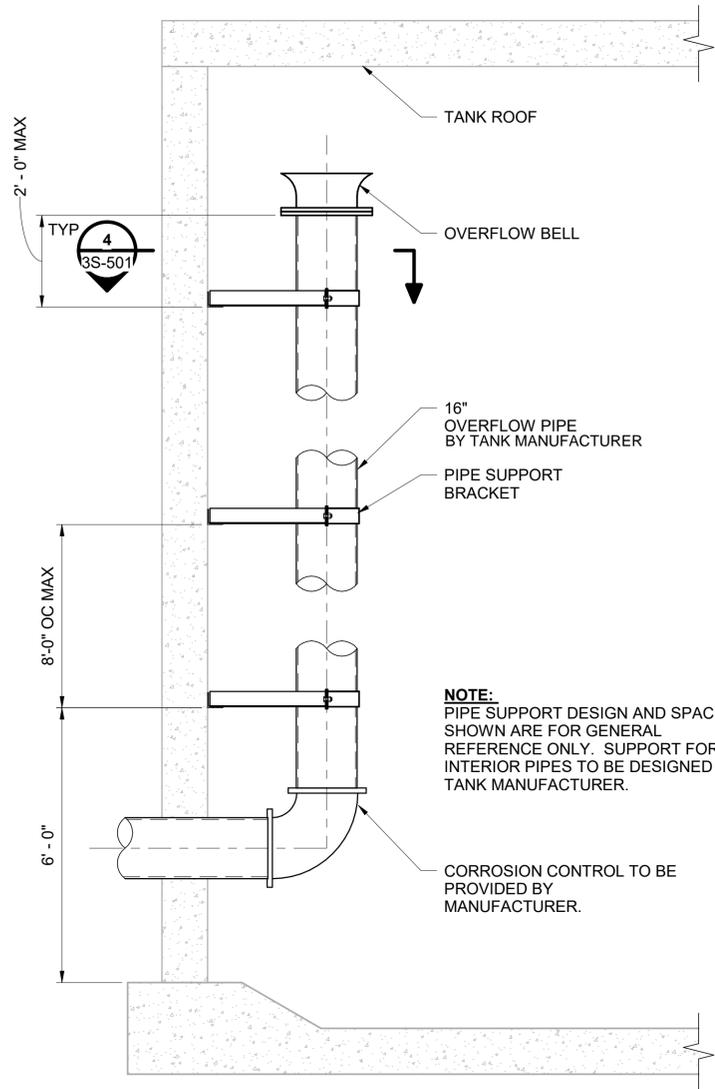
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
TANK DETAILS I

project 162116	contract 23-150
drawing 3S-500	rev. 0
sheet 48	of 74 sheets

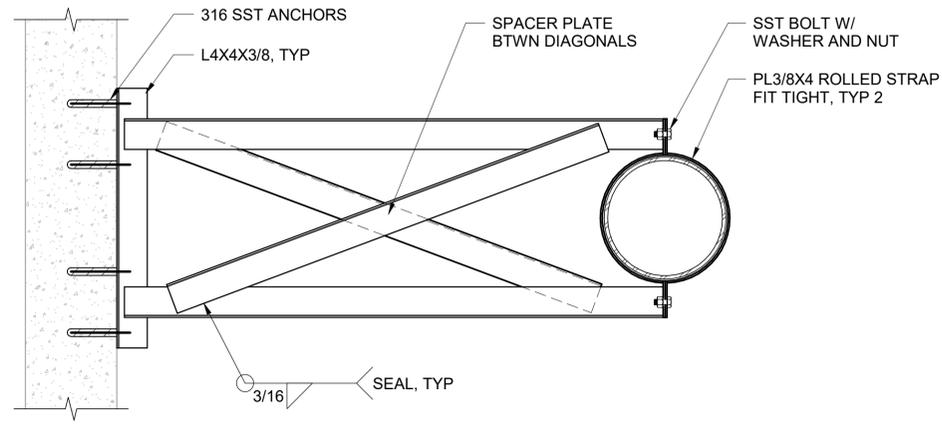
10/2/2024 12:44:42 PM



VALVE STEM EXTENSION AND SUPPORT 1
NOT TO SCALE 3S-500



OVERFLOW PIPE 2
NOT TO SCALE 3S-100



DETAIL 4
NOT TO SCALE 3S-501

Millimeters
Scale For Microfilming
Inches

no.	date	by	ckd	description
0	10/02/24	BS	JJZ	ISSUED FOR BID

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS & MCDONNELL
9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed N. KROUSS
designed B. SIVARAMAKRISHNAN	checked J. KIENHOLZ



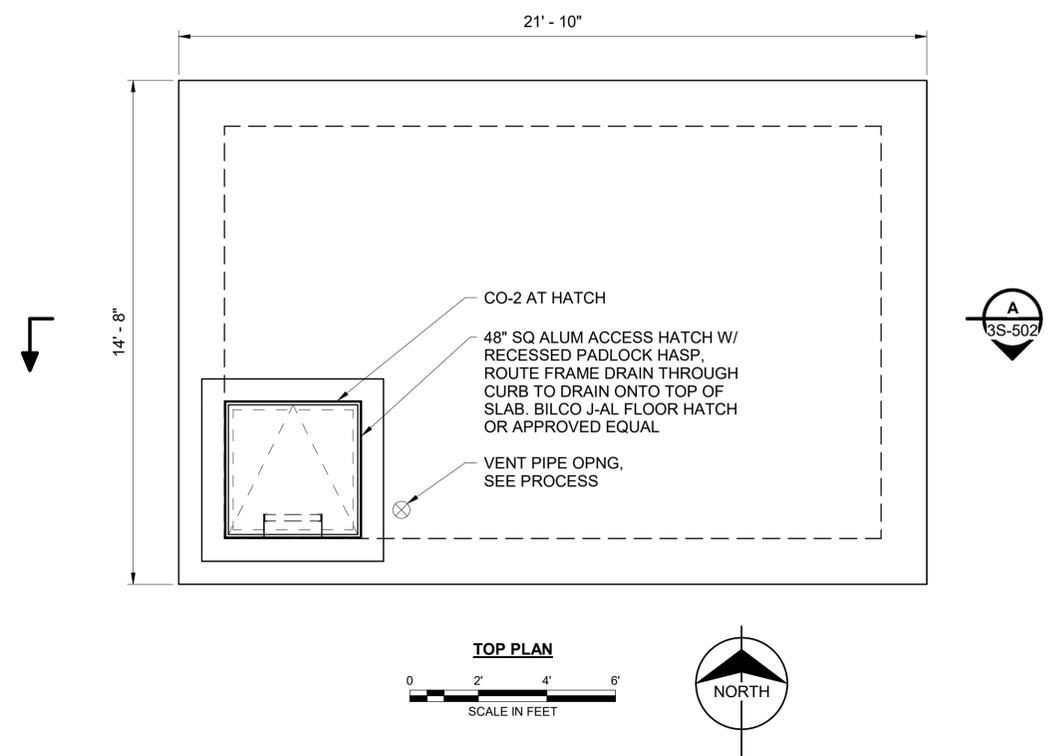
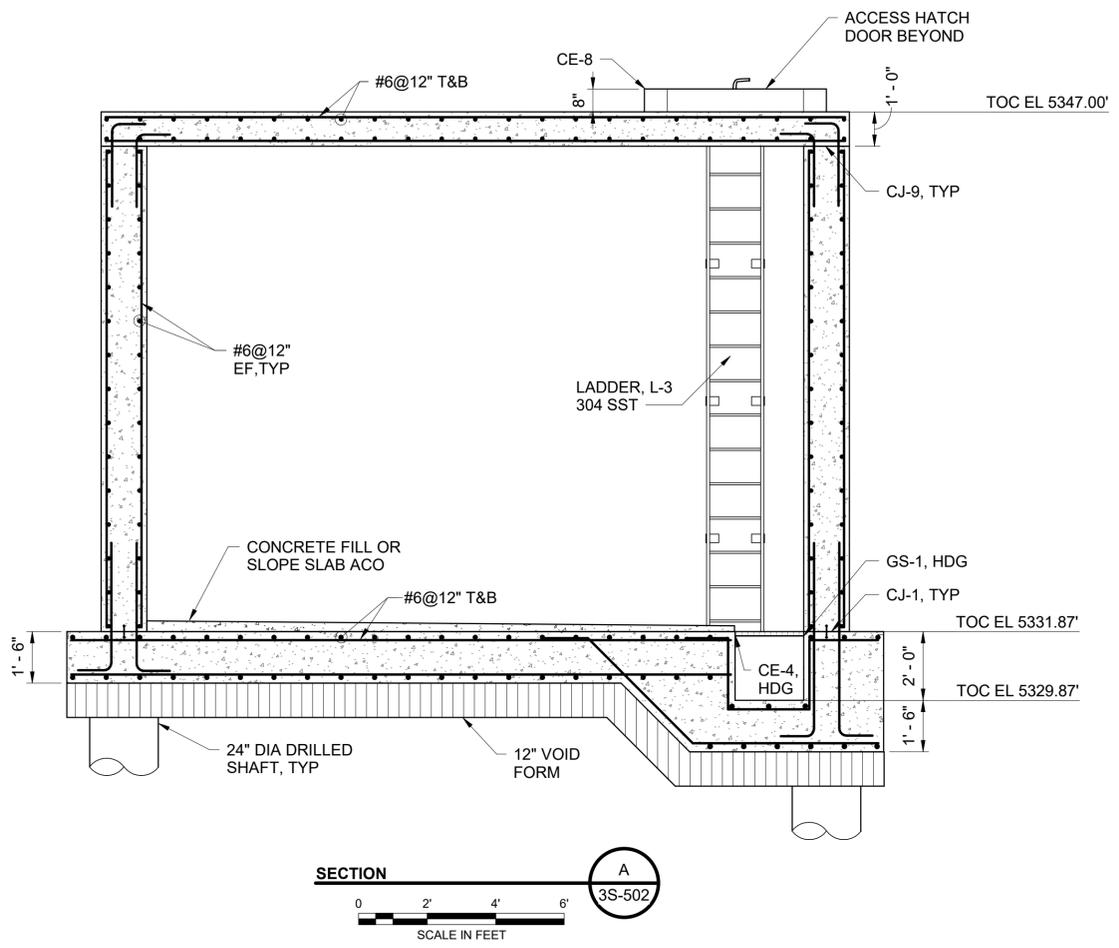
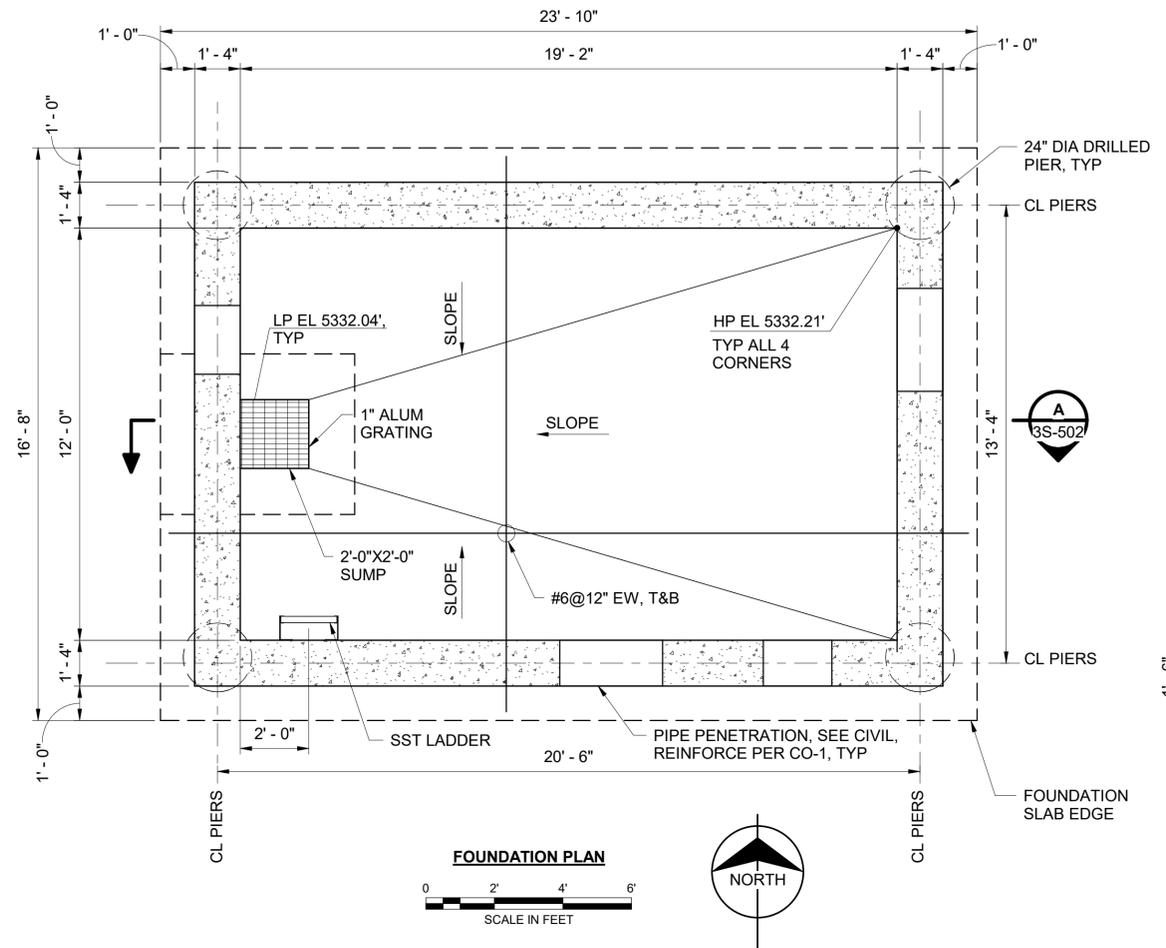
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36\"/>

project 162116	contract 23-150
drawing 3S-501	rev. 0
sheet 49 of 74 sheets	

10/2/2024 12:44:43 PM

GENERAL NOTES:
 1. SEE 0S-000 SERIES DRAWINGS FOR STRUCTURAL GENERAL NOTES, ABBREVIATIONS, AND STATEMENT OF SPECIAL INSPECTIONS.
 2. PROVIDE BITUMINOUS COATING AT ALUMINUM IN DIRECT CONTACT WITH CONCRETE.
 3. PROVIDE PIPE SUPPORTS AT LOCATIONS SHOWN IN CIVIL DRAWINGS.

no.	date	by	ckd	description
0	10/02/24	BS	JJZ	ISSUED FOR BID



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 9191 S. JAMAICA STREET
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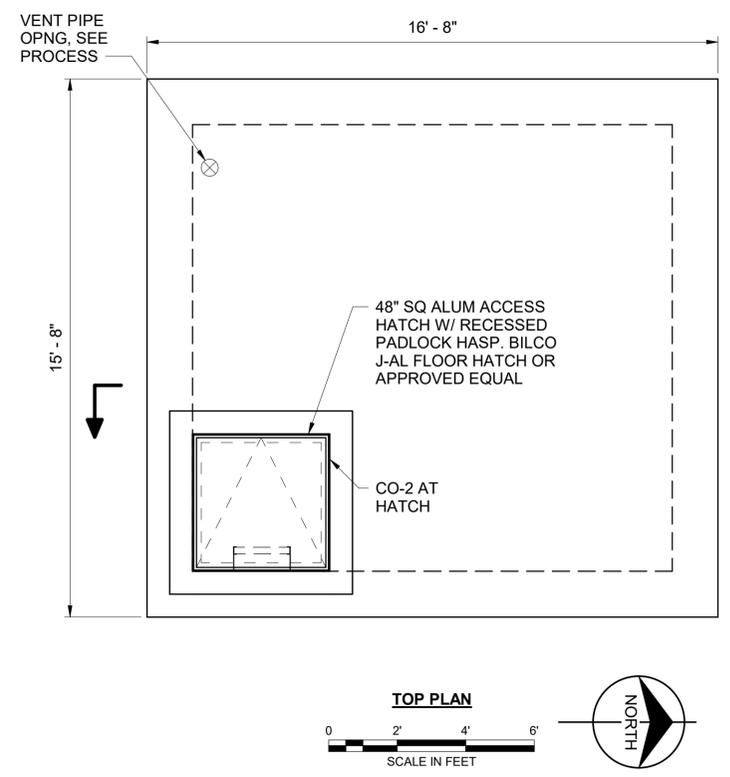
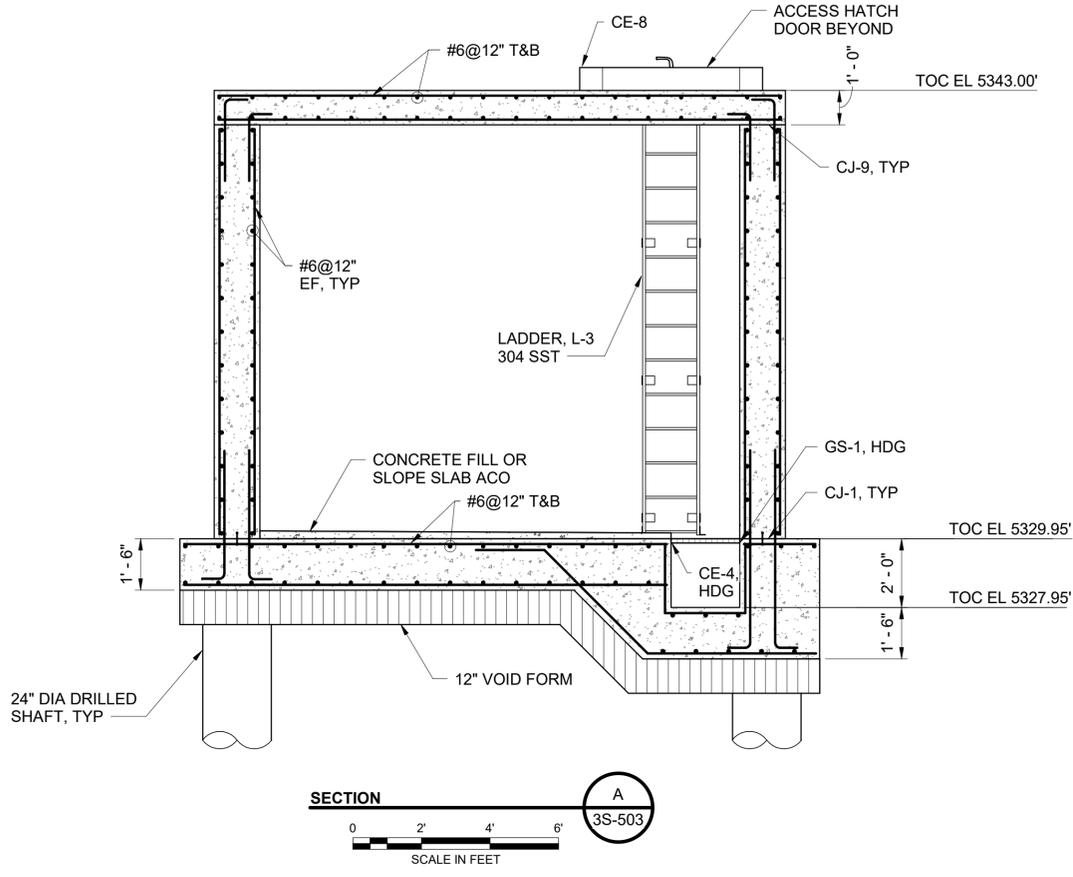
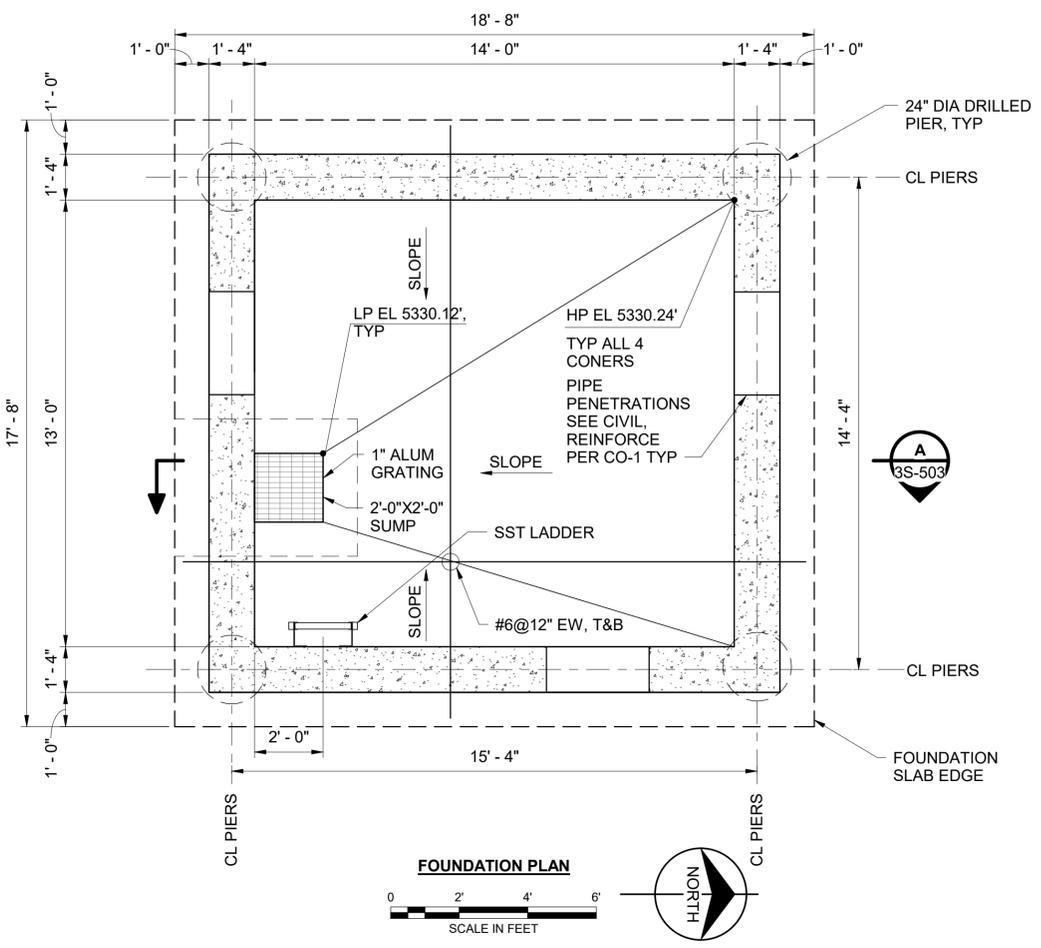
CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE VALVE VAULT 1 PLANS AND SECTION

project 162116	contract 23-150
drawing 3S-502	rev. 0
sheet 50	of 74 sheets

10/2/2024 12:44:44 PM

GENERAL NOTES:
 1. SEE 05-000 SERIES DRAWINGS FOR STRUCTURAL GENERAL NOTES, ABBREVIATIONS, AND STATEMENT OF SPECIAL INSPECTIONS.
 2. PROVIDE BITUMINOUS COATING AT ALUMINUM IN DIRECT CONTACT WITH CONCRETE.
 3. PROVIDE PIPE SUPPORTS AT LOCATIONS SHOWN IN CIVIL DRAWINGS.

no.	date	by	ckd	description
0	10/02/24	BS	JJZ	ISSUED FOR BID



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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

date	OCTOBER 2024	detailed	N. KROUSS
designed	B. SIVARAMAKRISHNAN	checked	J. KIENHOLZ



CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE VALVE VAULT 2 PLANS AND SECTION

project	162116	contract	23-150
drawing	3S-503	rev.	0
sheet	51 of 74	sheet	

ITEMS USED ON PLANS

ITEMS USED ON ONE-LINES AND CONTROL DIAGRAMS

TAG DESIGNATION SCHEMES

no.	date	by	ckd	description
0	10/02/24	AN M	MA H	ISSUED FOR BID

LINES	
	NEW CONSTRUCTION
	EXISTING CONSTRUCTION
	CONDUIT EXPOSED
	CONDUIT CONCEALED IN WALL, CEILING OR HIDDEN FROM VIEW
	CONDUIT CONCEALED IN FLOOR OR UNDERGROUND
	HOMERUN TO PANEL
	FLEXIBLE CONDUIT
	FIBER-OPTIC CABLE
	UNDERGROUND ELECTRICAL
	OVERHEAD ELECTRICAL
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	CONDUIT TERMINATED AND CAPPED
	CONDUIT WITH BUSHING
	CONDUIT PASSING THRU ELEVATION

LIGHTING	
	RECTANGULAR LUMINAIRE
	RECTANGULAR LUMINAIRE WITH EMERGENCY BACK-UP
	CIRCULAR LUMINAIRE
	CIRCULAR LUMINAIRE WITH EMERGENCY BACK-UP
	EMERGENCY WALL PACK UNIT
	CEILING MOUNTED EXIT SIGN
	WALL MOUNTED EXIT SIGN
	POLE-MOUNTED AREA LIGHT
	SINGLE POLE SWITCH
	THREE-WAY SWITCH
	FOUR-WAY SWITCH
	WEATHERPROOF SWITCH
	DIMMER SWITCH
	EXPLOSIONPROOF SWITCH
	CEILING MOUNTED OCCUPANCY SENSOR WALL MOUNTED OCCUPANCY SENSOR CEILING/ROOF MOUNTED PHOTOCELL WALL MOUNTED PHOTOCELL

LINES AND TERMINALS	
	POWER CIRCUIT AND EQUIPMENT INSTALLED BY THIS CONTRACT
	EXISTING CIRCUIT AND EQUIPMENT
	FUTURE POWER CIRCUIT AND EQUIPMENT
	EQUIPMENT ENCLOSURE
	CONTROL OR INTERLOCK CIRCUIT
	REMOTE WIRING
	TERMINALS
	(A) POSITIVE TERMINAL (B) NEGATIVE TERMINAL
	(A) CONDUCTOR CONNECTION (B) NO CONNECTION

LOADS/SOURCES	
	GENERATOR
	ELECTRIC MOTOR - APPROX. HORSEPOWER AS INDICATED
	EQUIPMENT AS NOTED ON DIAGRAM

LUMINAIRE TAG SCHEME		
	LXX XXX-PNL-XXX-XX SXXX XX-XX" AFF	LUMINAIRE TYPE CIRCUIT SWITCHING DEVICE(S) ELEVATION TO BOTTOM OF FIXTURE

RECEPTACLE TAG SCHEME		
	XXX-PNL-XXX XX XXX	POWER SOURCE TAG CIRCUIT NUMBER MODIFIER (IF APPLICABLE)

INSTRUMENT TAG SCHEME		
	XXX-XXX XXX	NOTES XX-XX" AFF XXX-PLC-XXX
EQUIPMENT/INSTRUMENT IDENTIFIER	FACILITY AREA OR SYSTEM	NOTES INSTRUMENT ELEVATION ASSOCIATED CONTROL PANEL
LOOP NUMBER		

CABLE TRAY TAG SCHEME		
	XXX-CT-XXX XX" x XX" XX'-XX" AFF	CABLE TRAY TAG HEIGHT x WIDTH ELEVATION TO BOTTOM OF TRAY

ABBREVIATIONS			
A	AMPERES	INDUST	INDUSTRIAL
AFG	ABOVE FINISHED GRADE	LC	LIGHTING CONTACTOR
AFF	ABOVE FINISHED FLOOR	GND	GROUND
AIC	AMPS INTERRUPTING CURRENT	MCC	MOTOR CONTROL CENTER
AWG	AMERICAN WIRE GAUGE	MUN	MUNICIPAL
BC	BARE COPPER WIRE	N.O.	NORMALLY OPEN
BF	BELOW FLOOR	N.C.	NORMALLY CLOSED
BG	BELOW GRADE	P	POLE
BKR	BREAKER	PP	POWER PANEL
C	CONDUIT	PLC	PROGRAMMABLE LOGIC CONTROLLER
CHL	CHLORINE	REC	RECEPTACLE
COND	CONDUCTIVITY	RW	RAW WATER
CP	CONTROL PANEL	SP	SPARE
CPT	CONTROL POWER TRANSFORMER	SPD	SURGE PROTECTIVE DEVICE
EL	ELEVATION	SW	SWITCH
EO	ELECTRICALLY OPERATED	TYP.	TYPICAL
EX	EXPOSED	UE	UNDERGROUND ELECTRICAL
EXP	EXPLOSION-PROOF	VFD	VARIABLE FREQUENCY DRIVE
EXT	EXTERIOR	WP	WEATHERPROOF
FACP	FIRE ALARM CONTROL PANEL	XFMR	TRANSFORMER

GROUNDING/LIGHTNING PROTECTION	
	GROUND CABLE
	BOLTED CONNECTION
	WELDED CONNECTION
	BI-METALIC CONNECTION
	GROUND ROD
	GROUND TEST WELL
	AIR TERMINAL
	GROUND BUS BAR

RECEPTACLES	
	208/240V RECEPTACLE
	480V RECEPTACLE
	SURFACE, SIMPLEX RECEPTACLE
	SURFACE, SIMPLEX, GFI RECEPTACLE
	FLUSH, SIMPLEX RECEPTACLE
	FLUSH, SIMPLEX, GFI RECEPTACLE
	SURFACE, DUPLEX RECEPTACLE
	SURFACE, DUPLEX, GFI RECEPTACLE
	FLUSH, DUPLEX RECEPTACLE
	FLUSH, DUPLEX, GFI RECEPTACLE
	SURFACE, QUADPLEX RECEPTACLE
	SURFACE, QUADPLEX, GFI RECEPTACLE
	FLUSH, QUADPLEX RECEPTACLE
	FLUSH, QUADPLEX, GFI RECEPTACLE

PROTECTION/DISCONNECTS	
	PROTECTION DEVICE (ANSI C37.2 DEVICE NUMBER AS INDICATED) CIRCUIT BREAKER
	FUSE
	FUSED DISCONNECT SWITCH
	DISCONNECT SWITCH
	POLE MOUNTED FUSED DISCONNECT SWITCH
	PLUG-IN OR DRAWOUT CONNECTION
	CAPACITOR
	THERMAL OVERLOADS
	THERMAL OVERLOAD RELAY (SHOWN WITH QUANTITY)
	O.L. (3)
	ARC FLASH REDUCTION MAINTENANCE SWITCH
	ELECTRONIC TRIP UNIT
	LONG TIME, SHORT TIME, INSTANTANEOUS, AND GROUND TRIP SETTINGS

METERING/NETWORKING	
	AMMETER
	VOLTMETER
	POWER QUALITY METER
	NETWORK SWITCH
	POWER SUPPLY UNIT

MISC ONE-LINE SYMBOLS	
	"X" INDICATES NUMBER OF DEVICES WHEN MORE THAN ONE
	DELTA WINDING CONNECTION
	GROUNDING WYE WINDING CONNECTION
	GROUNDING CONNECTION
	LIGHTNING ARRESTOR

CONTROL DEVICES	
	(A) LEVEL SWITCH - CLOSSES WITH RISING LEVEL (B) LEVEL SWITCH - OPENS WITH RISING LEVEL
	(A) FLOW SWITCH - CLOSSES WITH INCREASING FLOW (B) FLOW SWITCH - OPENS WITH INCREASING FLOW
	(A) MAINTAINED PUSH-BUTTON - N.O. (B) MAINTAINED PUSH-BUTTON - N.C.
	(A) LIMIT SWITCH - N.C. (B) LIMIT SWITCH - N.C. HELD OPEN
	(A) LIMIT SWITCH - N.O. (B) LIMIT SWITCH - N.O. HELD CLOSED
	(A) PRESSURE SWITCH - CLOSSES WITH INCREASING PRESSURE (B) PRESSURE SWITCH - OPENS WITH INCREASING PRESSURE
	(A) MOMENTARY PUSH-BUTTON - N.O. (B) MOMENTARY PUSH-BUTTON - N.C.
	(A) TEMP. SWITCH - CLOSSES WITH RISING TEMP. (B) TEMP. SWITCH - OPENS WITH RISING TEMP.
	(A) N.O. TIME DELAY CONTACT (B) N.C. TIME DELAY CONTACT

EQUIPMENT	
	NEW EQUIPMENT
	EXISTING EQUIPMENT
	FUTURE EQUIPMENT
	LIGHTING PANEL
	POWER PANEL
	DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	COMBINATION DISCONNECT/MAGNETIC MOTOR STARTER
	REDUCED VOLTAGE COMBINATION DISCONNECT/MAG MOTOR STARTER
	MOTOR
	MISC. ELECTRICAL LOAD
	JUNCTION BOX
	PULL BOX

DATA JACKS	
	RECESSED DATA JACK
	RECESSED MIXED DATA JACK
	RECESSED TELEPHONE JACK
	SURFACE DATA JACK
	SURFACE MIXED DATA JACK
	SURFACE TELEPHONE JACK

STARTERS	
	SINGLE SPEED NON-REVERSING MANUAL MOTOR STARTER
	SINGLE SPEED NON-REVERSING MAGNETIC MOTOR STARTER
	SINGLE SPEED REVERSING MAGNETIC MOTOR STARTER
	TWO SPEED NON-REVERSING MAGNETIC MOTOR STARTER
	REDUCED VOLTAGE SOLID-STATE STARTER
	REDUCED VOLTAGE AUTOTRANSFORMER STARTER
	VARIABLE FREQUENCY DRIVE

TRANSFORMERS	
	POWER TRANSFORMER (XFMR)
	POTENTIAL TRANSFORMER (SHOWN WITH QUANTITY)
	CURRENT TRANSFORMER, SINGLE RATIO (SHOWN WITH QUANTITY)
	CONTROL POWER TRANSFORMER (ONE-LINE DIAGRAMS)
	CONTROL POWER TRANSFORMER (CONTROL SCHEMATIC DIAGRAMS)

	(A) LEVEL SWITCH - CLOSSES WITH RISING LEVEL (B) LEVEL SWITCH - OPENS WITH RISING LEVEL
	(A) FLOW SWITCH - CLOSSES WITH INCREASING FLOW (B) FLOW SWITCH - OPENS WITH INCREASING FLOW
	(A) MAINTAINED PUSH-BUTTON - N.O. (B) MAINTAINED PUSH-BUTTON - N.C.
	(A) LIMIT SWITCH - N.C. (B) LIMIT SWITCH - N.C. HELD OPEN
	(A) LIMIT SWITCH - N.O. (B) LIMIT SWITCH - N.O. HELD CLOSED
	(A) PRESSURE SWITCH - CLOSSES WITH INCREASING PRESSURE (B) PRESSURE SWITCH - OPENS WITH INCREASING PRESSURE
	(A) MOMENTARY PUSH-BUTTON - N.O. (B) MOMENTARY PUSH-BUTTON - N.C.
	(A) TEMP. SWITCH - CLOSSES WITH RISING TEMP. (B) TEMP. SWITCH - OPENS WITH RISING TEMP.
	(A) N.O. TIME DELAY CONTACT (B) N.C. TIME DELAY CONTACT
	TWO POSITION SELECTOR SWITCH
	THREE POSITION SELECTOR SWITCH
	FOUR POSITION SELECTOR SWITCH
	SOLENOID VALVE
	PHOTOCELL
	INDICATING LIGHT, COLOR AS INDICATED
	PUSH-TO-TEST INDICATING LIGHT, COLOR AS INDICATED

PRELIMINARY - NOT FOR CONSTRUCTION



date OCTOBER 2024	detailed A. BENSON
designed A. MCDONALD	checked M. HOPKINS

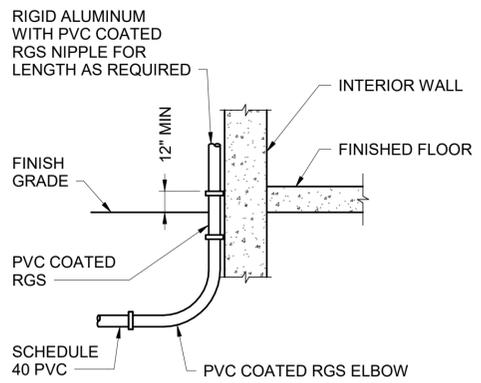


CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE ELECTRICAL GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS	
project 162116	contract 23-150
drawing 00E-001	rev. 0
sheet 52	of 74
sheets	

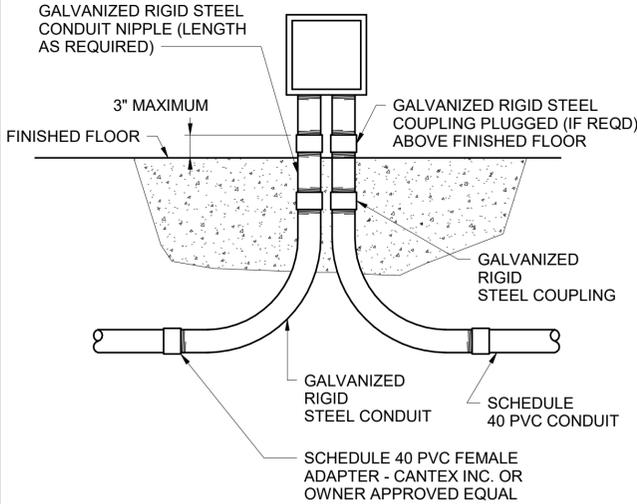
Millimeters

Inches

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EXTERIOR STUB-UP
NOT TO SCALE



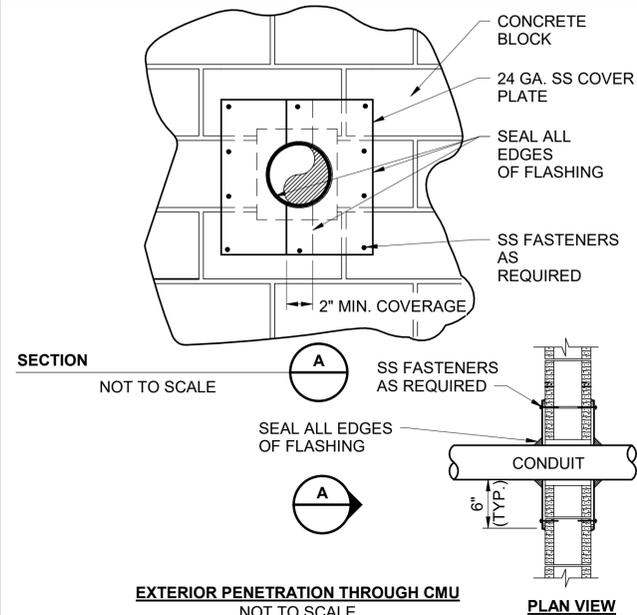
GENERAL NOTES:

- BACKFILL -
 - OBTAIN BACKFILL MATERIALS FROM TRENCHES AND OTHER EXCAVATION IN THIS CONTRACT AND/OR FROM THE ON SITE BORROW AREAS AS DESIGNATED BY THE RESIDENT PROJECT REPRESENTATIVE.
 - BACKFILL MATERIALS INCLUDE MATERIAL THAT IS FREE OF DEBRIS, ROOTS, ORGANIC MATTER, REFUSE, CINDERS, FROZEN MATTER, AND ALSO FREE OF ROCK, WITH A DIMENSION GREATER THAN 2 INCHES.
- COMPACTION -
 - PLACE BACKFILL MATERIAL IN LEVEL LAYERS NOT EXCEEDING 4 TO 8 INCHES.
 - USE HAND METHODS TO A HORIZONTAL PLANE OF 12 INCHES ABOVE TOP OF CONDUIT.
 - USE APPROVED MECHANICAL METHODS WHERE HAND BACKFILL IS NOT REQUIRED.
 - FOR BACKFILL COMPACTION AND MOISTURE CONTENT REQUIREMENTS SE SECTION 2A (SITE WORK PREPARATION AND EARTHWORK) OF SPECIFICATIONS.
- DETAIL ALSO APPLIES TO MULTIPLE CONDUIT INSTALLATION AND DIRECT BURIED CABLE.
- BACKFILL AND COMPACTION REQUIREMENTS ALSO APPLY TO ROADWAY LIGHTING FOUNDATIONS.

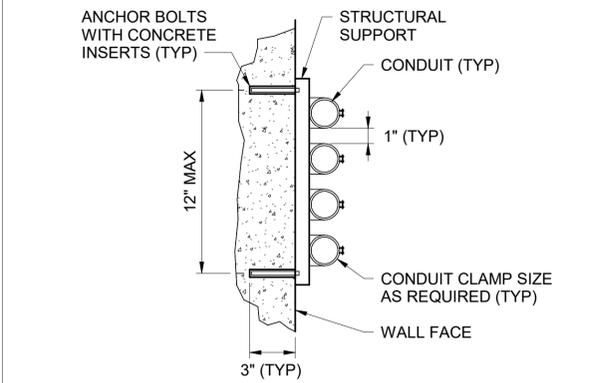
TWO CONDUIT RISER
NOT TO SCALE

- GENERAL NOTES:**
- BACKFILL -
 - OBTAIN BACKFILL MATERIALS FROM TRENCHES AND OTHER EXCAVATION IN THIS CONTRACT AND/OR FROM THE ON SITE BORROW AREAS AS DESIGNATED BY THE RESIDENT PROJECT REPRESENTATIVE.
 - BACKFILL MATERIALS INCLUDE MATERIAL THAT IS FREE OF DEBRIS, ROOTS, ORGANIC MATTER, REFUSE, CINDERS, FROZEN MATTER, AND ALSO FREE OF ROCK, WITH A DIMENSION GREATER THAN 2 INCHES.
 - COMPACTION -
 - PLACE BACKFILL MATERIAL IN LEVEL LAYERS NOT EXCEEDING 4 TO 8 INCHES.
 - USE HAND METHODS TO A HORIZONTAL PLANE OF 12 INCHES ABOVE TOP OF CONDUIT.
 - USE APPROVED MECHANICAL METHODS WHERE HAND BACKFILL IS NOT REQUIRED.
 - FOR BACKFILL COMPACTION AND MOISTURE CONTENT REQUIREMENTS SE SECTION 2A (SITE WORK PREPARATION AND EARTHWORK) OF SPECIFICATIONS.
 - DETAIL ALSO APPLIES TO MULTIPLE CONDUIT INSTALLATION AND DIRECT BURIED CABLE.
 - BACKFILL AND COMPACTION REQUIREMENTS ALSO APPLY TO ROADWAY LIGHTING FOUNDATIONS.

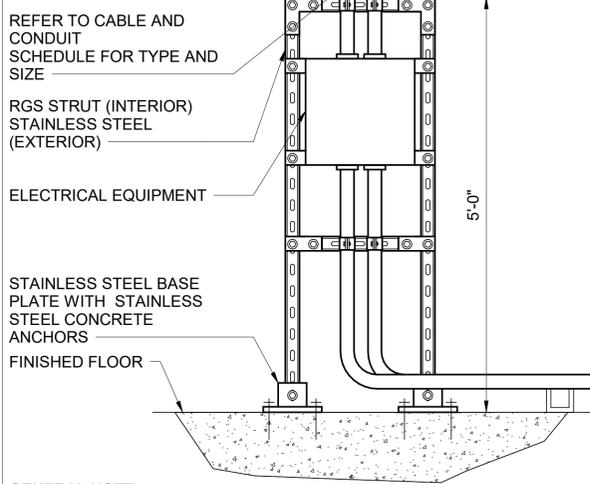
ONE CONDUIT RISER
NOT TO SCALE



EXTERIOR PENETRATION THROUGH CMU
NOT TO SCALE

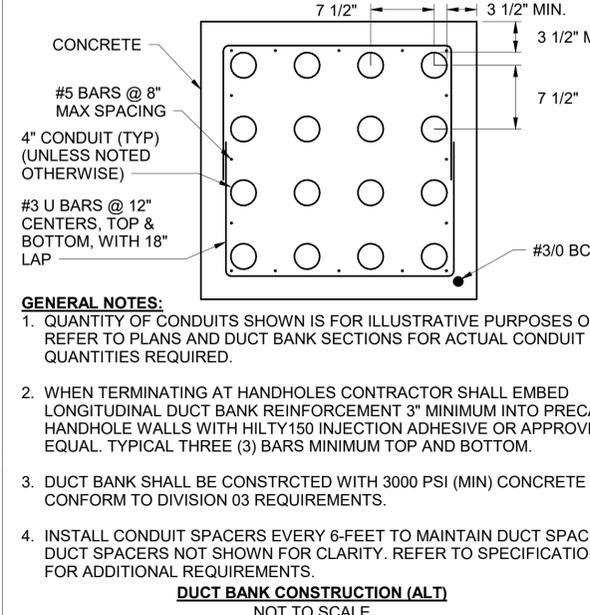


EXPOSED CONDUIT ROUTING (WALL)
NOT TO SCALE



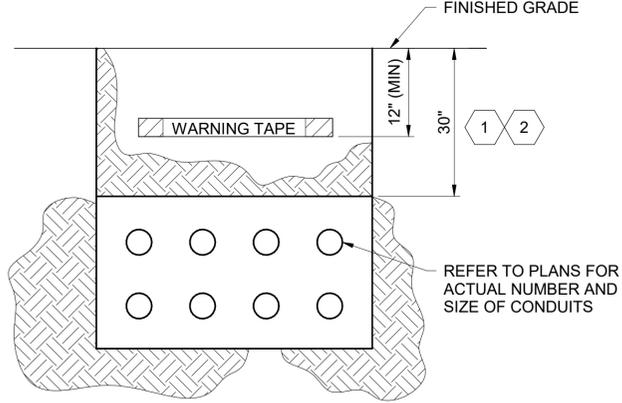
GENERAL NOTE:
1. RACK SIZE IS FOR INFORMATION PURPOSES ONLY. RACK SIZES SHALL BE SIZED TO SUPPORT EQUIPMENT SHOWN ON PLANS.

RACK ELEVATION
NOT TO SCALE



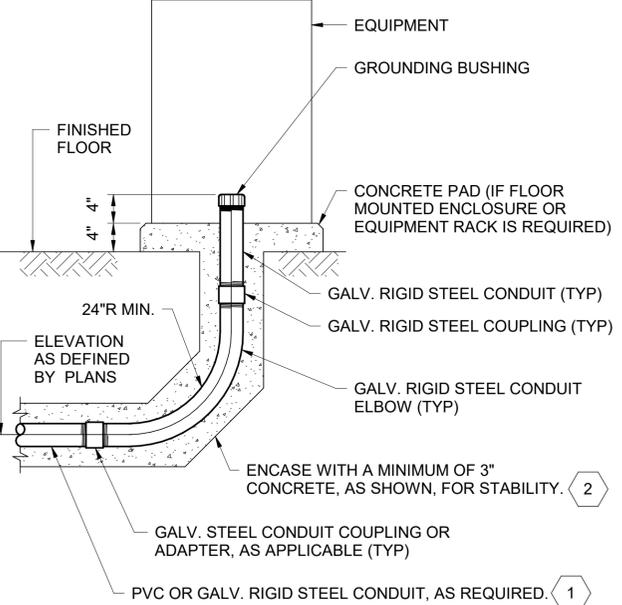
- GENERAL NOTES:**
- QUANTITY OF CONDUITS SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO PLANS AND DUCT BANK SECTIONS FOR ACTUAL CONDUIT QUANTITIES REQUIRED.
 - WHEN TERMINATING AT HANDHOLES CONTRACTOR SHALL EMBED LONGITUDINAL DUCT BANK REINFORCEMENT 3" MINIMUM INTO PRECAST HANDHOLE WALLS WITH HILTY150 INJECTION ADHESIVE OR APPROVED EQUAL. TYPICAL THREE (3) BARS MINIMUM TOP AND BOTTOM.
 - DUCT BANK SHALL BE CONSTRUCTED WITH 3000 PSI (MIN) CONCRETE AND CONFORM TO DIVISION 03 REQUIREMENTS.
 - INSTALL CONDUIT SPACERS EVERY 6-FEET TO MAINTAIN DUCT SPACING. DUCT SPACERS NOT SHOWN FOR CLARITY. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

DUCT BANK CONSTRUCTION (ALT)
NOT TO SCALE



- KEYED NOTES:**
- 30-INCHES MINIMUM UNLESS INDICATED OTHERWISE TO AVOID BELOW GRADE PIPING OR BELOW GRADE OBSTRUCTIONS.
 - DUCT BANK SHALL BE SLOPED TOWARDS HAND HOLE TO PROVIDE PROPER DRAINAGE.

DUCT BANK TRENCH
NOT TO SCALE



GENERAL NOTE:
1. THIS DETAIL IS TYPICAL FOR SINGLE AND MULTI-DUCT ARRANGEMENTS.

- KEYED NOTES:**
- USE RIGID GALVANIZED STEEL CONDUITS WHERE A DUCT BANK CROSSES UNDER DEFINED ROADWAYS, RAILROADS AND FOR A DISTANCE OF 10 FEET BEYOND EACH SIDE.
 - ALL DUCT BANKS SHALL BE REINFORCED AS SHOWN IN DETAIL ON THIS PAGE.

EXTERIOR DUCT BANK RISER
NOT TO SCALE

no.	date	by	ckd	description
0	10/02/24	AN M	MA H	ISSUED FOR BID

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date	OCTOBER 2024	detailed	A. BENSON
designed	A. McDONALD	checked	M. HOPKINS

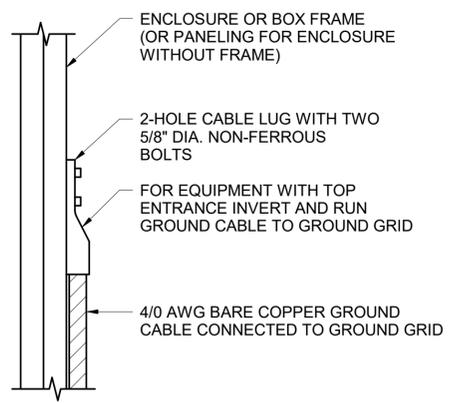


CITY OF THORNTON
5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE ELECTRICAL DETAILS I

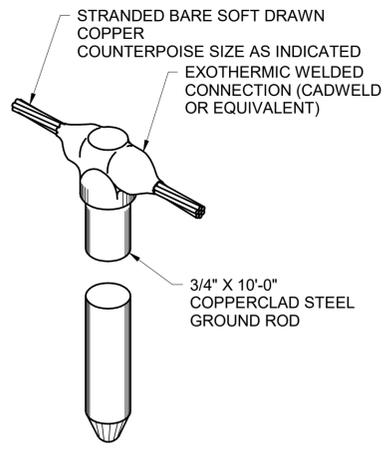
project	162116	contract	23-150
drawing	00E-300	rev.	0
sheet	53	of	74 sheets

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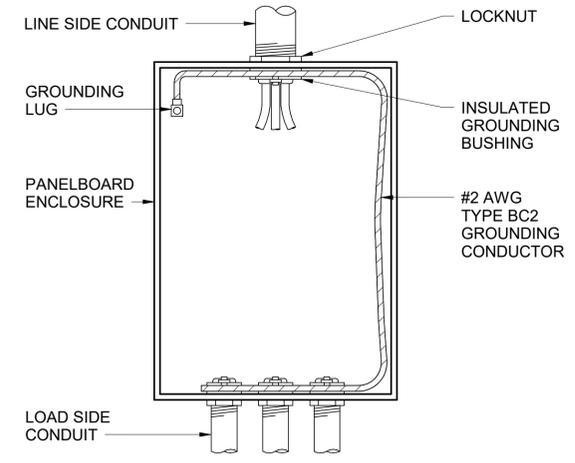
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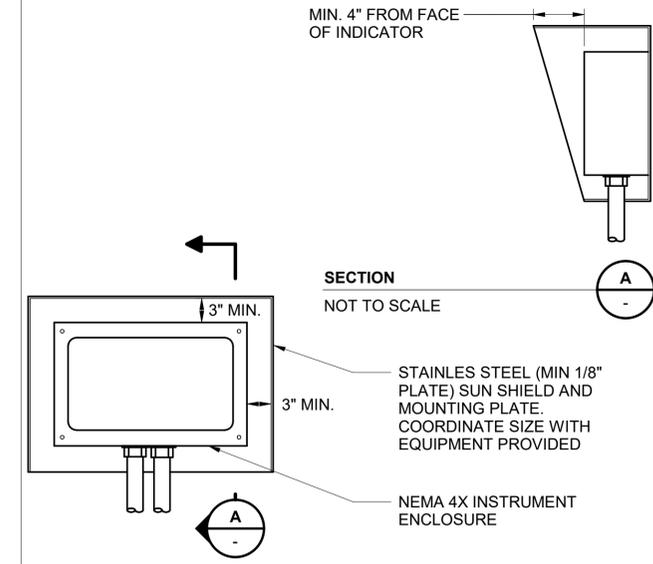
EQUIPMENT ENCLOSURE GROUNDING
NOT TO SCALE



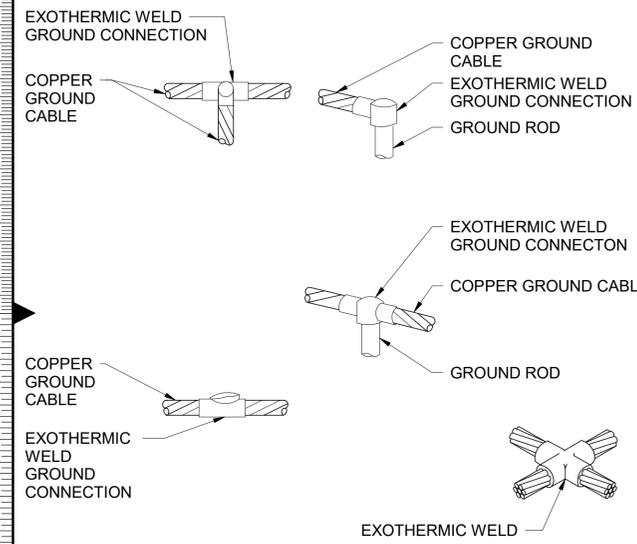
GROUND ROD WELD
NOT TO SCALE



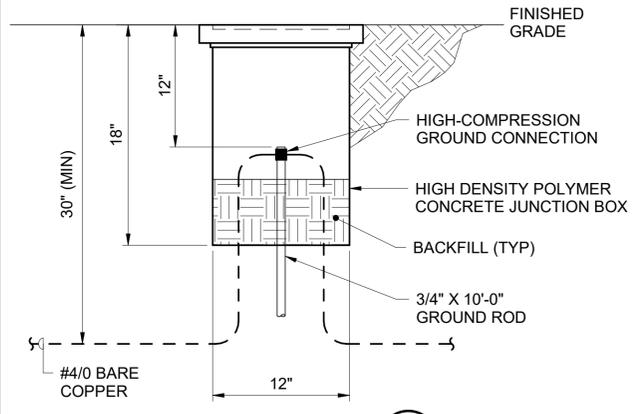
PANELBOARD GROUNDING
NOT TO SCALE



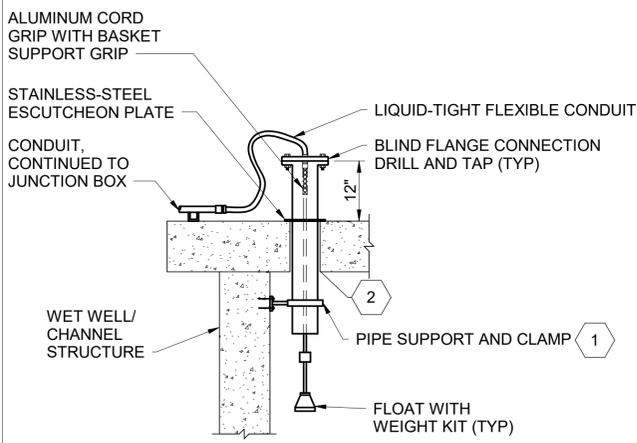
INSTRUMENT SUNSHADE
NOT TO SCALE



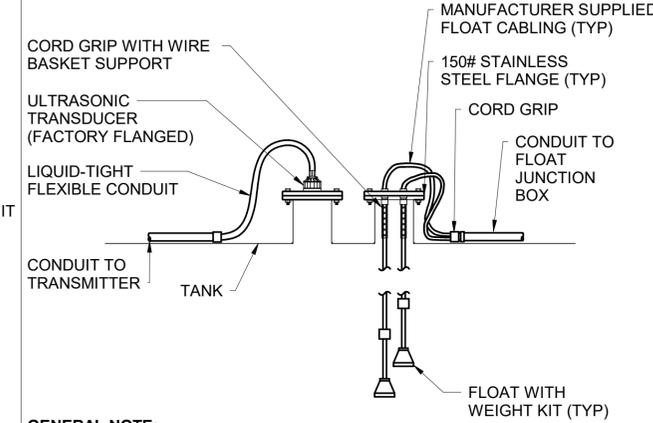
EXOTHERMIC WELDS
NOT TO SCALE



SECTION
NOT TO SCALE



FLOAT SWITCH (WET WELL)
NOT TO SCALE



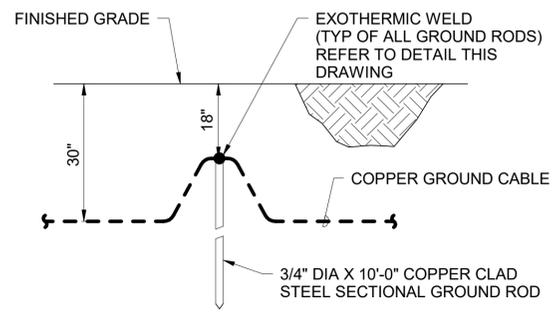
LEVEL TRANSMITTER W/ BACKUP FLOATS (TANK MOUNT)
NOT TO SCALE

GENERAL NOTE:
1. THIS DETAIL IS SHOWN FOR STORAGE TANK INSTALLATIONS. FLANGED CONNECTION SHALL BE PROVIDED BY THE TANK MANUFACTURER. REFER TO PLANS FOR MOUNTING LOCATIONS AND CONDUIT ROUTING.
2. TYPICAL STORAGE TANK FLANGED TRANSDUCER AND FLOAT MOUNTING

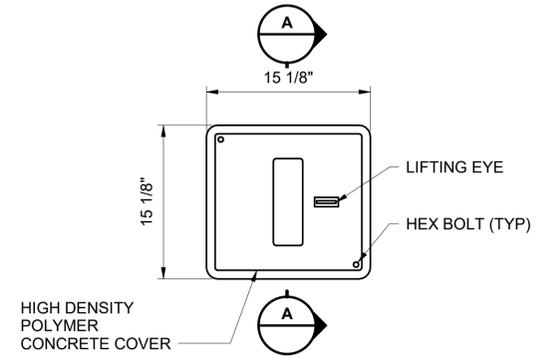
GENERAL NOTES:
1. THIS DETAIL IS SHOWN FOR WET WELL OR CHANNEL INSTALLATIONS. PIPING SUPPORTS SHALL BE PROVIDED BY CONTRACTOR. REFER TO PLANS FOR MOUNTING LOCATIONS AND CONDUIT ROUTING.

KEYED NOTES:

1. INSTALL PIPE CLAMP(S) AS REQUIRED TO SUPPORT PIPING SLEEVE. THE FLOAT SWITCH SHALL BE SERVICABLE FROM WORKING FLOOR LEVEL FOR MAINTENANCE WITHOUT ENTERING WET WELL/CHANNEL AREA. SUSPEND AT ELEVATIONS AS SPECIFIED.
2. FOR EXISTING LOCATIONS CORE EXISTING CONCRETE SLAB FOR INSTALLATION OF STILLING PIPING AT LOCATIONS INDICATED. PROVIDE CONCRETE COATINGS ON INTERIOR OF CORED OPENING. REFER TO SPECIFICATION FOR COATING SYSTEM REQUIREMENTS.



GROUND ROD INSTALLATION
NOT TO SCALE



GROUND TEST WELL
NOT TO SCALE

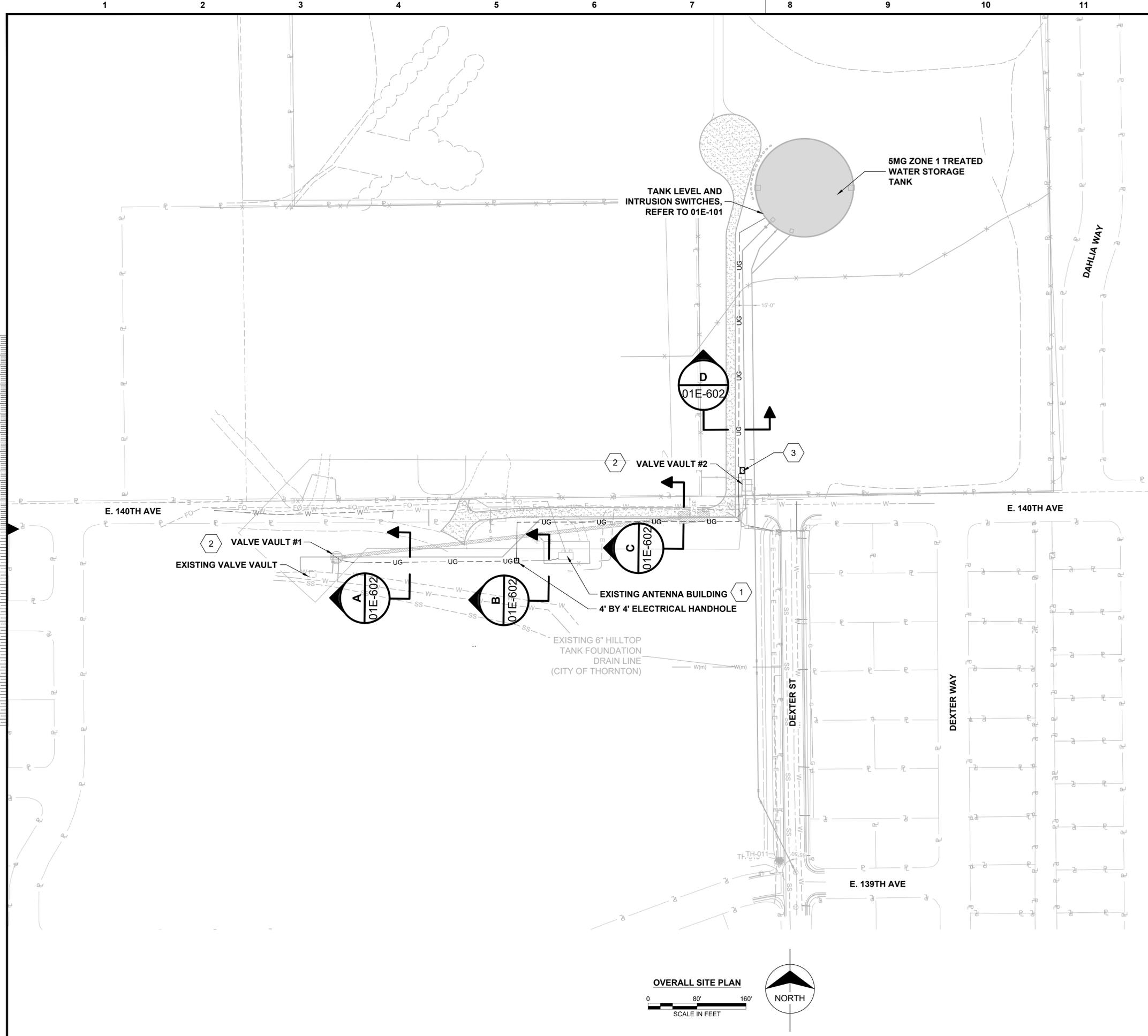
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date OCTOBER 2024	detailed A. BENSON
designed A. MCDONALD	checked M. HOPKINS



CITY OF THORNTON	
5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE ELECTRICAL DETAILS II	
project 162116	contract 23-150
drawing 00E-301	rev. 0
sheet 54	of 74 sheets



- GENERAL NOTES:**
- REFER TO P&ID SHEET 01-100 FOR MORE DETAILS REGARDING INSTRUMENTATION
 - ROUTE TWO 2 INCH CONDUITS FOR FIBER BETWEEN EXISTING RTU CONTROL CABINET LOCATED IN THE EXISTING ANTENNA BUILDING AND NEW CONTROL PANEL RIO NEAR VAULT #2. REFER TO NETWORK ARCHITECTURE DIAGRAM 0ES-600 FOR RIO CONNECTION.

- KEYED NOTES:** #
- EXISTING RTU
 - REFER TO DRAWING 01E-102.
 - NEW RIO CABINET AND ELECTRICAL SERVICE LOCATED OFF VALVE VAULT #2 PERIMETER. MOUNT ON UNISTRUT STAND. PROVIDE LOCKABLE ENCLOSURES.

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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

Burns & McDonnell Engineering Co., Inc.

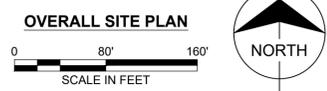
date	OCTOBER 2024	detailed	A.MCDONALD
designed	A.MCDONALD	checked	M.HOPKINS



THORNTON COLORADO

ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 OVERALL SITE PLAN

project	162116	contract	23-150
drawing	ES-100	rev.	0
sheet	55	of	74 sheets
file	162116_ES-100.DWG		



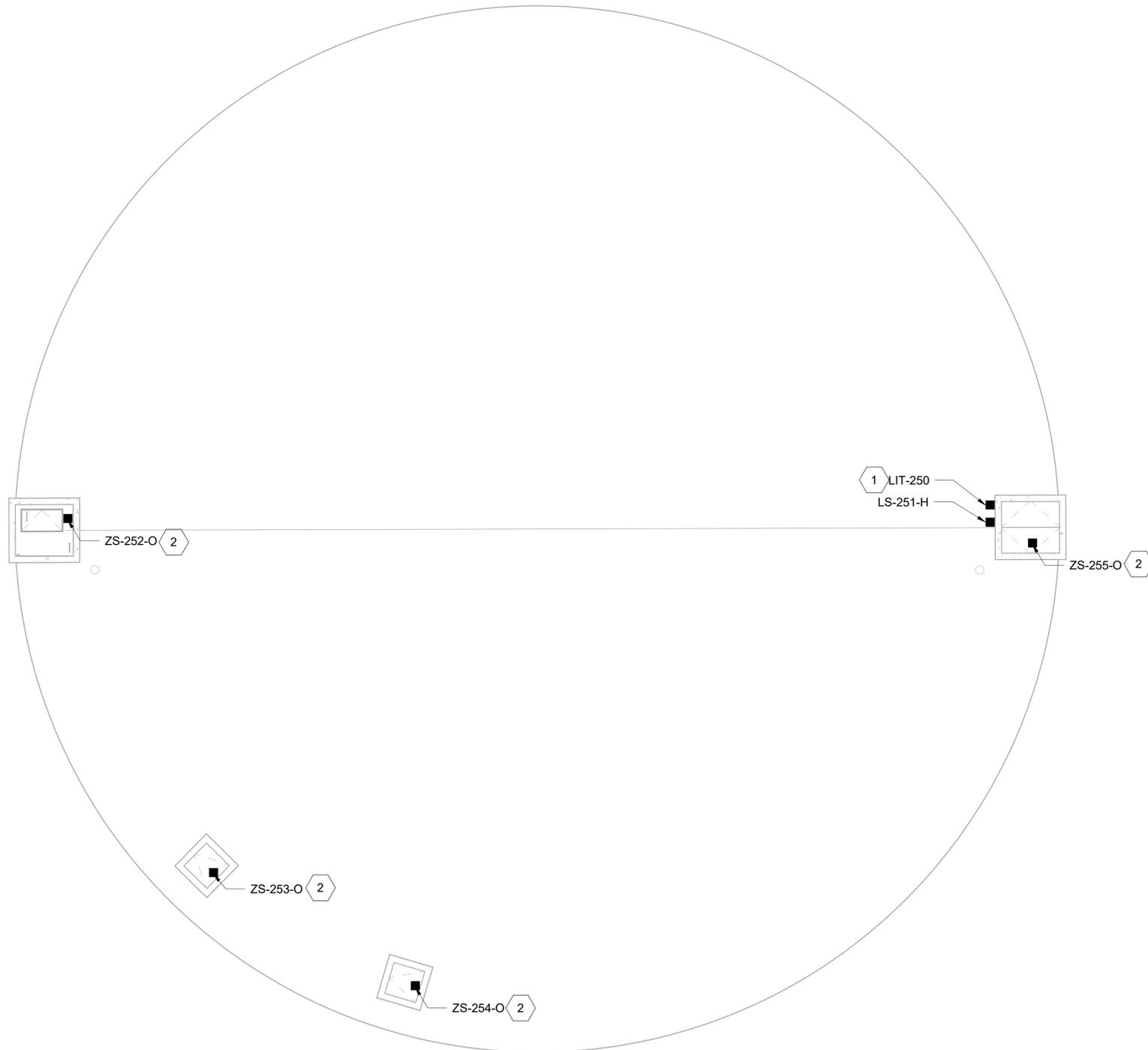
GENERAL NOTES:

1. ALL CONTROL WIRING ROUTES TO NEW RIO CABINET LOCATED NEXT TO VALVE VAULT 2. REFER TO 01E-603 CONNECTION DIAGRAM AND SITE PLAN 01E-100.
2. INSTALL LEVEL SENSOR SUCH THAT READING REACHES BOTTOM OF TANK WITHOUT INTERFERENCE FROM PIPING. PROVIDE THREADED CONDUIT FOR EASY ACCESS.

KEYED NOTES:

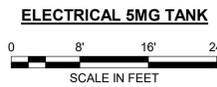
- #
- 1. PROVIDE ENDRESS+HAUSER FMR20-AAPBMVCEVEE1 LEVEL SENSOR OR OWNER APPROVED EQUAL. PROVIDE SHELF SPARE, COORDINATE WITH OWNER FOR STORAGE.
- 2. PROVIDE SENTROL 2507-A HATCH INTRUSION SWITCH OR OWNER APPROVED EQUAL.

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Millimeters
Scale For Microfilming

Inches



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designed A. MCDONALD	checked M. HOPKINS



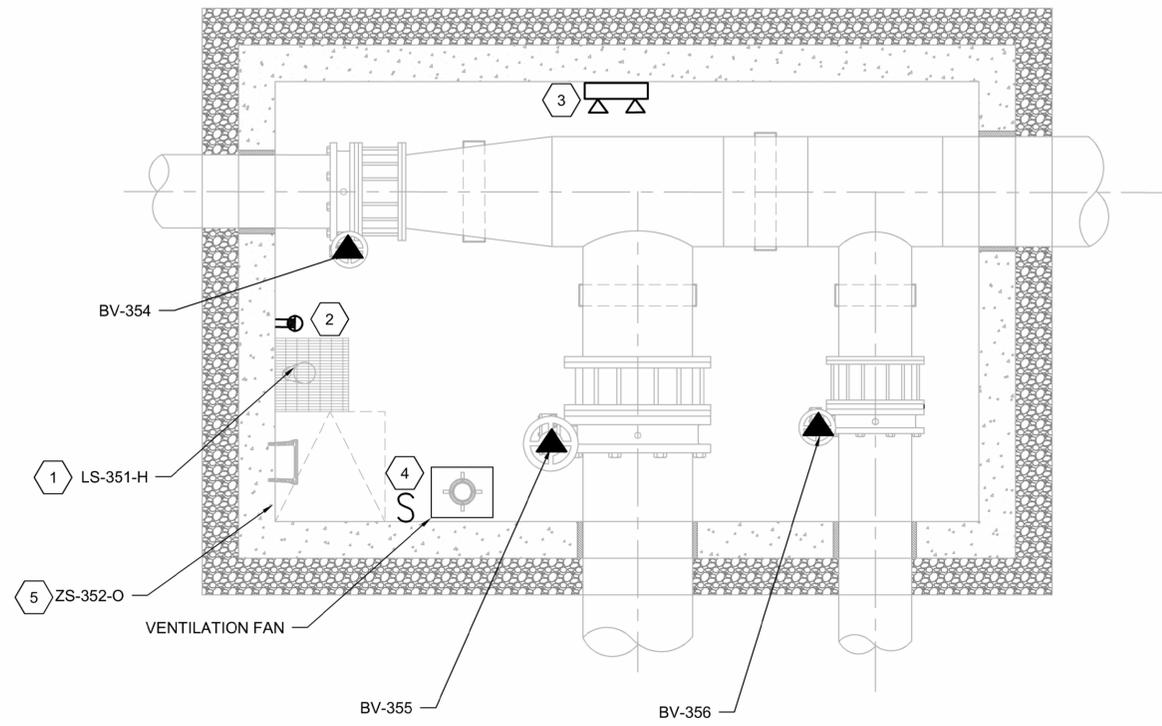
THORNTON
COLORADO

CITY OF THORNTON
5MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
ELECTRICAL PLAN

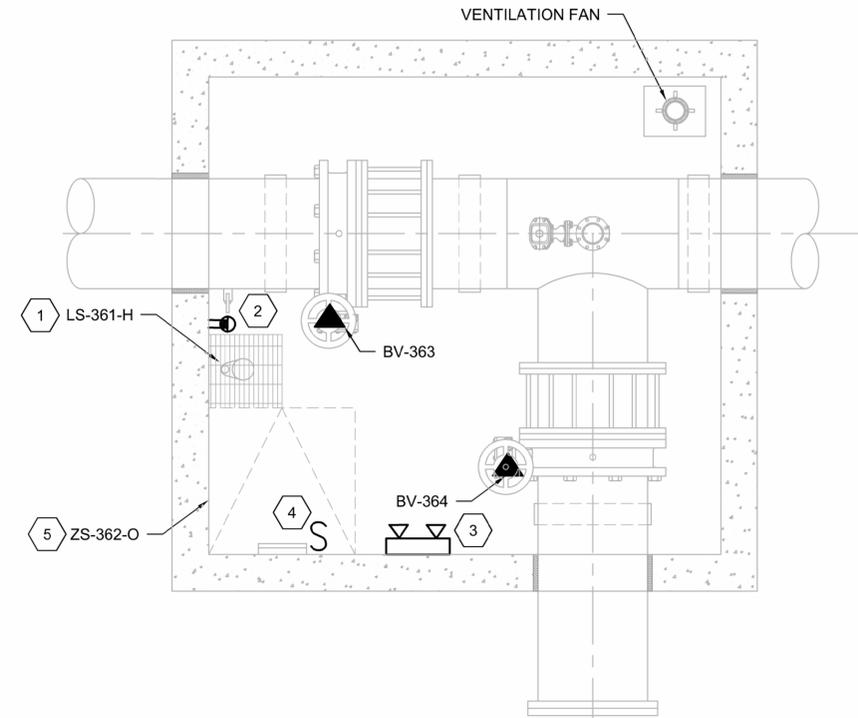
project 162116	contract 23-150
drawing 01E-101	rev. 0
sheet 56	of 74 sheets

no.	date	by	ckd	description
0	10/02/24	ANM	MAH	ISSUED FOR BID

Millimeters
 Scale For Microfilming
 Inches



VALVE VAULT 1 PLAN VIEW
 SCALE: 1"=2'-6"
 1



VALVE VAULT 2 PLAN VIEW
 SCALE: 1"=2'-6"
 2

GENERAL NOTES:

- ALL POWER FOR VALVE VAULT 1 ROUTES TO PANEL LP-3, REFER TO 01E-600 ELECTRICAL SCHEDULES.
- ALL POWER FOR VALVE VAULT 2 ROUTES TO PANEL PPL-2, REFER TO 01E-600 ELECTRICAL SCHEDULES.
- ALL CONTROL WIRING FOR VALVE VAULT 1 AND VALVE VAULT 2 ROUTES TO RIO. REFER TO 01E-603 CONNECTION DIAGRAM.
- PROVIDE REMOTE MOUNTED UNISTRUT RACK FOR VALVE CONTROLS ABOVE GROUND FOR ACCESS TO VALVE CONTROL ABOVE GROUND. MOUNT VALVE CONTROLS IN A NEMA 4X LOCKABLE BOX. MOUNT ASSOCIATED LIGHTING PANEL ON SAME RACK.

KEYTED NOTES: (X)

- MOUNT LEVEL SWITCH WITH STRING TO PULL ABOVE VAULT WITHOUT HAVING TO ENTER VAULT. REFER TO TYPICAL DETAIL FOR INSTALLATION.
- PROVIDE GFCI RECEPTACLE FOR PLUG IN SUMP PUMP.
- PROVIDE WALL PACK LIGHT EATON CROUSE HINDS: CPMV3LWH-UNV1 OR ENGINEER APPROVED EQUAL.
- SWITCH CONTROLS LIGHT AND VENTILATION FAN.
- VALVE VAULT HATCH INTRUSION SWITCH

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 9191 S. JAMAICA STREET
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Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	A. BENSON
designed	A. MCDONALD	checked	M.HOPKINS



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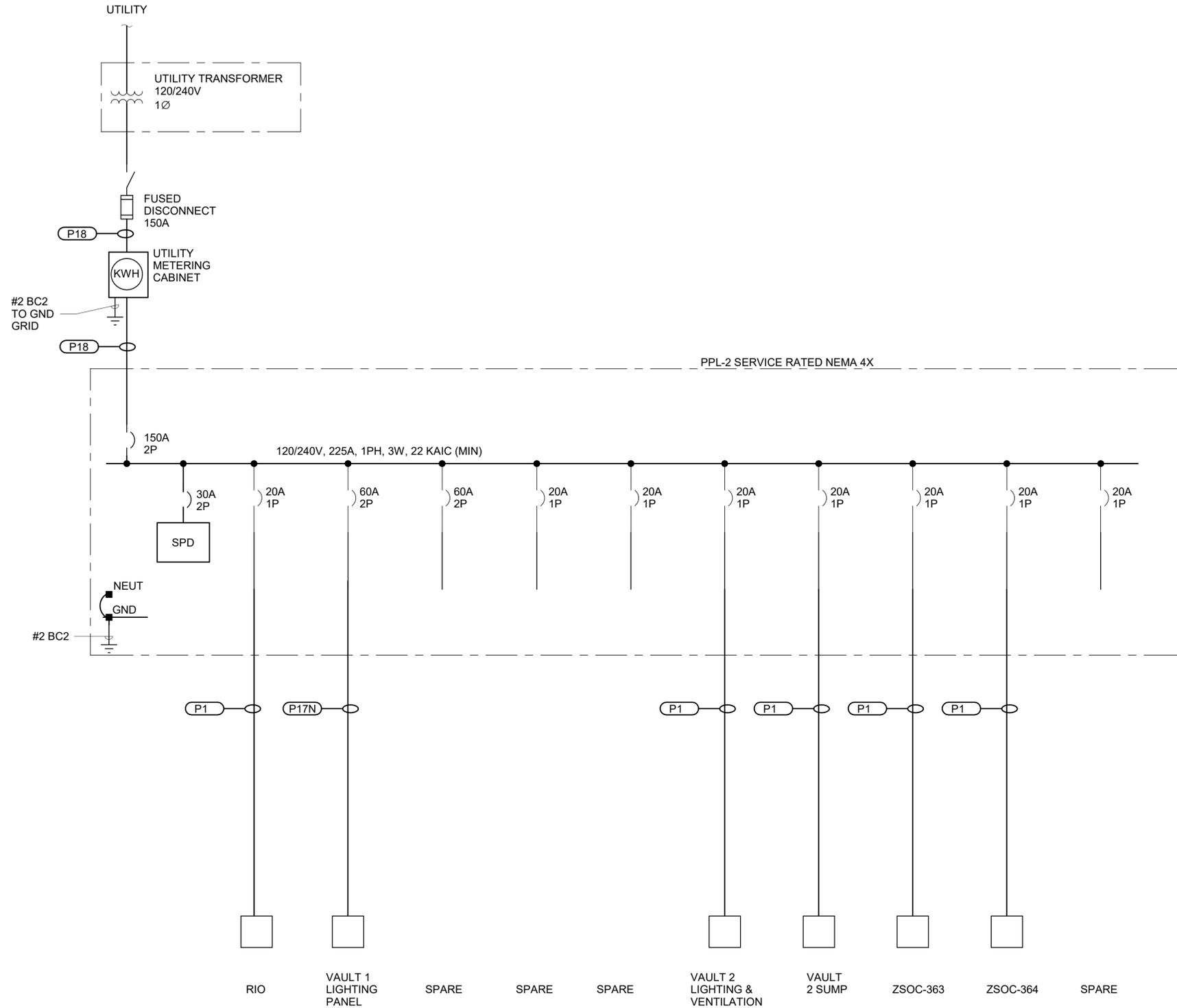
ADAMS COUNTY, COLORADO
 CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER
 STORAGE TANK AND 36" PIPELINE
 CONNECTION VALVE VAULT

project	162116	contract	23-150
drawing	01E-102	rev.	0
sheet	57	of	74 sheets
file	162116_0E-500.dwg		

GENERAL NOTES:

- 1. COORDINATE WITH XCEL ENERGY TO PROVIDE NEW UTILITY SERVICE

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Millimeters
Scale For Microfilming
Inches

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designed A. MCDONALD	checked M. HOPKINS



CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE ELECTRICAL ONE-LINE			
project 162116	contract 23-150		
drawing 01E-500	rev. 0		
sheet 58	of 74	sheets	

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PANELBOARD: PPL-2		MAIN BUS: 225 A		MAIN BREAKER/MLO: 150A					
VOLTS: 240/120V		PHASE: 1		SYM. A.I.C. MIN.: 22KAIC					
FED FROM: XCEL UTILITY XFMR		WIRE: 3		ENCLOSURE: NEMA 4X					
LOCATION: VALVE VAULT #2 EXTERIOR				MOUNTING: SURFACE					
DESCRIPTION	NO. POLES	TRIP AMPS	POLE NO.	LOAD - VA		POLE NO.	TRIP AMPS	NO. POLES	DESCRIPTION
				A	B				
RIO	1	20	1	<-- 180.00 0.00		--> 2	20	1	VAULT 2 LIGHTING & VENTILLATION
VALVE VAULT 1 LIGHTING PANEL	2	60	3	<-- 3000.00 1500.00	1500	--> 4	20	1	VAULT 2 SUMP
			5	<-- 3000.00 1000.00		--> 6	20	1	ZSOC-363 POWER
SPARE	2	100	7	<-- 0.00 1000.00		--> 8	20	1	ZSOC-364 POWER
			9	<-- 0.00 0.00		--> 10	20	1	SPARE
SPARE	1	20	11	<-- 0.00 0.00		--> 12	20	1	SPARE
SPARE	1	20	13	<-- 0.00 0.00		--> 14	20	1	SPARE
SPACE	1	20	15	<-- 0.00 0.00		--> 16	30	2	SPD
SPACE	1	20	17	<-- 0.00 0.00		--> 18			
				6.00	6.50	Demand Factor		100.0%	
Unbalance load				4.0%	4.0%				
Maximum Unbalance load =				4.0%	4.0%				
Total Connected Load						Est. Demand Load			
12.50 kVA		52.09 A		12.50 kVA		52.09 A			

PANELBOARD: LP-3		MAIN BUS: 60A		MAIN BREAKER/MLO: 60A					
VOLTS: 240/120V		PHASE: 1		SYM. A.I.C. MIN.: 10KAIC					
FED FROM: PPL-2		WIRE: 3		ENCLOSURE: NEMA 4X					
LOCATION: VALVE VAULT #1				MOUNTING: SURFACE					
DESCRIPTION	NO. POLES	TRIP AMPS	POLE NO.	LOAD - VA		POLE NO.	TRIP AMPS	NO. POLES	DESCRIPTION
				A	B				
ZSOC-354 POWER	1	20	1	<-- 1500 500.00		--> 2	20	1	VAULT 1 LIGHTING & VENTILLATION
ZSOC-355 POWER	1	20	3	<-- 1500 1500		--> 4	20	1	VAULT 1 SUMP
ZSOC-356 POWER	1	20	5	<-- 1500 0		--> 6	20	1	SPARE
SPARE	1	20	7	<-- 0.00 0.00		--> 8	20	1	SPARE
SPARE	1	20	9	<-- 0.00 0.00		--> 10	30	1	SPD
SPARE	1	20	11	<-- 0.00 0.00		--> 12			
				3.5	3.00	Demand Factor		100.0%	
Unbalance load				7.7%	7.7%				
Maximum Unbalance load =				7.7%	7.7%				
Total Connected Load						Est. Demand Load			
6.5 kVA		27.09 A		6.5 kVA		27.09 A			

no.	date	by	ckd	description
0	10/02/24	AN M	MA H	ISSUED FOR BID

Millimeters

Inches

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designed A. MCDONALD	checked M. HOPKINS



CITY OF THORNTON
5MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
ELECTRICAL SCHEDULES I

project 162116	contract 23-150
drawing 01E-600	rev. 0
sheet 59	of 74 sheets

GENERAL NOTES:

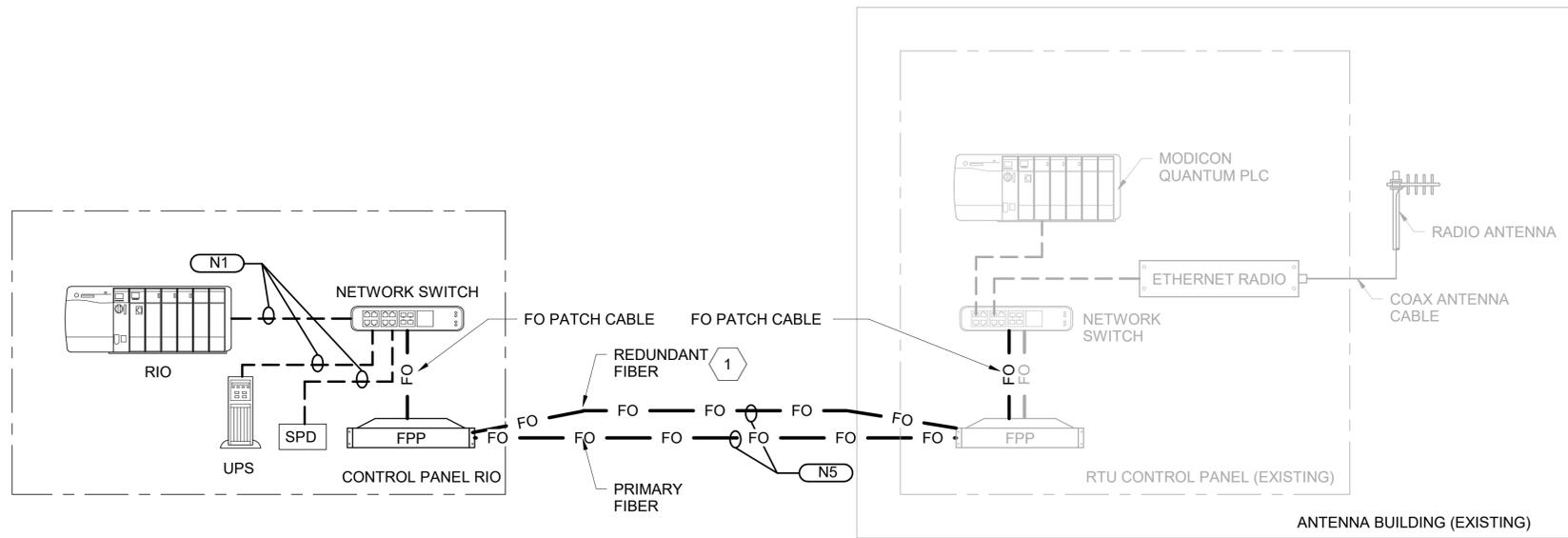
- CONNECT MODICON RIO DROP TO EXISTING RTU CONTROL PANEL LOCATED IN ANTENNA BUILDING. EXISTING ANTENNA SENDS SIGNAL TO WATER TREATMENT PLANT VIA REPEATER.

KEYED NOTES:



- RUN REDUNDANT FIBER IN SEPARATE 2 INCH SCHEDULE 40 PVC CONDUIT THAN PRIMARY FIBER.

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NETWORK ARCHITECTURE DIAGRAM
NOT TO SCALE

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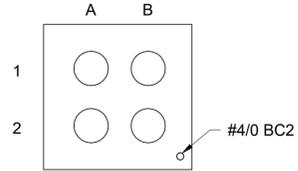


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CITY OF THORNTON
5MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
NETWORK ARCHITECTURE DIAGRAM

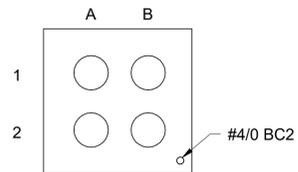
project 162116	contract 23-150
drawing 01E-601	rev. 0
sheet 60	of 74 sheets





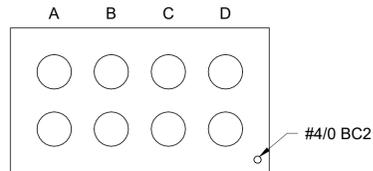
ELECTRICAL DUCT BANK A
NOT TO SCALE

DUCT SCHEDULE A				
DUCT ID	DUCT SIZE	CIRCUIT DESCRIPTION	ORIGIN	DESTINATION
A1	2	SPARE	VALVE VAULT #1	STUB UP AT VALVE VAULT #2
A2	2	C12, C12, C12, C2, C2	VALVE VAULT #1	RIO
B1	2	SPARE	VALVE VAULT #1	STUB UP AT VALVE VAULT #2
B2	2	P17N	LP-3, VALVE VAULT #1	PPL-2



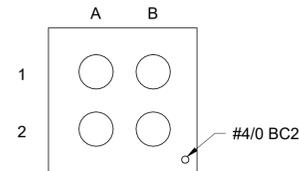
ELECTRICAL DUCT BANK B
NOT TO SCALE

DUCT SCHEDULE B				
DUCT ID	DUCT SIZE	CIRCUIT DESCRIPTION	ORIGIN	DESTINATION
A1	2	SPARE	STUB UP AT VALVE VAULT #2	STUB UP AT ANTENNA BUILDING
A2	2	N5	RIO	EXISTING RTU
B1	2	SPARE	STUB UP AT VALVE VAULT #2	STUB UP AT ANTENNA BUILDING
B2	2	N5	RIO	EXISTING RTU



ELECTRICAL DUCT BANK C
NOT TO SCALE

DUCT SCHEDULE C				
DUCT ID	DUCT SIZE	CIRCUIT DESCRIPTION	ORIGIN	DESTINATION
A1	2	SPARE	VALVE VAULT #1	STUB UP AT VALVE VAULT #2
A2	2	C12, C12, C12, C2, C2	VALVE VAULT #1	RIO
B1	2	SPARE	VALVE VAULT #1	STUB UP AT VALVE VAULT #2
B2	2	P17N	LP-3, VALVE VAULT #1	PPL-2
C1	2	SPARE	STUB UP AT VALVE VAULT #2	STUB UP AT ANTENNA BUILDING
C2	2	N5	RIO	EXISTING RTU
D1	2	SPARE	STUB UP AT VALVE VAULT #2	STUB UP AT ANTENNA BUILDING
D2	2	N5	RIO	EXISTING RTU



ELECTRICAL DUCT BANK D
NOT TO SCALE

DUCT SCHEDULE D				
DUCT ID	DUCT SIZE	CIRCUIT DESCRIPTION	ORIGIN	DESTINATION
A1	2	SPARE	NEW 5MG TANK	STUB UP AT VALVE VAULT #2
A2	2	C2, C2, C2, C2, C2	NEW 5MG TANK	RIO
B1	2	SPARE	NEW 5MG TANK	STUB UP AT VALVE VAULT #2
B2	2	A2	NEW 5MG TANK	RIO

Millimeters
Scale For Microfilming

Inches

POWER CABLE			
CONDUIT DESCRIPTOR	WIRE/CONDUIT	CONDUIT DESCRIPTOR	WIRE/CONDUIT
P1*	2-#12, #12 GND, 3/4"C	P21	2 SETS - 3-300KCMIL, #1/0 GND, 2-1/2"C
P2*	3-#12, #12 GND, 3/4"C	P21N	2 SETS - 4-300KCMIL, #1/0 GND, 3"C
P3*	2-#10, #12 GND, 3/4"C	P22	3-350KCMIL, #2 GND, 2-1/2"C
P4*	3-#10, #12 GND, 3/4"C	P22N	4-350KCMIL, #2 GND, 3"C
P5*	2-#8, #10 GND, 3/4"C	P23	2 SETS - 3-350KCMIL, #1/0 GND, 2-1/2"C
P6*	3-#8, #10 GND, 1"C	P23N	2 SETS - 4-350KCMIL, #1/0 GND, 3"C
P7*	2-#6, #8 GND, 3/4"C	P24	3-500KCMIL, #2 GND, 4"C
P8*	3-#6, #8 GND, 1"C	P24N	4-500KCMIL, #2 GND, 4"C
P9*	2-#4, #8 GND, 3/4"C	P25	2 SETS - 3-500KCMIL, #1/0 GND, 4"C
P10*	3-#4, #8 GND, 1-1/4"C	P25N	2 SETS - 4-500KCMIL, #1/0 GND, 4"C
P11*	2-#2, #6 GND, 1"C	P26	3 SETS - 3-500KCMIL, #2/0 GND, 4"C
P12*	3-#2, #6 GND, 1-1/4"C	P26N	3 SETS - 4-500KCMIL, #2/0 GND, 4"C
P13*	2-#1/0, #6 GND, 1-1/4"C	P27	4 SETS - 3-500KCMIL, #4/0 GND, 4"C
P14*	3-#1/0, #6 GND, 1-1/2"C	P27N	4 SETS - 4-500KCMIL, #4/0 GND, 4"C
P15*	3-#2/0, #6 GND, 2"C	P28	5 SETS - 3-500KCMIL, 250KCMIL GND, 4"C
P16*	3-#3/0, #6 GND, 2"C	P28N	5 SETS - 4-500KCMIL, 250KCMIL GND, 4"C
P17*	3-#4/0, #4 GND, 2"C	P29	6 SETS - 3-500KCMIL, 350KCMIL GND, 4"C
P18	3-250KCMIL, #4 GND, 2"C	P29N	6 SETS - 4-500KCMIL, 350KCMIL GND, 4"C
P18N	4-250KCMIL, #4 GND, 2"C	P30	7 SETS - 3-500KCMIL, 500KCMIL GND, 4"C
P19	2 SETS - 3-250KCMIL, #4 GND, 2"C	P30N	7 SETS - 4-500KCMIL, 500KCMIL GND, 4"C
P19N	2 SETS - 4-250KCMIL, #4 GND, 2-1/2"C	P31	8 SETS - 3-500KCMIL, 500KCMIL GND, 4"C
P20	3-300KCMIL, #4 GND, 2-1/2"C	P31N	8 SETS - 4-500KCMIL, 500KCMIL GND, 4"C
P20N	4-300KCMIL, #4 GND, 2-1/2"C		

CONTROL	
CONDUIT DESCRIPTOR	WIRE/CONDUIT
C1	NOT USED
C2	2-#14, 3/4"C
C3	3-#14, 3/4"C
C4	4-#14, 3/4"C
C5	5-#14, 3/4"C
C6	6-#14, 3/4"C
C7	7-#14, 3/4"C
C8	8-#14, 3/4"C
C9	9-#14, 3/4"C
C10	10-#14, 3/4"C
C11	11-#14, 3/4"C
C12	12-#14, 1"C
C13	13-#14, 1"C
C14	14-#14, 1"C
C15	15-#14, 1"C
C16	16-#14, 1"C
C17	17-#14, 1"C
C18	18-#14, 1"C
C19	19-#14, 1"C
C20	20-#14, 1-1/4"C
C21	21-#14, 1-1/4"C
C22	22-#14, 1-1/4"C
C23	23-#14, 1-1/4"C
C24	24-#14, 1-1/4"C
C25	25-#14, 1-1/4"C

ANALOG SIGNAL	
CONDUIT DESCRIPTOR	WIRE/CONDUIT
A1	1-#16/2 TSP, 3/4"C
A2	2-#16/2 TSP, #18 GND, 3/4"C
A3	3-#16/2 TSP, #18 GND, 3/4"C
A4	4-#16/2 TSP, #18 GND, 1"C
A5	5-#16/2 TSP, #18 GND, 1"C
A6	6-#16/2 TSP, #18 GND, 1-1/4"C
A7	7-#16/2 TSP, #18 GND, 1-1/4"C
A8	8-#16/2 TSP, #18 GND, 1-1/4"C
A9	9-#16/2 TSP, #18 GND, 1-1/4"C
A10	10-#16/2 TSP, #18 GND, 1-1/4"C
A11	11-#16/2 TSP, #18 GND, 1-1/2"C
A12	12-#16/2 TSP, #18 GND, 1-1/2"C
A13	13-#16/2 TSP, #18 GND, 1-1/2"C
A14	14-#16/2 TSP, #18 GND, 2"C
A15	15-#16/2 TSP, #18 GND, 2"C
A16	16-#16/2 TSP, #18 GND, 2"C
A17	17-#16/2 TSP, #18 GND, 2"C
A18	18-#16/2 TSP, #18 GND, 2"C
A19	19-#16/2 TSP, #18 GND, 2"C
A20	20-#16/2 TSP, #18 GND, 2"C
A21	21-#16/2 TSP, #18 GND, 2"C
A22	22-#16/2 TSP, #18 GND, 2"C
A23	23-#16/2 TSP, #18 GND, 2-1/2"C
A24	24-#16/2 TSP, #18 GND, 2-1/2"C
A25	25-#16/2 TSP, #18 GND, 2-1/2"C

NETWORK	
CONDUIT DESCRIPTOR	WIRE/CONDUIT
N1	1 - CAT 6 NETWORK, 3/4"C
N2	2 - CAT 6 NETWORK, 3/4"C
N3	3 - CAT 6 NETWORK, 1"C
N4	4 - CAT 6 NETWORK, 1"C
N5	1 - 6 STR MM FIBER, 2"C
N6	1 - 12 STR MM FIBER, 2"C
N7	1 - 24 STR MM FIBER, 2"C
N8	1 - 6 STR SM FIBER, 2"C
N9	1 - 12 STR SM FIBER, 2"C
N10	1 - 24 STR SM FIBER, 2"C

NOTE (*): WHERE "N" IS USED ON THE DRAWINGS APPENDED TO THE DESCRIPTORS SHOWN ABOVE AN ADDITIONAL CONDUCTOR EQUAL TO THE PHASE CONDUCTORS IS TO BE PROVIDED.

no.	date	by	ckd	description
0	10/02/24	AN M	MA H	ISSUED FOR BID

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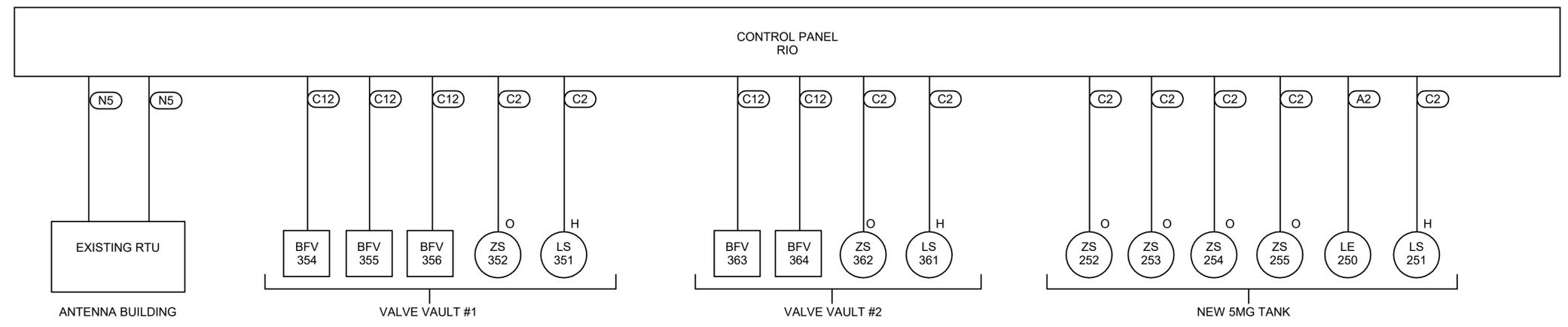


date	OCTOBER 2024	detailed	A. BENSON
designed	A. MCDONALD	checked	M. HOPKINS



CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE DUCT BANK AND CABLE SCHEDULE			
project	162116	contract	23-150
drawing	01E-602	rev.	0
sheet	61	of	74 sheets

no.	date	by	ckd	description
0	10/02/24	AN M	MA H	ISSUED FOR BID



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CITY OF THORNTON
5MG ZONE 1 TREATED WATER
STORAGE TANK AND 36" PIPELINE
CONNECTION DIAGRAM

project 162116	contract 23-150
drawing 01E-603	rev. 0
sheet 62	of 74 sheets

TAGGING SCHEME

EQUIPMENT TAG BBBB-XYZZ
EXAMPLE TAG LS-3415-H
BBBB - EQUIPMENT, INSTRUMENT, AND VALVE IDENTIFIERS, ASME AND ISA FUNCTIONAL DESIGNATIONS (ONE TO FOUR LETTERS)
X - PROCESS SYSTEM IDENTIFICATION (ONE DIGIT)
Y - PROCESS TRAIN IDENTIFICATION (ONE DIGIT)
ZZ - LOOP NUMBER - NUMBER TO CORRELATE PRIMARY AND FINAL CONTROL ELEMENTS, CONDUIT AND COMPONENTS. (TWO DIGITS)

AS INDICATED ON THE DRAWINGS FOR INSTRUMENTS, CONTROL DEVICES:



PLANT IDENTIFIERS 'XX' IS NOT SHOWN BUT IMPLIED FOR ALL INSTRUMENT TAGS INDICATED ON THESE DRAWINGS

OPTIONAL INDICATORS MAY BE INCLUDED TO ADD CLARITY TO THE DRAWINGS.

ADDITIONAL CLARIFIERS

- AS - ARSENIC
DISC - DISCONNECT AUX
ES - EMERGENCY STOP
FCL - FREE CHLORINE
FLT - FAULT
FR* - FORWARD / REVERSE
H, HH - HIGH, HIGH-HIGH
HOA* - HAND / OFF / AUTO
L, LL - LOW, LOW-LOW
LOR* - LOCAL / OFF / REMOTE (OR LOCAL / STOP / REMOTE)
LP - LOOP POWER
ORP - OXIDATION REDUCTION POTENTIAL
OSC* - OPEN / STOP / CLOSE
pH - pH
RC - RUN CONFIRM
REM - REMOTE
SIL - SILENCE
TCL - TOTAL CHLORINE
TURB - TURBIDITY

* INDICATORS MAY BE USED INDIVIDUALLY OR IN DIFFERENT COMBINATIONS

EQUIPMENT IDENTIFIER (BBBB)

- AC - AUR COMPRESSOR
B - BLOWER
CC - CALIBRATION COLUMN
CGD - COMBUSTIBLE GAS DETECTOR
CU - CONDENSING UNIT
DRY - DESICCANT DRYER
EF - EXHAUST FAN
F - FAN
FCU - FAN COIL UNIT
FLC - FLOCCULATOR
FLT - FILTER OR FAULT
FVNR - FULL VOLTAGE REVERSING
FVR - FULL VOLTAGE NON-REVERSING
G - GENERATOR
HTR - HEATER
IPS - INCLINED PLATE SETTLERS
LP - 120VAC PANEL BOARD
LCP - LOCAL CONTROL PANEL
LV - LOUVER
M - MOTOR, ELECTRIC
MAU - MAKEUP AIR UNIT
MCC - MOTOR CONTROL CENTER
MXR - MIXER
P - PUMP
PP - 480VAC PANEL BOARD
PWR - POWER
RTU - ROOF TOP UNIT
RVSS - REDUCED VOLTAGE SOLID-STATE (MOTOR STARTER)
SF - SUPPLY FAN
SC - SLUDGE COLLECTOR
SED - PLATE SETTLER
SKD - SKID EQUIPMENT
SWB - SWITCH BOARD
T - TANK OR BASIN
TS - TOTE SCALE
UH - UNIT HEATER
VFD - VARIABLE FREQUENCY DRIVE
XFMR - TRANSFORMER

INSTRUMENT IDENTIFIER (BBBB)

- A_ - ANALYZER
E_ - VOLTAGE
F_ - FLOW
H_ - MANUAL PUSH BUTTON OR SWITCH
I_ - CURRENT
J_ - POWER (DIGITAL COMMAND OR OUTPUT)
L_ - LEVEL
M_ - MOISTURE
P_ - PRESSURE
S_ - SPEED
T_ - TEMP
V_ - VIBRATION
W_ - TORQUE OR WEIGHT
X_ - MISCELLANEOUS OR COMMON
Y_ - EVENT
Z_ - POSITION
_A - ALARM
_B - BUTTON
_C - CONTROL (ANALOG DEMAND)
_D - DIFFERENTIAL
_E - PROBE OR DIRECT MEASUREMENT ELEMENT
_G - GAUGE/GLASS
_I - INDICATOR
_Q - TOTALIZER
_S - SWITCH OR SETPOINT
_T - TRANSMITTER (ANALOG FEEDBACK)
_Y - RELAY (IF DIGITAL) OR CALCULATION (IF ANALOG)
_I - INDICATION (ANALOG FEEDBACK)
_T - TRANSMITTER (ANALOG FEEDBACK)

GENERAL NOTES:

GENERAL NOTES

- 1. REFER TO THE CONTROL NARRATIVE SPECIFIED IN THE SECTION 40 91 60. FOR PROGRAMMING OF THE EQUIPMENT INDICATED ON THE P&IDS.
2. WHERE USED, PLC XX INDICATES THE CONTROLLER FOR THE HARDWIRE INPUT TO SCADA SYSTEM. XX MAY USE MORE THAN TWO CHARACTERS.
3. PROGRAM COMPLETE TAG NUMBER FOR EACH HARD AND SOFT POINT, WITH PREFIX "WE-" FOR THE CITY TO KEEP THE TAGS SEPARATE FROM THE SOUTH END WATER TREATMENT PLANT.

KEY NOTES

KEY NOTES:

- 1. AN "A" IN THE TAG IDENTIFIER MEANS THE POINT IS PROGRAMMED AS AN ALARM, DISPLAYING ON THE GRAPHICS AND ON THE SYSTEM ALARM SCREENS. ALARM STATE SHALL BE AS DEFINED IN THE I/O LIST.

INSTRUMENT DEVICE AND FUNCTION SYMBOLS

Table with 5 columns: DISPLAY OR CONTROL, DEVICES (INSTRUMENTS, SELECTOR SWITCHES, ETC.), PHYSICAL STATUS INDICATION LIGHT MOUNTED ON PANEL, ACCESSABILITY, and FIELD MOUNTED (INSTRUMENTS, VALVES, ETC.). It shows various symbols for field, operator, and control panel access.

P&IDs LINETYPES

- PROCESS LINE
EXISTING PROCESS LINE
FUTURE PROCESS LINE
PROCESS HEAVY LINES
HEAVY LINES
MEDIUM LINES
ELECTRICAL SIGNAL (ANALOG)
ELECTRICAL SIGNAL (DISCRETE)
ENCLOSURE BOUNDARY
EQUIPMENT
EQUIPMENT - INSTRUMENTS
EQUIPMENT - VALVES
MISCELLANEOUS
MISCELLANEOUS LINE WORK
ELECTRICAL SIGNAL (POWER)
SOFTWARE, DATA LINK, OR BUS
MANUFACTURER'S CABLE
PNEUMATIC TUBING
SKID / VENDOR BOUNDARY

SYSTEM IDENTIFICATION (X)

- 200 - 5MG TANK
300 - VALVE VAULT

PROCESS TRAIN IDENTIFICATION (Y)

- _50 - VALVE VAULT 2/ 5MG TANK
_60 - VALVE VAULT 1

VALVE IDENTIFIER (BBB)

- ARV - AIR RELEASE VALVE
BP - BACKFLOW PREVENTER
FCV - FLOW CONTROL VALVE
PRV - PRESSURE REGULATING VALVE
SG - SLIDE GATE
SV - SOLENOID VALVE
V - VALVE (ALL TYPES)

PLC / RIO IDENTIFICATION

- PLC CABINET LOCATION
PLC - RTU ANTENNA BUILDING
RIO VAULT #2 RIO

NOTES:

- 1. *** - REFER "TAGGING SCHEME" TABLE THIS SHEET
2. HMI AND OIT DISPLAY OR CONTROL, SYSTEM INTEGRATOR (SI) SHALL STORE POINTS INDICATED IN THE HISTORIAN AND MAKE AVAILACROSS THE SCADA NETWORK AND THROUGH SYSTEM
3. PPPP = PLC SUFFIX NAME

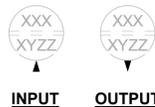


Table with 5 columns: no., date, by, ckd, description. Row 0: 10/02/24, AM, H, ISSUED FOR BID

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9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

Table with 2 columns: date, detailed, designed, checked. Values: OCTOBER 2024, A. BENSON, A. MCDONALD, M. HOPKINS



THORNTON COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND PIPELINE

PROCESS AND INSTRUMENTATION LEGENDS AND ABBREVIATIONS I

Table with 2 columns: project, contract, drawing, rev. Values: 162116, 23-150, 001-001, 0

sheet 63 of 74 sheets

Millimeters

Inches

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PROCESS SYMBOLS

	GLOBE VALVE		FLUME
	GATE VALVE		WEIR
	BUTTERFLY VALVE		DIAPHRAGM SEAL
	CHECK VALVE		ANNULAR SEAL
	DUCK BILL CHECK VALVE		DIFFUSER
	PLUG VALVE		EJECTOR/EDUCTOR
	3-WAY VALVE		FLEXIBLE HOSE
	PRESSURE AND VACUUM RELIEF VALVE		EXPANSION ELEMENT (JOINT)
	PRESSURE RELIEF VALVE		FLEXIBLE BALL JOINT
	BALL VALVE		BASKET TYPE STRAINER
	DIAPHRAGM VALVE		TEE TYPE STRAINER
	SLIDE GATE		Y-TYPE STRAINER
	CORPORATION STOP		CONICAL STRAINER
	AIR RELEASE VALVE		DUPLEX STRAINER
	AIR RELEASE AND VACUUM VALVE		PIPE WITH HEAT TRACE CABLE
	BACKFLOW PREVENTER		REDUCING TEE
	DEMISTER		CONCENTRIC REDUCER
	STOP PLATE		ECCENTRIC REDUCER
	RUPTURE PLATE		DISCHARGE ELBOW ASSEMBLY
	CALIBRATION COLUMN		HOSE CONNECTION
	FLOW THROUGH CELL		REMOVABLE PLUG
	BUBBLE TRAP		REMOVABLE CAP
			WELDED CAP
			BLIND FLANGE
			CLEANOUT
			YARD HYDRANT
			AIR COCK
			WALL HYDRANT
			QUICK DISCONNECT COUPLING
			DRAIN
			PULSATION DAMPENER

PROCESS EQUIPMENT

	PERISTALTIC PUMP		SEDIMENTATION BASIN
	DIAPHRAGM METERING PUMP		AIR RECEIVER TANK
	CENTRIFUGAL PUMP		ULTRAVIOLET DISINFECTION BANK
	BLOWER		COMPRESSOR
	GRINDER		DEWATERING DRUM OR SCREW PRESS
	ROTARY LOBE PUMP		SCREEN
	SUBMERSIBLE PUMP		SURFACE AERATOR
	AGITATOR/MIXER		MEMBRANE FILTER
	POSITIVE DISPLACEMENT BLOWER		SAFETY SHOWER/ EYE WASH STATION
	PROGRESSIVE CAVITY PUMP		CHEMICAL TOTE
	VERTICAL TURBINE PUMP		SCALE
	WETTING CONE		STRAINER

INSTRUMENTATION SYMBOLS

	LEVEL TRANSMITTER
WHERE * IS: R = RADAR, U = ULTRASONIC	
	GUIDED WAVE RADAR LEVEL TRANSMITTER
	FLOAT SWITCH
	ROTAMETER
	SIGHT FLOW INDICATOR
	AVERAGING PITOT TUBE FLOW ELEMENT
	TURBINE OR PROPELLER TYPE FLOW ELEMENT
	POSITIVE-DISPLACEMENT FLOW METER
	VORTEX FLOW SENSOR
	MAGNETIC FLOWMETER
	SONIC FLOWMETER DOPPLER OR TRANSIT TIME
	THERMAL MASS FLOW METER

SELF-ACTUATED REGULATORS AND VALVES

	PRESSURE-REDUCING REGULATOR, SELF-CONTAINED, WITH HANDWHEEL ADJUSTABLE SET POINT
	PRESSURE-REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP
	DIFFERENTIAL-PRESSURE-REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESSURE TAP
	BACKPRESSURE REGULATOR, SELF-CONTAINED
	BACKPRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP
	PRESSURE-REDUCING REGULATOR WITH INTEGRAL OUTLET PRESSURE RELIEF VALVE AND OPTIONAL PRESSURE INDICATOR

P&IDs LINE TYPES AND EXAMPLES

	OPEN TROUGH
	DIRECTION OF FLOW
	SIGNAL CONNECTION
	CROSSOVER - NO CONNECTION
	BROKEN SIGNAL LINE WHERE X IS SAME DESTINATION NO.
	CONTROL INTERLOCK
	EXTRA LINE OF TEXT
	OFF-SHEET REFERENCE, INCLUDING SHEET DESTINATION NO.

MOTOR STARTER SYMBOLS

	VARIABLE FREQUENCY DRIVE
	FULL VOLTAGE - NON-REVERSING
	FULL VOLTAGE - REVERSING
	REDUCED VOLTAGE SOLID-STATE STARTER
	MOTOR

VALVE AND GATE OPERATORS

	SOLENOID		DIAPHRAGM
	PNEUMATIC		CHAINWHEEL
	MOTOR		VANE

no.	date	by	ckd	description
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BURNS & MCDONNELL

9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed A. BENSON
designed A. MCDONALD	checked M. HOPKINS

THORNTON COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND PIPELINE
PROCESS AND INSTRUMENTATION LEGENDS AND ABBREVIATIONS II

project 162116	contract 23-150
drawing 001-002	rev. 0
sheet 64	of 74 sheets

Scale For Microfilming

Inches

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no.	date	by	ckd	description
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Millimeters

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Scale For Microfilming

A

B

C

D

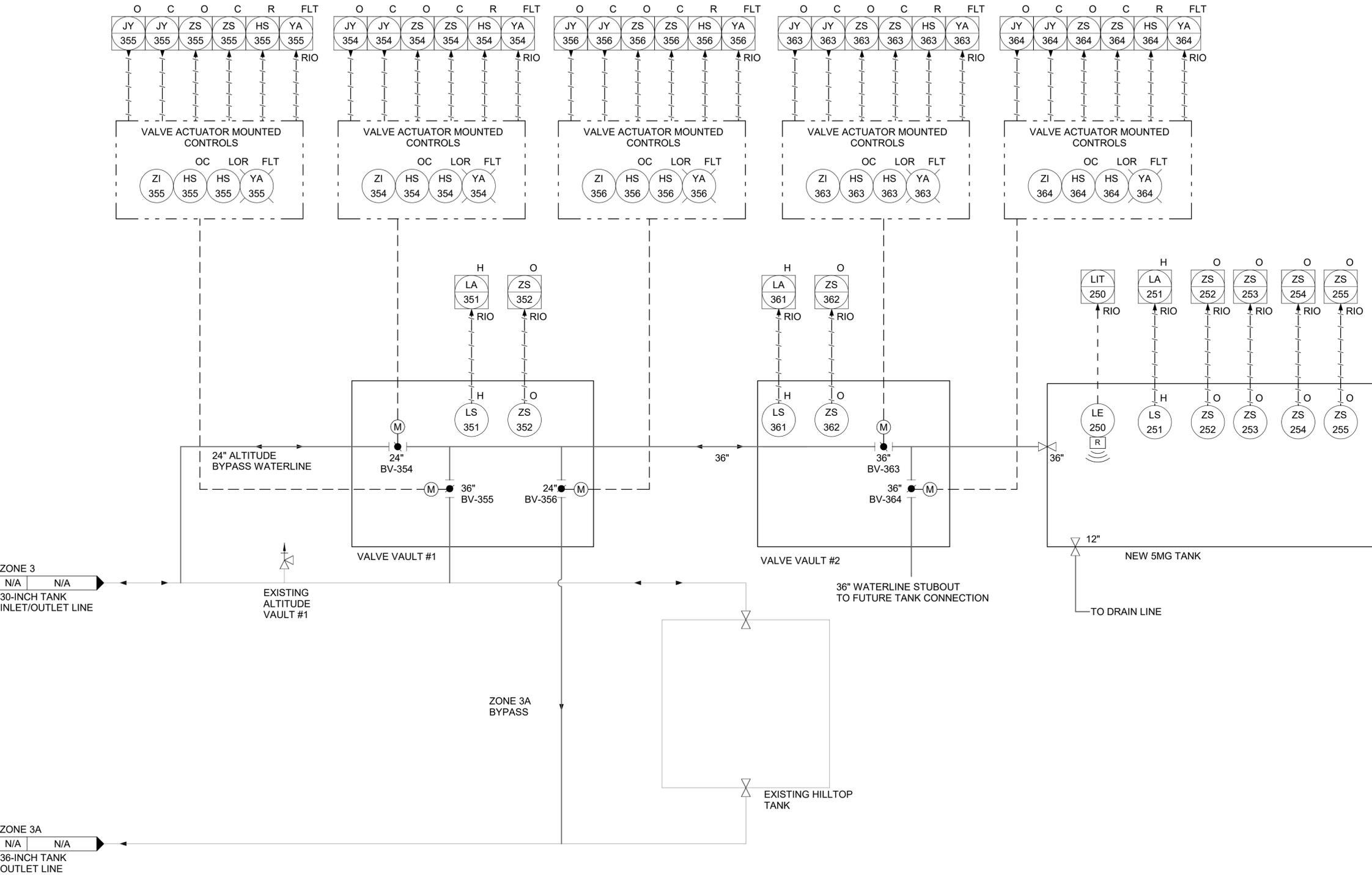
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F

G

H

I



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ENGLEWOOD, CO 80112
303-721-9292

date OCTOBER 2024	detailed A. BENSON
designed A. MCDONALD	checked M. HOPKINS



THORNTON
COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED WATER STORAGE TANK AND PIPELINE
PROCESS INSTRUMENTATION DIAGRAM

project 162116	contract 23-150
drawing 001-100	rev. 0
sheet 65 of 74 sheets	

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Tag Type	Tag Sequence Number	Optional Indicator	Complete Tag	DESCRIPTION	Signal Type	Signal Level	Power Source	Controlled By	Description "0" Level	Description "1" Level	P&ID Drawing
LIT	250		LIT-250	5MGD TANK LEVEL	AI	24VDC	RIO	RIO	-	-	ODI-100
LS	251	H	LS-251-H	5MGD TANK HIGH LEVEL ALARM	DO	24VDC	RIO	RIO	HIGH	N-HIGH	ODI-100
ZS	252	O	ZS-252-O	5MGD TANK HATCH OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
ZS	253	O	ZS-253-O	5MGD TANK HATCH OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
ZS	254	O	ZS-254-O	5MGD TANK HATCH OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
ZS	255	O	ZS-255-O	5MGD TANK HATCH OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
LS	351	H	LS-351-H	VALVE VAULT 1 SUMP LEVEL INDICATION	DO	24VDC	RIO	RIO	HIGH	N-HIGH	ODI-100
ZS	352	O	ZS-352-O	VALVE VAULT 1 HATCH OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
JY	354	O	JS-354-O	24" VALVE - VALVE VAULT 1 - OPEN	DI	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
JY	354	C	JS-354-C	24" VALVE - VALVE VAULT 1 - CLOSE	DI	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
ZS	354	O	ZS-354-O	24" VALVE - VALVE VAULT 1 - OPEN	DO	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
ZS	354	C	ZS-354-C	24" VALVE - VALVE VAULT 1 - CLOSE	DO	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
HS	354	R	HS-354-R	24" VALVE - VALVE VAULT 1 - REMOTE	DI	24VDC	RIO	RIO	N-RUN	RUN	ODI-100
YA	354	FLT	YA-354-FLT	24" VALVE - VALVE VAULT 1 - ALARM	DO	24VDC	RIO	RIO	FAULT	N-FAULT	ODI-100
JY	355	O	JY-355-O	36" VALVE - VALVE VAULT 1 - OPEN	DI	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
JY	355	C	JY-355-C	36" VALVE - VALVE VAULT 1 - CLOSE	DI	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
ZS	355	O	ZS-355-O	36" VALVE - VALVE VAULT 1 - OPEN	DO	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
ZS	355	C	ZS-355-C	36" VALVE - VALVE VAULT 1 - CLOSE	DO	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
HS	355	R	ZS-355-R	36" VALVE - VALVE VAULT 1 - REMOTE	DI	24VDC	RIO	RIO	N-RUN	RUN	ODI-100
YA	355	FLT	YA-355-FLT	36" VALVE - VALVE VAULT 1 - ALARM	DO	24VDC	RIO	RIO	FAULT	N-FAULT	ODI-100
JY	356	O	ZS-356-O	24" VALVE - VALVE VAULT 1 - OPEN	DI	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
JY	356	C	ZS-356-C	24" VALVE - VALVE VAULT 1 - CLOSE	DI	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
ZS	356	O	ZS-356-O	24" VALVE - VALVE VAULT 1 - OPEN	DO	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
ZS	356	C	ZS-356-C	24" VALVE - VALVE VAULT 1 - CLOSE	DO	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
HS	356	R	HS-356-R	24" VALVE - VALVE VAULT 1 - REMOTE	DI	24VDC	RIO	RIO	N-RUN	RUN	ODI-100
YA	356	FLT	YA-356-FLT	24" VALVE - VALVE VAULT 1 - ALARM	DO	24VDC	RIO	RIO	FAULT	N-FAULT	ODI-100
LS	361	H	LS-361-H	VALVE VAULT 2 SUMP LEVEL INDICATION	DO	24VDC	RIO	RIO	HIGH	N-HIGH	ODI-100
ZS	362	O	ZS-352-O	VALVE VAULT HATCH 2 OPEN POSITION INDICATION	DO	24VDC	RIO	RIO	CLOSED	OPEN	ODI-100
JY	363	O	JS-363-O	36" VALVE - VALVE VAULT 2 - OPEN	DI	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
JY	363	C	JS-363-C	36" VALVE - VALVE VAULT 2 - CLOSE	DI	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
ZS	363	O	ZS-363-O	36" VALVE - VALVE VAULT 2 - OPEN	DO	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
ZS	363	C	ZS-363-C	36" VALVE - VALVE VAULT 2 - CLOSE	DO	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
HS	363	R	HS-363-R	36" VALVE - VALVE VAULT 2 - REMOTE	DI	24VDC	RIO	RIO	N-RUN	RUN	ODI-100
YA	363	FLT	YA-363-FLT	36" VALVE - VALVE VAULT 2 - ALARM	DO	24VDC	RIO	RIO	FAULT	N-FAULT	ODI-100
JY	364	O	ZS-364-O	36" VALVE - VALVE VAULT 2 - OPEN	DI	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
JY	364	C	ZS-364-C	36" VALVE - VALVE VAULT 2 - CLOSE	DI	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
ZS	364	O	ZS-364-O	36" VALVE - VALVE VAULT 2 - OPEN	DO	24VDC	RIO	RIO	N-OPEN	OPEN	ODI-100
ZS	364	C	ZS-364-C	36" VALVE - VALVE VAULT 2 - CLOSE	DO	24VDC	RIO	RIO	N-OPEN	CLOSE	ODI-100
HS	364	R	HS-364-R	36" VALVE - VALVE VAULT 2 - REMOTE	DI	24VDC	RIO	RIO	N-RUN	RUN	ODI-100
YA	364	FLT	YA-364-FLT	36" VALVE - VALVE VAULT 2 - ALARM	DO	24VDC	RIO	RIO	FAULT	N-FAULT	ODI-100

Millimeters

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Inches

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9191 S. JAMAICA STREET
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date OCTOBER 2024	detailed A. BENSON
designed A. MCDONALD	checked M. HOPKINS



THORNTON
COLORADO

CITY OF THORNTON 5MG ZONE 1 TREATED
WATER STORAGE TANK AND PIPELINE
IO LIST

project 162116	contract 23-150
drawing 001-101	rev. 0
sheet 66 of 74 sheets	

Millimeters
Scale For Microfilming
Inches

TAG NUMBER	DESCRIPTION	DEVICE TYPE	CONTROL POINT	SET POINT	CAL. RANGE MIN	CAL. RANGE...	SET POINT / CAL. RANGE...	FURNISHED BY	INSTALL DETAIL	WIRED BY	ELECTRICAL DWG /...	PID Dwg	NOTES
LE/LIT-250	5MGD TANK LEVEL	LEVEL TRANSMITTER	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
LS-251-H	5MGD TANK LEVEL - HIGH	LEVEL SWITCH	RIO	34	-	-	FT	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
ZS-252-O	5MGD TANK HATCH INTRUSION SWITCH	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
ZS-253-O	5MGD TANK HATCH INTRUSION SWITCH	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
ZS-254-O	5MGD TANK HATCH INTRUSION SWITCH	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
ZS-255-O	5MGD TANK HATCH INTRUSION SWITCH	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-101	ODI-100	
LS-351-H	VALVE VAULT 1 LEVEL SWITCH	LEVEL SWITCH	RIO	1	-	-	IN	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-352-O	VALVE VAULT 1 INTRUSION SWITCH	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-354-O	24" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-354-C	24" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-355-O	36" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-355-C	36" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-356-O	24" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-356-C	24" VALVE - VALVE VAULT 1	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
LS-361-H	VALVE VAULT 2 LEVEL SWITCH	LEVEL SWITCH	RIO	1	-	-	IN	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-362-O	VALVE VAULT 2 INTRUSION SWITCH	FLOW ELEMENT/TRANSMITTER	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-363-O	36" VALVE - VAULT 2	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-356-C	36" VALVE - VAULT 2	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-364-O	36" VALVE - VAULT 2	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	
ZS-356-C	36" VALVE - VAULT 2	POSITION SWITCH	RIO	-	-	-	-	CONTRACTOR	SEE DRAWINGS	CONTRACTOR	01E-102	ODI-100	

no.	date	by	ckd	description
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WATER STORAGE TANK AND PIPELINE
INSTRUMENT LIST

project 162116	contract 23-150
drawing 001-102	rev. 0
sheet 67 of 74 sheets	

LEGEND:

SM		SEEDING AND MULCHING
IP		INLET PROTECTION
RS		ROCK SOCK
ECB		EROSION CONTROL BLANKET
SF		SILT FENCE
RSF		REINFORCED SILT FENCE
LOC		LIMITS OF CONSTRUCTION AND CONSTRUCTION FENCE
LAR		LIMITS OF ASPHALT REMOVAL AND REPLACEMENT
LCR		LIMITS OF CONCRETE REMOVAL AND REPLACEMENT
LGR		LIMITS OF GRAVEL REMOVAL AND REPLACEMENT
VTC		VEHICLE TRACKING CONTROL
TRM		TURF REINFORCEMENT MAT (SEE NOTE 2)
SSA		STABILIZED STAGING AREA
CWA		CONCRETE WASHOUT AREA
SPA		STOCKPILE AREA

BMP QUANTITIES	
BMP MEASURE	QUANTITY
LOC	214,234 SQFT
SF	1229 LF
RSF	1086 LF
IP	4 QTY
RS	13 QTY
LAR	306 SQFT
LCR	474 SQFT
LGR	1759 SQFT
SM	171,970 SQFT
ECB	72,588 SQFT
VTC	1,870 SQFT
TRM	8,158 SQFT
SSA	3,750 SQFT
CWA	1 QTY
SPA	3,750 SQFT

ABBREVIATIONS:

BMP	BEST MANAGEMENT PRACTICES
CDPHE	COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT
CM	CONTROL MEASURE
CMP	CORRUGATED METAL PIPE
DIA	DIAMETER
ESC	EROSION & SEDIMENT CONTROL
SWMP	STORMWATER MANAGEMENT PLAN

GENERAL NOTES:

- ALL SITE GRADING (EXCAVATION, EMBANKMENT, AND COMPACTION) SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST SPECIFICATIONS FOR THIS PROJECT AND SHALL FURTHER BE IN CONFORMANCE WITH THE CITY OF THORNTON'S GENERAL EROSION AND SEDIMENT CONTROL MANUAL.
- SEDIMENT CONTROL LOGS SHALL BE PLACED DOWNSTREAM OF ANY DITCH OR CHANNEL BEING DISTURBED.
- CONTRACTOR SHALL USE VEHICLE TRACKING PADS WHERE VEHICLES WILL BE ENTERING AND EXITING THE ROADWAY. IN ADDITION TO THE INSTALLATION OF TRACKING PAD BMPs, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING AFFECTED PUBLIC STREETS OF MUD OR DEBRIS DUE TO CONSTRUCTION ACTIVITY INITIATED BY SAID CONTRACTOR ON A DAILY BASIS OR AS OTHERWISE DIRECTED BY AUTHORIZED CITY REPRESENTATIVE.
- ANY STORM DRAIN INLET ALONG CONSTRUCTION ALIGNMENT AND IMMEDIATELY DOWN GRADIENT OF DISTURBED AREAS SHALL BE PROTECTED WITH INLET PROTECTION (IP).
- NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATION AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
- TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE REVEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROTECTED FROM EROSION ELEMENTS.
- ALL DISTURBED SURFACE NOT REQUIRING SURFACING (PAVEMENT, GRAVEL, ETC.) SHALL BE SEEDED AND MULCHED OR SODDED PER THE ESC DRAWINGS IMMEDIATELY AFTER CONSTRUCTION.
- TEMPORARY VEGETATION SHALL BE INSTALLED ON ALL DISTURBED AREAS WHERE PERMANENT SURFACE IMPROVEMENTS ARE NOT SCHEDULED FOR INSTALLATION WITHIN 30 DAYS OR LOCAL JURISDICTIONAL STANDARDS. VEGETATION SHALL BE A VIGOROUS, DROUGHT TOLERANT, NATIVE SPECIES MIX. (REFER TO SPECIFICATIONS SECTION 32 92 00). PROJECT SCHEDULING SHOULD TAKE ADVANTAGE OF SPRING OR FALL PLANTING SEASONS FOR NATURAL GERMINATION, BUT SEEDED AREAS SHALL BE IRRIGATED, IF CONDITIONS SO MERIT.
- AT ALL TIMES, THE PROPERTY SHALL BE MAINTAINED AND/OR WATERED TO PREVENT WIND CAUSED EROSION. EARTHWORK OPERATIONS SHALL BE DISCONTINUED WHEN FUGITIVE DUST SIGNIFICANTLY IMPACTS ADJACENT PROPERTY. IF EARTHWORK IS COMPLETE OR DISCONTINUED AND DUST FROM THE SITE CONTINUES TO CREATE PROBLEMS, THE CONTRACTOR SHALL IMMEDIATELY INSTITUTE MITIGATIVE MEASURES AND SHALL CORRECT DAMAGE TO ADJACENT PROPERTY.
- TEMPORARY CUT/FILL SLOPES SHALL NOT EXCEED A STEEPNESS OF 2:1 (2H:1V). PERMANENT SLOPES SHALL NOT EXCEED 4:1 (4H:1V) IN AREAS TO BE SEEDED OR SODDED.
- UTILITY CONSTRUCTION IS NOT APPROVED UNDER THIS PLAN.
- THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL DUST ABATEMENT AND EROSION CONTROL MEASURES DEEMED NECESSARY BY THE CITY, SHOULD CONDITIONS MERIT THEM.
- THIS LIST IS NOT INTENDED TO BE ALL INCLUSIVE, BUT IS INTENDED TO IDENTIFY THE GENERAL NOTES IDENTIFIED BY THE CITY TO BE INCLUDED AS PART OF THE STORMWATER MANAGEMENT PLAN FOR COMPLIANCE WITH THE CITY'S STORMWATER MANAGEMENT REQUIREMENTS FOR CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL MINIMIZE TRENCH WIDTH SUCH THAT ASPHALT WORK IS MAINTAINED TO ONE LANE. IF CONTRACTOR EXTENDS TRENCH/OVERCUT INTO OTHER LANE, CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF ASPHALT INTO CENTER OF THAT LANE AT NO ADDITIONAL COST TO THE OWNER.

CITY OF THORNTON EROSION AND SEDIMENT CONTROL NOTES:

- CONTROL MEASURES SHALL BE INSTALLED BEFORE ANY EARTH DISTURBING ACTIVITIES COMMENCE.
- THE CONTRACTOR SHALL NOTIFY THE CITY OF THORNTON INSPECTOR ONCE ALL INITIAL CONTROL MEASURES HAVE BEEN INSTALLED FOR AN INITIAL INSPECTION AT LEAST FORTY EIGHT (48) HOURS PRIOR TO THE INSPECTION. CONSTRUCTION ACTIVITY CANNOT BEGIN UNTIL A PASSING INITIAL INSPECTION HAS OCCURRED.
- STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES SHALL NOT CAUSE, HAVE THE REASONABLE POTENTIAL TO CAUSE, OR MEASURABLY CONTRIBUTE TO AN EXCEEDANCE OF ANY WATER QUALITY STANDARD.
- CONSTRUCTION SHALL BE PHASED IN A MANNER TO LIMIT EARTH DISTURBING ACTIVITIES (I.E. THE ENTIRE PROJECT SITE SHOULD NOT BE DISTURBED IF CONSTRUCTION WILL ONLY BE OCCURRING IN ONE PARTICULAR SECTION).
- SEDIMENT CAUSED BY ACCELERATED SOIL EROSION SHALL BE REMOVED FROM RUNOFF WATER BEFORE IT LEAVES THE CONSTRUCTION SITE.
- BULK STORAGE STRUCTURES FOR PETROLEUM PRODUCTS AND ANY OTHER CHEMICALS SHALL HAVE SECONDARY CONTAINMENT OR EQUIVALENT PROTECTION TO CONTAIN ALL SPILLS AND PREVENT ANY SPILLED MATERIAL FROM ENTERING THE MS4 OR STATE WATERS.
- A COPY OF THE SWMP AND SITE MAPS MUST BE AVAILABLE AT ALL TIMES ON THE CONSTRUCTION SITE UNLESS OTHERWISE APPROVED BY CDPHE OR THE CITY OF THORNTON.
- THE SWMP AND SITE MAPS SHALL BE CONTINUOUSLY UPDATED TO REFLECT NEW OR REVISED CONTROL MEASURES (CM) DUE TO CHANGES IN DESIGN, CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE CONSTRUCTION SITE. UPDATES MUST BE MADE WITHIN 72-HOURS FOLLOWING THE CHANGE IN CONTROL MEASURES.

- THE CONTRACTOR SHALL INSPECT THE CONSTRUCTION SITE (INCLUDING ALL BMP'S, STORAGE CONTAINERS, AND CONSTRUCTION EQUIPMENT) A MINIMUM OF EVERY 14 CALENDAR DAYS AND WITHIN 24-HOURS AFTER A PRECIPITATION EVENT OR SNOW MELT THAT CAUSE SURFACE EROSION. INSPECTIONS SHALL CONTINUE UNTIL AN INACTIVATION NOTICE IS FILED WITH CDPHE.
- THE CONTRACTOR SHALL KEEP A RECORD OF ALL INSPECTIONS ON SITE AND AVAILABLE FOR REVIEW BY CDPHE OR CITY STAFF. INSPECTION REPORTS MUST IDENTIFY ANY INCIDENTS OF NON-COMPLIANCE WITH THE TERMS AND CONDITIONS OF THE PERMIT.
- CONTROL MEASURES REQUIRING MAINTENANCE OR ADJUSTMENT SHALL BE REPAIRED IMMEDIATELY AFTER OBSERVATION OF THE FAILING CONTROL MEASURE.
- SILT FENCE PATCHING: PATCHING IS ONLY ALLOWED ON THE TOP HALF OF THE FENCE. NOT MORE THAN TWO (2) PATCHES PER SECTION OF FENCE. SILT FENCE WITH HOLES OR DETERIORATION ON THE LOWER HALF OF THE FENCE MUST BE REPLACED. REPAIR TYPICALLY INVOLVES REPLACING THE SILT FENCE TO MAINTAIN THE CM'S EFFECTIVENESS TO DRAIN SLOWLY AND FUNCTION AS ORIGINALLY DESIGNED.
- FOR ALL INSTANCES OF NONCOMPLIANCE BASED ON ENVIRONMENTAL HAZARDS AND CHEMICAL SPILLS AND RELEASES, ALL NEEDED INFORMATION MUST BE PROVIDED ORALLY TO CDPHE SPILL REPORTING LINE (24-HOUR NUMBER FOR ENVIRONMENTAL HAZARDS AND CHEMICAL SPILLS AND RELEASES: 1-877-518-5608) WITHIN 24-HOURS FROM THE TIME THE CONTRACTOR BECOMES AWARE OF THE CIRCUMSTANCES.
- STRAW BALES **SHALL NOT** BE USED FOR PRIMARY EROSION OR SEDIMENT CONTROL (I.E. STRAW BALES MAY BE USED FOR REINFORCEMENT BEHIND ANOTHER BMP SUCH AS SILT FENCE).
- CONTROL MEASURES REFERRED TO AS "CUTBACK CURB" ARE **NOT ALLOWED**. THE CUTBACK CURB MAY BECOME INEFFECTIVE AND MAY ALSO COMPROMISE THE INTEGRITY OF THE CURB AND IN MOST CASES DOES NOT PROVIDE ANY WATER QUALITY BENEFIT FOR FILTERING OUR SEDIMENT.
- INLET PROTECTION AND VEGETATIVE BUFFER CONTROL MEASURES **SHALL NOT** BE USED AS STANDALONE CM'S. THESE METHODS MUST BE UTILIZED WITH AT LEAST ONE ADDITIONAL CM.
- CONTROL MEASURES INTENDED FOR SHEET FLOW SEDIMENT RUNOFF SHALL BE PLACED PARALLEL TO THE SLOPE.
- ALL CONTROL MEASURES SHALL BE CLEANED WHEN SEDIMENT LEVELS ACCUMULATE TO HALF THE DESIGN OF THE CM UNLESS OTHERWISE SPECIFIED.
- A VEHICLE TRACKING CONTROL (VTC) SHALL BE PLACED AT ALL ENTRANCES/EXITS FROM THE SITE TO PREVENT TRACK-OUT ONTO PUBLIC STREETS. IF TRACK-OUT DOES OCCUR, THE CONTRACTOR SHALL IMMEDIATELY SWEEP THE STREET OF DEBRIS. RECYCLED CRUSHED CONCRETE OR ASPHALT **SHALL NOT** BE USED FOR VEHICLE TRACKING CONTROL (VTC).
- FOR RESIDENTIAL PROJECTS, BACK OF CURB PROTECTION IS REQUIRED ALONG ALL INTERIOR LOTS.
- ALL SEDIMENT COLLECTED IN BMP'S SHALL BE REMOVED UPON INITIAL ACCEPTANCE.
- WIND EROSION AND DUST CONTROL MEASURES MUST BE UTILIZED TO MINIMIZE AIRBORNE PARTICULATE DUST. CONTROL MEASURES MAY INCLUDE MINIMIZING DISTURBED AREAS, WATERING, AND/OR PROVIDING TEMPORARY STABILIZATION.
- PERMANENT EROSION CONTROL MEASURES FOR SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 14 CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH DISTURBANCE HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH DISTURBANCE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH DISTURBANCE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED WITHIN 14 CALENDAR DAYS. TEMPORARY EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION MEASURES ARE IMPLEMENTED.
- FINAL STABILIZATION HAS BEEN ACHIEVED WHEN ALL EARTH DISTURBING ACTIVITIES AT THE SITE HAVE BEEN COMPLETED, AND UNIFORM VEGETATIVE COVER HAS BEEN ESTABLISHED WITH AN INDIVIDUAL PLANT DENSITY OF AT LEAST 70 PERCENT OF PRE-DISTURBANCE LEVELS, OR EQUIVALENT PERMANENT, PHYSICAL EROSION REDUCTION METHODS HAVE BEEN EMPLOYED.
- ALL TEMPORARY CONTROL MEASURES SHALL BE REMOVED FROM THE SITE UPON SUBMITTING THE INACTIVATION NOTICE.
- ALL SITE WASTES (INCLUDING TRASH AND BUILDING MATERIALS) MUST BE PROPERLY MANAGED TO PREVENT POTENTIAL POLLUTION OF STATE WATERS.
- STREET REPAIR OPERATIONS SUCH AS ROTOR MILLING, SLURRY SEAL, AND CHIP SEAL SHALL REQUIRE THE MINIMUM CM'S OF INLET PROTECTION, CURB SOCKS, AND STREET SWEEPING.
- ALL EROSION CONTROL MEASURES SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE CITY.
- REMOVAL OF CONTROL MEASURES SHALL NOT OCCUR WITHOUT THE APPROVAL OF THE STORMWATER INSPECTOR.
- ALL PAVED SURFACES MUST REMAIN FREE OF SEDIMENT AND REQUIRE CLEANING INCLUDING STREET SWEEPING, AS NEEDED.
- ROCK SOCK SHALL BE PLACED AT ALL STORM WATER INLETS IMMEDIATELY DOWNSTREAM OF CONSTRUCTION.

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID



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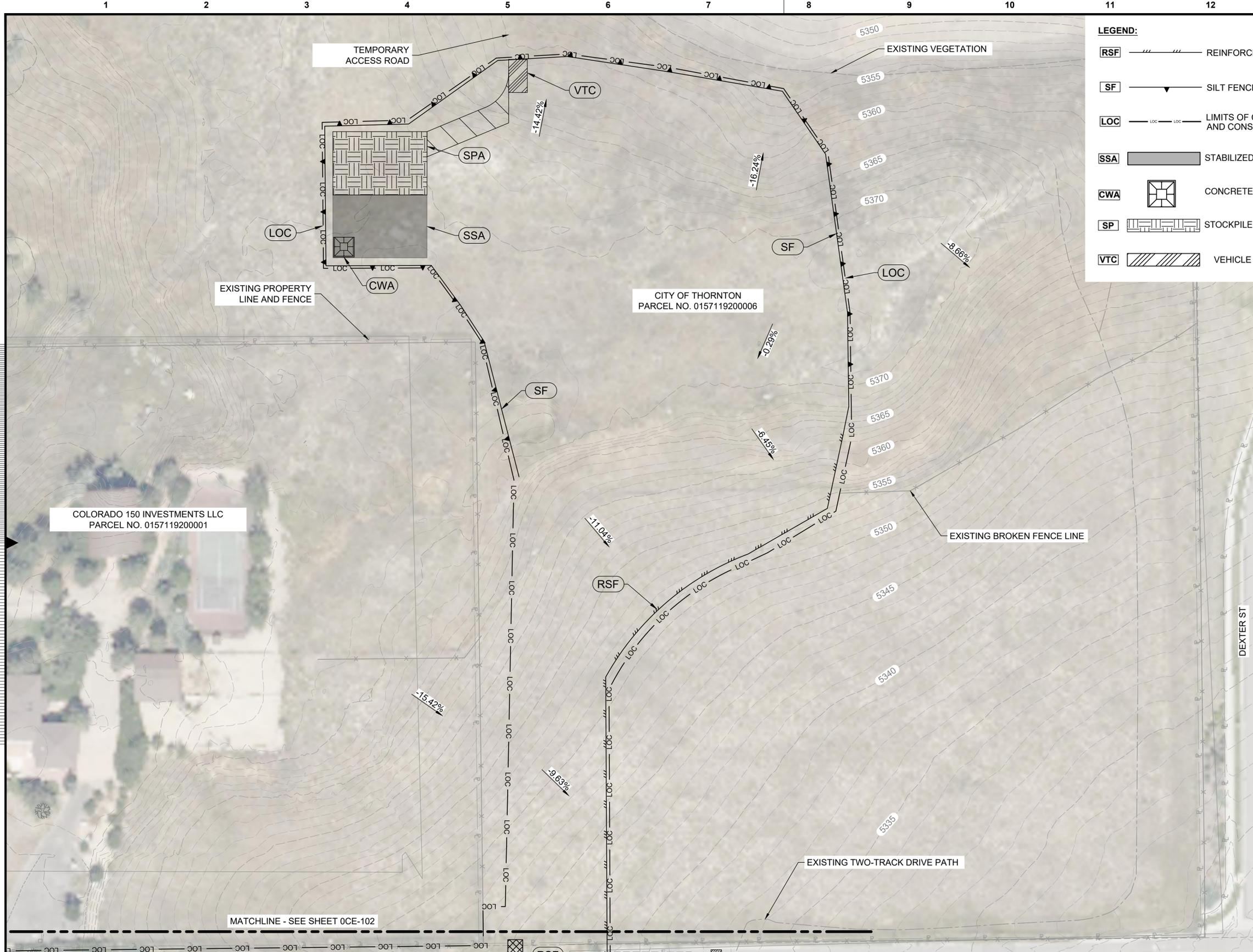
date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO

CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
EROSION AND SEDIMENT CONTROL NOTES
ABBREVIATIONS AND LEGEND

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drawing	OCE-002 - 0		rev.
sheet	68	of	74 sheets
file	162116_OCE-002.dwg		



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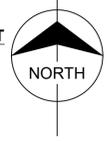
RSF		REINFORCED SILT FENCE
SF		SILT FENCE
LOC		LIMITS OF CONSTRUCTION AND CONSTRUCTION FENCE
SSA		STABILIZED STAGING AREA
CWA		CONCRETE WASHOUT AREA
SP		STOCKPILE AREA
VTC		VEHICLE TRACKING CONTROL

	6	0CE-502
	5	0CE-502
	2	0CE-503
	4	0CE-503
	1	0CE-502
	2	0CE-502
	3	0CE-503

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

Scale For Microfining
Millimeters
Inches

INITIAL EROSION AND SEDIMENT CONTROL PLAN - NORTH
SCALE IN FEET
0 20' 40' 80'



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BURNS MEDONNELL
9191 S. JAMAICA STREET
ENGLEWOOD, CO 80112
303-721-9292

Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
INITIAL EROSION AND SEDIMENT CONTROL PLAN - NORTH

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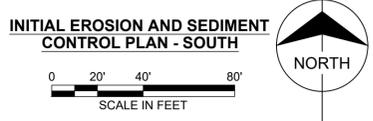


Scale For Microfilming
Millimeters
Inches

LEGEND:

		INLET PROTECTION		4
		ROCK SOCK		3
		SILT FENCE		5
		REINFORCED SILT FENCE		6
		LIMITS OF CONSTRUCTION AND CONSTRUCTION FENCE		2
		VEHICLE TRACKING CONTROL		3

OCE-502
 OCE-502
 OCE-502
 OCE-502
 OCE-503
 OCE-503



no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

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 9191 S. JAMAICA STREET
 ENGLEWOOD, CO 80112
 303-721-9292

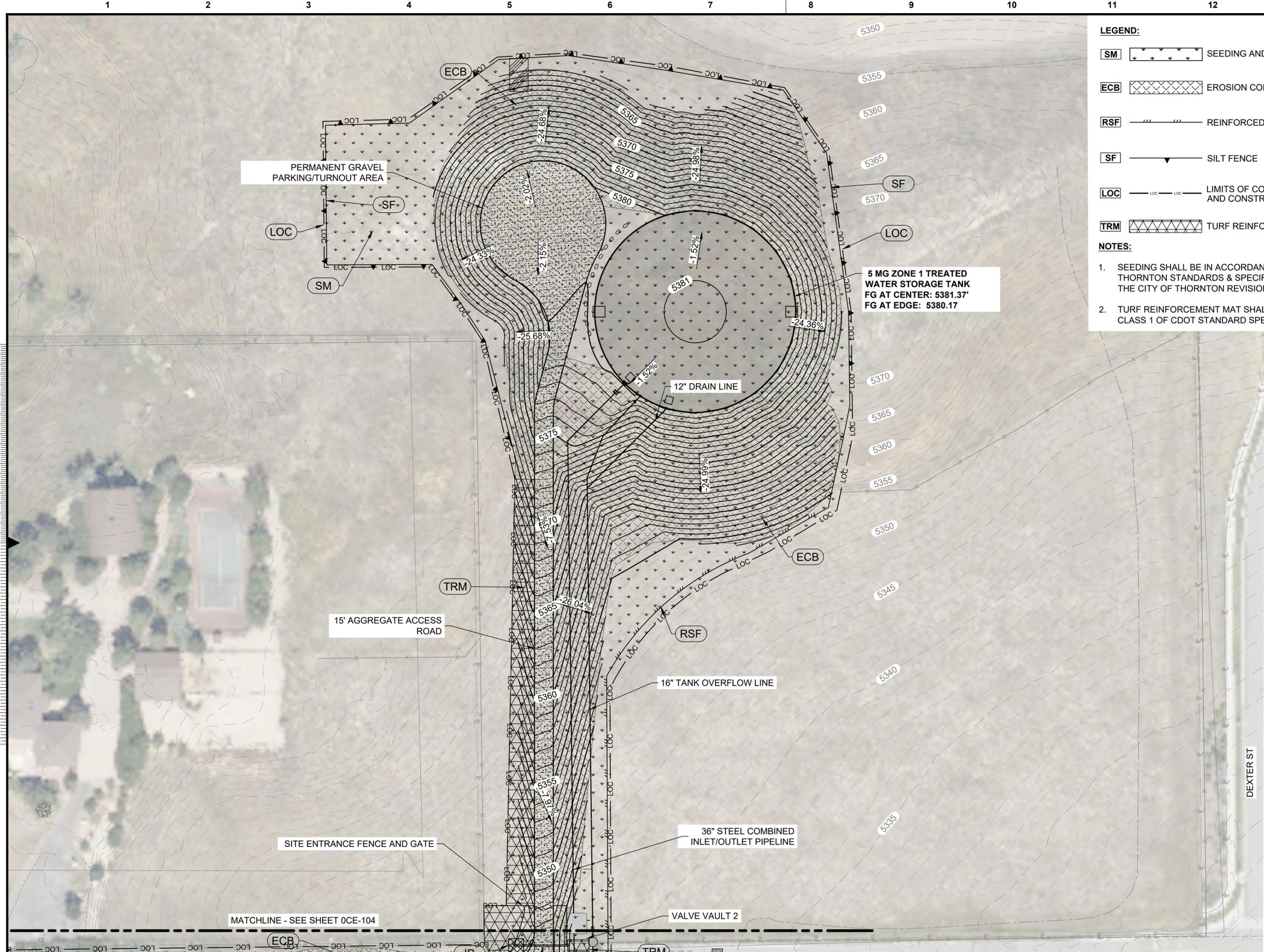
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date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
INITIAL EROSION AND SEDIMENT CONTROL PLAN - SOUTH

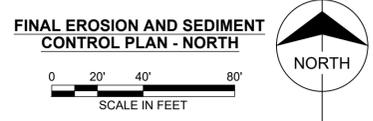
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- LEGEND:**
- SM** SEEDING AND MULCHING (SEE NOTE 1)
 - ECB** EROSION CONTROL BLANKET
 - RSF** REINFORCED SILT FENCE
 - SF** SILT FENCE
 - LOC** LIMITS OF CONSTRUCTION AND CONSTRUCTION FENCE
 - TRM** TURF REINFORCEMENT MAT (SEE NOTE 2)
- NOTES:**
- SEEDING SHALL BE IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 805 AND THE CITY OF THORNTON REVISIONS TO CDOT SECTION 212.
 - TURF REINFORCEMENT MAT SHALL BE IN ACCORDANCE WITH CLASS 1 OF CDOT STANDARD SPECIFICATIONS TABLE 216-4.

5 MG ZONE 1 TREATED WATER STORAGE TANK
 FG AT CENTER: 5381.37'
 FG AT EDGE: 5380.17'

Millimeters
 Scale For Microfining
 Inches



no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

- 1
OCE-503
- 6
OCE-502
- 5
OCE-502
- 2
OCE-503

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date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO

CITY OF THORNTON
 5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
 FINAL EROSION AND SEDIMENT CONTROL PLAN - NORTH

project	162116	contract	23-150
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drawing **OCE-103** - 0 rev.

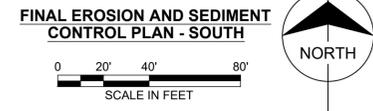
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file	162116_OCE-103.dwg			



Scale For Microfilming
Inches
Millimeters

LEGEND:

SM	SEEDING AND MULCHING (SEE NOTE 1)	4 OCE-502
IP	INLET PROTECTION	3 OCE-502
RS	ROCK SOCK	5 OCE-502
SF	SILT FENCE	6 OCE-502
RSF	REINFORCED SILT FENCE	2 OCE-503
LOC	LIMITS OF CONSTRUCTION AND CONSTRUCTION FENCE	1 OCE-503
ECB	EROSION CONTROL BLANKET	
LAR	LIMITS OF ASPHALT REMOVAL AND REPLACEMENT (SEE NOTE 2)	
LCR	LIMITS OF CONCRETE REMOVAL AND REPLACEMENT (SEE NOTE 3)	
LGR	LIMITS OF GRAVEL REMOVAL AND REPLACEMENT (SEE NOTE 4)	
TRM	TURF REINFORCEMENT MAT (SEE NOTE 5)	



- NOTES:**
- SEEDING SHALL BE IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 805 AND THE CITY OF THORNTON REVISIONS TO CDOT SECTION 212.
 - ASPHALT REPLACEMENT SHALL BE RESTORED TO EXISTING CONDITIONS IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 504.
 - CONCRETE REPLACEMENT SHALL BE RESTORED TO EXISTING CONDITIONS IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 505.1.
 - AGGREGATE BASE COURSE REPLACEMENT SHALL BE RESTORED TO EXISTING CONDITIONS IN ACCORDANCE WITH THE CITY OF THORNTON STANDARDS & SPECIFICATIONS SECTION 505.2.
 - CURB AND GUTTER SHALL BE RESTORED TO EXISTING CONDITIONS.
 - TURF REINFORCEMENT MAT SHALL BE IN ACCORDANCE WITH CLASS 1 OF CDOT STANDARD SPECIFICATIONS TABLE 216-4.

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

PRELIMINARY - NOT FOR CONSTRUCTION



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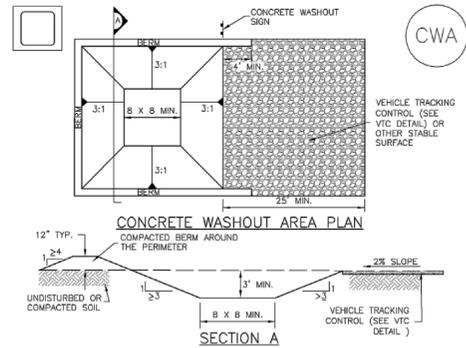
date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
FINAL EROSION AND SEDIMENT CONTROL PLAN - SOUTH

project	162116	contract	23-150
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sheet	72	of	74 sheets
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Concrete Washout Area (CWA) MM-1



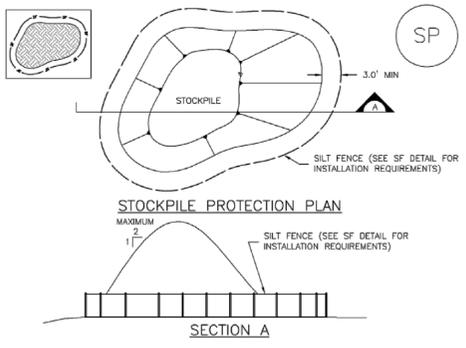
CWA-1. CONCRETE WASHOUT AREA

- CWA INSTALLATION NOTES**
- SEE PLAN VIEW FOR: CWA INSTALLATION LOCATION.
 - DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE AREA SHOULD BE USED.
 - THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
 - CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8' BY 8' SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
 - BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 12".
 - VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
 - SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP TRUCKS.
 - USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

November 2010 Urban Drainage and Flood Control District CWA-3
Urban Storm Drainage Criteria Manual Volume 3

CONCRETE WASHOUT AREA 1
OC-502

Stockpile Management (SP) MM-2



SP-1. STOCKPILE PROTECTION

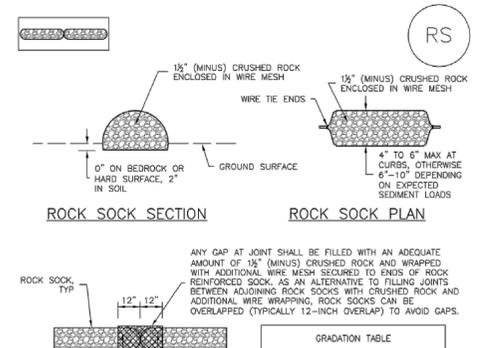
- STOCKPILE PROTECTION INSTALLATION NOTES**
- SEE PLAN VIEW FOR: LOCATION OF STOCKPILES; TYPE OF STOCKPILE PROTECTION.
 - INSTALL PERIMETER CONTROLS IN ACCORDANCE WITH THEIR RESPECTIVE DESIGN DETAILS. SILT FENCE IS SHOWN IN THE STOCKPILE PROTECTION DETAILS; HOWEVER, OTHER TYPES OF PERIMETER CONTROLS INCLUDING SEDIMENT CONTROL LOGS OR ROCK SOCKS MAY BE SUITABLE IN SOME CIRCUMSTANCES. CONSIDERATIONS FOR DETERMINING THE APPROPRIATE TYPE OF PERIMETER CONTROL FOR A STOCKPILE INCLUDE WHETHER THE STOCKPILE IS LOCATED ON A PERVIOUS OR IMPERVIOUS SURFACE, THE RELATIVE HEIGHTS OF THE PERIMETER CONTROL AND STOCKPILE, THE ABILITY OF THE PERIMETER CONTROL TO CONTAIN THE STOCKPILE WITHOUT FAILING IN THE EVENT THAT MATERIAL FROM THE STOCKPILE SHIFTS OR SLUMPS AGAINST THE PERIMETER, AND OTHER FACTORS.
 - STABILIZE THE STOCKPILE SURFACE WITH SURFACE ROUGHENING, TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS, OR SOIL BINDERS. SOILS STOCKPILED FOR AN EXTENDED PERIOD (TYPICALLY FOR MORE THAN 60 DAYS) SHOULD BE SEEDED AND MULCHED WITH A TEMPORARY GRASS COVER ONCE THE STOCKPILE IS PLACED (TYPICALLY WITHIN 14 DAYS). USE OF MULCH ONLY OR A SOIL BINDER IS ACCEPTABLE IF THE STOCKPILE WILL BE IN PLACE FOR A MORE LIMITED TIME PERIOD (TYPICALLY 30-60 DAYS).
 - FOR TEMPORARY STOCKPILES ON THE INTERIOR PORTION OF A CONSTRUCTION SITE, WHERE OTHER DOWNGRADING CONTROLS, INCLUDING PERIMETER CONTROL, ARE IN PLACE, STOCKPILE PERIMETER CONTROLS MAY NOT BE REQUIRED.

November 2010 Urban Drainage and Flood Control District SP-3
Urban Storm Drainage Criteria Manual Volume 3

STOCKPILE MANAGEMENT 2
OC-502

SC-5

Rock Sock (RS)



RS-1. ROCK SOCK PERIMETER CONTROL

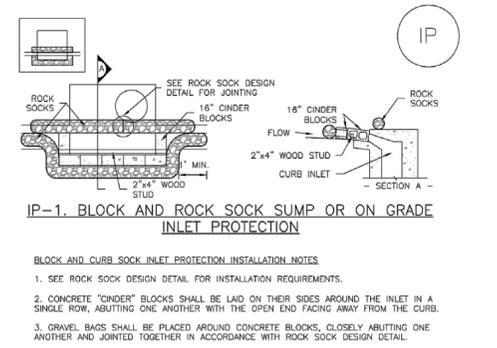
- ROCK SOCK INSTALLATION NOTES**
- SEE PLAN VIEW FOR: LOCATION(S) OF ROCK SOCKS.
 - CRUSHED ROCK SHALL BE 1/2" (MINUS) IN SIZE WITH A FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON THIS SHEET (1/2" MINUS).
 - WIRE MESH SHALL BE FABRICATED OF 10 GAUGE POULTRY MESH, OR EQUIVALENT, WITH A MAXIMUM OPENING OF 1/2", RECOMMENDED MINIMUM ROLL WIDTH OF 48".
 - WIRE MESH SHALL BE SECURED USING "HOC RINGS" OR WIRE TIES AT 6" CENTERS ALONG ALL JOINTS AND AT 2" CENTERS ON ENDS OF SOCKS.
 - SOME MUNICIPALITIES MAY ALLOW THE USE OF FILTER FABRIC AS AN ALTERNATIVE TO WIRE MESH FOR THE ROCK ENCLOSURE.

RS-2 Urban Drainage and Flood Control District November 2010
Urban Storm Drainage Criteria Manual Volume 3

ROCK SOCK 3
OC-502

SC-6

Inlet Protection (IP)



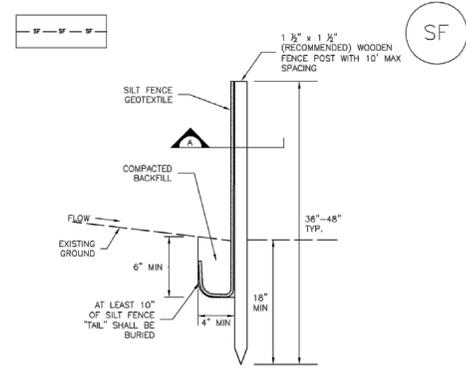
IP-1. BLOCK AND ROCK SOCK SUMP OR ON GRADE INLET PROTECTION

- BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.
 - GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.
- IP-2. CURB ROCK SOCKS UPSTREAM OF INLET PROTECTION**
- CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL INSTALLATION REQUIREMENTS.
 - PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
 - SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
 - AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.

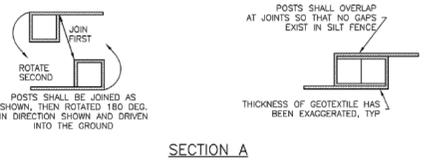
IP-4 Urban Drainage and Flood Control District August 2013
Urban Storm Drainage Criteria Manual Volume 3

INLET PROTECTION 4
OC-502

Silt Fence (SF) SC-1



SILT FENCE



SF-1. SILT FENCE

SC-1

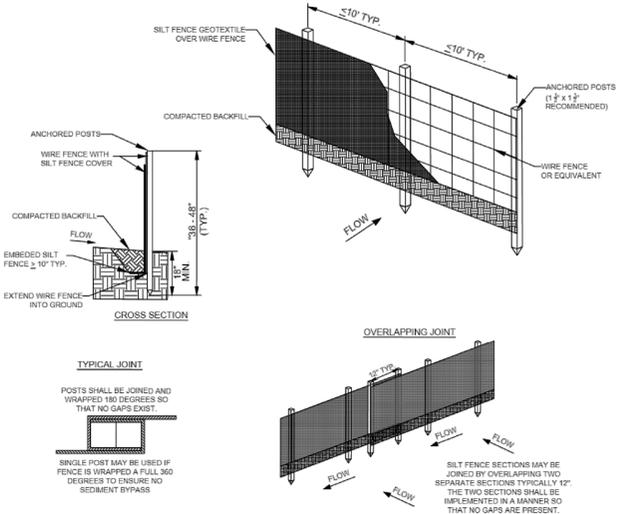
Silt Fence (SF)

- SILT FENCE INSTALLATION NOTES**
- SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOE OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOE OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
 - A UNIFORM 6" x 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
 - COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
 - SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
 - SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
 - AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK." THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
 - SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- SILT FENCE MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
 - REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
 - SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
 - WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDING AND MULCH OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.
- (DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, NOT AVAILABLE IN AUTOCAD)
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

November 2010 Urban Drainage and Flood Control District SF-3
Urban Storm Drainage Criteria Manual Volume 3

SILT FENCE 5
OC-502

REINFORCED SILT FENCE (RSF)



DESCRIPTION AND PURPOSE
REINFORCED SILT FENCE IS A MORE HEAVY DUTY SEDIMENT BARRIER OPTION FOR LOCATIONS WHERE STANDARD SILT FENCE MAY FAIL BY BACKING THE WOVEN GEOTEXTILE FABRIC WITH WIRE FENCE. THE REINFORCED SILT FENCE CAN WITHSTAND HIGHER FLOWS OR PRESSURES.

November 2010 Urban Drainage and Flood Control District November 2010
Urban Storm Drainage Criteria Manual Volume 3

REINFORCED SILT FENCE 6
OC-502

no.	date	by	ckd	description
0	10/02/24	MDS	JLL	ISSUED FOR BID

PRELIMINARY - NOT FOR CONSTRUCTION

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Burns & McDonnell Engineering Co., Inc.

date	OCTOBER 2024	detailed	M. STROBEL
designed	M. STROBEL	checked	J. LEE



ADAMS COUNTY, COLORADO
CITY OF THORNTON
5 MG ZONE 1 TREATED WATER STORAGE TANK AND 36" PIPELINE
EROSION AND SEDIMENT CONTROL DETAILS I

project	162116	contract	23-150
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drawing **OC-502** rev. **0**

sheet	73	of	74	sheets
file	162116_OC-501.dwg			

Scale For Microfitting
Millimeters
Inches

EC-6 Rolled Erosion Control Products (RECP)

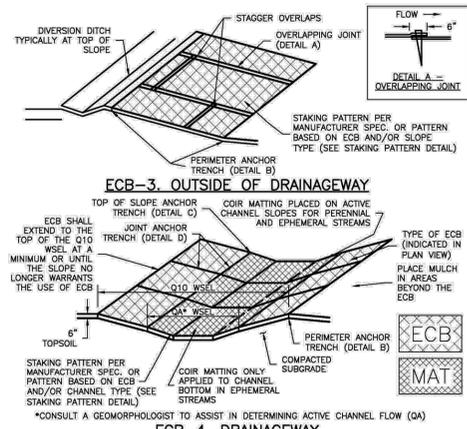


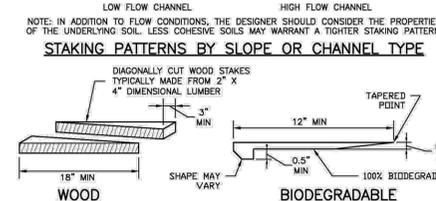
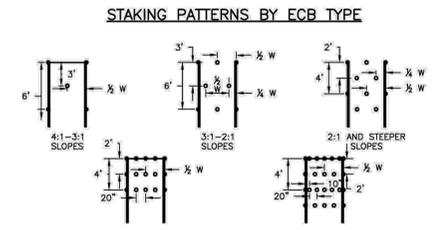
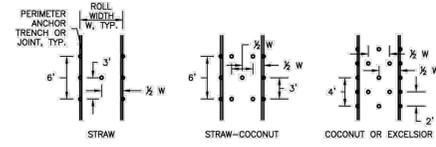
TABLE ECB-1. ECB MATERIAL SPECIFICATIONS

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	RECOMMENDED NETTING**
STRAW*	—	100%	—	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN	70% MAX	—	DOUBLE/NATURAL
COIR MAT	100%	—	—	DOUBLE/NATURAL
EXCELSIOR	—	—	100%	DOUBLE/NATURAL

*STRAW ECBs MAY ONLY BE USED OUTSIDE OF STREAMS AND DRAINAGE CHANNELS.
**NATURAL NETTING INCLUDING SINGLE NETTING AND SYNTHETIC PHOTOGRADABLE FIBER MAY BE ACCEPTABLE IN SOME JURISDICTIONS.

RECP-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 December 2022

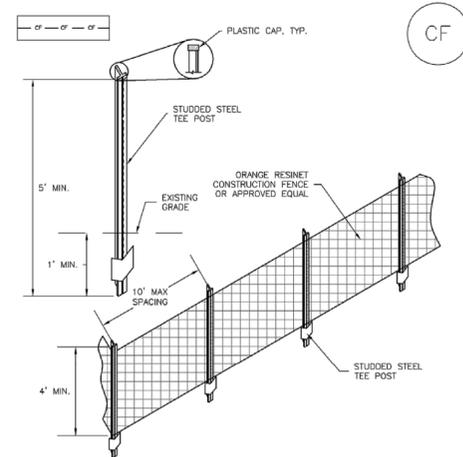
Rolled Erosion Control Products (RECP) EC-6



NOTES: 1. PLACE STAKES 18" O.C. TO 3' ABOVE WATER, THEN 24" O.C. TO UPPER LIMIT OF FABRIC OR AS RECOMMENDED BY THE MANUFACTURER. 2. WHEN BLANKETING IS PLACED OVER RIPRAP, USE WOOD STAKES.

December 2022 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 RECP-7

SM-3 Construction Fence (CF)



CF-1. PLASTIC MESH CONSTRUCTION FENCE

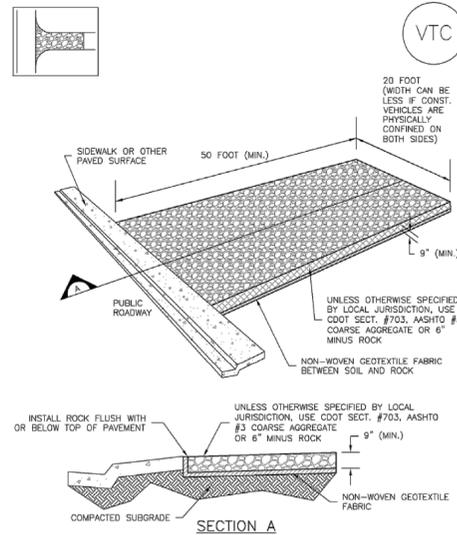
- CONSTRUCTION FENCE INSTALLATION NOTES
- SEE PLAN VIEW FOR: -LOCATION OF CONSTRUCTION FENCE.
 - CONSTRUCTION FENCE SHOWN SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
 - CONSTRUCTION FENCE SHALL BE COMPOSED OF ORANGE, CONTRACTOR-GRADE MATERIAL THAT IS AT LEAST 4' HIGH. METAL POSTS SHOULD HAVE A PLASTIC CAP FOR SAFETY.
 - STUDDED STEEL TEE POSTS SHALL BE UTILIZED TO SUPPORT THE CONSTRUCTION FENCE. MAXIMUM SPACING FOR STEEL TEE POSTS SHALL BE 10'.
 - CONSTRUCTION FENCE SHALL BE SECURELY FASTENED TO THE TOP, MIDDLE, AND BOTTOM OF EACH POST.

CF-2 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

EROSION CONTROL BLANKET 1 QC-503

CONSTRUCTION FENCE 2 QC-503

Vehicle Tracking Control (VTC) SM-4



VTC-1. AGGREGATE VEHICLE TRACKING CONTROL

November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-3

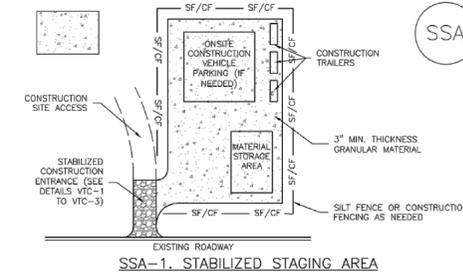
VEHICLE TRACKING CONTROL 3 QC-503

SM-4 Vehicle Tracking Control (VTC)

- STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES
- SEE PLAN VIEW FOR: -LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S). -TYPE OF CONSTRUCTION ENTRANCE(S)/EXIT(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).
 - CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.
 - A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT-OF-WAYS.
 - STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
 - A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.
 - UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
- STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.
 - SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.
- NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UICFD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.
- (DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

VTC-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Stabilized Staging Area (SSA) SM-6



SSA-1. STABILIZED STAGING AREA

- STABILIZED STAGING AREA INSTALLATION NOTES
- SEE PLAN VIEW FOR: -LOCATION OF STAGING AREA(S). -CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
 - STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
 - STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
 - THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
 - UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
 - ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.
- STABILIZED STAGING AREA MAINTENANCE NOTES
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SSA-3

STABILIZED STAGING AREA 4 QC-503

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0	10/02/24	MDS	JLL	ISSUED FOR BID

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project	162116	contract	23-150
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file	162116_OC-501.dwg		