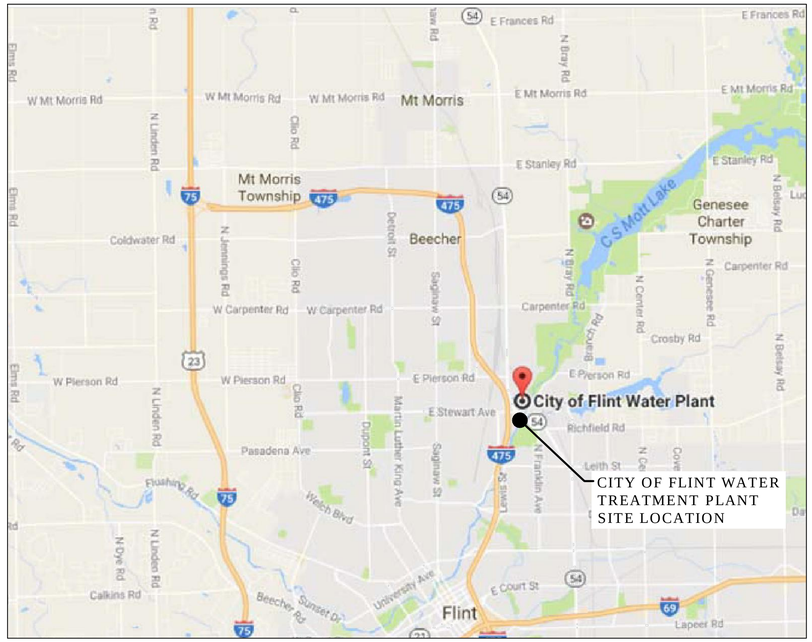
CITY OF FLINT, MICHIGAN

DEPARTMENT OF PUBLIC WORKS

CHEMICAL SYSTEMS FEED BUILDING

CONTRACT NO.

BID SET
OCTOBER 2019



N

1" = 1200'
600 0 1200

LOCATION PLAN

CDM Smith

CDM Smith Michigan Inc.
645 Griswold Street., Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

Water *Environment* *Transportation* *Energy* *Facilities*

JAMES JOSEPH BROZ ENGINEER No. 35875 STATE OF MICHIGAN LICENSED PROFESSIONAL ENGINEER 10-2-19

PROJECT NO. 255128-234374

BID SET

SHEET NO.	TITLE
GENERAL	
G-0	TITLE SHEET
G-1	DRAWING INDEX SHEET
G-2	INDEX, NOTES, ABBREVIATIONS AND SYMBOLS
G-3	PROCESS FLOW DIAGRAM
CIVIL	
C-1	GENERAL AND SURVEY NOTES, LEGEND, SYMBOLS AND ABBREVIATIONS
C-2	EXISTING SITE PLAN
C-3	CONSTRUCTION STAGING AND REMOVAL PLAN
C-4	PROPOSED SITE PLAN
C-5	YARD PIPING PROFILES
C-6	GRADING AND DRAINAGE PLAN
C-7	EROSION AND SEDIMENTATION CONTROL PLAN
C-8	EROSION AND SEDIMENTATION CONTROL DETAILS
C-9	CIVIL DETAILS I
C-10	CIVIL DETAILS II
C-11	MAG METER AND CHEMICAL INJECTION VAULT
C-12	EXISTING CONTROL STATION NO. 2 PLAN, SECTIONS AND DETAIL
ARCHITECTURAL	
A-1	ARCHITECTURAL LEGEND, ABBREVIATIONS, GENERAL NOTES
A-2	CODE AND LIFE SAFETY
A-3	FLOOR AND ROOF PLANS
A-4	ELEVATIONS
A-5	BUILDING SECTIONS
A-6	WALL, DOOR, & WINDOW DETAILS
A-7	ROOF DETAILS
STRUCTURAL	
S-1	CHEMICAL BUILDING ADDITION - FOUNDATION PLAN
S-2	CHEMICAL BUILDING ADDITION - ROOF PLAN, SECTIONS AND DETAILS
S-3	CHEMICAL BUILDING ADDITION - SECTIONS
S-4	STANDARD CONCRETE DETAILS
S-5	STRUCTURAL MASONRY DETAILS
S-6	STANDARD METAL DETAILS
S-7	STANDARD FRP DETAILS
S-8	SPECIAL INSPECTIONS I
S-9	SPECIAL INSPECTIONS II
MECHANICAL	
M-1	PROCESS MECHANICAL LEGENDS I
M-2	PROCESS MECHANICAL LEGENDS II
M-3	PROCESS MECHANICAL LEGENDS III
M-4	PROCESS MECHANICAL NOTES
M-5	CHEMICAL BUILDING PLAN
M-6	SODIUM HYPOCHLORITE ROOM PLAN
M-7	SODIUM HYPOCHLORITE ROOM SECTIONS
M-8	SODIUM HYPOCHLORITE ROOM DETAILS
M-9	CAUSTIC SODA ROOM PLAN
M-10	CAUSTIC SODA ROOM SECTIONS
M-11	CAUSTIC SODA ROOM DETAILS
M-12	CORROSION INHIBITOR ROOM PLAN
M-13	CORROSION INHIBITOR ROOM SECTIONS
M-14	CORROSION INHIBITOR ROOM DETAILS
M-15	CHEMICAL UNLOADING DETAILS
M-16	PROCESS MECHANICAL STANDARD DETAILS
M-17	PROCESS MECHANICAL STANDARD DETAILS
M-18	PROCESS MECHANICAL CHEMICAL STANDARD DETAILS
HVAC	
H-1	HVAC LEGEND, ABBREVIATIONS, AND GENERAL NOTES
H-2	CHEMICAL BUILDING HVAC FLOOR PLAN
H-3	CHEMICAL BUILDING HVAC ROOF PLAN
H-4	HVAC SCHEDULES
H-5	HVAC DETAILS

SHEET NO.	TITLE
PLUMBING	
P-1	PLUMBING LEGEND, ABBREVIATIONS, GENERAL NOTES, AND SCHEDULES
P-2	CHEMICAL BUILDING PLUMBING DRAIN, WASTE, AND VENT PLAN
P-3	CHEMICAL BUILDING PLUMBING WATER PLAN
P-4	CHEMICAL BUILDING PLUMBING ROOF PLAN
P-5	CHEMICAL BUILDING PLUMBING PIPING ISOMETRICS
P-6	PLUMBING DETAILS I
P-7	PLUMBING DETAILS II
FIRE PROTECTION	
F-1	CHEMICAL BUILDING FIRE PROTECTION LEGEND, GENERAL NOTES, SCHEDULE, AND OVERALL PLAN
F-2	FIRE PROTECTION DETAILS
ELECTRICAL	
E-1	ELECTRICAL LEGEND AND ABBREVIATIONS I
E-2	ELECTRICAL LEGEND AND ABBREVIATIONS II
E-3	ELECTRICAL GENERAL NOTES
E-4	ELECTRICAL SITE PLAN
E-5	ELECTRICAL OVERALL SINGLE-LINE DIAGRAM MODIFICATIONS
E-6	ELECTRICAL MCC-CHEM SINGLE-LINE DIAGRAM AND ELEVATION
E-7	ELECTRICAL CHEMICAL BUILDING POWER PLAN I
E-8	ELECTRICAL CHEMICAL BUILDING POWER PLAN II
E-9	ELECTRICAL CHEMICAL BUILDING LIGHTING PLAN
E-10	ELECTRICAL CHEMICAL BUILDING SPECIAL SYSTEMS PLAN
E-11	ELECTRICAL CHEMICAL BUILDING ROOF PLAN
E-12	ELECTRICAL MISCELLANEOUS STRUCTURES
E-13	ELECTRICAL RISER DIAGRAM
E-14	ELECTRICAL RISER AND SPECIAL SYSTEMS RISER DIAGRAM
E-15	ELECTRICAL PANELBOARD AND LUMINAIRE SCHEDULES
E-16	ELECTRICAL SCHEMATIC DIAGRAMS
E-17	ELECTRICAL STANDARD DETAILS I
E-18	ELECTRICAL STANDARD DETAILS II
INSTRUMENTATION	
I-1	INSTRUMENTATION LEGEND I
I-2	INSTRUMENTATION LEGEND II
I-3	SYSTEM ARCHITECTURE
I-4	PROCESS AND INSTRUMENTATION DIAGRAM SODIUM HYPOCHLORITE SYSTEM (1 OF 2)
I-5	PROCESS AND INSTRUMENTATION DIAGRAM SODIUM HYPOCHLORITE SYSTEM (2 OF 2)
I-6	PROCESS AND INSTRUMENTATION DIAGRAM CAUSTIC SODA SYSTEM (1 OF 2)
I-7	PROCESS AND INSTRUMENTATION DIAGRAM CAUSTIC SODA SYSTEM (2 OF 2)
I-8	PROCESS AND INSTRUMENTATION DIAGRAM CORROSION INHIBITOR SYSTEM (1 OF 2)
I-9	PROCESS AND INSTRUMENTATION DIAGRAM CORROSION INHIBITOR SYSTEM (2 OF 2)
I-10	PROCESS & INSTRUMENTATION DIAGRAM CHEMICAL FEED LOCATIONS
I-11	CHEMICAL SYSTEMS (PLC-CHEM) CONTROL PANEL DETAIL
I-12	SODIUM HYPOCHLORITE FILL STATION (FSCP-1100) CONTROL PANEL DETAIL
I-13	SODIUM HYPOCHLORITE (LCP-1210) CONTROL PANEL DETAIL
I-14	CAUSTIC SODA FILL STATION (FSCP-2100) CONTROL PANEL DETAIL
I-15	CAUSTIC SODA (LCP-2200) CONTROL PANEL DETAIL
I-16	CORROSION INHIBITOR FILL STATION (FSCP-3100) CONTROL PANEL DETAIL
I-17	CORROSION INHIBITOR (LCP-3200) CONTROL PANEL DETAIL
I-18	TOWER CONTROL HOUSE - UPS (TCH-UPS) PANEL DETAIL
I-19	INSTALLATION DETAIL - I
I-20	INSTALLATION DETAIL - II

SHEET NO.	REFERENCE TITLE
HISTORICAL	
HD-1	OLD FLINT UTILITY MAPS - PLAN AND PROFILE OF WEBSTER ROAD SANITARY OUTLET. WATERWORKS TO WEBSTER ROAD.
HD-2	OLD FLINT UTILITY MAPS - PLAN AND PROFILE OF NORTHERN EXTENSION OF THE EASTSIDE INTERCEPTER
HD-3	OLD FLINT UTILITY MAPS - PLAN AND PROFILE OF W. BLVD DRIVE STORM SEWER STEARET AVE. N. TO WATER PLANT
HD-4	OLD FLINT UTILITY MAPS - PLAN AND PROFILE OF
HD-5	OLD FLINT UTILITY MAPS
HD-6	OLD FLINT UTILITY MAPS
HD-7	CTA PLANS DIVISION A - SITE PLAN AT EXISTING WATER TREATMENT PLANT
HD-8	CTA PLANS DIVISION A - SITE PLAN AT EXISTING WATER TREATMENT PLANT
HD-9	CTA PLANS DIVISION A - PROFILE AT EXISTING WATER TREATMENT PLANT
HD-10	CTA PLANS DIVISION A - FLOW AND PRESSURE CONTROL VALVE BUILDING AT TREATMENT PLANT
HD-11	CTA PLANS DIVISION A - ELECTRICAL - SITE PLAN AT EXISTING WATER TREATMENT PLANT
HD-12	CTA PLANS DIVISION A - PIPELINE DETAILS
HD-13	CTA PLANS DIVISION A - PIPELINE DETAILS
HD-14	CTA PLANS DIVISION A - AIR RELEASE BLOWOFF VALVE & ACCESS MANHOLE CHAMBERS
HD-15	CTA PLANS DIVISION A - CRADLE AND THRUST BLOCK
HD-16	CTA PLANS DIVISION A - LAYOUT DETAILS OF APPURTENECES
HD-17	CTA PLANS DIVISION A - MISCELLANEOUS DETAILS
HD-18	WATER TREATMENT PLANT - WTP REHABILIATION PHASE I, SEGMENT 4; ASSOCIATED ELECTRICAL DUCT BANK & ELECTRICAL MAN HOLE LOCATIONS
HD-19	WATER TREATMENT PLANT - WTP REHABILIATION PHASE I, SEGMENT 4; ASSOCIATED ELECTRICAL DUCT BANK SECTIONS

REFERENCE DRAWINGS:

REFERENCE DRAWINGS AT THE END OF THE BID SET ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: D. ISLAS
DRAWN BY: D. ISLAS
SHEET CHK'D BY: K. PERRY
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

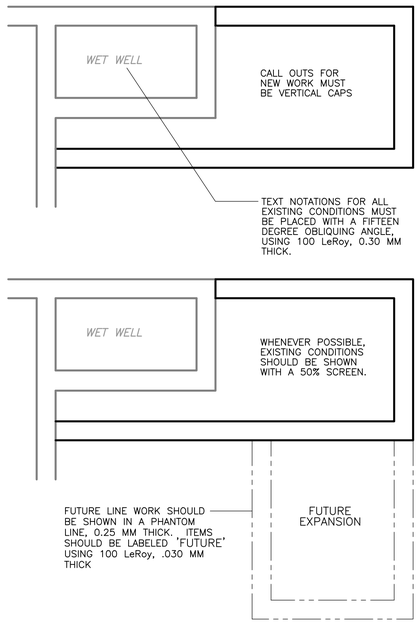
CHEMICAL SYSTEMS FEED BUILDING

DRAWING SHEET INDE□

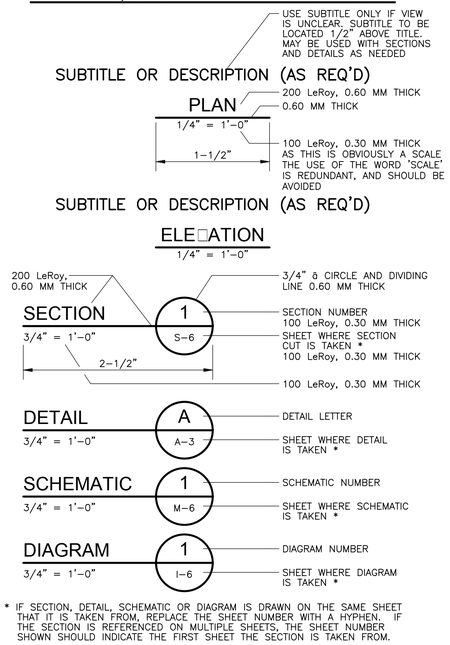
PROJECT NO. 255128-234374
FILE NAME: G001GFIX.DWG
SHEET NO.
G-1

BID SET

EXISTING OR FUTURE CONDITION DESIGNATION

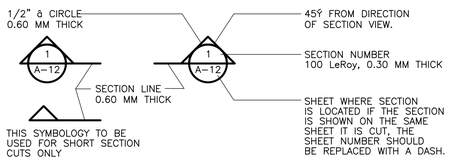


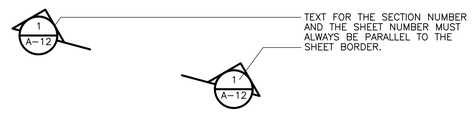
DRAWING, SECTION AND DETAIL TITLES



* IF SECTION, DETAIL, SCHEMATIC OR DIAGRAM IS DRAWN ON THE SAME SHEET THAT IT IS TAKEN FROM, REPLACE THE SHEET NUMBER WITH A HYPHEN. IF THE SECTION IS REFERENCED ON MULTIPLE SHEETS, THE SHEET NUMBER SHOWN SHOULD INDICATE THE FIRST SHEET THE SECTION IS TAKEN FROM.

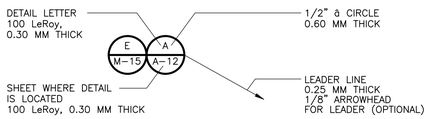
SECTION CUT SYMBOLS





WHEN REFERENCING A SECTION IN A NOTE, USE 1/M-1 FORMAT INSTEAD OF THE BUBBLE

DETAIL CALL OUT SYMBOLS



WHERE A NOTE IS REQUIRED FOR CLARITY, USE A/M-12 FORMAT IN THE NOTE INSTEAD OF BUBBLE. IF MULTIPLE DETAILS REFER TO THE SAME AREA OF THE DRAWING, THE BUBBLES SHOULD BE STACKED SIDE BY SIDE.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: D. ISLAS
DRAWN BY: D. ISLAS
SHEET CHK'D BY: J. BROZ
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

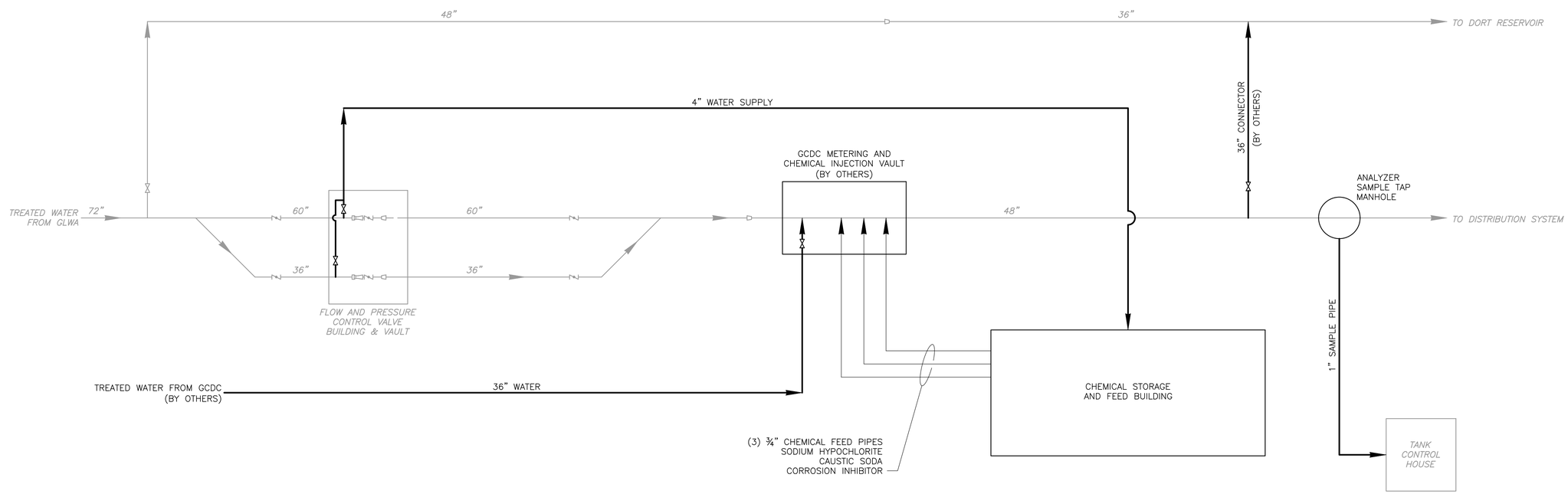
CHEMICAL SYSTEMS FEED BUILDING

INDEX, NOTES, ABBREVIATIONS AND SYMBOLS

PROJECT NO. 255128-234374
FILE NAME: G002GNAB.DWG

SHEET NO.
G-2

BID SET



STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. BROZ
DRAWN BY: D. ISLAS
SHEET CHK'D BY: J. BROZ
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS FLOW DIAGRAM

PROJECT NO. 255128-234374
FILE NAME: G003PFDI.DWG

SHEET NO.
G-3

BID SET

GENERAL NOTES

GENERAL NOTES

1. THE CONTRACTOR SHALL NOT DAMAGE ANY EXISTING SITE FEATURES TO REMAIN IN PLACE SUCH AS (BUT NOT LIMITED TO) – SURVEY MONUMENTS, UTILITY POLES, MANHOLES, ELECTRICAL BOXES, BUILDINGS, FIRE HYDRANTS, BERMS, LAWNS, GRAVEL SURFACE AREAS ETC. ANY DAMAGED ITEMS SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER.

REMOVAL NOTES

1. COORDINATE ALL SITE WORK WITH OWNER'S REPRESENTATIVE. COORDINATE AND ESTABLISH LOCATION AND EXTENT OF CONSTRUCTION SPOILS AND STAGING AREAS.

UTILITIES

UTILITY INFORMATION

1. UTILITY INFORMATION IS DELINEATED IN ACCORDANCE WITH THE LOCATIONS PROVIDED BY UTILITY OWNERS. THE ENGINEER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION OR THE LOCATION AT WHICH THESE ARE SHOWN ON THE CONSTRUCTION PLANS. DIFFERING FIELD CONDITIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND OWNER.

MISS DIG/UNDERGROUND UTILITY NOTIFICATION

1. FOR THE PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 174 OF 2013, THE CONTRACTOR SHALL CONTACT MISS DIG SYSTEM, INC. BY PHONE AT 811 OR 800-482-7171 OR VIA THE WEB AT EITHER ELOCATE.MISSDIG.ORG FOR SINGLE ADDRESS OR RTE. MISSDIG.ORB, A MINIMUM OF 3 BUSINESS DAYS PRIOR TO EXCAVATING, EXCLUDING WEEKENDS AND HOLIDAYS.

OUT OF SERVICE UTILITIES

2. IF PLAN INFORMATION INDICATES AN EXISTING UNDERGROUND UTILITY IS OR WILL BE OUT OF SERVICE WITHIN THE LIMITS OF THIS CONTRACT, THE CONTRACTOR IS CAUTIONED TO TREAT SUCH A LINE AS IF IT WERE STILL IN SERVICE AND NOTIFY "MISS DIG" WHEN WORKING IN THE AREA OF THE OUT OF SERVICE FACILITY.

EXISTING UTILITIES

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO PROPERLY IDENTIFIED EXISTING WATER MAINS AND/OR EXISTING SEWERS DURING THE CONSTRUCTION OF THIS PROJECT.

4. NOT ALL UNDERGROUND UTILITIES ARE SHOWN ON THE DRAWINGS. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE, THE CONTRACTOR SHALL FIELD VERIFY ALL PERTINENT UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AT ALL TIMES DURING CONSTRUCTION OPERATIONS TO PROTECT AND MAINTAIN EXISTING UTILITIES. ANY DAMAGED UTILITIES SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

5. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND DEPTHS OF ALL PERTINENT UTILITIES PRIOR TO CONSTRUCTION. ALL EXISTING UTILITIES SHALL BE PROTECTED, AND EXISTING UTILITY SERVICES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. ANY UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT THE SOLE EXPENSE OF THE CONTRACTOR.

6. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR THE PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE PROPERLY REPAIRED IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS AT THE CONTRACTOR'S EXPENSE.

7. PRIOR TO BEGINNING THE WORK, THE CONTRACTOR SHALL BE REQUIRED TO EXPOSE ALL EXISTING UTILITIES THAT CROSS THE PROPOSED CONSTRUCTION, SO THE ENGINEER MAY DETERMINE IF A VERTICAL CONFLICT EXISTS BETWEEN AN EXISTING UTILITY AND THE PROPOSED WORK. ALL LABOR REQUIRED TO UNCOVER THE EXISTING UTILITY SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. THE CONTRACTOR SHALL VERIFY THE DEPTH AND HORIZONTAL LOCATIONS OF ALL UTILITIES IN SUFFICIENT TIME SUCH THAT ANY CONFLICTS CAN BE RESOLVED BEFORE WORK IS STARTED IN THAT PORTION OF THE PROJECT. THE CONTRACTOR SHALL ARRANGE FOR THE VARIOUS UTILITY OWNERS TO LOCATE, REMOVE AND REPLACE, OR RELOCATE THEIR FACILITIES. ALL COSTS FOR THIS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE PROJECT.

8. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING SANITARY SEWER, PRESSURE PIPE, STORM SEWER, GAS, TELEPHONE, FIBER OPTIC, CABLE, OR ELECTRICAL CONNECTIONS IN SERVICE THROUGHOUT THE WORK. THE CONTRACTOR SHALL PROVIDE OR ARRANGE FOR THE TEMPORARY SUPPORT OF GAS MAIN, TELEPHONE, FIBER OPTIC, CABLE, PRESSURE PIPE, SANITARY SEWER, STORM SEWER, AND UTILITY POLES WHERE NEEDED. ALL STORM SEWERS DAMAGED OR REMOVED, OR RELOCATED BY THE CONTRACTOR, SHALL BE REPLACED WITH THE SAME SIZE AND QUALITY PIPE BY THE CONTRACTOR AT CONTRACTOR'S SOLE EXPENSE. ALL UTILITIES UNDERMINED BY THE EXCAVATION SHALL HAVE COMPACTED SAND BACKFILL PLACED UNDER THEM, UNLESS MDOT 6AA CRUSHED LIMESTONE (A1) OR MDOT 22A ‹TRAVEL (A2) IS SHOWN ON THE CONSTRUCTION PLANS. ALL WORK TO ACCOMMODATE CONSTRUCTION TO CLEAR EXISTING SERVICES, SHALL BE INCLUSIVE TO THE PROJECT.

SURVEY

9. MICHIGAN STATE LAW PROHIBITS DEFACING, DESTROYING OR ALTERING EXISTING PROPERTY CORNER MONUMENTS AND MARKERS. CONTRACTOR SHALL CONTACT CITY ENGINEER FOR PROTECTION AND/OR TEMPORARY RELOCATION OF MONUMENT. EXISTING MONUMENT LOCATION SHALL BE RE-ESTABLISHED DURING POURING OF NEW CONCRETE. THE CONTRACTOR SHALL NOT DEFACE, REMOVE OR ALTER ANY EXISTING SURVEY BENCH MARKS.

EARTHWORK

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. CONTRACTOR SHALL EXTEND AND REWORK GRADING AS REQUIRED TO MEET EXISTING GRADE AND TO MAINTAIN POSITIVE DRAINAGE.

SLOPES

2. ALL AREAS WITHIN THE LIMITS OF GRADING THAT ARE NOT PAVED SHALL BE SEEDED.

SOIL EROSION MEASURES

1. APPROPRIATE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO EARTH – DISTURBING ACTIVITIES. PLACE TURF ESTABLISHMENT ITEMS AS SOON AS POSSIBLE ON POTENTIAL ERODIBLE SLOPES AS DIRECTED BY THE ENGINEER.

2. THE CONTRACTOR SHALL MAINTAIN SOIL EROSION CONTROLS ON A WEEKLY BASIS AND AFTER EVERY STORM EVENT

3. CONTRACTOR SHALL CARRY OUT PROPER DUST CONTROL DURING PROGRESS OF WORK. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL INSTALL TEMPORARY INLET SEDIMENT FILTERS ON ALL CATCH BASINS AND STORM INLETS WITHIN THE CONSTRUCTION AREA.

4. THE CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF PART 91, ACT 451 OF P.A. 1994 FOR SOIL EROSION AND SEDIMENTATION CONTROL (SESC), AND WILL BE RESPONSIBLE FOR ALL MAINTENANCE UNTIL THE FINAL ACCEPTANCE OF THE PERMANENT CONTROL MEASURES BY THE AGENCY HAVING JURISDICTION. THE CONTRACTOR IS REQUIRED BY THE OWNER TO PREPARE AND SUBMIT A SOIL EROSION AND SEDIMENTATION CONTROL PLAN IN ORDER TO OBTAIN THE SOIL EROSION AND SEDIMENTATION CONTROL PERMIT, AND TO PAY ANY APPLICATION FEES AND BOND FEES NECESSARY TO OBTAIN THE PERMIT.

5. ALL DISTURBED AREAS SHALL BE COMPLETELY RESTORED IN STRICT COMPLIANCE WITH THE SOIL EROSION AND SEDIMENTATION CONTROL (SESC) PLANS AND SPECIFICATIONS, AND TO THE SATISFACTION OF OWNER, GOVERNING AGENCY, COUNTY ROAD COMMISSION, MDOT, THE LOCAL MUNICIPALITY, AND THE PROPERTY OWNER. ALL COSTS FOR THE CLEANUP, RESTORATION WORK, AND OTHER INTERMEDIATE OPERATIONS INCLUDING BUT NOT LIMITED TO, CONSTRUCTION SIGNAGE, STREET SWEEPING, AND MAINTAINING EXISTING UTILITIES, SHALL BE CONSIDERED INCLUSIVE AND AT NO ADDITIONAL COST TO OWNER. AREAS DISTURBED DURING THE WORK SHALL RECEIVE A MINIMUM 4" APPLICATION OF SCREENED TOPSOIL, FERTILIZER, SEED, AND MULCH. ALL EXCESS MATERIALS, DEBRIS, AND SIMILAR ITEMS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF IN ACCORDANCE WITH THE LAW. ALL GROUND SURFACES SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER PRIOR TO FINAL APPROVAL.

6. PRIOR TO FINAL ACCEPTANCE BY GOVERNING AGENCY, THE CONTRACTOR SHALL REQUEST A FINAL INSPECTION OF ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AND RECEIVE WRITTEN APPROVAL FROM GOVERNING AGENCY. THE SOIL EROSION AND SEDIMENTATION CONTROL BOND WILL BE RELEASED UPON GOVERNING AGENCIES FINAL APPROVAL AND ACCEPTANCE OF THE NPDES.

PERMITS AND FEES

1. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS, INCLUDING THE PAYMENT OF ANY FEES OR BONDS, REQUIRED BY ANY FEDERAL, STATE, COUNTY, LOCAL, OR PRIVATE ORGANIZATIONS AND UTILITIES PRIOR TO COMMENCING WORK. PROVIDE FINAL WRITTEN APPROVAL AND RELEASE OF PERMITS FROM ALL GOVERNING AGENCIES TO OWNER AND ENGINEER.

DISPOSAL OF EXCESS EXCAVATED MATERIAL

1. CONTRACTOR SHALL OBTAIN ALL APPROPRIATE PERMITS AND WRITTEN PERMISSIONS FOR DISPOSAL OF EXCESS EXCAVATED MATERIAL. ALL EXCESS EXCAVATED MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR WITH ALL PERMITS, PERMISSIONS, AND LOCATIONS PROVIDED BY THE CONTRACTOR. ADJACENT PROPERTY OWNERS SHALL BE GIVEN PREFERENCE FOR DISPOSAL OF EXCESS MATERIAL. WRITTEN PERMISSION FOR DISPOSAL FROM THE PROPERTY OWNERS SHALL BE PROVIDED TO OWNER.

MIOSHA SAFETY REQUIREMENTS

1. ALL WORK, WORK PRACTICE AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE STATE AND FEDERAL SAFETY GUIDELINES, OCCUPATION, HEALTH AND ENVIRONMENTAL REGULATIONS, AND ALSO NFPA AND ANSI CODES AS APPLICABLE. ALL WORK INSIDE A CONFINED SPACE, SUCH AS THE PIPE LINE, MANHOLES OR OTHER UNDERGROUND STRUCTURES, SHALL BE COORDINATED WITH THE UTILITY OWNER, AND ALL WORKER SAFETY REQUIREMENTS STRICTLY ENFORCED. THE CONTRACTOR, SHALL HAVE ITS SAFETY PLAN ON FILE WITH OWNER, INSPECTOR, AND ONE COPY ON SITE AT ALL TIMES.

YARD PIPING NOTES

1. EXISTING UTILITIES SHOWN ARE BASED FROM BEST AVAILABLE RECORD INFORMATION AT THE TIME OF DESIGN. CONTRACTOR MAY NEED TO SHIFT PROPOSED PIPE LOCATIONS/ ROUTES BASED ON EXISTING UTILITY CONDITIONS ENCOUNTERED IN THE FIELD.

2. CONTRACTOR SHALL COORDINATE NEW YARD PIPING WITH MECHANICAL LOCATIONS WHERE ENTERING/EXITING BUILDINGS.

3. CONTRACTOR SHALL COORDINATE NEW YARD PIPING CONSTRUCTION WITH NEW ELECTRICAL CONDUIT AND DUCT BANK INSTALLATION.

4. CONTRACTOR SHALL KEEP RECORDS OF EACH NEW PIPE LOCATION, LOCATING BENDS, VALVES WITH DIMENSIONS FROM CLOSEST BUILDING. THESE RECORDS SHALL BE PROVIDED TO ENGINEER WHO WILL DEVELOP "AS- BUILT' DRAWINGS FOR OWNER.

SURVEY NOTES

THE HORIZONTAL PROJECT CONTROL IS BASED ON THE MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, INTERNATIONAL FEET, 2013 ADJUSTMENT YEAR AND ESTABLISHED UTILIZING MSRN.

THE VERTICAL CONTROL IS BASED ON NAVD 1988. A LEVEL LOOP WAS COMPLETED FROM PUBLISHED BENCHMARK DL4945 TO THE SITE TO ESTABLISH THE VERTICAL CONTROL.

NO BOUNDARY WORK WAS COMPLETED AS PART OF THIS PROJECT

UTILITIES SHOWN ARE BASED ON ABOVE GROUND FEATURES AND PROVIDED PLANS. NO UNDERGROUND OBSERVATIONS WERE CONDUCTED.

BENCHMARK:

WP#3 ELEV. = 737.62 NAVD 1988 CHISELED + TOP/SOUTH BOLT OF S'LY MOST LEG OF WATER TOWER

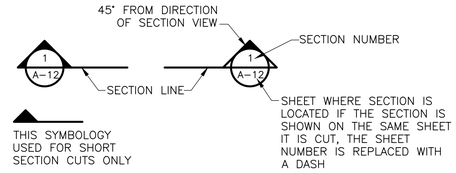
WP#4 ELEV. = 725.62 NAVD 1988 SPIKE IN WEST FACE OF POWER POLE 40'± N OF PWR SUB STATION FENCE

LEGEND

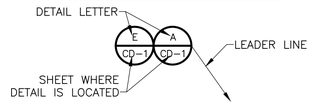
- WATER MAIN
- SANITARY SEWER
- STORM SEWER
- GAS MAIN
- UNDERGROUND ELECTRIC
- UNDERGROUND CABLE
- UNDERGROUND TELEPHONE/CONDUIT
- UNDERGROUND FIBER OPTIC
- 350 INDEX CONTOUR
- 351 INTERMEDIATE CONTOUR
- LIGHT POLE
- GUY ANCHOR
- GUY POLE
- POWER POLE
- TELEPHONE MANHOLE
- U/G TELEPHONE BOX
- U/G CABLE TV BOX
- U/G ELECTRIC BOX
- GAS METER
- ELECTRIC METER
- ELECTRIC MANHOLE
- ELECTRIC OUTLET
- MAILBOX
- SIGN
- POST
- CONCRETE FILLED POST
- GUARD POST
- WATER SERVICE – SHUT OFF
- GATE VALVE IN WELL
- SPRINKLER VALVE
- SPRINKLER HEAD
- FIRE HYDRANT
- FIRE HYDRANT VALVE
- STORM MANHOLE
- CATCH BASIN
- SANITARY MANHOLE
- CLEAN OUT
- FOUND IRON/RE-ROD/PIPE
- FOUND MONUMENT
- ELEVATION TAKEN HERE
- ELECTRIC MARKER
- GAS MARKER
- MONITORING WELL
- DECIDUOUS TREE W/DRIPLINE
- CONIFEROUS TREE W/DRIPLINE
- BUSH
- ASPHALT PAVEMENT
- CONCRETE
- GRAVEL
- WP#3 BENCHMARK

SYMBOLS

SECTION CUT SYMBOLS



DETAIL CALL OUT SYMBOLS

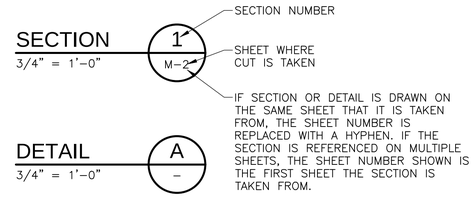


IF MULTIPLE DETAILS REFER TO THE SAME AREA OF THE DRAWING, THE BUBBLES ARE STACKED SIDE BY SIDE.

DRAWING, SECTION AND DETAIL TITLES

SUBTITLE OR DESCRIPTION (AS REQ'D)

PLAN
1/4" = 1'-0"



ABBREVIATIONS

BOT	BOTTOM
CB	CATCH BASIN
Cu	COPPER
CW	COLD WATER
DI	DUCTILE IRON
DIA	DIAMETER
DL	DRIP LINE
DR	DRAIN
ELEC	ELECTRIC
G	GAS
GV	GATE VALVE
INV	INVERT
OH	OVERHEAD LINES
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
SS	SANITARY SEWER
STM	STORM
TC	TOP OF CURB
TOB	TOP OF BANK
T/P	TOP OF PIPE
UE	UNDERGROUND ELECTRIC
W	WATER
WM	WATER MAIN

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43128
REGISTERED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

GENERAL AND SURVEY NOTES, LEGEND, SYMBOLS AND ABBREVIATIONS

PROJECT NO. 255128-234374
FILE NAME: C001LGND.DWG

SHEET NO.
C-1

BID SET

SOURCE: 2019 GOOGLE EARTH PRO

LOCATION MAP

PLAN

NOTES:

1. 100-YR FLOODPLAIN ELEVATION = 716.9
2. EXISTING SURFACE EAST OF GRAVEL DRIVE APPROXIMATE NO SURFACE PROVIDED BY SURVEYOR.

BENCHMARK

WP#3 ELEV. = 737.62 NAVD 1988 CHISELED + TOP/SOUTH BOLT OF S'LY MOST LEG OF WATER TOWER

WP#4 ELEV. = 725.62 NAVD 1988 SPIKE IN WEST FACE OF POWER POLE 40'± N OF PWR SUB STATION FENCE

SOIL BORINGS			
DESCRIPTION	NORTHING	EASTING	ELEVATION
B-01	568366.19	13309627.17	731.7
B-02	568359.21	13309589.07	732.1
B-03	568312.31	13309551.99	731.0
B-04	568396.15	13309600.09	731.2

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43123
LICENSED PROFESSIONAL ENGINEER
10/29/19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

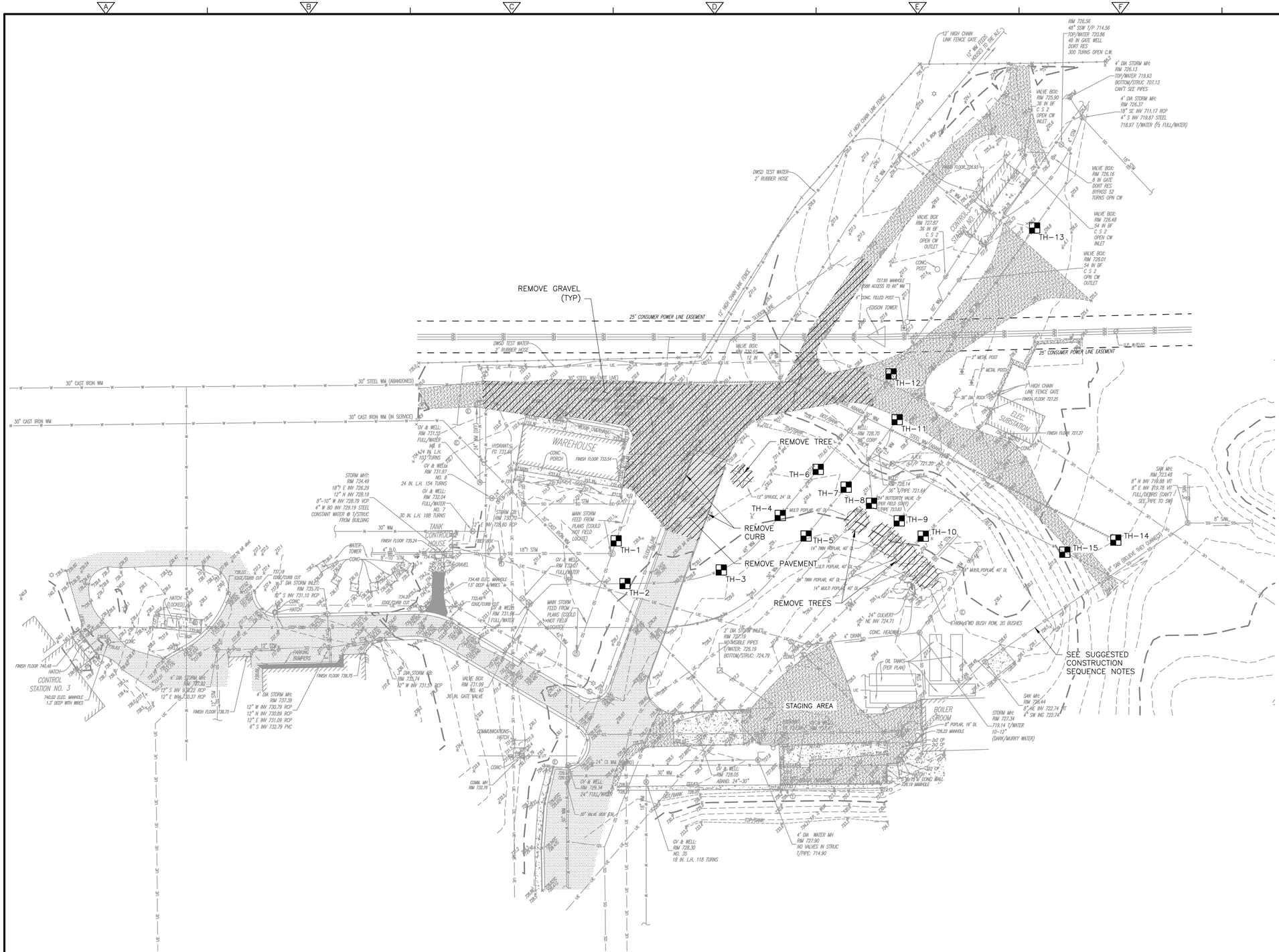
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

EXISTING SITE PLAN

PROJECT NO. 255128-234374
FILE NAME: C002EPPL.DWG
SHEET NO. C-2

BID SET



PLAN

LEGEND

TO BE REMOVED

TH-1 TEST HOLE LOCATION

SUGGESTED CONSTRUCTION SEQUENCE:

1. CONSULT REFERENCE DRAWINGS FOR POTENTIAL LOCATION OF BURIED RAILROAD TRACKS ON SITE.
2. VERIFY LOCATION AND FUNCTION OF EXISTING UTILITIES.
   - A. CLEAN AND TELEVISE EXISTING 8–INCH SANITARY SEWER TO 24" SANITARY AND CONFIRM SANITARY OUTLET AVAILABLE FOR USE.
   - B. VERIFY DEPTH AND LOCATION OF EXISTING 48" WATERMAIN ADJACENT TO PROPOSED CHEMICAL SYSTEMS BUILDING UTILIZING AVAILABLE RECORD DRAWINGS AND SOFT DIG METHODS TO CONFIRM TOP OF WATERMAIN.
   - C. VERIFY DEPTH AND LOCATION OF EXISTING ELECTRICAL DUCT BANKS CROSSING PROPOSED SANITARY SERVICE LEAD FOR CHEMICAL SYSTEMS BUILDING.
3. OBTAIN SOIL EROSION AND SEDIMENTATION CONTROL PERMIT FROM GENESEE COUNTY IF REQUIRED AND INSTALL TEMPORARY EROSION CONTROLS.
4. REMOVE PAVEMENT, GRAVEL, AND TREES AS INDICATED WITHIN TEMPORARY CONSTRUCTION LIMITS.
5. INSTALL GEOTECHNICAL & VIBRATION MONITORING EQUIPMENT AS REQUIRED.
6. OBTAIN APPROVAL FOR WATER DISCHARGE VARIANCE FROM CITY OF FLINT AS REQUIRED AND INSTALL DEWATERING EQUIPMENT.
7. REMOVE EXISTING UNSUITABLE SOILS BENEATH PROPOSED PAVED AREAS AND FOOTPRINT OF PROPOSED CHEMICAL SYSTEMS BUILDING AS INDICATED IN THE CONTRACT DOCUMENTS. FOUNDATION BEARING SURFACES TO BE CONFIRMED BY QUALIFIED GEOTECHNICAL ENGINEER.
8. INSTALL RECOMMENDED GEOTEXTILE, GEOFABRIC, AND 1X3 STONE MATERIALS TO STABILIZE LOOSE UNDERLYING SOILS.
9. CONSTRUCT CHEMICAL SYSTEMS FEED BUILDING & COORDINATE INSTALLATION OF PROPOSED BUILDING UTILITIES.
   - A. COORDINATE PROPOSED GAS SERVICE FOR BUILDING WITH CMS ENERGY.
     - i. CALL 1–800–477–5050 AND PLACE A NEW CONSTRUCTION REQUEST.
     - ii. PROVIDE SITE PLAN AND GAS LOAD INFORMATION.
     - iii. COORDINATE WITH AREA CMS ENERGY GAS TECHNICIAN LINDSAY BOEGNER (810) 760–3510.
     - iv. CONSUMERS ENERGY WILL PROVIDE THE METER BRACKET AND METER AND MOUNT IT ON THE WALL. CITY OF FLINT GAS MAIN OWNERSHIP STARTS AT THE CONNECTION TO THE BRACKET ON THE OUTLET SIDE.
   - B. INSTALL 6" WATER SUPPLY PIPING TO CHEMICAL SYSTEMS BUILDING FROM CONTROL STATION #2. VENTURI METER REPLACEMENT WORK BY OTHERS THROUGH THE SECONDARY WATER SUPPLY CONTRACT AT CONTROL STATION #2 TO BE COMPLETED BY AUGUST 1, 2020, TWO 6–INCH FLANGE CONNECTIONS WITH BALL VALVE FOR WATER SERVICE SUPPLY TO CHEMICAL SYSTEMS BUILDING TO BE PROVIDED FOR CONNECTION BY SECONDARY WATER SUPPLY CONTRACT.
10. INSTALL SITE PAVING AND COMPLETE SITE RESTORATION ACTIVITIES.

STATE OF MICHIGAN — MARK A. SCHOBERT — ENGINEER — No. 43128 — LICENSED PROFESSIONAL ENGINEER — 10-8-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

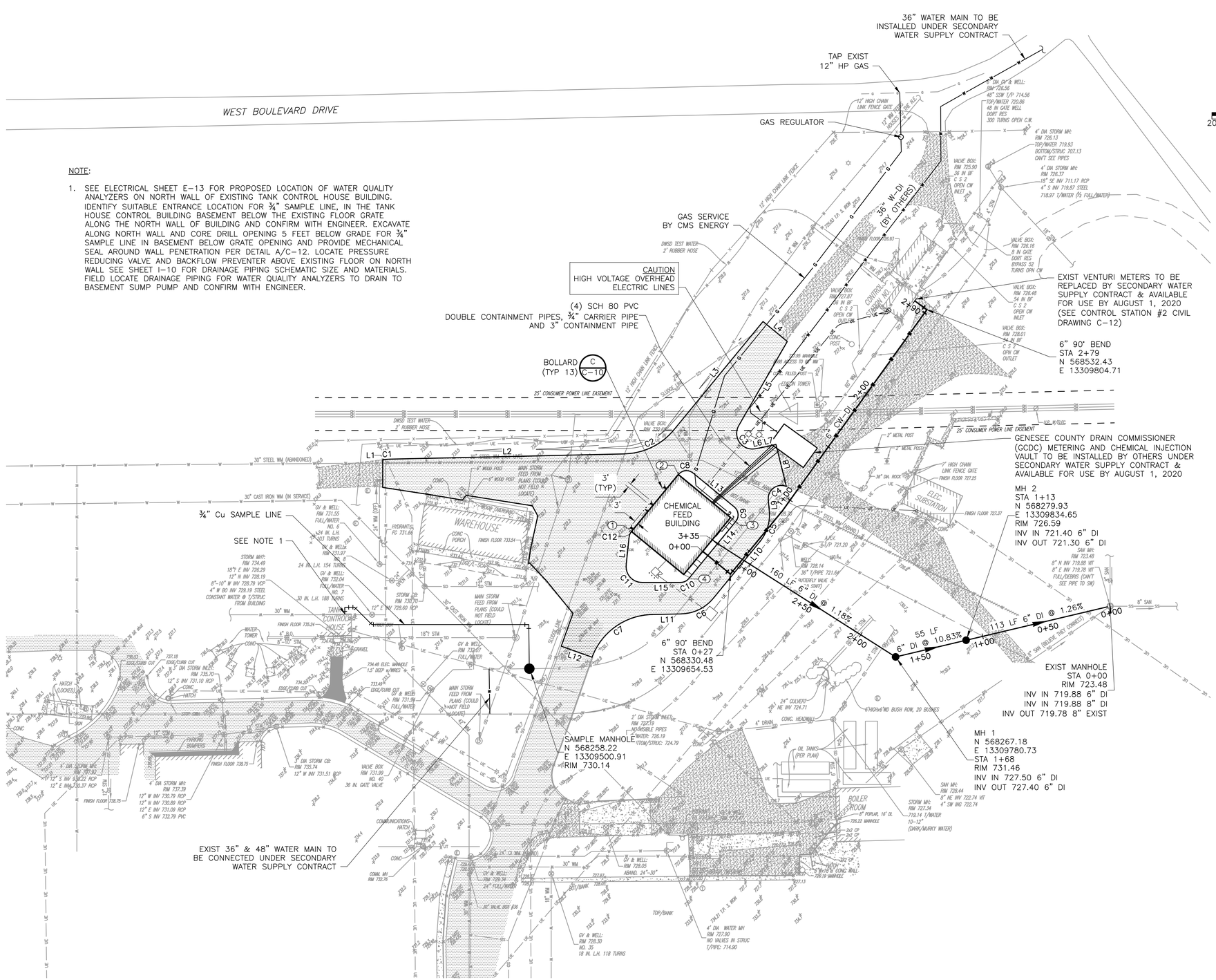
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

CONSTRUCTION STAGING AND REMOVAL PLAN

PROJECT NO. 255128–234374
FILE NAME: C003STPL.DWG
SHEET NO. C-3

BID SET



PLAN

EDGE OF PAVEMENT LINE DATA				
LINE #	BEARING	DISTANCE	START POINT	END POINT
L1	N83° 15' 07.08"E	0.81	N=568417.83 E=13309388.89	N=568417.93 E=13309389.69
L2	N88° 43' 16.42"E	179.34	N=568418.26 E=13309394.45	N=568422.26 E=13309573.75
L3	N39° 27' 16.51"E	107.36	N=568440.48 E=13309611.24	N=568523.37 E=13309679.46
L4	S50° 32' 43.49"E	24.00	N=568523.37 E=13309679.46	N=568508.12 E=13309697.99
L5	S30° 01' 35.27"W	74.10	N=568508.12 E=13309697.99	N=568443.97 E=13309660.91
L6	N78° 59' 43.58"E	10.12	N=568426.18 E=13309673.60	N=568428.11 E=13309683.53
L7	N76° 06' 07.42"E	5.97	N=568428.11 E=13309683.53	N=568429.55 E=13309689.32
L8	S13° 53' 52.58"E	33.05	N=568429.55 E=13309689.32	N=568397.47 E=13309697.26
L9	S5° 08' 00.66"E	8.91	N=568387.34 E=13309683.46	N=568378.46 E=13309684.26
L10	S39° 27' 16.51"W	56.40	N=568355.26 E=13309677.10	N=568311.72 E=13309641.26
L11	S88° 49' 51.98"W	22.55	N=568300.06 E=13309617.20	N=568299.60 E=13309594.65
L12	N70° 21' 13.25"W	24.95	N=568266.99 E=13309548.79	N=568275.38 E=13309525.30
L13	S50° 32' 43.49"E	40.73	N=568407.66 E=13309626.02	N=568381.77 E=13309657.47
L14	S39° 27' 16.51"W	56.40	N=568370.51 E=13309658.56	N=568326.97 E=13309622.73
L15	N90° 00' 00.00"W	29.74	N=568324.05 E=13309616.55	N=568324.05 E=13309586.81
L16	N6° 02' 31.34"E	21.58	N=568337.31 E=13309574.87	N=568358.78 E=13309577.15

EDGE OF PAVEMENT CURVE DATA							
CURVE #	RADIUS	LENGTH	TANGENT	DELTA	CHORD LENGTH	START POINT	END POINT
C1	50.00	4.77	2.39	5°28'09"	4.77	N=568417.93 E=13309389.69	N=568418.26 E=13309394.45
C2	50.00	42.99	22.93	49°16'00"	41.68	N=568422.26 E=13309573.75	N=568440.48 E=13309611.24
C3	12.00	27.44	26.35	131°01'52"	21.84	N=568443.97 E=13309660.91	N=568426.18 E=13309673.60
C4	10.00	20.54	16.54	117°41'57"	17.12	N=568397.47 E=13309697.26	N=568387.34 E=13309683.46
C5	32.00	24.90	13.12	44°35'17"	24.28	N=568378.46 E=13309684.26	N=568355.26 E=13309677.10
C6	32.00	27.58	14.71	49°22'35"	26.73	N=568311.72 E=13309641.26	N=568300.06 E=13309617.20
C7	50.00	59.76	34.03	68°29'03"	56.27	N=568299.60 E=13309594.65	N=568266.99 E=13309548.79
C8	8.00	12.57	8.00	90°00'00"	11.31	N=568406.56 E=13309614.76	N=568407.66 E=13309626.02
C9	8.00	12.57	8.00	90°00'00"	11.31	N=568381.77 E=13309657.47	N=568370.51 E=13309658.56
C10	8.00	7.06	3.78	50°32'43"	6.83	N=568326.97 E=13309622.73	N=568324.05 E=13309616.55
C11	12.00	20.11	13.34	96°02'31"	17.84	N=568324.05 E=13309586.81	N=568337.31 E=13309574.87
C12	8.00	4.67	2.40	33°24'45"	4.60	N=568358.78 E=13309577.15	N=568363.02 E=13309578.92

CHEMICAL FEED BUILDING		
POINT NO.	NORTHING	EASTING
1	568363.02	13309578.92
2	568406.54	13309614.74
3	568373.69	13309654.70
4	568330.14	13309618.87

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43123
10-3-19
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

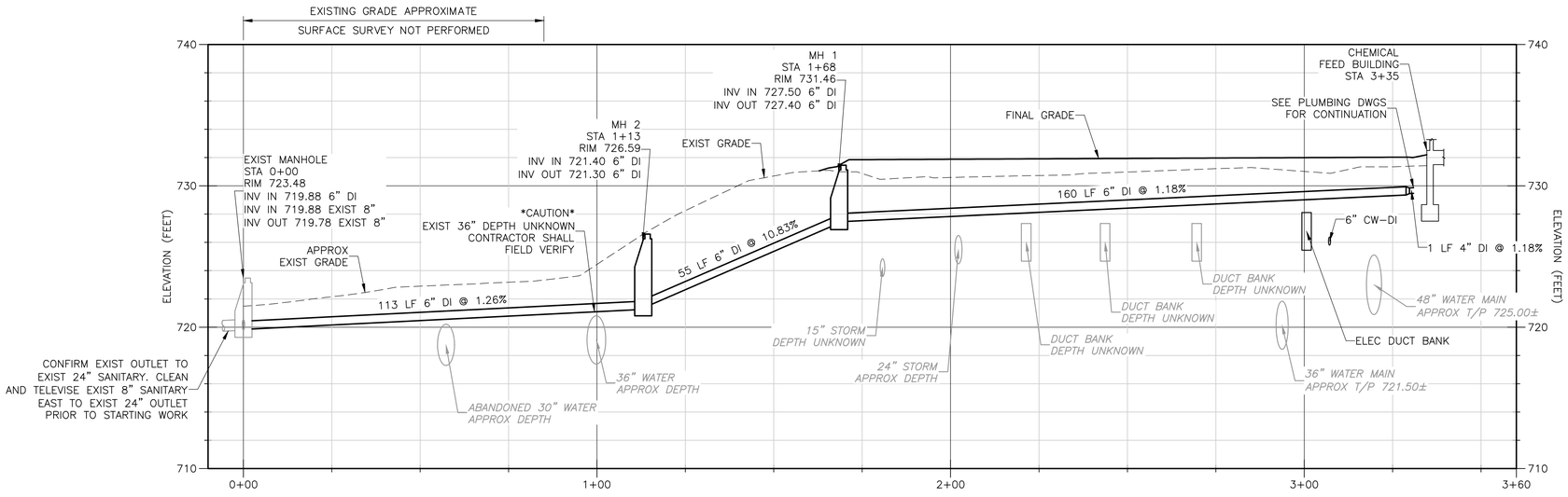
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROPOSED SITE PLAN

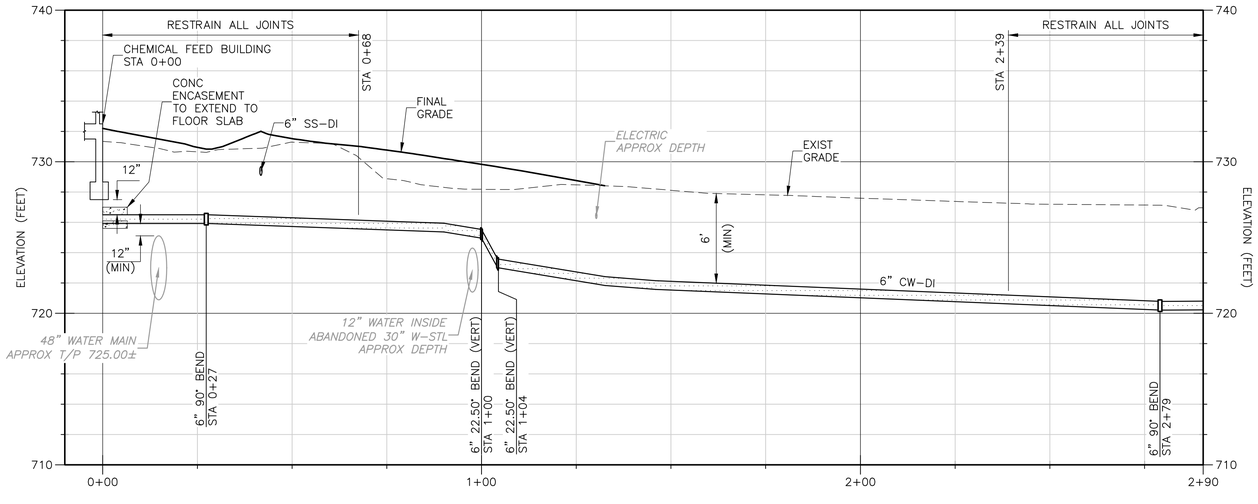
PROJECT NO. 255128-234374
FILE NAME: C004STPL.DWG
SHEET NO. C-4

BID SET



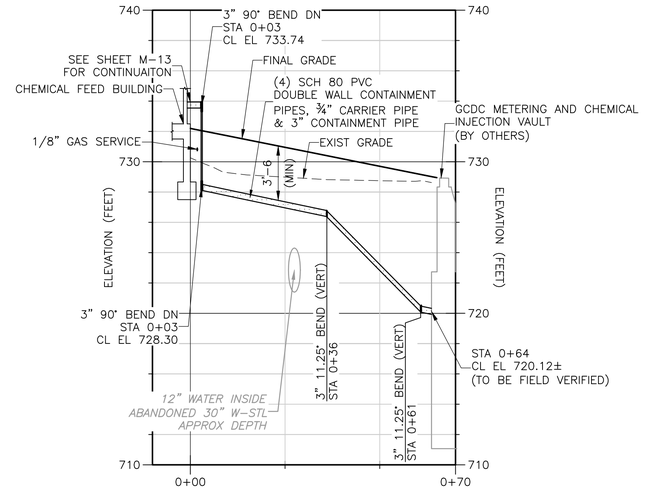
6" SS-DI FROM CHEMICAL FEED BUILDING TO EXISTING MANHOLE

PROFILE



6" CW-DI FROM CHEMICAL FEED BUILDING TO EXISTING CONTROL STATION #2

PROFILE



CHEMICAL FEED FROM CHEMICAL FEED BUILDING TO GCDC METERING AND CHEMICAL INJECTION VAULT

PROFILE

1" = 20'
10 0 20

1" = 5'
2.5 0 5

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43128
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

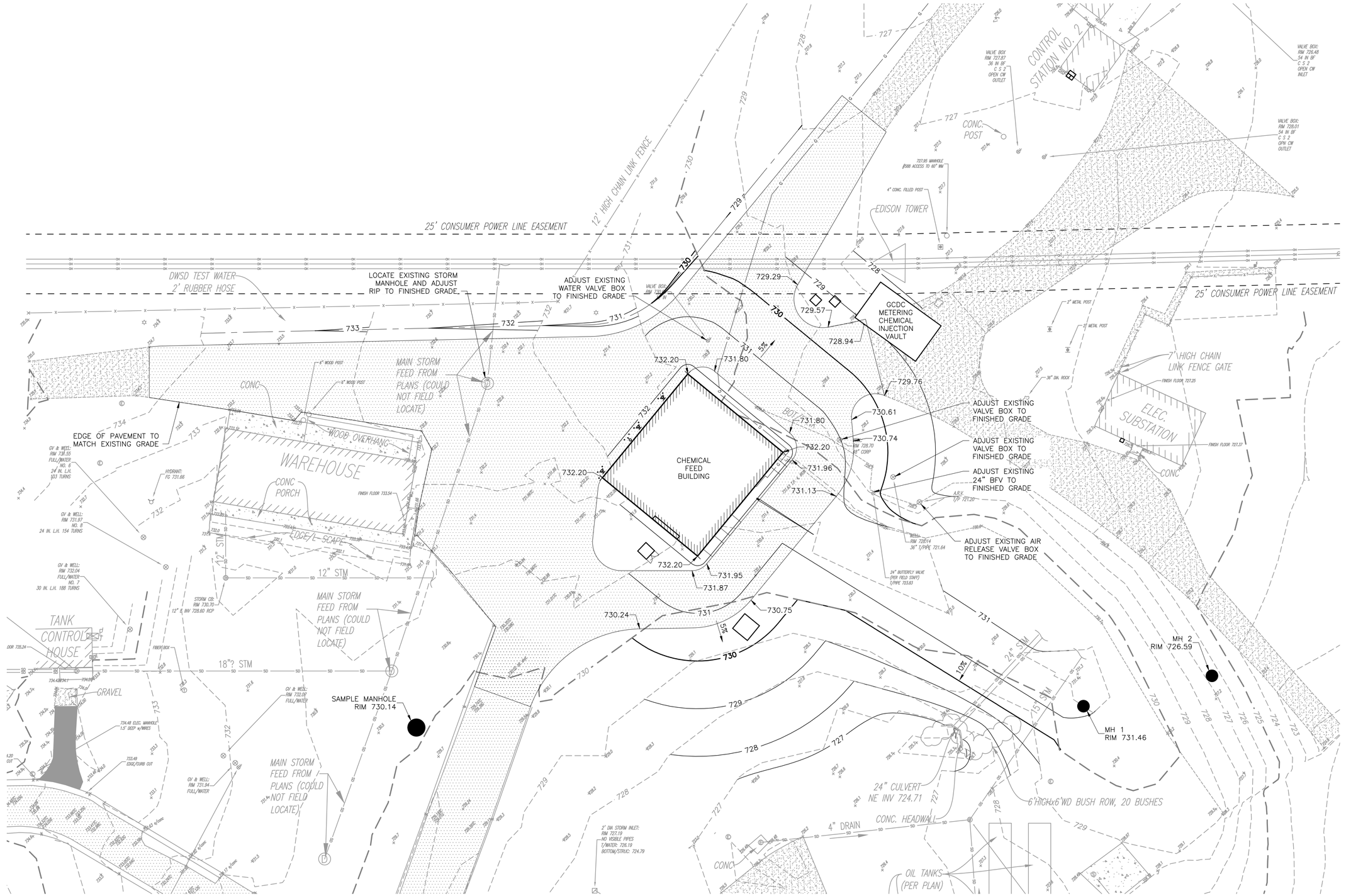
CHEMICAL SYSTEMS FEED BUILDING

YARD PIPING
PROFILES

PROJECT NO. 255128-234374
FILE NAME: C005SSPR.DWG

SHEET NO.
C-5

BID SET



PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

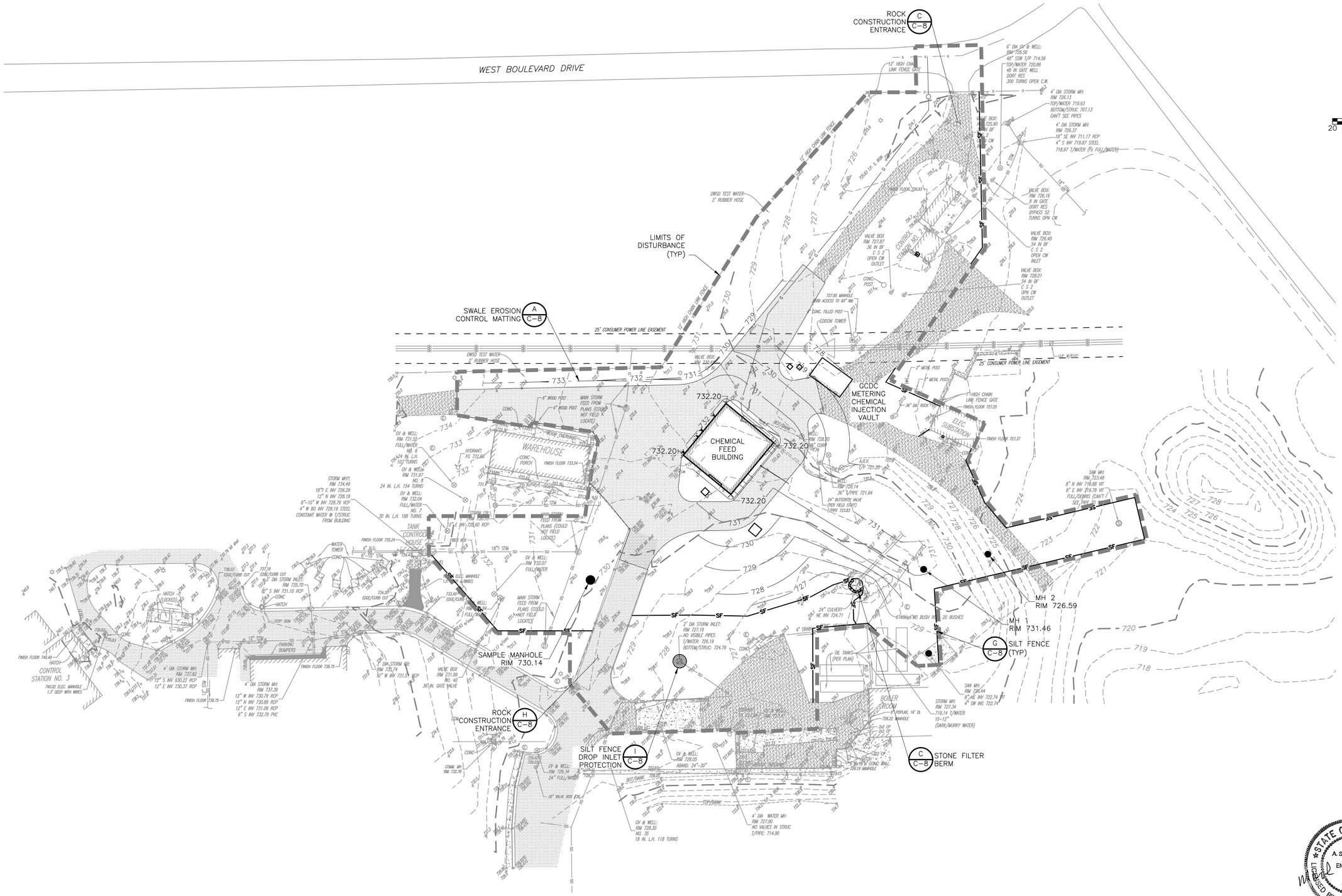
CHEMICAL SYSTEMS FEED BUILDING

GRADING AND DRAINAGE PLAN

PROJECT NO. 255128-234374
FILE NAME: C006GRPL.DWG

SHEET NO.
C-6

BID SET



PLAN

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43123
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

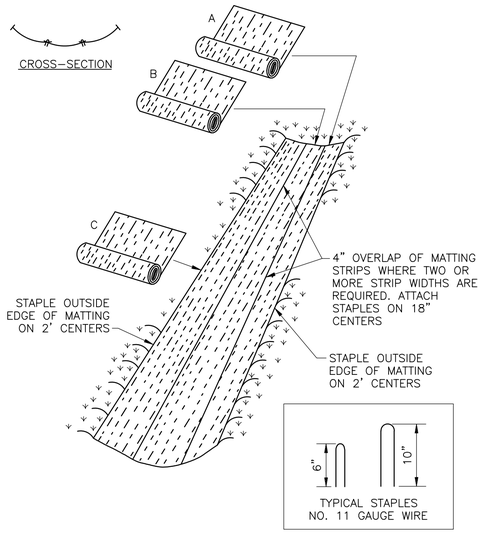
CHEMICAL SYSTEMS FEED BUILDING

EROSION AND SEDIMENTATION CONTROL PLAN

PROJECT NO. 255128-234374
FILE NAME: C007ESPL.DWG

SHEET NO.
C-7

BID SET



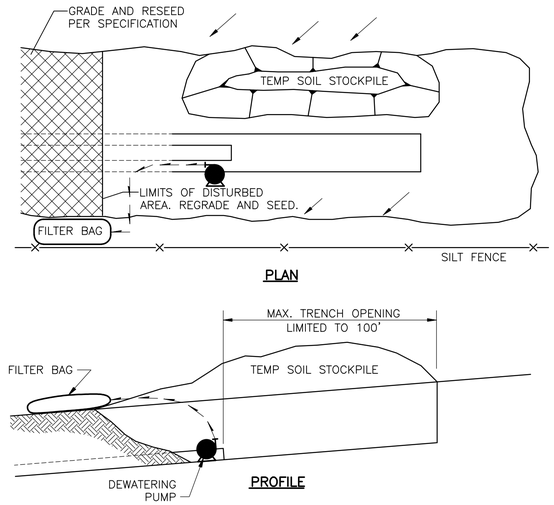
CONSTRUCTION SPECIFICATIONS

1. KEY-IN THE MATTING BY PLACING THE TOP ENDS OF THE MATTING IN A NARROW TRENCH, 6" IN DEPTH. BACKFILL THE TRENCH AND TAMP FIRMLY TO CONFORM TO THE CHANNEL CROSS-SECTION. SECURE WITH A ROW OF STAPLES ABOUT 4" DOWN SLOPE FROM THE TRENCH. SPACING BETWEEN STAPLES IS 6".
2. STAPLE THE 4" OVERLAP IN THE CHANNEL CENTER USING AN 18" SPACING BETWEEN STAPLES.
3. BEFORE STAPLING THE OUTER EDGES OF THE MATTING, MAKE SURE THE MATTING IS SMOOTH AND IN FIRM CONTACT WITH THE SOIL.
4. STAPLES SHALL BE PLACED 2' APART WITH 4 ROWS FOR EACH STRIP, 2 OUTER ROWS, AND 2 ALTERNATING ROWS DOWN THE CENTER.
5. WHERE ONE ROLL OF MATTING ENDS AND ANOTHER BEGINS, THE END OF THE TOP STRIP SHALL OVERLAP THE UPPER END OF THE LOWER STRIP BY 4", SHIPLAP FASHION. REINFORCE THE OVERLAP WITH A DOUBLE ROW OF STAPLES SPACED 6" APART IN A STAGGERED PATTERN ON EITHER SIDE.
6. THE DISCHARGE END OF THE MATTING LINER SHOULD BE SIMILARLY SECURED WITH 2 DOUBLE ROWS OF STAPLES.

NOTE: IF FLOW WILL ENTER FROM THE EDGE OF THE MATTING THEN THE AREA EFFECTED BY THE FLOW MUST BE KEYED-IN.

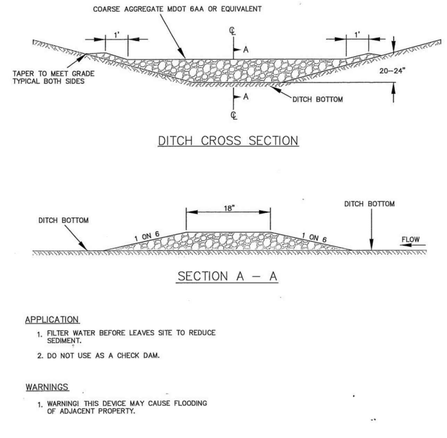
SWALE EROSION CONTROL MATTING

DETAIL A – NTS



SOIL STOCKPILE

DETAIL B – NTS



APPLICATION

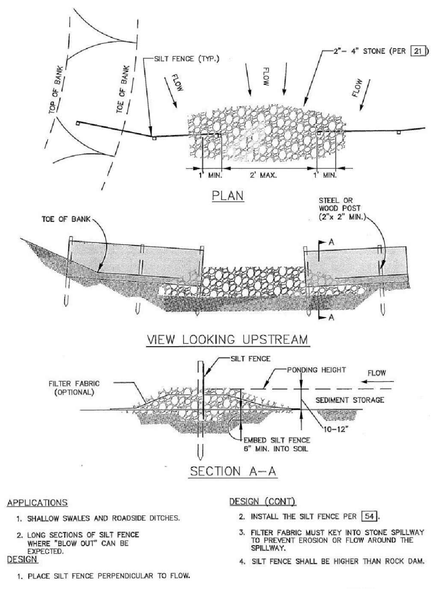
1. FILTER WATER BEFORE LEAVES SITE TO REDUCE SEDIMENT.
2. DO NOT USE AS A CHECK DAM.

WARNINGS

1. WARNING! THIS DEVICE MAY CAUSE FLOODING OF ADJACENT PROPERTY.

STONE FILTER BERM (21)

DETAIL C – NTS



APPLICATIONS

1. SHALLOW SWALES AND ROADSIDE DITCHES.
2. LONG SECTIONS OF SILT FENCE WHERE "BLOW OUT" CAN BE EXPECTED.

DESIGN

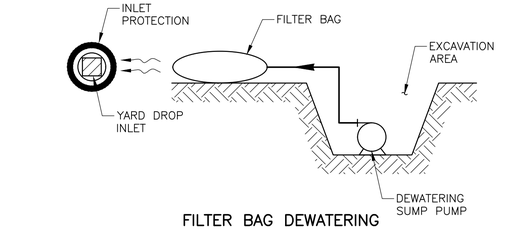
1. PLACE SILT FENCE PERPENDICULAR TO FLOW.

DESIGN (CONT)

2. INSTALL THE SILT FENCE PER 54.
3. FILTER FABRIC MUST KEY INTO STONE SPILLWAY TO PREVENT EROSION OR FLOW AROUND THE SPILLWAY.
4. SILT FENCE SHALL BE HIGHER THAN ROCK DAM.

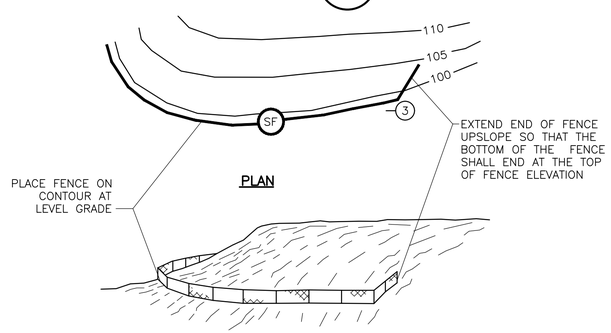
STONE FILTER BERM WITH SILT FENCE (21A)

DETAIL D – NTS



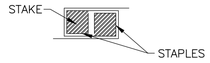
FILTER BAG DEWATERING

DETAIL E – NTS

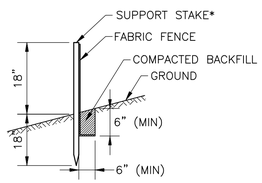


SILT FENCE INSTALLATION

DETAIL F – NTS



JOINING FENCE SECTIONS



STANDARD FILTER FABRIC FENCE (18" HEIGHT)

NOTES:

* STAKES SPACED @ 8' MAXIMUM. USE 2" X 2" WOOD OR EQUIVALENT STEEL STAKES.

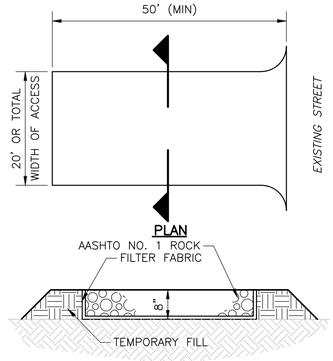
FILTER FABRIC FENCE MUST BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET. SEE STANDARD CONSTRUCTION DETIAL #18.

SILT FENCE

DETAIL G – NTS

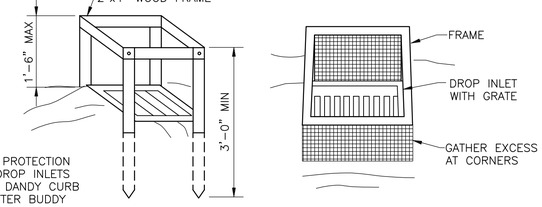


MAINTENANCE:

ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

ROCK CONSTRUCTION ENTRANCE

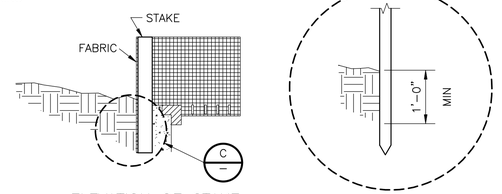
DETAIL H – NTS



NOTE:

DROP INLET PROTECTION FOR CURB DROP INLETS SHALL BE A DANDY CURB BAG OR GUTTER BUDDY OR OTHER SIMLAR PRODUCTS THAT ALLOW FOR OVERFLOWING INTO DROP INLETS DURING STORM EVENTS.

PERSPECTIVE VIEWS



ELEVATION OF STAKE AND FABRIC ORIENTATION

DETAIL A

SPECIFIC APPLICATION:

1. THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLOAD FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.
2. CONTRACTOR MAY PROPOSE ALTERNATE INLET PROTECTION WHERE INSTALLATION OF THE SILT FENCE DROP INLET PROTECTION IS NOT PRACTICAL. CONTRACTOR'S PROPOSED METHOD IS SUBJECT TO APPROVAL BY THE ENGINEER.

SILT FENCE DROP INLET PROTECTION

DETAIL I – NTS

STATE OF MICHIGAN – MARK A. SCHOBERT – ENGINEER – No. 43128 – LICENSED PROFESSIONAL ENGINEER – 10/9/19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

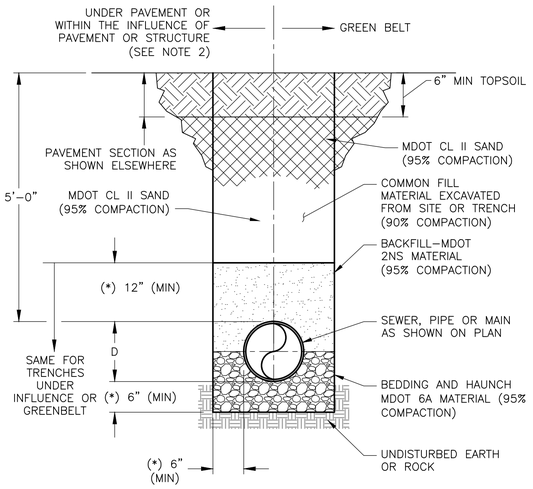
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

EROSION AND SEDIMENTATION CONTROL DETAILS

PROJECT NO. 255128-234374
FILE NAME: C008SDDT.DWG
SHEET NO. C-8

BID SET

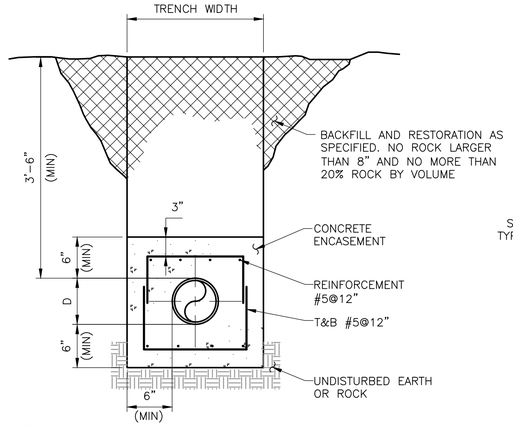


NOTES:

1. TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. BEGIN SIDE SLOPES, IF USED. APPROXIMATELY 18" ABOVE TOP OF PIPE (TYPICAL ALL BACKFILL TYPES).
2. ALL PIPES SHALL BE INSPECTED PRIOR TO BACKFILL. ALL PIPE COVERED PRIOR TO INSPECTION SHALL BE UNCOVERED AT THE CONTRACTOR'S EXPENSE.
3. UNLESS OTHERWISE AUTHORIZED BY ENGINEER; TRENCH BACKFILL IN AREAS OF FUTURE STREET CONSTRUCTION, SHALL CONFORM TO THIS DETAIL. BACKFILL LIMITS FOR THIS DETAIL SHALL EXTEND TO THE TOP OF TRENCH AND 3 FT. BACK OF ALL CURBS, AND UNDER ANY SIDEWALKS, EXISTING OR PROPOSED.

TRENCHING IN PAVED AND GREENBELT AREAS

DETAIL A – NTS

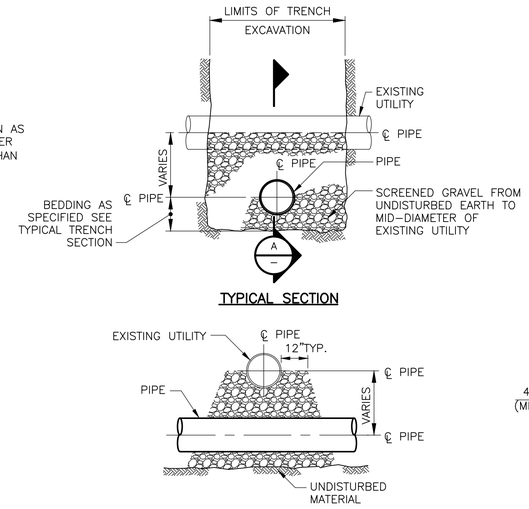


NOTES:

1. TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. BEGIN SIDE SLOPES, IF USED, APPROXIMATELY 18" ABOVE TOP OF PIPE (TYPICAL ALL BACKFILL TYPES).
2. CONTRACTOR MUST PROVIDE SOME MEANS OF BRACING TO PREVENT FLOTATION OF THE WATER LINE PRIOR TO THE POURING OF CONCRETE.

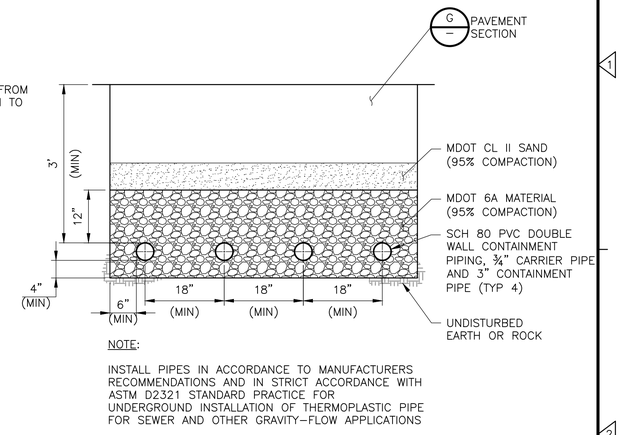
CONCRETE ENCASEMENT

DETAIL B – NTS



EXISTING UTILITY CROSSING

DETAIL C – NTS

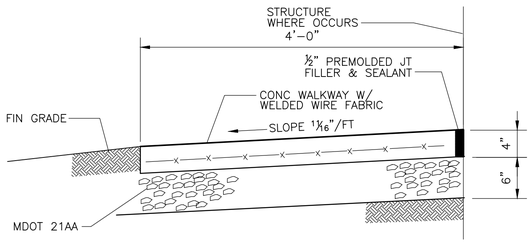


NOTE:

INSTALL PIPES IN ACCORDANCE TO MANUFACTURERS RECOMMENDATIONS AND IN STRICT ACCORDANCE WITH ASTM D2321 STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWER AND OTHER GRAVITY-FLOW APPLICATIONS

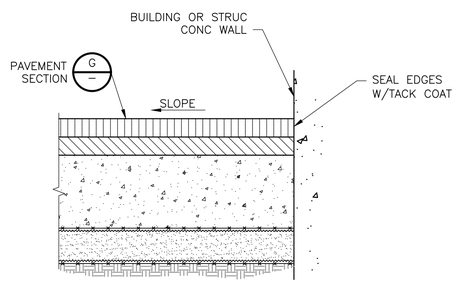
CHEMICAL FEED LINE CARRIER PIPE

DETAIL D – NTS



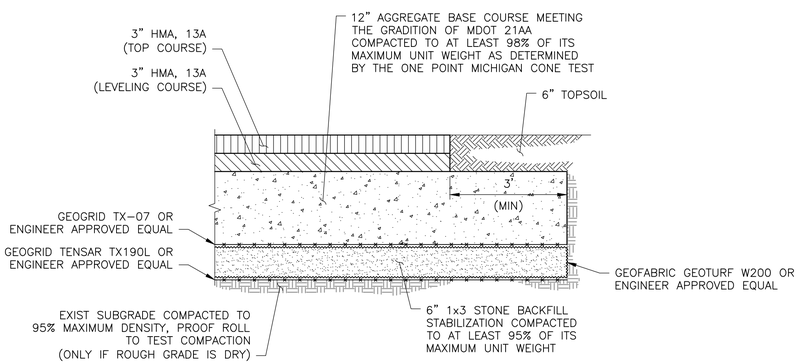
CONCRETE WALKWAY NEXT TO STRUCTURE

DETAIL E – NTS



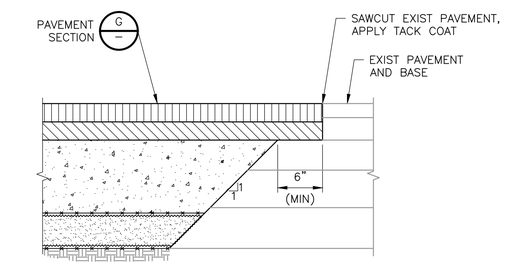
PAVEMENT ADJACENT TO BUILDING OR STRUCTURES

DETAIL F – NTS



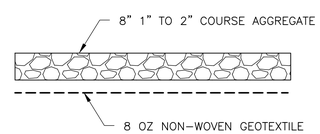
PAVEMENT SECTION

DETAIL G – NTS



TRANSITION FROM NEW TO EXISTING PAVEMENT

DETAIL H – NTS



GRAVEL DRIVE

DETAIL I – NTS

STATE OF MICHIGAN
MARK A. SCHOBERT
ENGINEER
No. 43128
REGISTERED PROFESSIONAL ENGINEER
10-29-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

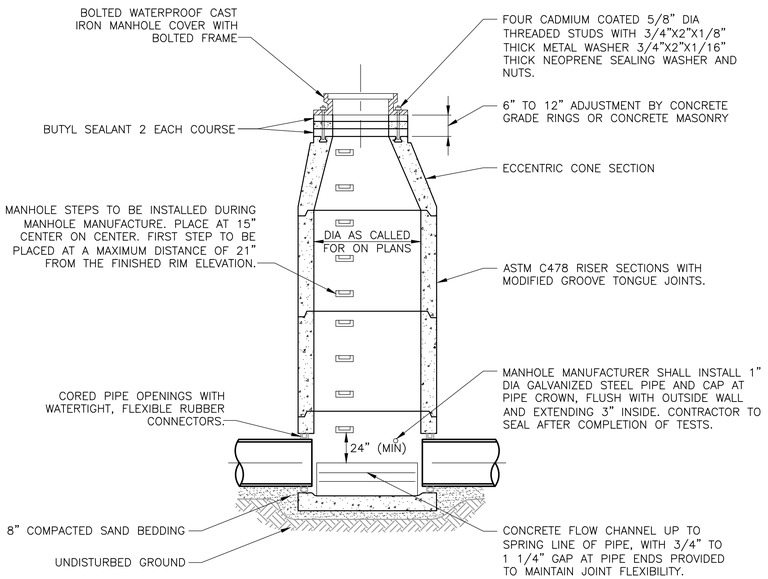
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

CIVIL
DETAILS I

PROJECT NO. 255128-234374
FILE NAME: C009SDDT.DWG
SHEET NO.
C-9

BID SET

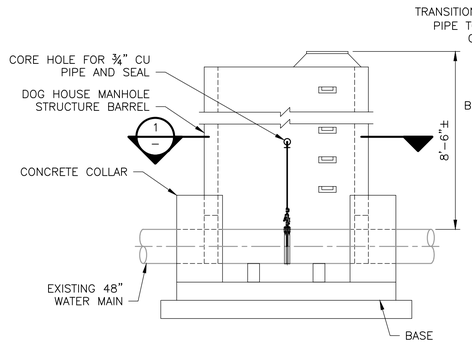


STANDARD SANITARY MANHOLE

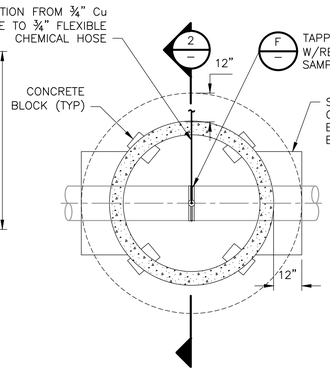
DETAIL A / – NTS

NOTES:

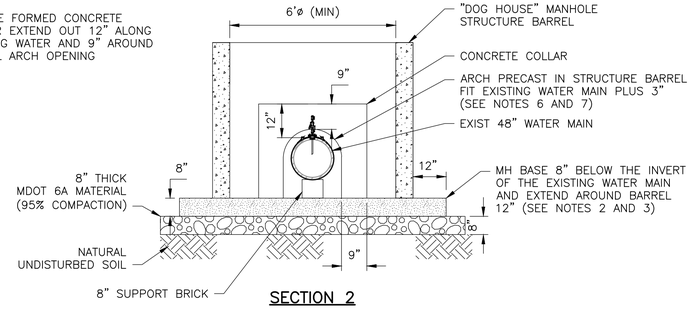
1. INTEGRAL POUR FOR BASE AND BENCH. (NO PRECAST BASE)
2. ALL POURED–IN–PLACE CONCRETE MUST BE 4000 PSI NON–SHRINK MIX.
3. MANHOLE DIAMETER MINIMUM SHALL BE 72 INCHES.
4. CONCRETE BONDING AGENT MUST BE APPLIED TO ALL INTERFACES OF PRECAST CONCRETE SURFACES WITH POURED–IN–PLACE CONCRETE.
5. A CURVED INTERNAL ARCH FORM MUST BE USED DURING COLLAR CONCRETE FILL. NO BRICK, MORTAR, OR DEBRIS IS TO BE USED IN PLACE OF CONSOLIDATED CONCRETE.
6. ALL DIMENSIONS NOTED ARE MINIMUM ALLOWED.
7. THE STRUCTURE MUST NOT BE BACKFILLED FOR A MINIMUM OF 24 HOURS AFTER CONSTRUCTION.



DOG HOUSE MANHOLE PROFILE



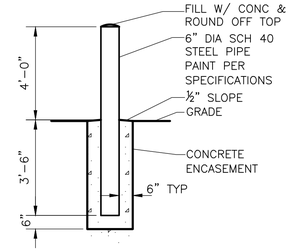
SECTION 1



SECTION 2

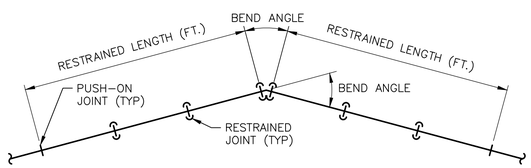
SAMPLE MANHOLE (DOGHOUSE)

DETAIL B / – NTS



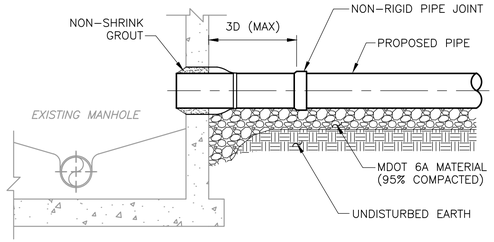
BOLLARD

DETAIL C / – NTS



RESTRAINED DI PIPE LENGTH

DETAIL D / – NTS

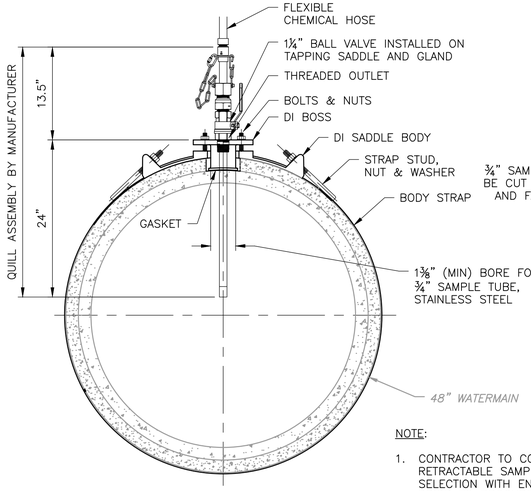


NOTES:

1. CUT HOLE IN EXISTING MANHOLE WITH CORING MACHINE.
2. INSTALL FLEXIBLE NEOPRENE BOOT.
3. FILL ANNULAR SPACE WITH NON–SHRINK GROUT.

NEW SEWER TO EXISTING MANHOLE CONNECTION

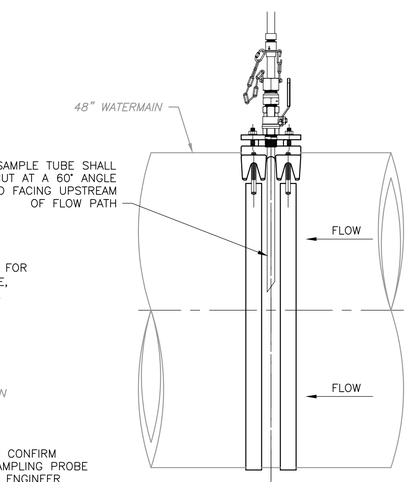
DETAIL E / – NTS



NOTE:

1. CONTRACTOR TO CONFIRM RETRACTABLE SAMPLING PROBE SELECTION WITH ENGINEER PRIOR TO PROCUREMENT AND TAPPING WATER MAIN.

EB–191–B–S–24–0–00



SECTION

TAPPING SADDLE WITH RETRACTABLE SAMPLING PROBE

DETAIL F / – NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

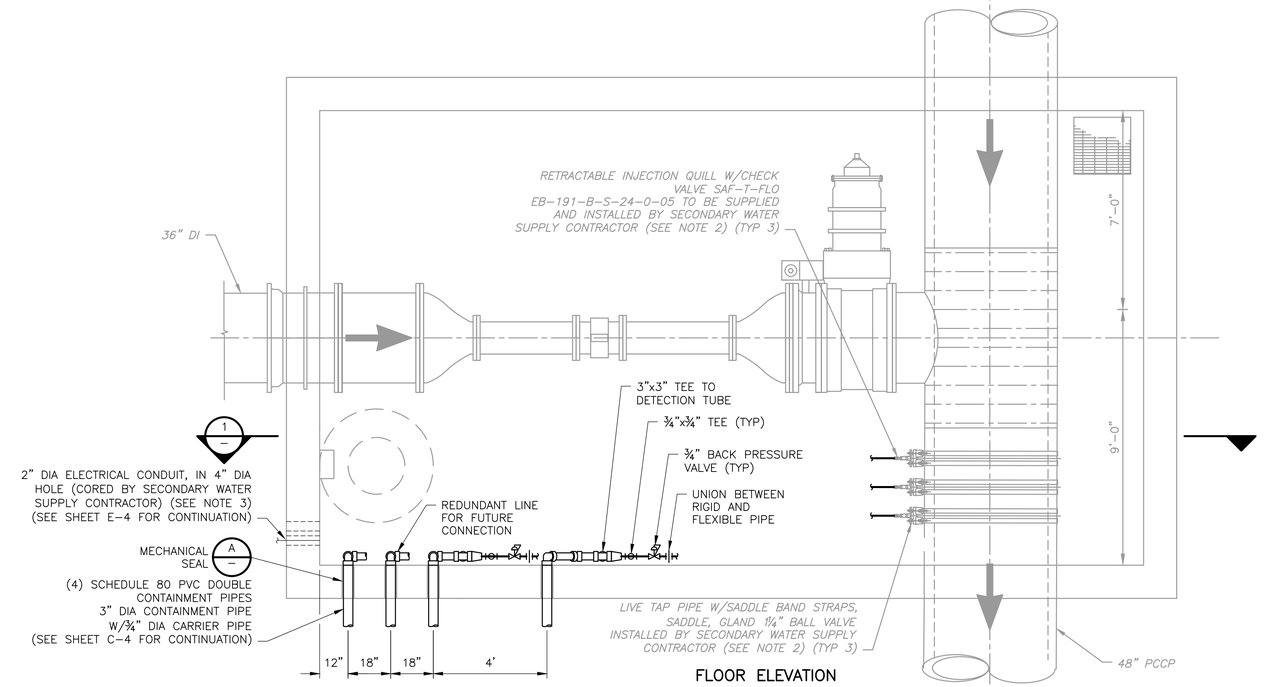
CHEMICAL SYSTEMS FEED BUILDING

CIVIL
DETAILS II

PROJECT NO. 255128–234374
FILE NAME: C010SDDT.DWG

SHEET NO.
C-10

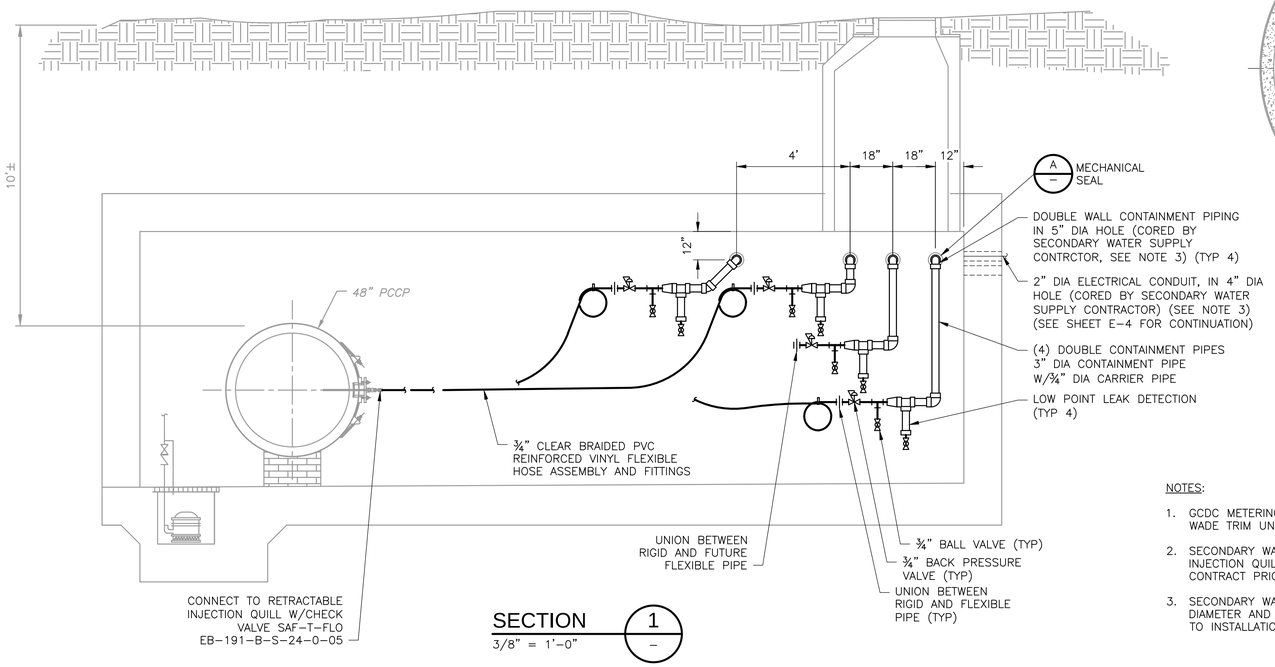
BID SET



FLOOR ELEVATION

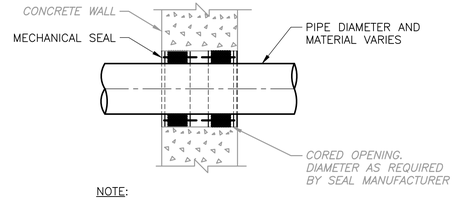
PLAN

3/8" = 1'-0"



SECTION 1

3/8" = 1'-0"



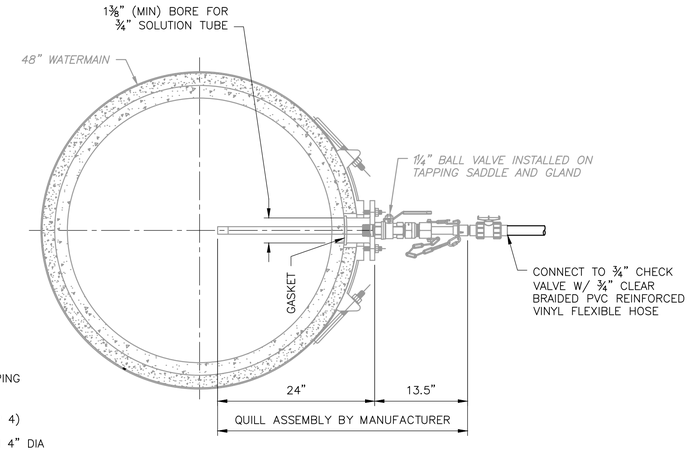
NOTE:

INSULATED PIPING: INTERRUPT INSULATION AT BOTH SIDES OF WALL. INSTALL INSULATION FLUSH WITH WALL AFTER WATER TIGHT INSTALLATION OF MECHANICAL SEAL.

CORE DRILLED OPENING AND MECHANICAL SEAL PENETRATION THROUGH EXISTING CONCRETE

DETAIL A

NTS



RETRACTABLE CHEMICAL INJECTION QUILL ASSEMBLY

DETAIL B

NTS

NOTES:

1. GCDC METERING AND CHEMICAL INJECTION VAULT TO BE DESIGNED BY WADE TRIM UNDER SECONDARY WATER SUPPLY CONTRACT.
2. SECONDARY WATER SUPPLY CONTRACTOR TO CONFIRM CHEMICAL INJECTION QUILL SELECTION WITH CHEMICAL SYSTEMS FEED BUILDING CONTRACT PRIOR TO PROCUREMENT AND TAPPING WATER MAIN.
3. SECONDARY WATER SUPPLY CONTRACTOR TO CONFIRM WALL OPENING DIAMETER AND LOCATION WITH CHEMICAL FEED BUILDING CONTRACT PRIOR TO INSTALLATION.

STATE OF MICHIGAN — MARK A. SCHOBERT — ENGINEER — No. 43129 — REGISTERED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

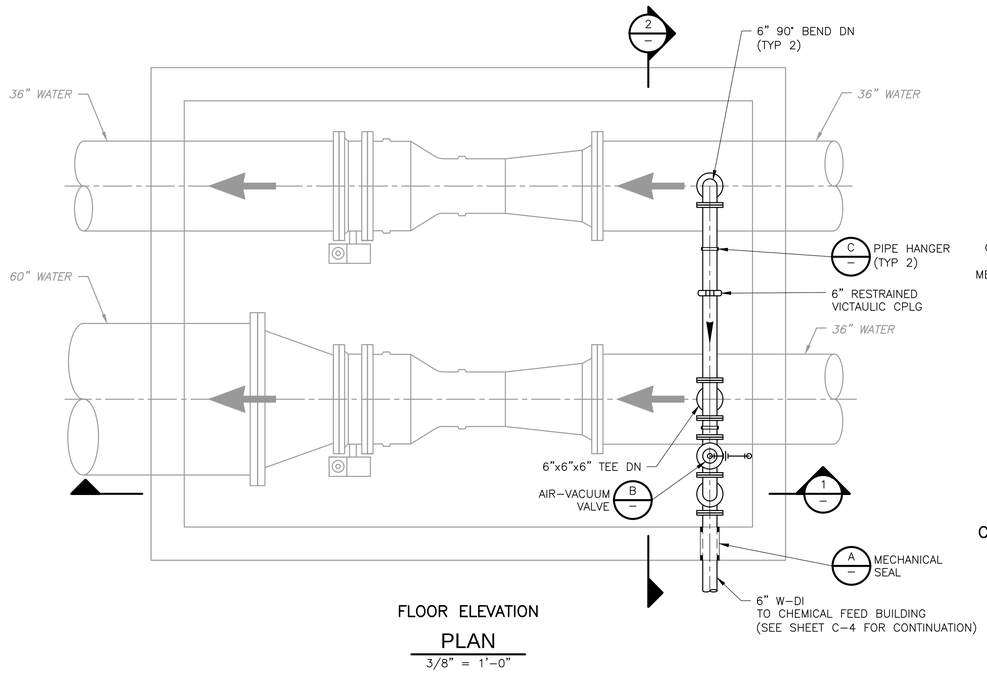
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL INJECTION PIPING IN GENESEE COUNTY DRAIN COMMISSIONERS METERING AND CHEMICAL INJECTION VAULT

PROJECT NO. 255128-234374
FILE NAME: C011VMDT.DWG

SHEET NO.
C-11

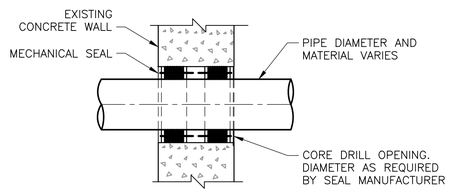
BID SET



FLOOR ELEVATION

PLAN

3/8" = 1'–0"



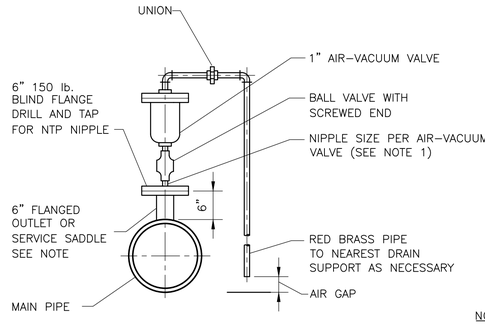
NOTE:

INSULATED PIPING: INTERRUPT INSULATION AT BOTH SIDES OF WALL. INSTALL INSULATION FLUSH WITH WALL AFTER WATER TIGHT INSTALLATION OF MECHANICAL SEAL.

CORE DRILLED OPENING AND MECHANICAL SEAL PENETRATION THROUGH EXISTING CONCRETE

DETAIL A

NTS



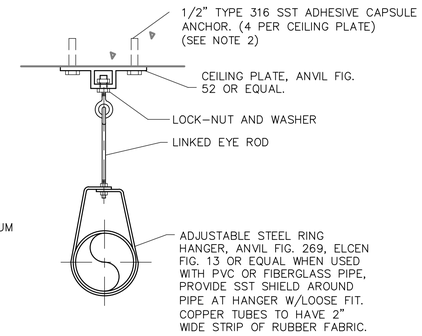
NOTE:

RED BRASS PIPE SHALL BE SEAMLESS ALLOY 230, 061 ANNEALED TEMPER, EXTRA STRONG IN ACCORDANCE WITH ASTM B43. PIPE SHALL BE SUITABLE FOR THREADING AND USE WITH CAST BRONZE THREADED FITTINGS. THREADED ENDS OF NIPPLES SHALL CONFORM TO ASME B1.20.1.

AIR–VACUUM VALVE

DETAIL B

NTS



HANGER RODS
3/4" DIA AND SMALLER
MAX WEIGHT 1430 LBS

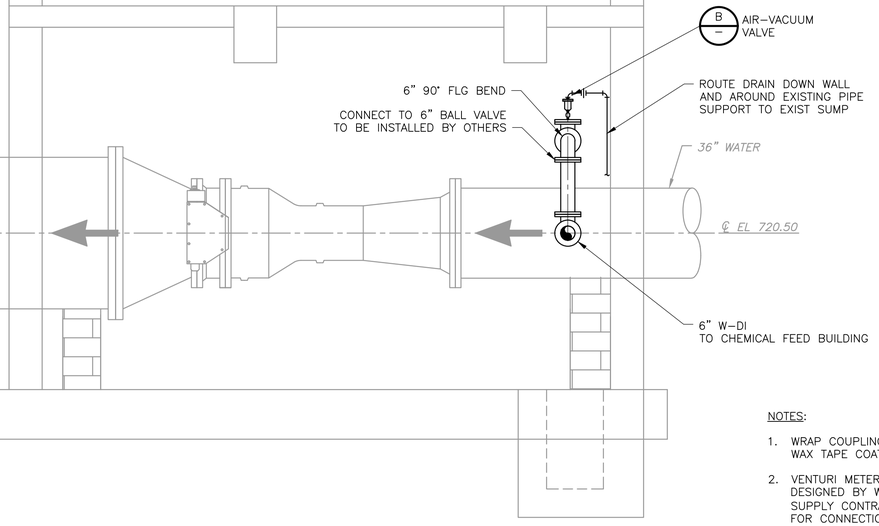
NOTES:

1. WHERE LOCATED ABOVE WATER, PIPE SUPPORT SYSTEMS SHALL BE TYPE 316 STAINLESS STEEL MATERIALS OF CONSTRUCTION.
2. STAINLESS STEEL ADHESIVE CAPSULE ANCHORS SHALL BE A TWO–PART STUD AND CAPSULE RESIN ANCHORING SYSTEM. CAPSULES SHALL BE SELF–CONTAINED, SEALED GLASS UNITS CONTAINING PREMEASURED AMOUNTS OF RESIN, AGGREGATES, AND HARDENER.
3. ALL PARTS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.

PIPE HANGER

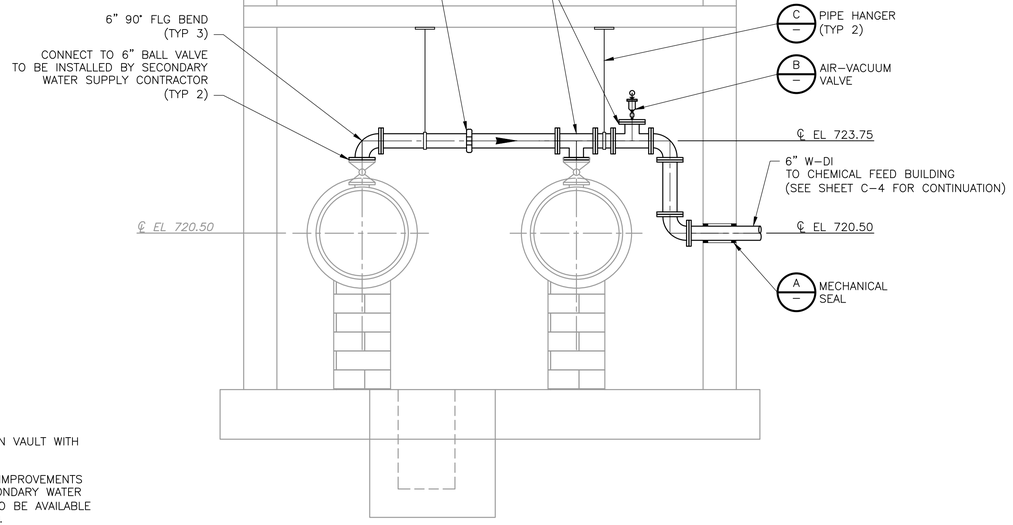
DETAIL C

NTS



SECTION 1

3/8" = 1'–0"

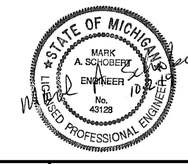


NOTES:

1. WRAP COUPLING AND FLANGE BOLTS IN VAULT WITH WAX TAPE COATING SYSTEM.
2. VENTURI METER AND RELATED PIPING IMPROVEMENTS DESIGNED BY WADE–TRIM UNDER SECONDARY WATER SUPPLY CONTRACT. 6" BALL VALVES TO BE AVAILABLE FOR CONNECTION BY AUGUST 1, 2020.

SECTION 2

3/8" = 1'–0"



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. SCHOBERT
DRAWN BY: C. MILLER
SHEET CHK'D BY: M. SCHOBERT
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. SCHOBERT
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

6-INCH WATER SUPPLY PIPING IN CONTROL STATION NO. 2 PLAN, SECTIONS AND DETAIL

PROJECT NO. 255128–234374
FILE NAME: C012VTDT.DWG

SHEET NO.
C-12

BID SET

ABBREVIATIONS

&	AND	GB	GLASS BLOCK	REF	ROOF EXHAUST FAN
<	ANGLE	GRT	GRATING	REINF	REINFORCE (D, ING)
@	AT	GYP	GYPSUM	REQ'D	REQUIRED
AB	ANCHOR BOLT	GWB	GYPSUM WALL BOARD	REV	REVISED
ABV	ABOVE	HARD	HARDENER	RF	ROOF FAN
ACMU	ACOUSTICAL CONCRETE MASONRY UNIT	HD	HEAVY DUTY	RFG	ROOFING
AFF	ABOVE FINISHED FLOOR	HDWD	HARDWOOD	RGH	ROUGH
AFG	ABOVE FINISHED GRADE	HDWR	HARDWARE	RJ	REVEAL/RUSTICATION JOINT
AL, ALUM	ALUMINUM	HG	HALF GLASS	RL	RAIN LEADER
AMP	ACOUSTICAL METAL PANELS	HGR	HANGER	RLG	RAILING
ANOD	ANODIZE(D)	HGT	HEIGHT	RM	ROOM
ASSY	ASSEMBLY	HM	HOLLOW METAL	RO	ROUGH OPENING
BBT	BIOBASED TILE	HOR	HORIZONTAL	RT	RUBBER TILE
BD	BOARD	HP	HIGH POINT	RWL	RAIN WATER LEADER
BEV	BEVEL(ED)	HR	HANDRAIL	S	STEEL S-SHAPED DESIGNATION
BLDG	BUILDING	IN	INCH	SAT	SUSPENDED ACOUSTICAL TILE
BLK	BLOCK	INST	INSTRUMENTATION	SB	SEAMLESS BASE
BLKG	BLOCKING	INSUL	ISULATION	SCHD	SCHEDULE
BRG	BEARING	JC	JANITOR'S CLOSET	SCRN	SCREEN(ED, ING)
BRK	BRICK	JT	JOINT	SECT	SECTION
BRS	BRASS	JT FLR	JOINT FILLER	SF	SEAMLESS FLOORING
BRZ	BRONZE	L	LINE OF STRUCTURAL ANGLE DESIGNATION	SGFT	STRUCTURAL GLAZED FACING TILE
BTM	BOTTOM	LAB	LABORATORY	SHT	SHEET
C TO C	CENTER TO CENTER	LAD	LADDER	SIM	SIMILAR
CAB	CABINET	LAM	LAMINIATED	SK	SINK
CEM	CEMENT	LAV	LAVATORY	SL	SLOPE
CF	COMPRESSIBLE FILLER	LG	LAMINATED GLASS	SLNT	SEALANT
CGFB	CEMENTITIOUS GLASS FIBER BOARD	LINO	LINOLEUM	SPEC	SPECIFICATION, SPECIFIED
CH	CONCRETE HARDENER	LKR	LOCKER	SST	STAINLESS STEEL
CHAM	CHAMFER	LNTL	LINTEL	STD	STANDARD
CHAN	CHANNEL	LP	LOW POINT	STL	STEEL
CIP	CAST IN PLACE	LT	LIGHT(S)	STOR	STORAGE
CJ	CONTROL JOINT	MAS	MASONRY	STRU	STRUCTURE(S, URAL)
CL OR	CENTERLINE	MATL	MATERIAL	STWY	STAIRWAY
CLG	CEILING	MAX	MAXIMUM	SUPT	SUPERINTENDENT
CLKG	CAULKING	MEMB	MEMBRANE	SUSP	SUSPENDED
CMU	CONCRETE MASONRY UNIT	MFR	MANUFACTURER	T	TREAD(S)
COL	COLUMN	MIN	MINIMUM	TBM	TRAFFIC BEARING MEMBRANE
COMP	COMPRESSIBLE	MISC	MISCELLANEOUS	T&G	TONGUE AND GROOVE
CONC	CONCRETE	MO	MASONRY OPENING	TEMP	TEMPERATURE
CONT	CONTINUOUS	MR	MOISTURE RESISTANT	TEMP	TEMPERED
CRPT	CARPET, CARPET TILE	MRAT	MOISTURE RESISTANT ACOUSTICAL TILE	TEMP	TEMPORARY
CRS	COURSE(S)	MTD	MOUNTED	TER	TERRAZZO
CT	CERAMIC TILE	MTG	MOUNTING	TERB	TERRAZZO BASE
CET	DETAIL	MTL	METAL	THK	THICK(NESS)
DF	DRINKING FOUNTAIN	NIC	NOT IN CONTRACT	THR	THRESHOLD
DIA	DIAMETER	NOM	MONINAL	TKBD	TACKBOARD
DIAG	DIAGONAL	NTS	NOT TO SCALE	TOB	TOP OF BRICK
DIM	DIMENSION	OC	ON CENTER	TOC	TOP OF CONCRETE
DISP	DISPENSER	OH	OVERHANG	TOIL	TOILET
DN	DOWN	OPNG	OPENING	TOM	TOP OF MASONRY
DP	DAMPPROOFING	OPP HD	OPPOSITE HAND	TOPG	TOPPING
DR	DRAIN	ORD	OVERFLOW ROOF DRAIN	TOS	TOP OF STEEL
ELEC	ELECTRICAL	OSB	ORIENTED STRAND BOARD	TS	STRUCTURAL TUBING (STEEL UNLESS NOTED)
ELEV	ELEVATION	OV	OVER	TSL	TOP OF SLAB
EQ	EQUAL(LY)	OVHD	OVERHEAD	TWF	THROUGH WALL FLASHING
EQPT	EQUIPMENT	PERIM	PERIMETER	TYP	TYPICAL
EWC	ELECTRICAL WATER COOLER	PL	PLATE	UC	UNDERCUT
EXP	EXPOSED	PL	PROPERTY LINE	UON	UNLESS OTHERWISE NOTED
EJ	EXPANSION JOINT	PLAS	PLASTER	UR	URINAL
EXIST, (E)	EXISTING	PLK	PLANK	VB	VAPOR BARRIER
FD	FLOOR DRAIN	PLYWD	PLYWOOD	VCT	VINYL COMPOSITE TILE
FE	FIRE EXTINGUISHER	PM	PRESSED METAL	VERT	VERTICAL
FF	FACTORY FINISH	PR	PAIR	VEST	VESTIBULE
FGL	FIBERGLASS	PRD	PROMENADE ROOF DRAIN	VTR	VENT THRU ROOF
FIN	FINISH(ED)	PRCST	PRECAST	W	WITH
FLG	FLASHING	PREFAB	PRE-FABRICATED	W/	WITH
FL	FLOOR(ING)	PT	PREASSURE TREATED	W/A	WHERE APPLICABLE
FLR	FILLER	PRMLD	PREMOLDED	W/O	WITHOUT
FR	FRAME	PSF	POUNDS PER SQUARE FOOT	WC	WATER CLOSET
FRP	FIBERGLASS REINFORCED PLASTIC	PTD	PAINTED	WD	WOOD
FO	FRAME OPENING	QT	QUARRY TILE	WDW	WINDOW
FV	FIELD VERIFY	QTB	QUARRY TILE BASE	WF	WIDE FLANGE
FXD	FIXED	R	RISER(S)	WPG	WATERPROOFING
GA	GAGE, GAUGE	R+S	BACKER ROD & SEALANT	WT	STEEL TEE-SHAPE DESIGNATION
GALV	GALVANIZED	RB	RUBBER BASE	WWF	WELDED WIRE FABRIC
GL	GLASS	RD	ROOF DRAIN		
		RECT	RECEPTACLE		

GENERAL NOTES

HEIGHT OF INTERIOR STUD AND CMU PARTITIONS ARE FROM FLOOR TO THE UNDERSIDE OF ROOF DECK UNLESS OTHERWISE NOTED. PROVIDE DEFLECTION HEADS AT TOP OF WALL (TYPICAL).

NOT ALL EQUIPMENT IS SHOWN FOR CLARITY. REFER TO THE APPROPRIATE DISCIPLINE SHEETS FOR SPECIFIC EQUIPMENT LAYOUT AND OTHER REQUIREMENTS

SEE CIVIL SHEETS FOR SIDEWALK, ROAD PAVING AND FINISH GRADE ELEVATIONS.

SEE STRUCTURAL SHEETS FOR SIZE AND LOCATION OF CONCRETE PADS, TRENCHES, VAULTS, SUMPS, ETC

SEE STRUCTURAL SHEETS FOR CONCRETE AND MASONRY REINFORCEMENT

ALL INTERIOR CMU WALLS SHALL BE PROVIDED WITH INSULATION INSERTS (SEE SPEC 04200)

PATCH AND REPAIR ANY MATERIALS OR SURFACES DAMAGED DURING THE CONSTRUCTION PROCESS TO MATCH THE EXISTING ADJACENT SURFACES.

ALL ITEMS TO BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE.

ALL JOINTS, VOIDS AND PENETRATIONS THROUGH FIRE-RATED WALL SYSTEMS ARE TO BE FILLED/SEALED WITH UL APPROVED FIRESAFING/FIRESTOPPING MATERIALS TO ACHIEVE THE REQUIRED FIRE-RATING (REFER TO CODE DRAWINGS FOR LOCATIONS).

DO NOT SCALE FROM THE DRAWINGS

NOTIFY ARCHITECT IF CONSTRUCTION DOCUMENTS DIFFER FROM ACTUAL FIELD CONDITIONS PRIOR TO FABRICATION OR NEW CONSTRUCTION

THIS DRAWING CONTAINS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

MATERIAL SYMBOLS

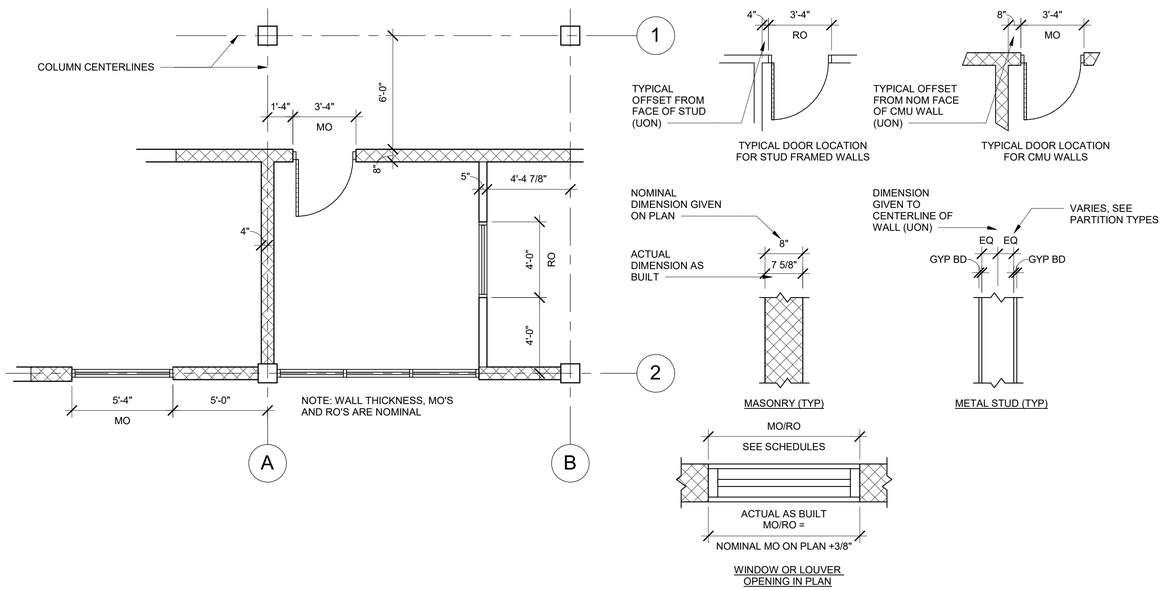
EARTH
GRAVEL
BRICK
CONCRETE MASONRY UNIT (CMU)
PRECAST CONCRETE
CAST-IN-PLACE CONCRETE
WOOD BLOCKING
WOOD FINISH
PLYWOOD
RIGID INSULATION
BLANKET INSULATION
STEEL
ALUMINUM
STUCCO / GROUT
CAULK

LINE TYPES (UNLESS OTHERWISE NOTED)

CONTINUOUS - NEW CONSTRUCTION

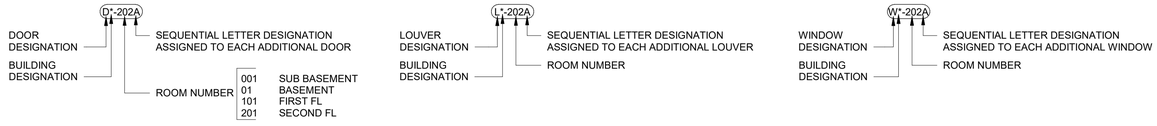
DASHED ON CONSTRUCTION PLAN/SHEETS - HIDDEN ELEMENTS BEYOND, ABOVE OR BELOW

DIMENSIONING SYSTEM

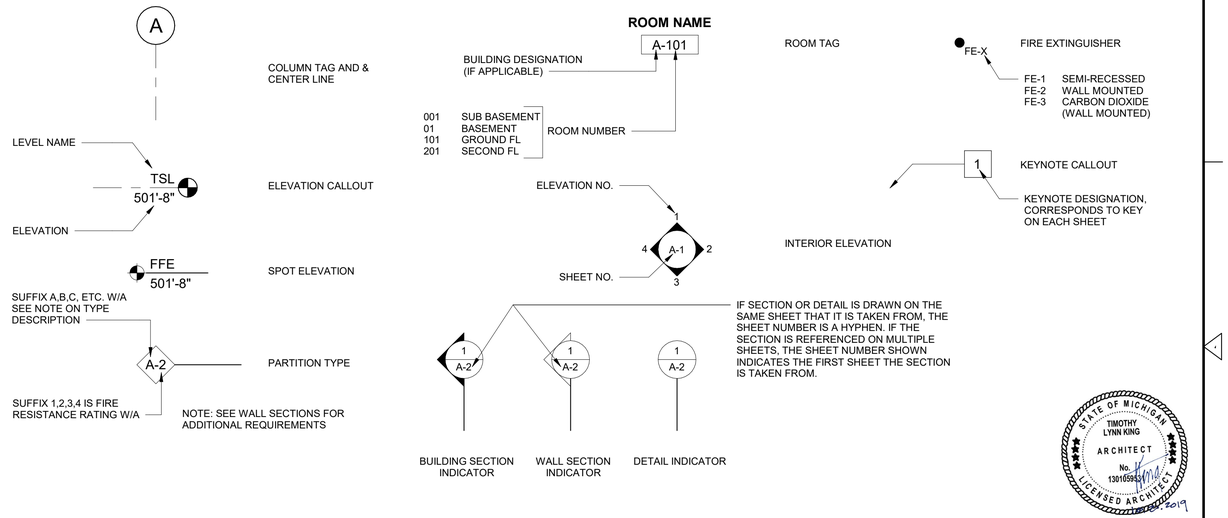


OPENINGS

USUALLY LABELED IN PLAN VIEW; HOWEVER, OPENINGS NOT SHOWN IN PLAN ARE LABELED ON ELEVATIONS



SYMBOLS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ARCHITECTURAL
LEGEND, ABBREVIATIONS, GENERAL NOTES

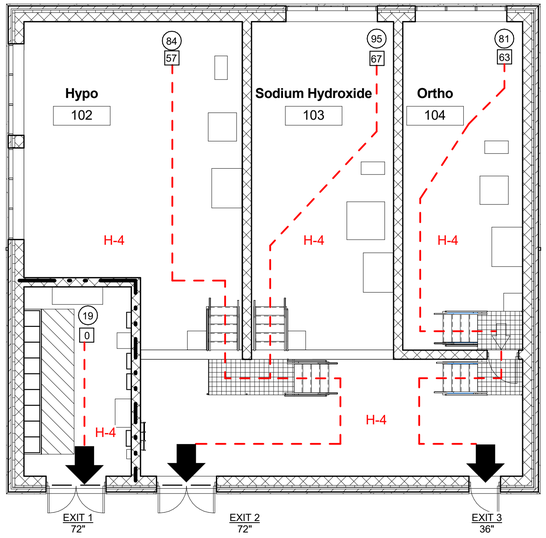
PROJECT NO. 255128-234374
FILE NAME: A001NFLG.RVT
SHEET NO. A-1

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059953
LICENSED ARCHITECT
2019

BID SET

Location Map

NTS



1 Life Safety Plan

1/8" = 1'-0"

Building Code Key Determinations (Michigan Building Code)

APPLICABLE CODES
2015 MICHIGAN BUILDING CODE, BUILDING
2015 MICHIGAN BUILDING CODE, FIRE PREVENTION
NFPA 13-2013 SPRINKLERS
NFPA 72-2012 FIRE ALARM
2015 MICHIGAN PLUMBING CODE
2015 MICHIGAN MECHANICAL CODE
IFGC 2015 INTERNATIONAL FUEL GAS CODE
NEC 2017 NATIONAL ELECTRIC CODE
2015 MICHIGAN BUILDING CODE, ACCESSIBILITY
2015 MICHIGAN ENERGY CODE
NATIONAL FIRE PROTECTION ASSOCIATIONS, NFPA 30A

(BUILDING NAME) KEY DETERMINATIONS

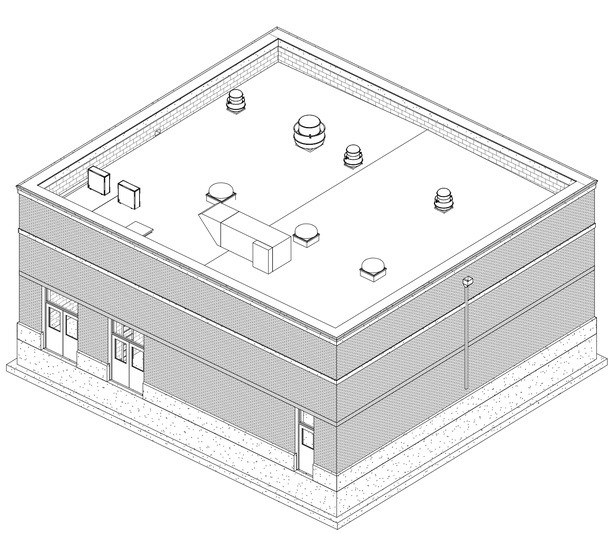
BUILDING CLASSIFICATION
OCCUPANCY - H-4 (HAZARDOUS)

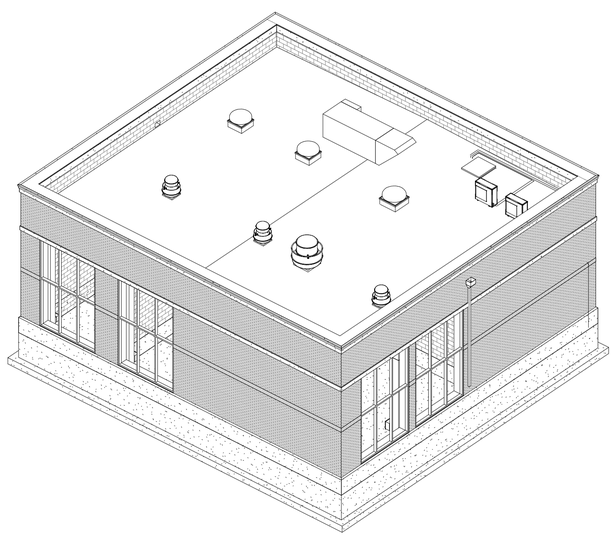
CONSTRUCTION - SECTION 602.2 TYPE II B

BUILDING HEIGHTS AND AREAS TABLE 503*	MAX AREA	17,350 SF PER FLOOR	ACTUAL	FIRST FLOOR:	2,466 SF
				TOTAL:	2,466 SF
	MAX HEIGHT	55 FEET	ACTUAL	24 FEET	
	MAX STORES	3	ACTUAL	1	
REQUIRED SEPARATION TABLE 508.4	STAIR	1 HOUR			
	ELEVATOR	1 HOUR			
	ELEVATOR MECH ROOM	1 HOUR			
	ASSEMBLY	1 HOUR			
ROOM SEPARATION NFPA 13 EXCEPTION	ELECTRICAL	2 HOUR TO ACHIEVE NFPA30 SPRINKLER EXEMPTION			
	SERVER	2 HOUR			
FIRE SEPARATION DISTANCE	TYPE II B > 30 FEET FROM BLDGS & PROPERTY LINE - 0 HR				
FIRE RESISTANCE RATING	ACTUAL = >30 FOOT SEPARATION 0 HR				
STAIRS SECTION 1009	MIN WIDTH	44" CLEAR	ACTUAL	EAST STAIR:	**** CLEAR
				WEST STAIR:	**** CLEAR
	MIN RISER HEIGHT	7"	ACTUAL	7"	
	MIN TREAD DEPTH	11"	ACTUAL	11"	
RAMPS	N/A				
HAZARDOUS CHEMICALS	SODIUM HYPOCHLORITE		ACTUAL	6,000 GAL	
	SODIUM HYDROXIDE		ACTUAL	6,000 GAL	
	ORTHOPHOSPHATE		ACTUAL	2,100 GAL	

SPRINKLERS REQUIRED	YES	PROVIDED:	****
FIRE ALARM REQUIRED	YES	PROVIDED:	****

PLUMBING FIXTURES	WATER CLOSETS REQ'D	**	NA - LOCATED IN ADJACENT FACILITIES
	LAVATORIES REQ'D	**	NA - LOCATED IN ADJACENT FACILITIES
	DRINKING FOUNTAIN REQ'D	**	NA - LOCATED IN ADJACENT FACILITIES
	SERVICE SINK REQ'D	**	NA - LOCATED IN ADJACENT FACILITIES





Life Safety Legend

- 1 HOUR FIRE RATING
- 2 HOUR FIRE RATING
- EXIT DISCHARGE
- AREA OR SPACE EXIT
- EXIT SIGN
- FE FIRE EXTINGUISHER
- EGRESS PATH
- (X) TRAVEL DISTANCE (FEET)
- [X] COMMON PATH OF TRAVEL (FEET)

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059457
LICENSED ARCHITECT
10/7/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

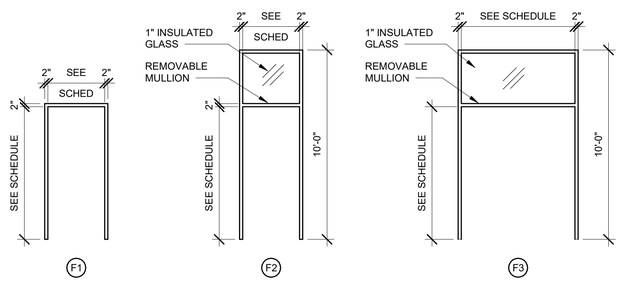
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

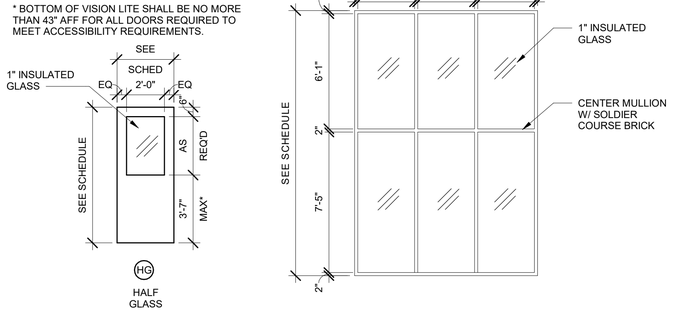
CODE AND LIFE SAFETY

PROJECT NO. 255128-234374
FILE NAME: A002NFLS.RVT
SHEET NO. A-2

BID SET



Door Frame Types



Door Types

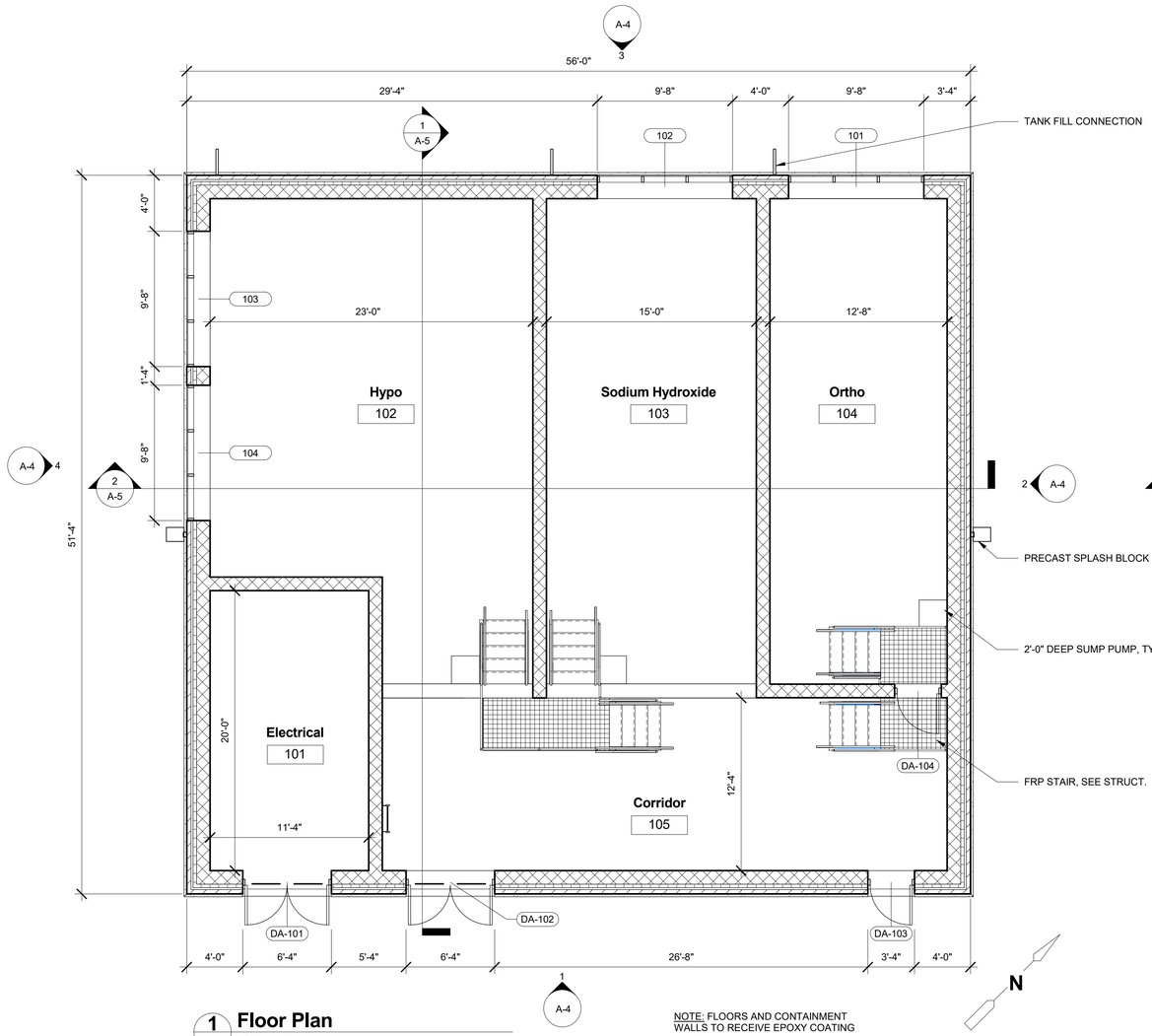
Window Type 1

CDMS DOOR SCHEDULE

DOOR NUMBER	ROOM NAME	EXT DOOR	SIZE			DOOR				FRAME			FIRE RATING (MIN)	DOOR HARDWARE
				W	H	TYPE	MAT.	FINISH	GLAZING	TYPE	MAT.	FINISH		
DA-101	Electrical	*	PR	3'-0"	7'-2"	HG	FRP	MFR	LOW -E	F3	FRP	MFR	0	1
DA-102	Corridor	*	PR	3'-0"	7'-2"	HG	FRP	MFR	LOW -E	F3	FRP	MFR	0	1
DA-103	Corridor	*		3'-0"	7'-2"	HG	FRP	MFR	LOW-E	F2	FRP	MFR	0	2
DA-104	Ortho			3'-0"	7'-2"	HG	FRP	MFR	LOW-E	F1	FRP	MFR	0	2

CDMS WINDOW SCHEDULE

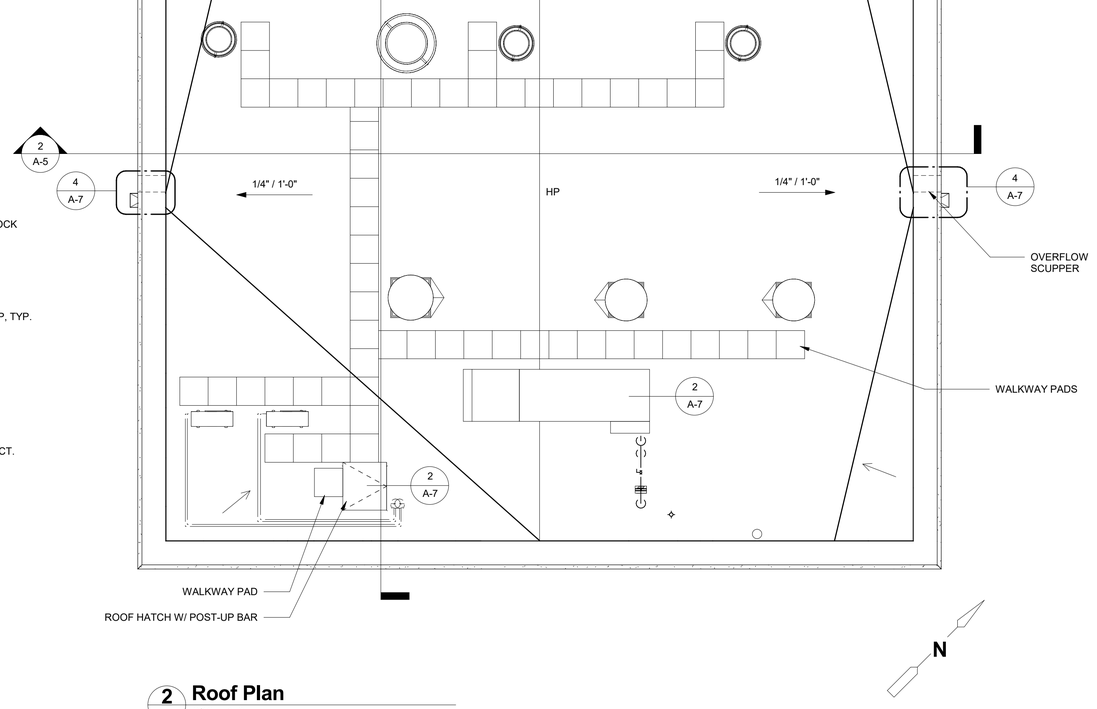
WINDOW NUMBER	ROOM NAME	SIZE		TYPE	FRAME		GLAZING	DETAILS			NOTES
		HEIGHT	WIDTH		MATERIAL	FINISH		HEAD	JAMB	SILL	
102	Sodium Hydroxide	14'-0"	9'-8"	1	FRP	MFR	1" INSULATED	1/A-6	4/A-6	8/A-6	
101	Ortho	14'-0"	9'-8"	1	FRP	MFR	1" INSULATED	1/A-6	4/A-6	8/A-6	
103	Hypo	14'-0"	9'-8"	1	FRP	MFR	1" INSULATED	1/A-6	4/A-6	8/A-6	
104	Hypo	14'-0"	9'-8"	1	FRP	MFR	1" INSULATED	1/A-6	4/A-6	8/A-6	



1 Floor Plan

3/16" = 1'-0"

NOTE: FLOORS AND CONTAINMENT WALLS TO RECEIVE EPOXY COATING



2 Roof Plan

3/16" = 1'-0"

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059537
LICENSED ARCHITECT
10-2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith

CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

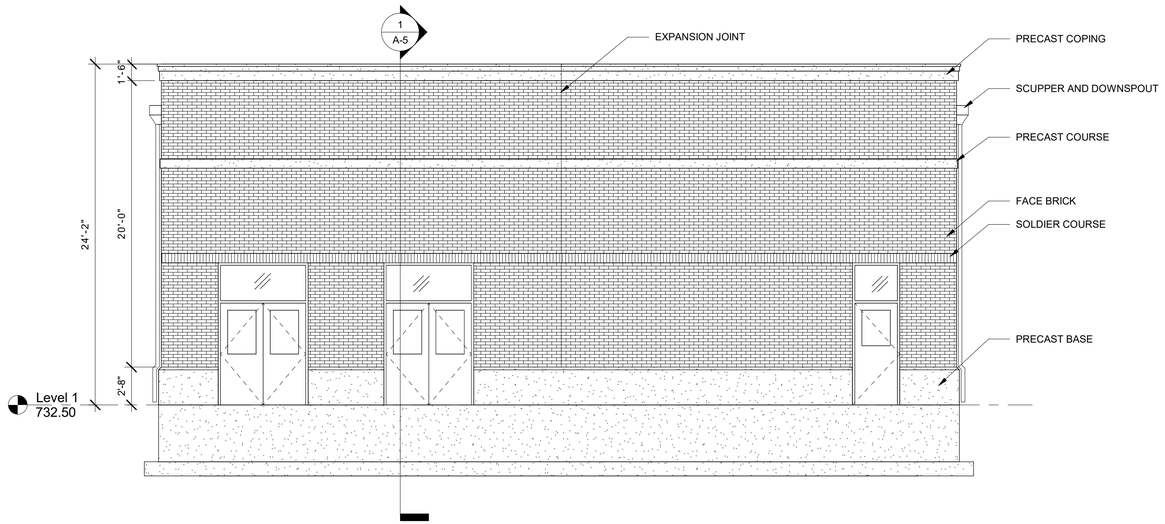
CHEMICAL SYSTEMS FEED BUILDING

FLOOR AND ROOF PLANS

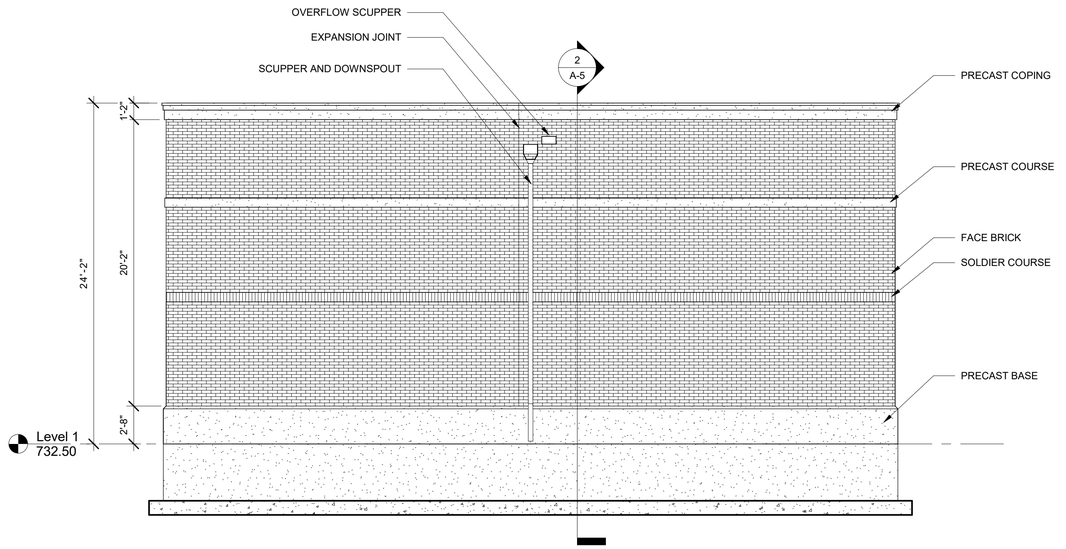
PROJECT NO. 255128-234374
FILE NAME: A003NFPL.RVT

SHEET NO.
A-3

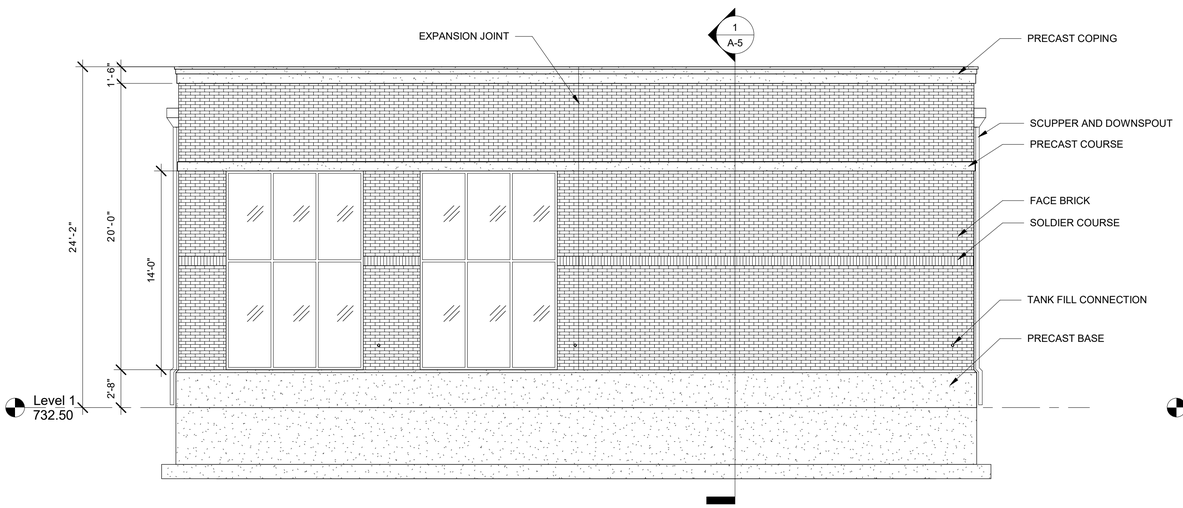
BID SET



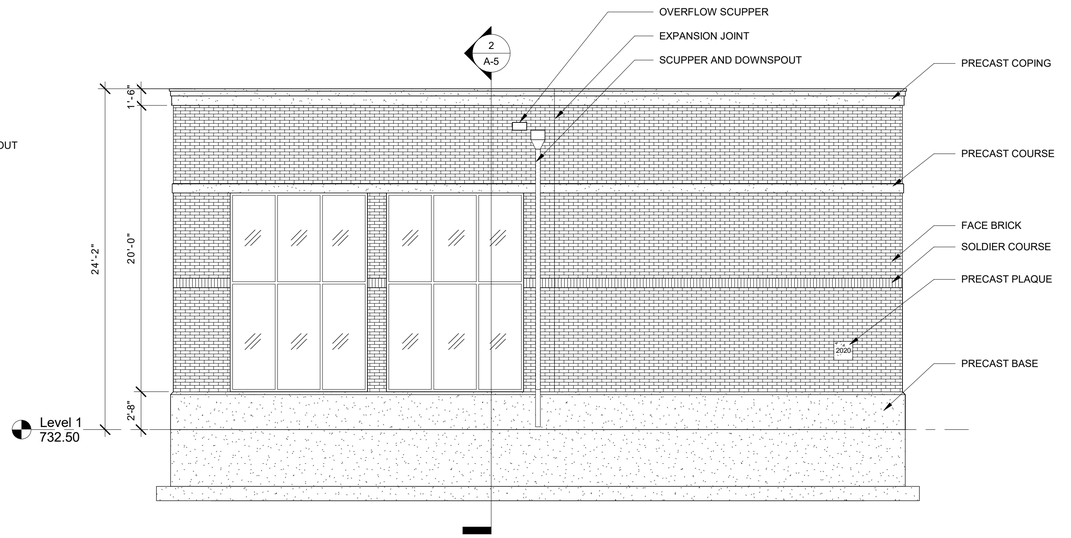
1 East Elevation
A-3 3/16" = 1'-0"



2 North Elevation
A-3 3/16" = 1'-0"



3 West Elevation
A-3 3/16" = 1'-0"



4 South Elevation
A-3 3/16" = 1'-0"

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059
LICENSED ARCHITECT
10/25/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

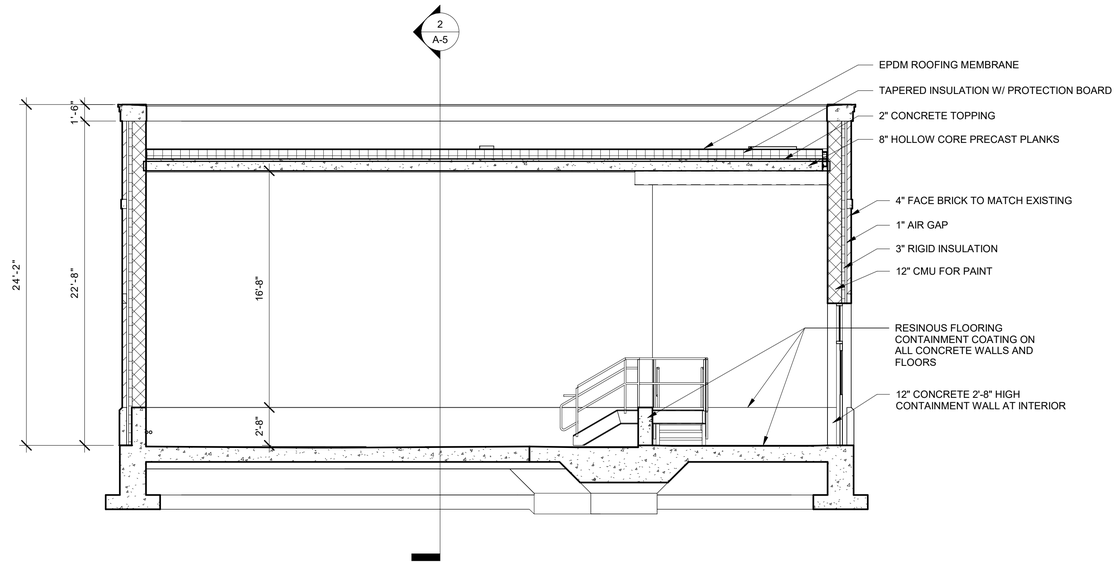
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

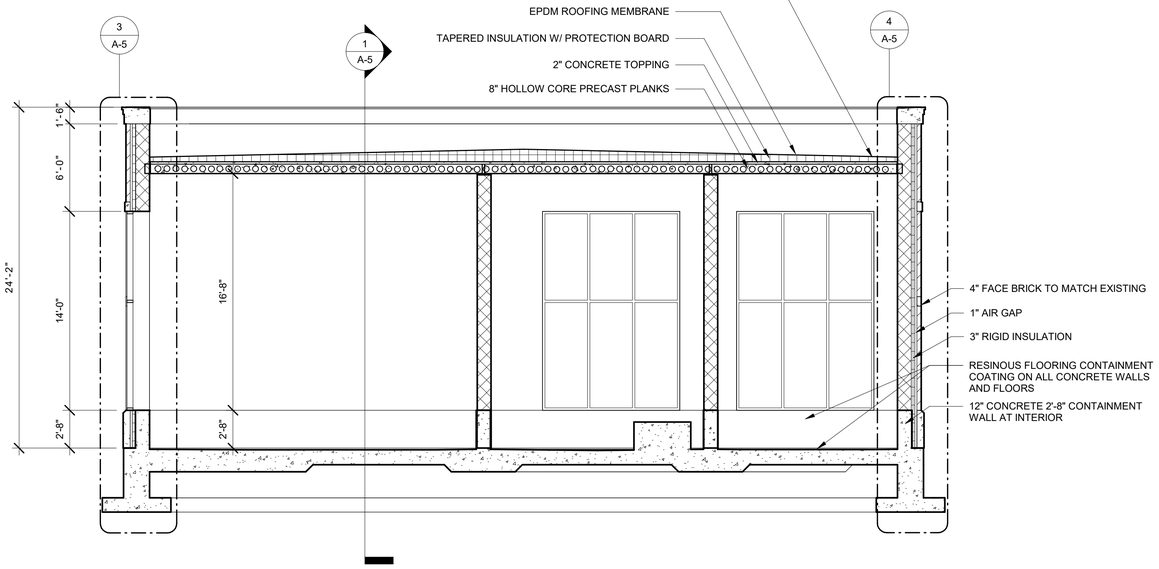
ELEVATIONS

PROJECT NO. 255128-234374
FILE NAME: A004NFEL.RVT
SHEET NO.
A-4

BID SET

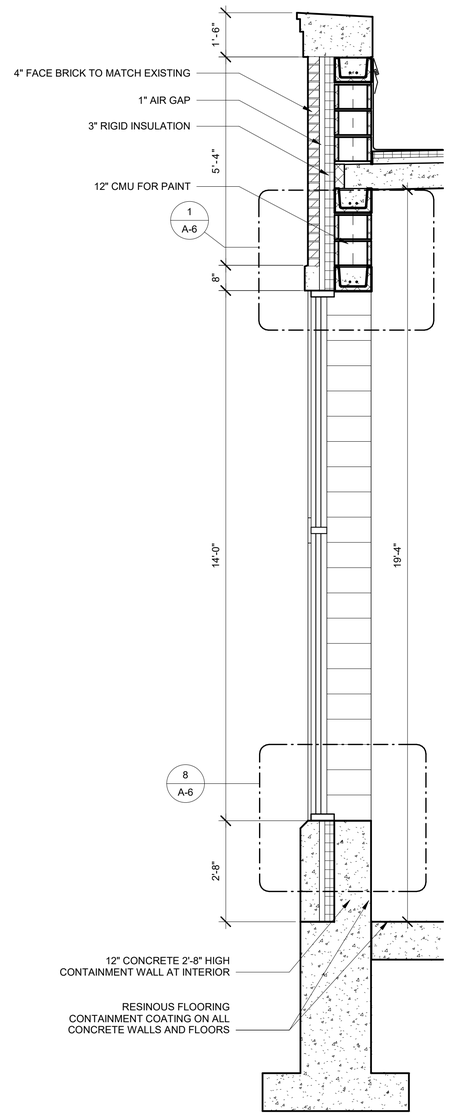


1 Section 1
A-3 3/16" = 1'-0"

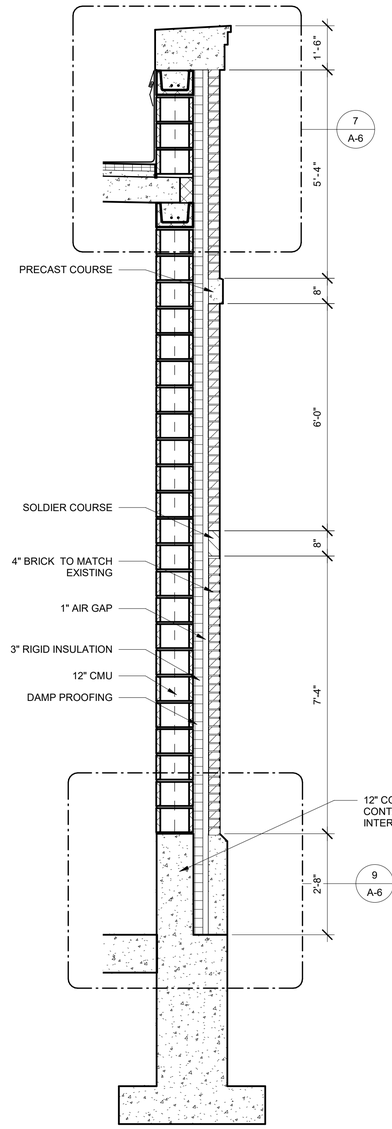


2 Section 2
A-3 3/16" = 1'-0"

NOTE: SEE STRUCTURAL DRAWINGS FOR WALL REINFORCEMENT



3 Detail 1
A-5 1/2" = 1'-0"



4 Detail 2
A-5 1/2" = 1'-0"

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059531
LICENSED ARCHITECT
2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

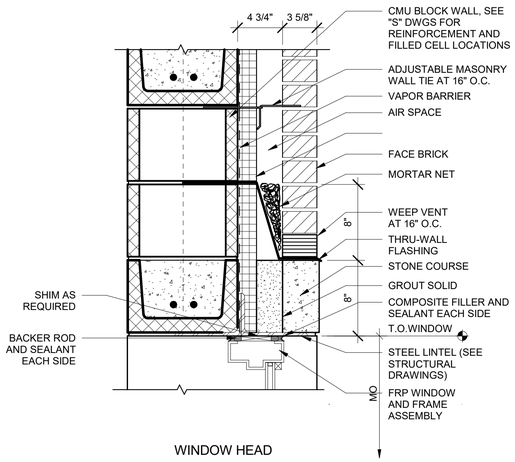
CHEMICAL SYSTEMS FEED BUILDING

BUILDING SECTIONS

PROJECT NO. 255128-234374
FILE NAME: A005NFSE.RVT

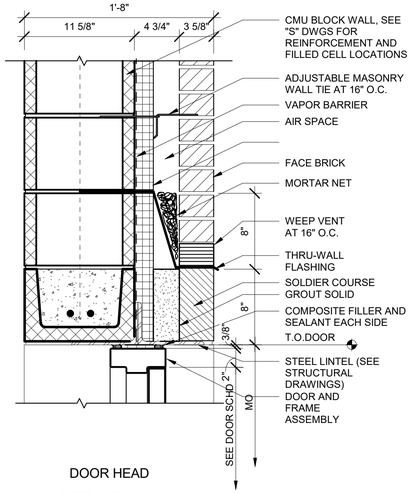
SHEET NO.
A-5

BID SET



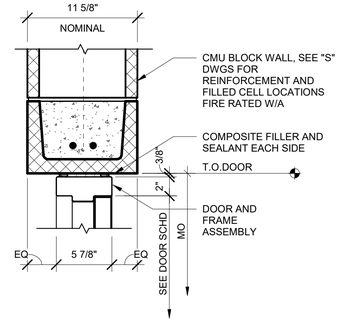
WINDOW HEAD

1 DETAIL
1 1/2" = 1'-0"



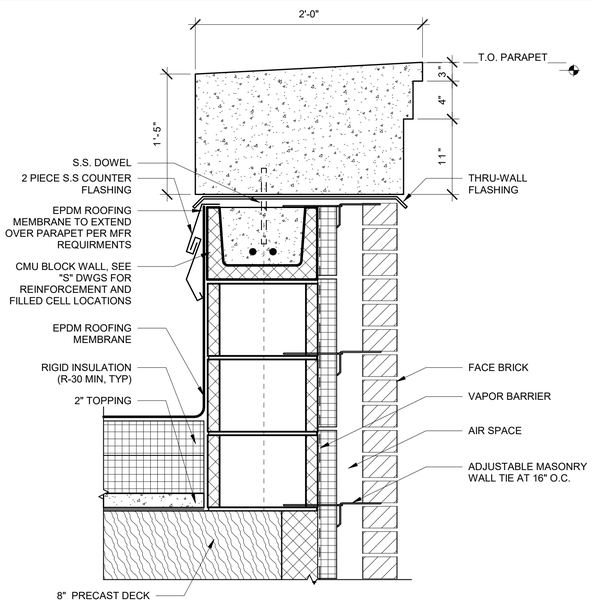
DOOR HEAD

2 DETAIL
1 1/2" = 1'-0"



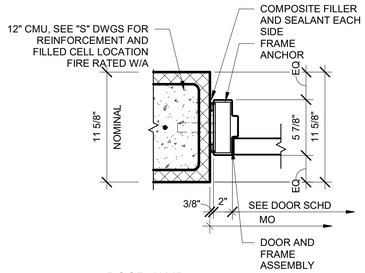
DOOR HEAD

3 DETAIL
1 1/2" = 1'-0"



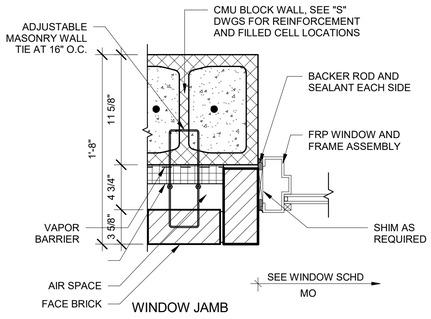
CAVITY WALL PARAPET

7 DETAIL
1 1/2" = 1'-0"



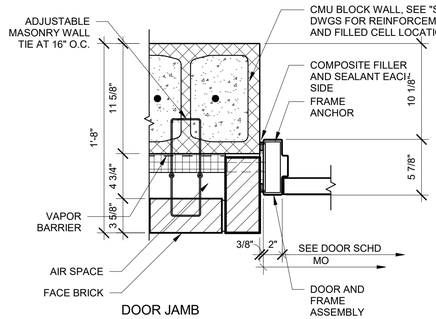
DOOR JAMB

6 DETAIL
1 1/2" = 1'-0"



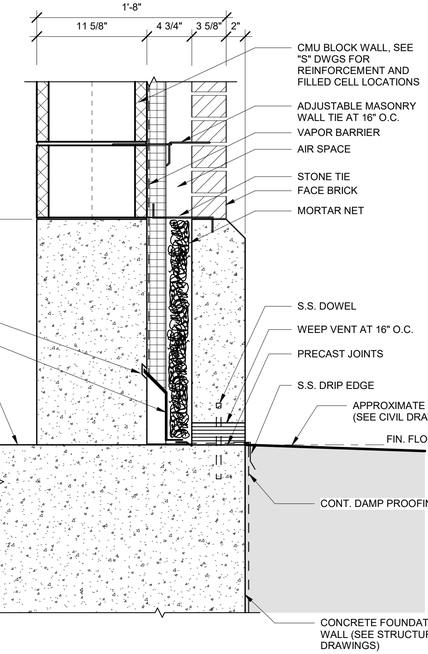
WINDOW JAMB

4 DETAIL
1 1/2" = 1'-0"



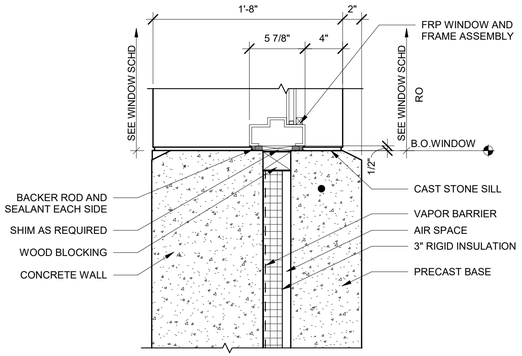
DOOR JAMB

5 DETAIL
1 1/2" = 1'-0"



CAVITY WALL BASE

9 DETAIL
1 1/2" = 1'-0"



WINDOW SILL

8 DETAIL
1 1/2" = 1'-0"

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

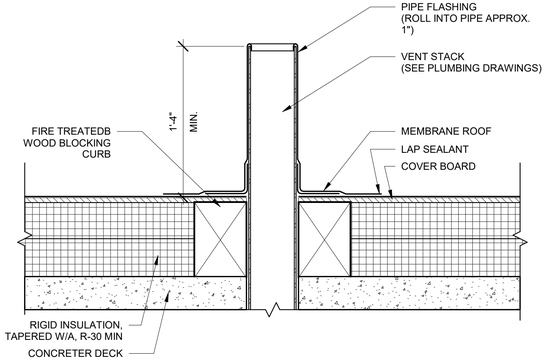
WALL, DOOR, & WINDOW DETAILS

PROJECT NO. 255128-234374
FILE NAME:

SHEET NO.
A-6

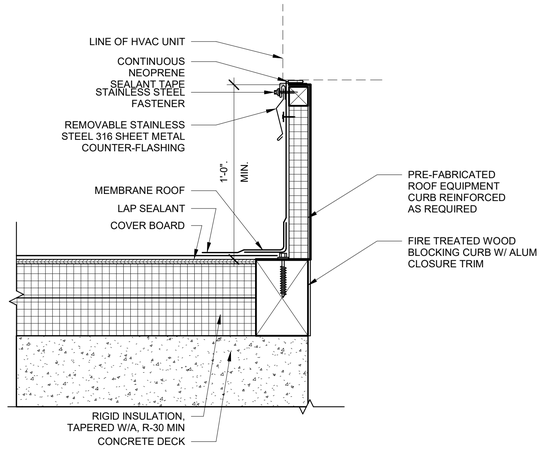
STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301055534
LICENSED ARCHITECT
2019

BID SET



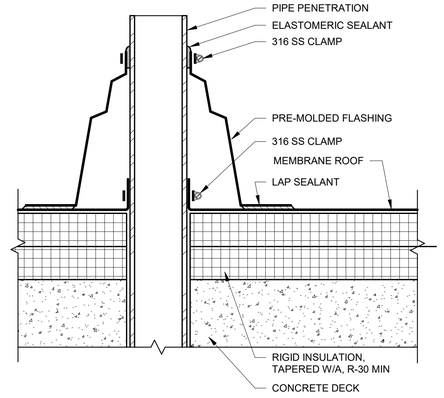
VENT PIPE LESS THAN 12" DIA

1 DETAIL
1 1/2" = 1'-0"



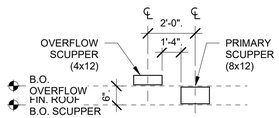
EQUIPMENT CURB

2 DETAIL
1 1/2" = 1'-0"



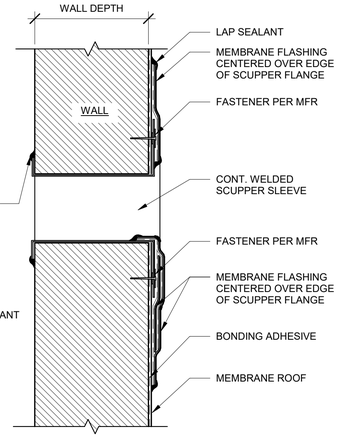
PRE-FORMED PIPE FLASHING

3 DETAIL
3" = 1'-0"



TYPICAL SCUPPER ELEVATION DIAGRAM

THRU WALL SCUPPER W/ CONDUCTOR HEAD



OVERFLOW THRU WALL SCUPPER

THRU WALL SCUPPER AND OVERFLOW SCUPPER

4 DETAIL
3" = 1'-0"

STATE OF MICHIGAN
TIMOTHY LYNN KING
ARCHITECT
No. 1301059555
LICENSED ARCHITECT
2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. LOHMAN
DRAWN BY: H. ATKINS
SHEET CHK'D BY: L. LOHMAN
CROSS CHK'D BY: T. KING
APPROVED BY: L. LOHMAN
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

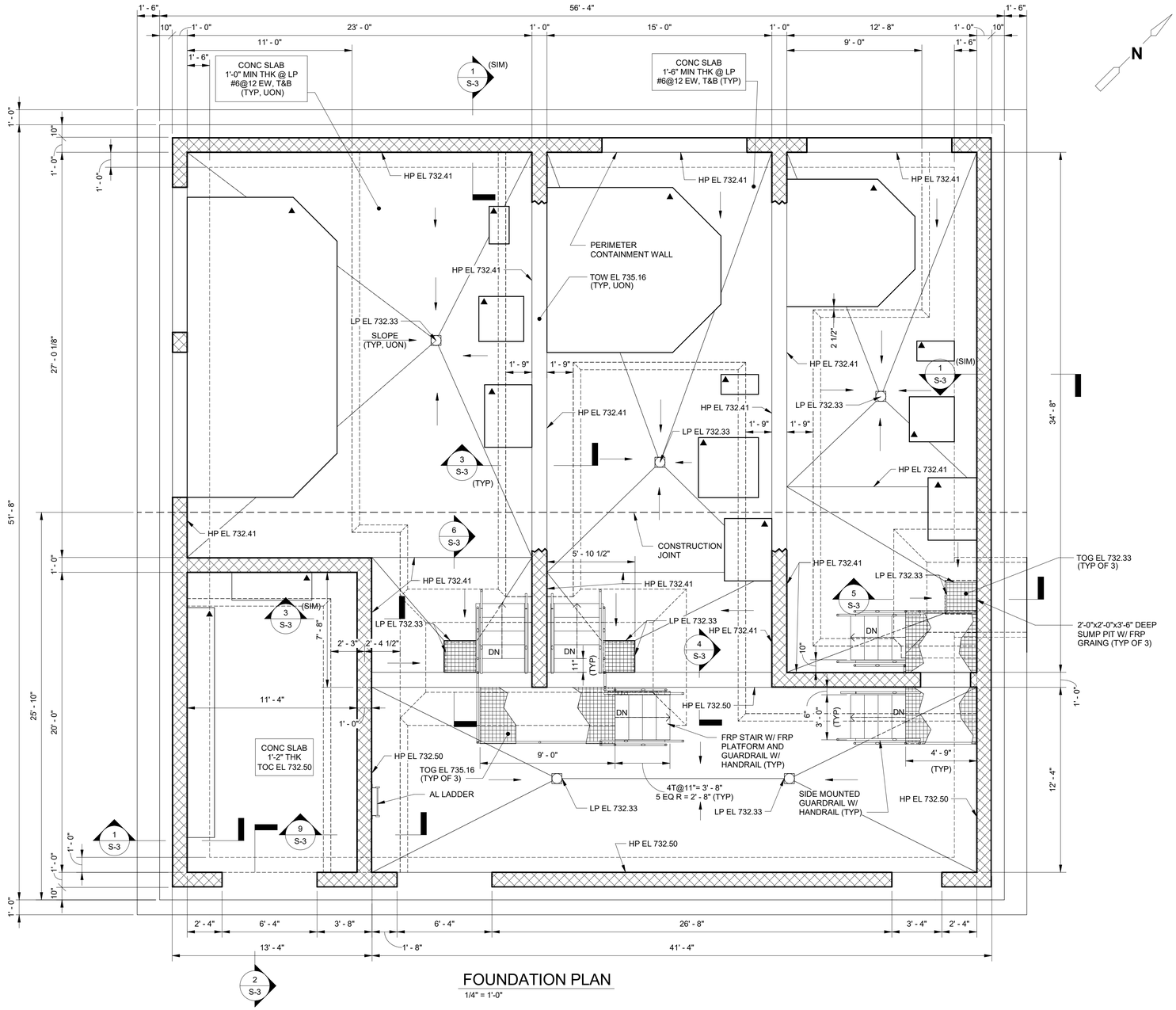
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ROOF DETAILS

PROJECT NO. 255128-234374
FILE NAME:

SHEET NO.
A-7

BID SET



FOUNDATION PLAN

1/4" = 1'-0"

NOTES:

1. DESIGN LOADS:
   BUILDING CODE: 2015 MICHIGAN BUILDING CODE
   RISK CATEGORY: RISK CATEGORY IV
   FLOOR LIVE LOAD:
   PROCESS AREAS : 200 PSF
   ROOF LIVE LOAD: 20 PSF
   GROUND SNOW LOAD (Pg): 30 PSF
   MIN FLAT-ROOF SNOW LOAD (Pf MIN): 24 PSF
   SNOW EXPOSURE FACTOR (Ce): 1.00
   SNOW LOAD IMPORTANCE FACTOR (Is): 1.20
   THERMAL FACTOR (Ct): 1.00
   WIND LOAD:
   BASIC WIND SPEED (THREE-SECOND GUST): 120 MPH
   WIND EXPOSURE: EXPOSURE CATEGORY B
   INTERNAL PRESSURE COEFFICIENT (GCPI): ±0.18
   EARTHQUAKE DESIGN DATA:
   SEISMIC IMPORTANCE FACTOR (Ie): 1.50
   MAPPED SPECTRAL RESPONSE ACCELERATIONS:
   SS = 0.092
   S1 = 0.039
   SOIL SITE CLASS: D
   SPECTRAL RESPONSE COEFFICIENTS:
   SDS = 0.098
   SD1 = 0.062
   SEISMIC DESIGN CATEGORY: A
   BASIC SEISMIC-FORCE-RESISTING SYSTEM:
   ORDINARY REINFORCED
   MASONRY SHEAR WALLS.

   SEISMIC RESPONSE COEFFICIENT (CS): 0.074

   RESPONSE MODIFICATION FACTOR (R): 2

   ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE

   GEOTECHNICAL DESIGN DATA:
   FOUNDATIONS:
   ALLOWABLE BEARING PRESSURE: 2.5 KSF

2. * INDICATES DIMENSIONS AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.

3. ▲ INDICATES EQUIPMENT PAD.

4. FOR PIPING LOCATIONS AND ELEVATIONS BELOW SOIL SUPPORTED CONCRETE SLABS SEE THE PLUMBING, MECHANICAL, ELECTRICAL AND HVAC DRAWINGS.

5. VAPOR BARRIER UNDER ENTIRE SLAB.

6. ◯ FD INDICATES FLOOR DRAIN.

0 2' 4' 8'

SCALE: 1/4" = 1'-0"

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

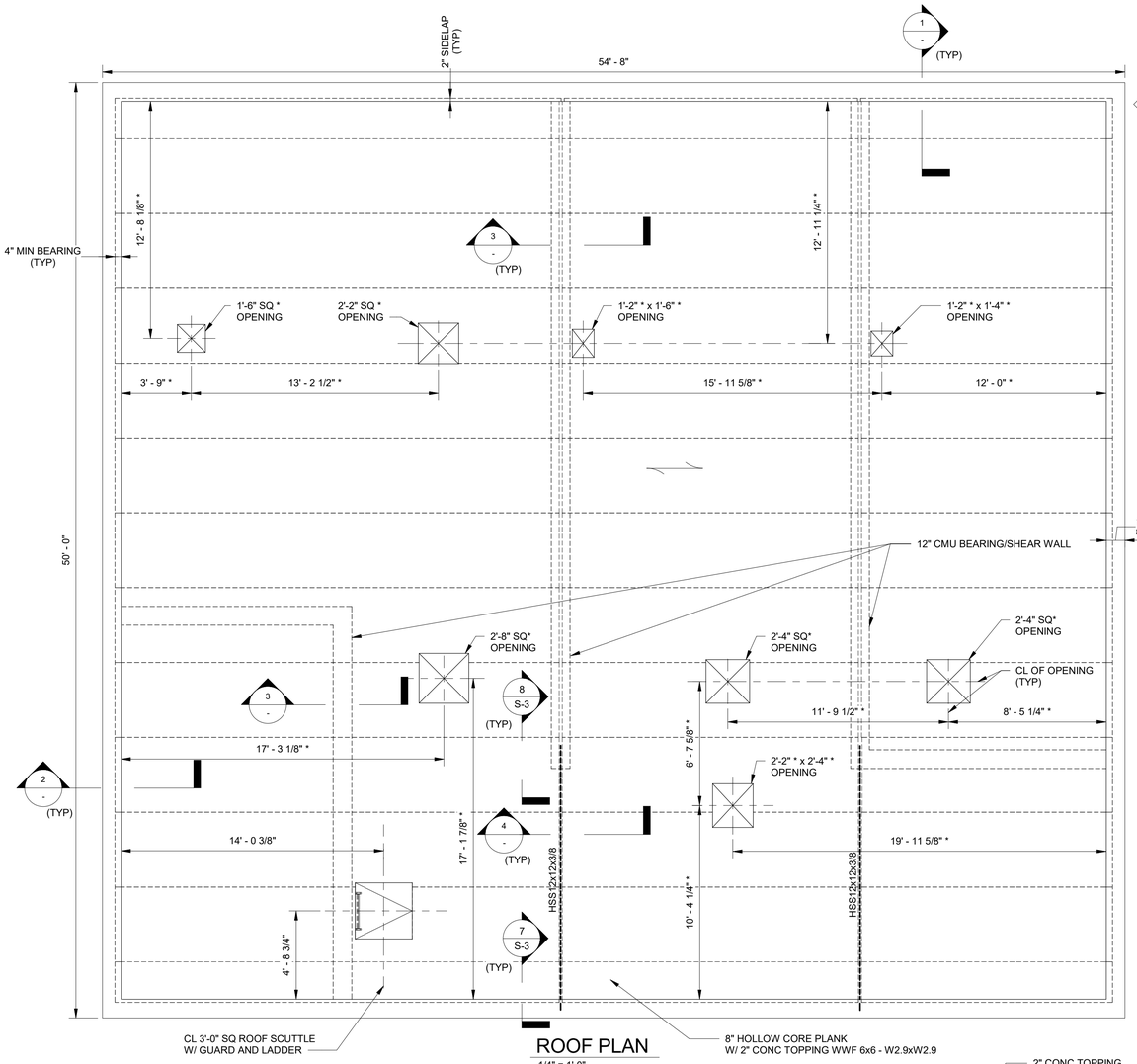
CHEMICAL BUILDING ADDITION

FOUNDATION PLAN

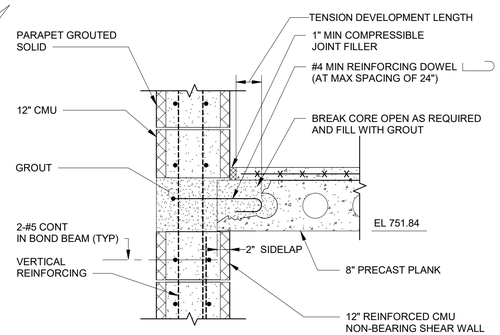
PROJECT NO. 255128-234374
FILE NAME: SWZ000CB.rvt

SHEET NO.
S-1

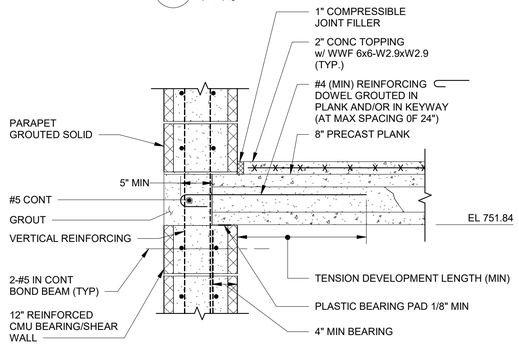
BID SET



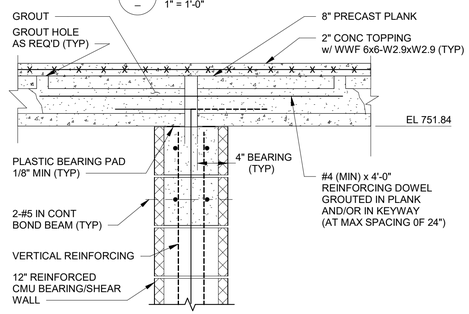
ROOF PLAN
1/4" = 1'-0"



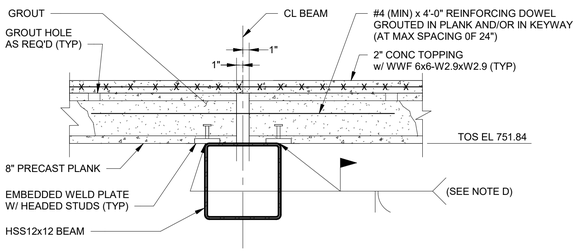
1 SECTION
1" = 1'-0"



2 SECTION
1" = 1'-0"



3 SECTION
1" = 1'-0"



4 SECTION
1" = 1'-0"

TYP PLANK CONNECTION

A DETAIL
NTS

PLANK TO PLANK CONNECTION

B DETAIL
NTS

PLANK CONNECTION DETAIL NOTES:

A. MAKE ATTACHMENTS TO PRECAST PRESTRESSED HOLLOW CORE PLANKS ONLY AT THE CENTER OF THE HOLLOW CORE USING DRILLED BOLTS (THROUGH BOLTS WITH NUTS AND PLATE WASHERS OR TOGGLE BOLTS). DO NOT MAKE ATTACHMENTS IN AREAS BETWEEN HOLLOW CORES.

B. DO NOT USE POWER ACTUATED ("SHOT") FASTENERS FOR ATTACHMENT TO PRECAST PRESTRESSED CONCRETE HOLLOW CORE PLANKS.

PLANK ANCHORAGE NOTES:

A. CONNECTION PLATES, WELD PLATES, EMBEDDED PLATES, AND WELDS INDICATED ON THIS DRAWING SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE PRECAST MANUFACTURER TO RESIST DIAPHRAGM ACTION AS SPECIFIED AND AS INDICATED ON THIS SHEET, UNLESS OTHERWISE NOTED.

B. REINFORCING BARS CONNECTING CMU TO PLANK SHALL BE DESIGNED FOR A WIND/ SEISMIC LOAD AT SERVICE LEVEL OF 75 PLF, ACTING PERPENDICULAR TO THE CMU WALL, TOWARDS OR AWAY FROM THE WALL AND ROOF DIAPHRAGM LOAD OF 300 PLF.

C. * INDICATES DIMENSION AND/ OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION OF THE PLANK.

D. WELD ALTERNATE ENDS OF PLANK.

HOLLOW-CORE PLANK NOTES:

1. ALL HOLLOW-CORE PLANK ANCHORAGE AND CONNECTION DETAILS SHOWN ONLY TO CONVEY THE INTENT OF THE DESIGN. ALL ANGLES, PLATES, HEADERS, BOLTS, REINFORCING BARS, WELDS AND OTHER ITEMS TO BE EMBEDDED IN THE HOLLOW-CORE PLANKS FOR THE TRANSFER OF THE INDICATED LOADS SHALL BE LOCATED AND DESIGNED BY THE HOLLOW-CORE PLANK MANUFACTURER.

2. HOLLOW-CORE PLANK SUPERIMPOSED DESIGN LOADS: (ALL LOADS ARE SERVICE LEVEL)

MINIMUM LIVE LOAD	20 PSF
FLAT ROOF SNOW LOAD	45 PSF
2" CONCRETE TOPPING (NON-STRUCTURAL)	25 PSF
ROOFING DEAD LOAD	16 PSF
COLLATERAL (HUNG) LOAD	10 PSF
FUTURE INSTALLATIONS	10 PSF
RAIN LOAD	37 PSF
EXHAUST FAN	*350 LBS
HUNG PIPING LOAD	PIPE SUPPORT REACTION PROVIDED BY CONTRACTOR

FOR SEISMIC LOADING, SEE HOLLOW-CORE PLANK LOAD DIAGRAMS ON THIS SHEET.

3. DESIGN OF HOLLOW-CORE PLANKS FOR COMBINATIONS OF THESE LOADS SHALL BE THE RESPONSIBILITY OF THE HOLLOW-CORE PLANK MANUFACTURER.

4. THE HOLLOW-CORE PLANKS SHALL BE DESIGNED BY THE PRECAST MANUFACTURER TO ACT AS A DIAPHRAGM INDEPENDENT OF THE 2" CONCRETE TOPPING. THE LOADS USED FOR THE DESIGN OF THE PLANKS AND THEIR CONNECTIONS FOR DIAPHRAGM ACTION SHALL BE PER ROOF-DIAPHRAGM LOADING DIAGRAM.

5. THE HOLLOW-CORE PLANKS ADJACENT TO OPENINGS SHALL BE DESIGNED TO SUPPORT ALL LOADS FROM THE INTERRUPTED PLANKS.

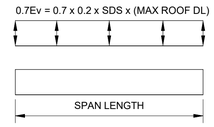
6. THE HOLLOW-CORE PLANKS MANUFACTURER SHALL COORDINATE LOCATION OF ALL EMBEDDED ITEMS AND OPENINGS WITH THE GENERAL AND SUB-CONTRACTORS PRIOR TO FABRICATION.

7. ALL ITEMS EMBEDDED IN HOLLOW-CORE PLANKS SHALL BE GALV AND SUPPLIED BY THE HOLLOW-CORE PLANKS MANUFACTURER.

8. ALL PRECAST ITEMS AND CONNECTIONS NOT SPECIFICALLY DETAILED SHALL BE PROVIDED BY THE HOLLOW-CORE PLANK MANUFACTURER AS REQUIRED.

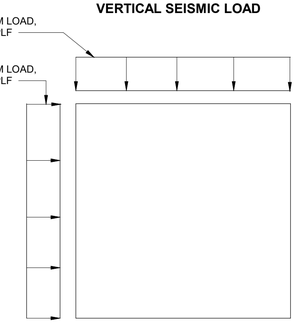
9. ⟷ INDICATES SPAN DIRECTION OF HOLLOW-CORE PLANKS.

10. REFER TO SPECIFICATION SECTION 034113 FOR ADDITIONAL REQUIREMENTS FOR PRECAST PRESTRESSED HOLLOW-CORE PLANKS.



SECTION

VERTICAL SEISMIC LOAD



NOTE: DIAPHRAGM LOADS ARE DUE TO SEISMIC EFFECTS AND ARE REVERSIBLE

PLAN

ROOF DIAPHRAGM LOADING

0 6" 1' 2'
SCALE: 1" = 1'-0"
0 2' 4' 8'
SCALE: 1/4" = 1'-0"

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

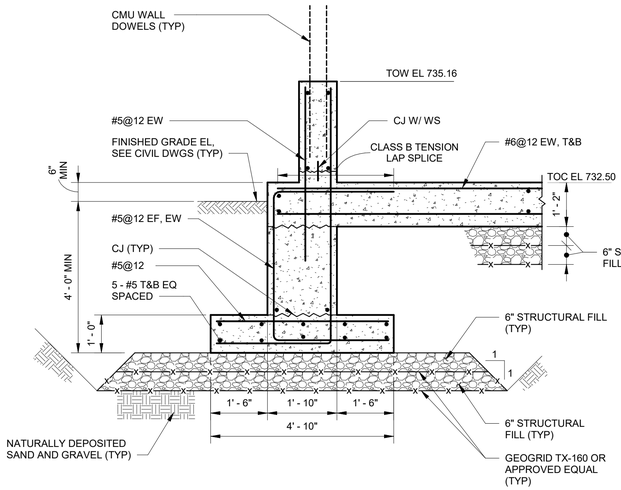
CHEMICAL BUILDING ADDITION

ROOF PLAN, SECTIONS AND DETAILS

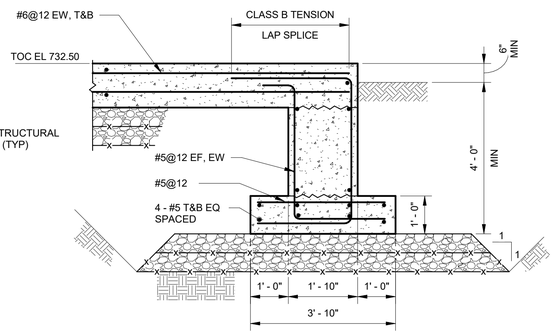
PROJECT NO. 255128-234374
FILE NAME: SWZ000CB.rvt

SHEET NO.
S-2

BID SET

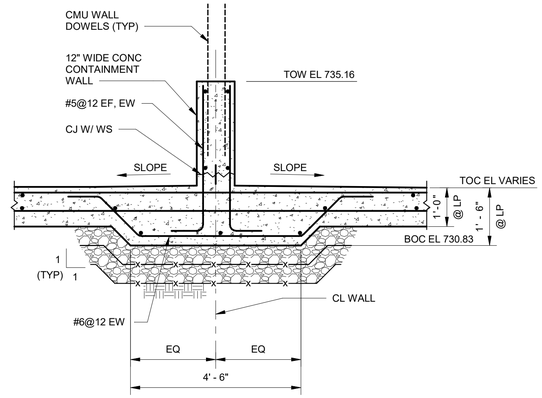


1 SECTION S-1 1/2" = 1'-0"



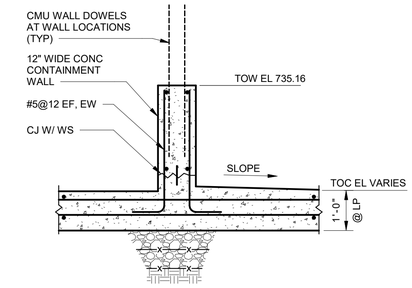
NOTE: SEE SECTION 1/- FOR ADDITIONAL INFO.

2 SECTION S-1 1/2" = 1'-0"



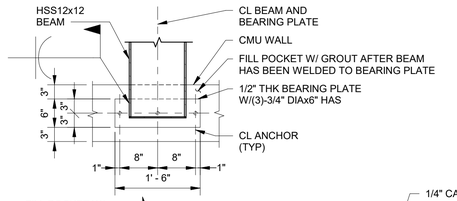
NOTE: SEE SECTION 1/- FOR ADDITIONAL INFO.

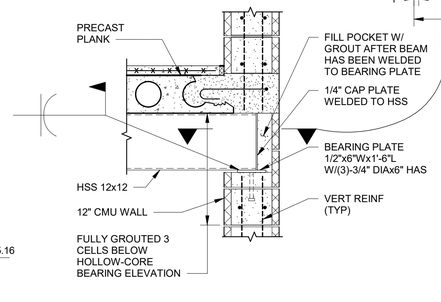
3 SECTION S-1 1/2" = 1'-0"



NOTE: SEE SECTION 1/- FOR ADDITIONAL INFO.

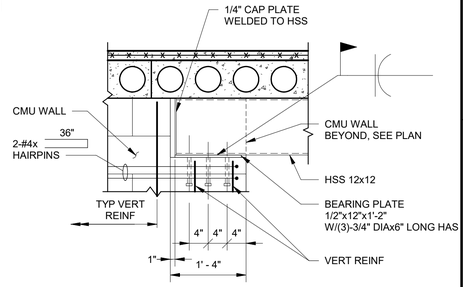
4 SECTION S-1 1/2" = 1'-0"



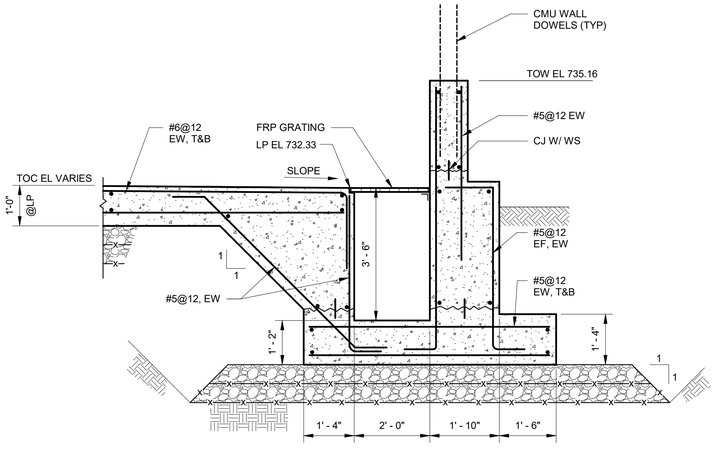


FOR MORE INFO SEE SECTION 2/S-2.

7 SECTION S-2 3/4" = 1'-0"

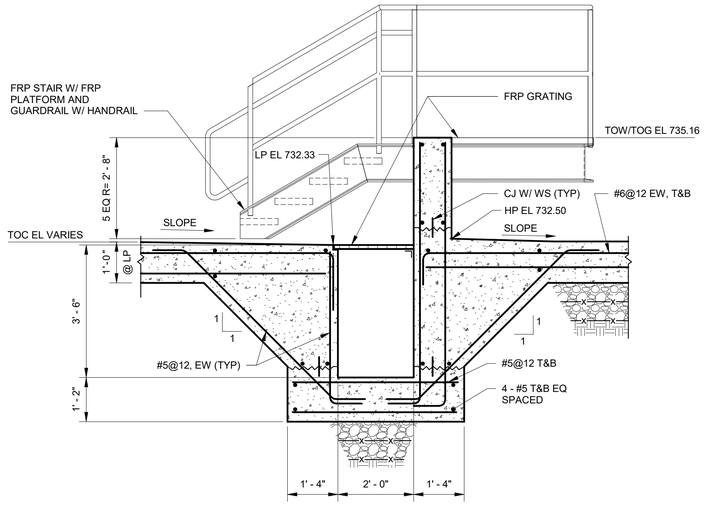


8 SECTION S-2 3/4" = 1'-0"



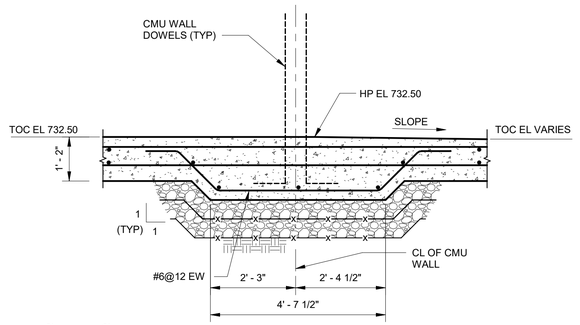
NOTE: SEE SECTION 1/- FOR ADDITIONAL INFO.

5 SECTION S-1 1/2" = 1'-0"



NOTE: SEE SECTION 1/- FOR ADDITIONAL INFO.

6 SECTION S-1 1/2" = 1'-0"



9 SECTION S-1 1/2" = 1'-0"

0 1' 2' 3'
SCALE: 3/4" = 1'-0"

0 1' 2' 4'
SCALE: 1/2" = 1'-0"

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

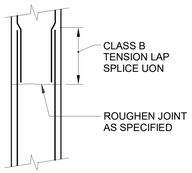
CHEMICAL BUILDING ADDITION

SECTIONS

PROJECT NO. 255128-234374
FILE NAME: SWZ000CB.rvt

SHEET NO.
S-3

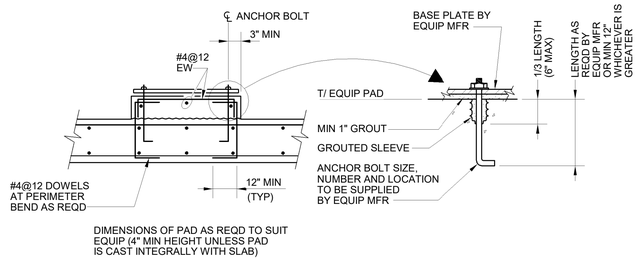
BID SET



NOTE: DETAIL SHOWN FOR WALLS; DETAIL AT SLABS SIMILAR.

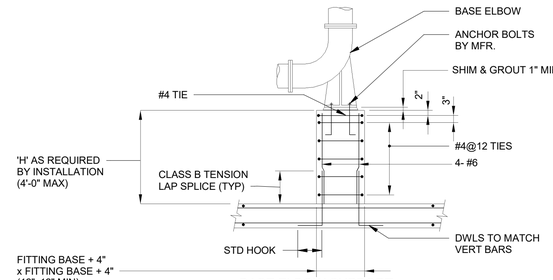
CONSTRUCTION JOINT

A DETAIL NTS



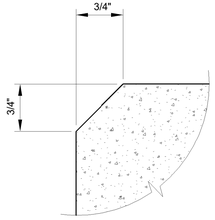
EQUIPMENT PAD

B DETAIL NTS



BASE ELBOW SUPPORT

C DETAIL NTS



CHAMFER

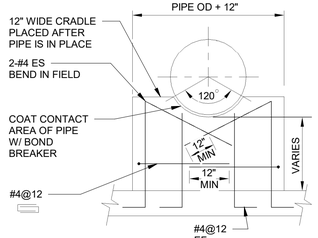
D DETAIL NTS

GENERAL NOTES:

1. ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, HEATING AND VENTILATING, PLUMBING DRAWINGS, SHOP DRAWINGS AND SPECIFICATIONS.
2. SEE CIVIL, ARCHITECTURAL, MECHANICAL, HEATING AND VENTILATING, PLUMBING, AND ELECTRICAL DRAWINGS FOR REGLETS, PIPE SLEEVES, CONDUITS OR OTHER ITEMS TO BE EMBEDDED OR PASSED THROUGH THE CONCRETE.
3. NO BACKFILL SHALL BE PLACED AGAINST WALLS UNTIL WALLS AND SLABS SUPPORTED THEREON HAVE ATTAINED DESIGN STRENGTH.

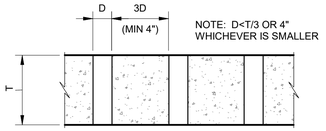
CAST IN PLACE CONCRETE NOTES:

1. REINFORCED CONCRETE SHALL COMPLY WITH ACI 318.
2. MINIMUM CONCRETE STRENGTH AT 28 DAYS:
   STRUCTURAL CONCRETE f'c = 4000 psi
   PIPE ENCASEMENT, ELECTRICAL RACEWAY ENCASEMENT, CONCRETE FILL f'c = 2500 psi
3. REINFORCING STEEL SHALL BE NEW STEEL CONFORMING TO ASTM SPECIFICATION A615 GRADE 60.
4. REINFORCING STEEL FABRICATION SHALL BE IN COMPLIANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.
5. DETERMINE CLEAR CONCRETE COVER BASED ON EXPOSURE TO THE ENVIRONMENT. REINFORCING STEEL SHALL HAVE THE FOLLOWING MINIMUM CLEAR CONCRETE COVER UNLESS OTHERWISE NOTED:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3 IN.
   ALL OTHER CONCRETE SURFACES: WALLS AND TOP AND BOTTOM OF SLABS: 2 IN.
6. SPLICED BARS SHALL HAVE A MINIMUM LAP OF CLASS B TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.
7. CONSTRUCTION JOINTS SHALL NOT BE PLACED AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.
8. SIZE AND LOCATION OF EQUIPMENT PADS AND ANCHOR BOLTS SHALL BE AS REQUIRED BY THE EQUIPMENT MANUFACTURER.
9. ALL EXPOSED CORNERS OF CONCRETE TO HAVE 3/4" MINIMUM CHAMFER UNLESS OTHERWISE NOTED.
10. REINFORCING BARS TO EXTEND 12 BAR DIAMETERS BUT NOT LESS THAN 12" BEYOND BEND UNLESS OTHERWISE NOTED.



CONCRETE PIPE CRADLE

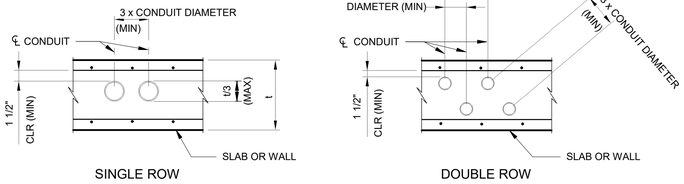
E DETAIL NTS



CONDUIT THROUGH SLAB OR WALL

NOTES:

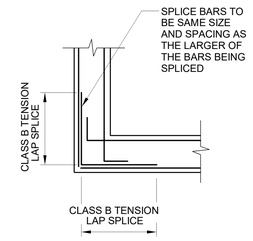
1. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.
2. WHERE THE INDICATED CLEAR DISTANCE BETWEEN SLEEVES IS IMPOSSIBLE THIS AREA SHALL BE TREATED AS A SLAB OPENING OR AS A WALL OPENING.



EMBEDDED CONDUIT SPACING DETAIL

MINIMUM CONDUIT PLACING CLEARANCES

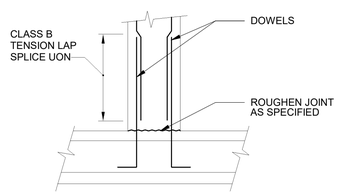
F DETAIL NTS



CORNER

WALL REINFORCEMENT DETAIL

G DETAIL NTS



WALL CONSTRUCTION JOINT AT SLAB

H DETAIL NTS

NOTES:

1. DETAIL IS TYP FOR ALL OPENINGS 15" AND GREATER IN CONCRETE WALLS AND SLABS UNLESS OTHERWISE NOTED. SPREAD REINF AT SMALLER OPENINGS.
2. BARS ARE NOT REQUIRED AT AN OPENING EDGE PARALLEL TO AND WITHIN 6 INCHES OF A WALL OR BEAM.
3. C = TENSION DEVELOPMENT LENGTH: PROVIDE STD HOOK IF FULL DEVELOPMENT LENGTH IS NOT POSSIBLE.
4. REINFORCING STEEL IS TO BE CARRIED ACROSS ALL CONSTRUCTION JOINTS.

REINFORCEMENT AT OPENINGS

J DETAIL NTS

CLASS B TENSION LAP SPLICE LENGTHS IN WALLS AND SLABS(INCHES)

BAR SIZE	BLACK STEEL f'c=4000 psi TOP BARS	BLACK STEEL f'c=4000 psi OTHER BARS
3	16	16
4	20	16
5	29	23
6	40	31
7	65	50
7*	43	33
8	81	62
8 *	49	37
9 *	60	46
10 *	74	57

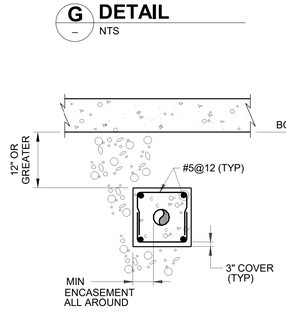
TENSION DEVELOPMENT LENGTHS IN WALLS AND SLABS(INCHES)

BAR SIZE	BLACK STEEL f'c=4000 psi TOP BARS	BLACK STEEL f'c=4000 psi OTHER BARS
3	12	12
4	15	12
5	23	17
6	31	24
7	50	38
7*	33	25
8	62	48
8 *	37	29
9 *	46	36
10 *	57	44

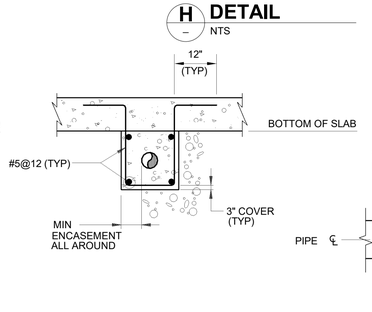
NOTES:

1. MINIMUM BAR SPACING = 6" ON CENTER.
2. MINIMUM CONCRETE COVER = 2" .
3. A TOP BAR IS A HORIZONTAL BAR WHERE MORE THAN 12" OF FRESH CONCRETE IS CAST DIRECTLY BELOW THE BAR. WHERE HORIZONTAL WALL REINFORCEMENT IS UNIFORMLY SPACED IN A VERTICAL PLANE AT 12" MAXIMUM SPACING, LENGTHS MAY BE AS FOR "OTHER BARS".

LAP SPLICE AND DEVELOPMENT LENGTHS
BLACK REINFORCING STEEL



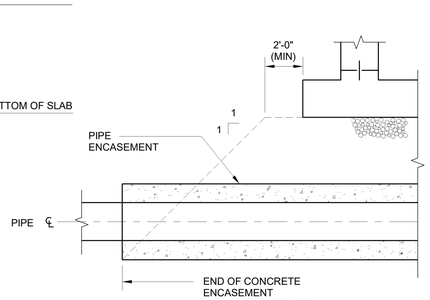
CASE A



CASE B

CONCRETE PIPE ENCASEMENT

K DETAIL NTS



END OF PIPE ENCASEMENT UNDER STRUCTURES

PIPE ENCASEMENT NOTES:

1. MIN ENCASEMENT
   PIPES LESS THAN 12" DIAMETER 8"
   PIPES 12" DIAMETER AND GREATER 12"
2. FOR CASE A, PROVIDE A PARTIAL CONTRACTION JOINT * AT EACH PIPE JOINT, MAXIMUM SPACING BETWEEN PARTIAL CONTRACTION JOINTS 24'-0".
3. FOR CASE B, PROVIDE A JOINT IN THE PIPE AT EACH JOINT IN STRUCTURE. PROVIDE CONSTRUCTION JOINTS IN ENCASEMENT AT LOCATIONS OF CONSTRUCTION JOINTS IN STRUCTURE.
4. FOR PIPING LOCATIONS AND ELEVATIONS BELOW SOIL SUPPORTED CONCRETE SLABS, SEE PLUMBING, MECHANICAL, ELECTRICAL AND HVAC DRAWINGS.
5. * 50% REINFORCING THROUGH JOINT W/ JOINT COATED WITH BOND BREAKER

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

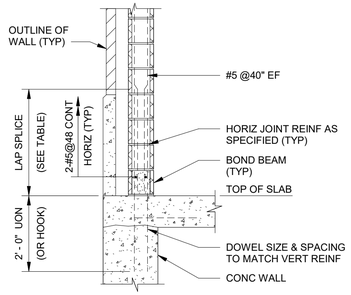
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

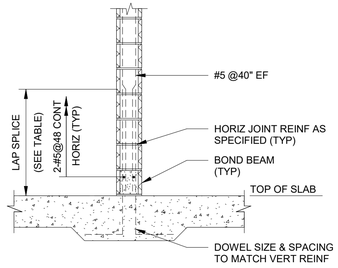
STANDARD CONCRETE DETAILS

PROJECT NO. 255128-234374
FILE NAME: S00400DT.rvt
SHEET NO. S-4

BID SET



EXTERIOR



INTERIOR

TYPICAL CMU WALL REINFORCING

A DETAIL
NTS

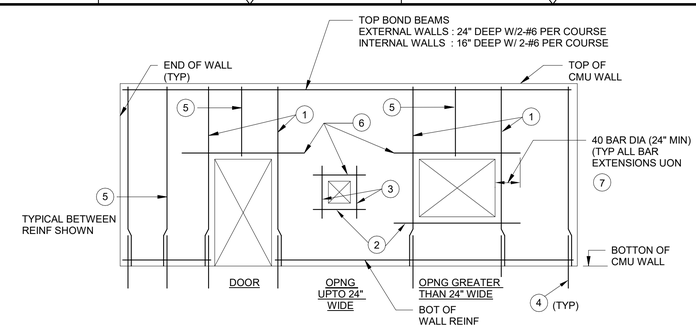
BAR SIZE	LAP SPLICE LENGTH	
	12" BLOCK	
	CTR	EF
4	2'-0"	2'-1"
5	2'-6"	3'-3"

NOTES :

1. SPLICE LENGTHS ARE BASED ON MASONRY STRENGTH f'm = 2000 PSI AND STEEL YIELD STRENGTH fy = 60,000 PSI. MAXIMUM ALLOWABLE STRESS IN STEEL REINFORCEMENT IS LIMITED TO 24,000 PSI.
2. LAP SPLICE FOR "EF" ARE BASED ON 2" MINIMUM CLEAR COVER TO THE REINFORCING.
3. FOR THE HORIZONTAL BARS IN CMU BLOCK/BOND BEAMS, LAP SPLICE SHALL BE "CTR" FOR SINGLE BAR AND "EF" FOR TWO BARS.
4. WHERE BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LAP LENGTH OF LARGER BAR DIAMETER.

LAP SPLICE SCHEDULE

NTS



TYPICAL CMU WALL ELEVATION

B DETAIL
NTS

LEGEND

1. SEE TYPICAL CMU WALL OPENING DETAIL ON THIS SHEET.
2. SILL BARS, 2-#5 IN BOND BEAM.
3. 2-#5 EACH SIDE.
4. SEE TYPICAL CMU WALL CORNER AND END WALL DETAIL ON THIS SHEET.
5. BETWEEN BARS SHOWN, PROVIDE TYPICAL WALL REINFORCING PER TYPICAL CMU WALL REINFORCING DETAIL ON THIS SHEET.
6. SEE CMU LINTEL REINFORCING SCHEDULE ON THIS SHEET AND THE ARCHITECTURAL DRAWINGS.
7. IF FULL LENGTH IS NOT AVAILABLE, EXTEND AS FAR AS POSSIBLE, HOOK 90 DEGREE, THEN EXTEND BEYOND BEND REMAINDER OF LENGTH REQUIRED (BUT NOT LESS THAN 12").

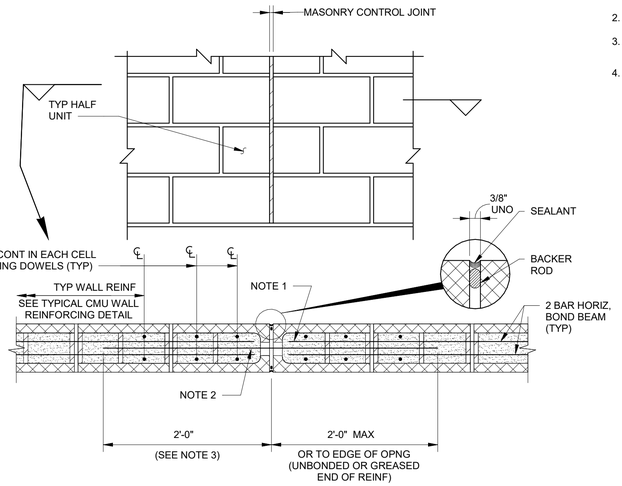
CMU MASONRY NOTES :

1. f'm = 2000 psi.
   ALL EXTERIOR & INTERNAL WALLS ARE 12" THICK. REFER TO ARCHITECTURAL DRAWINGS FOR WALL THICKNESS.
2. CMU MASONRY DETAILS, ELEVATIONS AND NOTES ON THIS SHEET APPLY TO ALL CMU EXTERIOR AND INTERIOR WALLS UON. (EXTERIOR WALLS CONSIST OF A CMU WYTHE AND ONE OR MORE BRICK WYTHES.)
3. LOAD BEARING WALLS ARE WALLS UPON WHICH A FLOOR OR ROOF IS SUPPORTED. ALL OTHER WALLS ARE NON-LOAD BEARING WALLS.
4. FULLY GROUT ALL CELLS AND COURSES WITH VERTICAL OR HORIZONTAL REINFORCING. PROVIDE 2" MINIMUM CLEAR COVER TO THE REINFORCING (UON).
5. ALL HORIZONTAL REINFORCING, EXCEPT IN THE LINTELS, SHALL BE PLACED IN A CMU BOND BEAM BLOCK. PROVIDE GALVANIZED METAL LATH IN THE HORIZONTAL JOINT BELOW THE BLOCK TO RETAIN THE GROUT.
6. VERTICAL REINFORCING SHALL EXTEND TO 2" BELOW THE TOP OF THE CMU WALL.
7. PROVIDE A CONTINUOUS BOND BEAM WITH 2-#5 CONTINUOUS HORIZONTAL BARS AT 4'-0" SPACING.
8. PROVIDE HORIZONTAL JOINT REINFORCING AS SPECIFIED.
9. REINFORCING BARS TO EXTEND 12 BAR DIAMETERS BUT NOT LESS THAN 12" BEYOND BEND UON.
10. FOR PLAN LOCATION OF MASONRY WALLS AND OTHER MASONRY DETAILS SEE ARCHITECTURAL DRAWINGS.

WALL TYPE	LOCATION / CLEAR SPAN	B	D	REINF	NOTES
EXTERIOR WALLS	≤ 3'-4"	12"	8"	2-#5	
EXTERIOR WALLS	> 3'-4" TO ≤ 6'-4"	12"	16"	2-#5	
EXTERIOR WALLS	> 6'-4" TO ≤ 9'-8"	12"	24"	4-#5*	
INTERIOR WALLS	≤ 3'-4"	12"	8"	2-#5	

CMU LINTEL NOTES:

1. PROVIDE 8" MINIMUM BEARING AT EACH SIDE OF CLEAR SPAN UNLESS OTHERWISE SHOWN ON DESIGN DRAWINGS. PROVIDE 40 BAR ø (24" MIN) BAR EXTENSION PAST EACH SIDE OF OPENING.
2. PROVIDE REINFORCING AS INDICATED AT ALL OPENINGS, BOTH INTERIOR AND EXTERIOR WALLS.
3. FULLY GROUT CMU OVER DEPTH "D" TO ENDS OF BEARING.
4. * INDICATES 2 PER COURSE, STARTING FROM BOTTOM COURSE OF LINTEL.

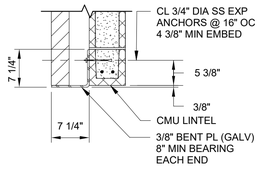


CONTROL JOINT NOTES:

1. TERMINATE HORIZ REINFORCING W/ A STANDARD HOOK TWO INCHES FROM CONTROL JOINTS, UON.
2. PROVIDE SMOOTH DOWELS IDENTICAL TO HORIZONTAL BAR DIA ACROSS THE JOINT AT HORIZONTAL BAR LOCATIONS. PREVENT BOND BETWEEN BAR AND GROUT ON ONE SIDE OF JOINT WITH GREASE OR A PLASTIC SLEEVE. CAP ALL DOWELS TO ALLOW ONE INCH OF MOVEMENT.
3. PROVIDE STD HOOK ON SIDE WITH BOND IF 2'-0" LENGTH IS NOT POSSIBLE.
4. CONTINUE HORIZ REINF THROUGH MCJ @ ABOVE AND BELOW PLANK BEARING, T.O.W. BOND BEAMS AND LINTEL REINF.
5. DISCONTINUE HORIZONTAL JOINT REINFORCEMENT AT THE MCJ.
6. SEE ARCHITECTURAL DWGS FOR LOCATIONS.

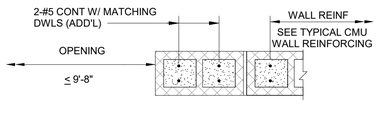
MASONRY CONTROL JOINT (MCJ)

C DETAIL
NTS



TYPICAL SHELF ANGLE

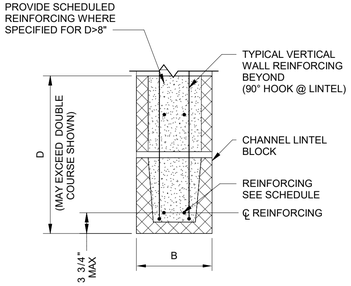
D DETAIL
NTS



12" CMU EXTERIOR/INTERIOR WALLS

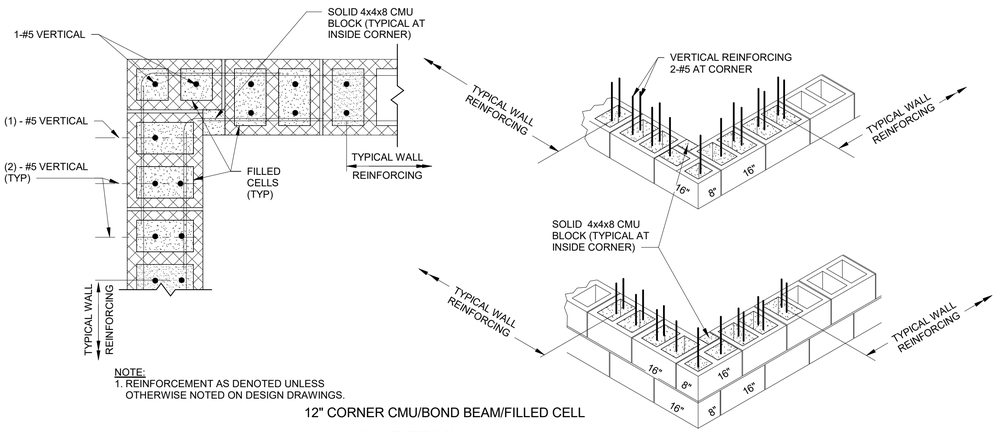
TYPICAL CMU WALL OPENING

E DETAIL
NTS



CMU LINTEL REINFORCING SCHEDULE

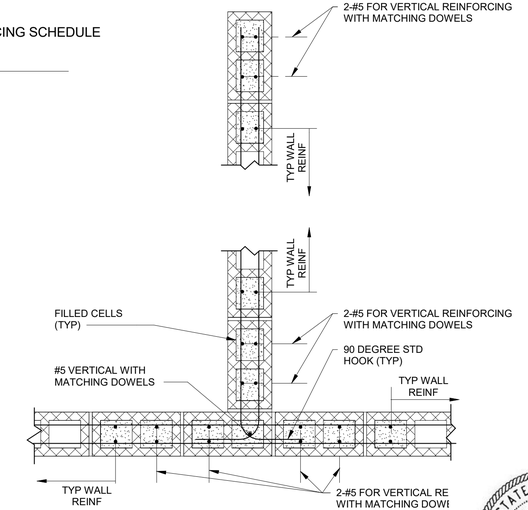
F DETAIL
NTS



NOTE:
1. REINFORCEMENT AS DENOTED UNLESS OTHERWISE NOTED ON DESIGN DRAWINGS.

12" CORNER CMU/BOND BEAM/FILLED CELL

G DETAIL
NTS



TYPICAL 12" CMU WALL INTERSECTION AND AT END

H DETAIL
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

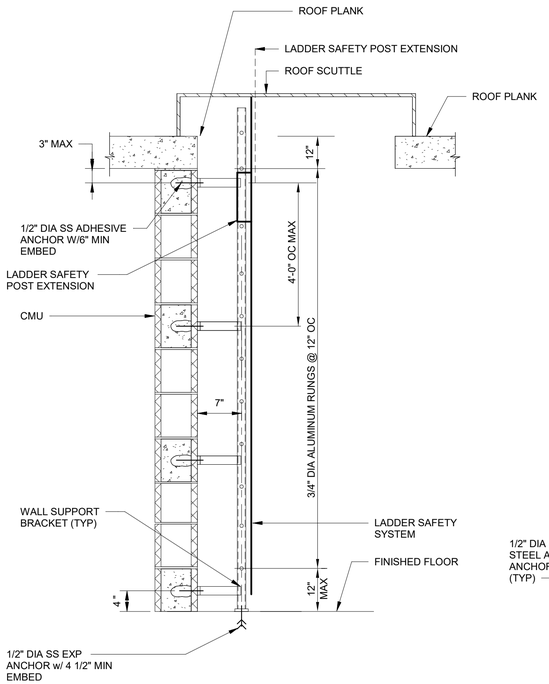
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

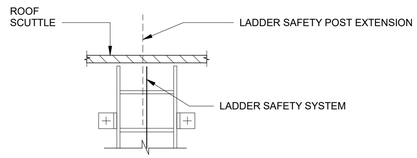
STRUCTURAL MASONRY DETAILS

PROJECT NO. 255128-234374
FILE NAME: S00500DT.rvt
SHEET NO. S-5

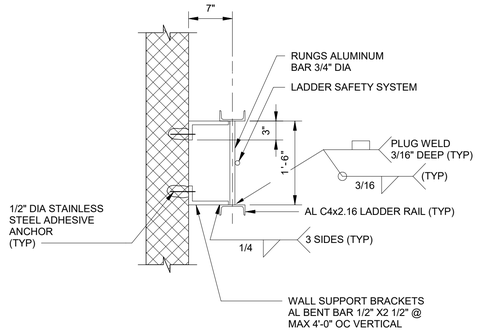
BID SET



LADDER SECTION
NTS



ELEVATION
NTS



LADDER PLAN
NTS

A DETAIL
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

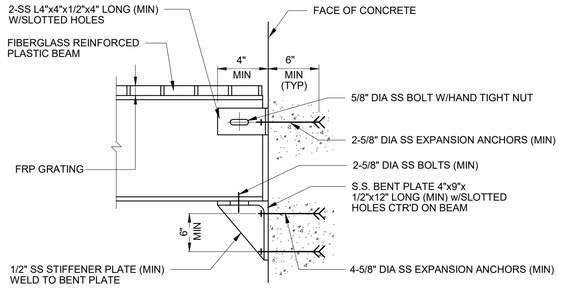
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

STANDARD METAL DETAILS

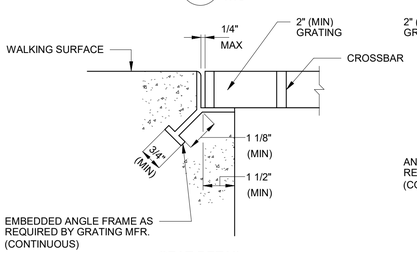
PROJECT NO. 255128-234374
FILE NAME: S00600DT.rvt
SHEET NO.
S-6

BID SET

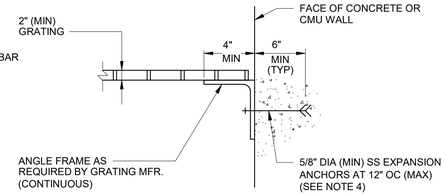


FRP BEAM CONNECTION

A DETAIL
NTS



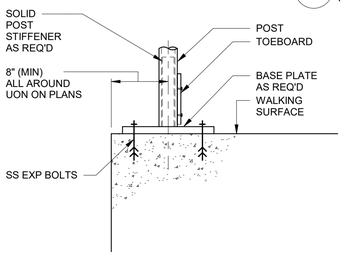
SEAT DETAIL



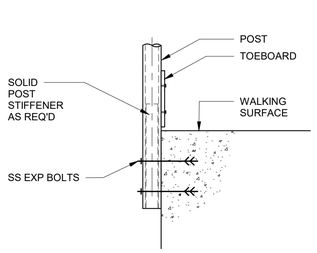
GRATING WALL SUPPORT

FRP GRATING

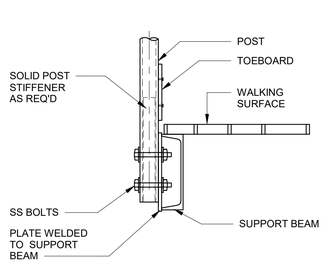
C DETAIL
NTS



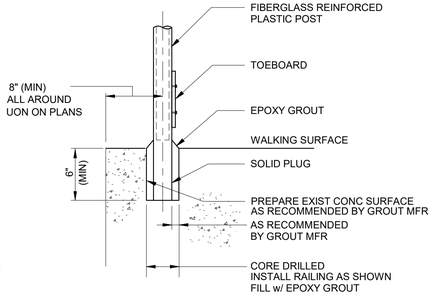
TOP MOUNTED



SIDE MOUNTED AT CONCRETE



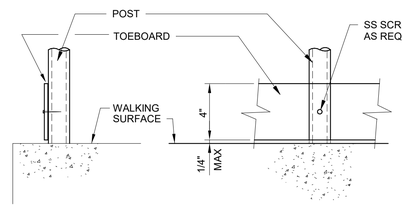
SIDE MOUNTED AT FRP BEAM



TOP MOUNTED/EMBEDDED

FRP RAILING BASE

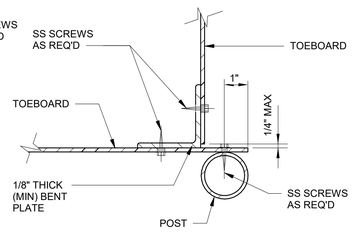
D DETAIL
NTS



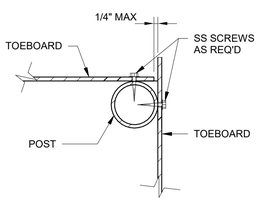
SECTION ELEVATION

FRP TOEBOARD CONNECTION TO POST

F DETAIL
NTS



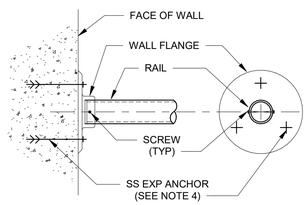
PLAN AT INSIDE CORNER



PLAN AT OUTSIDE CORNER

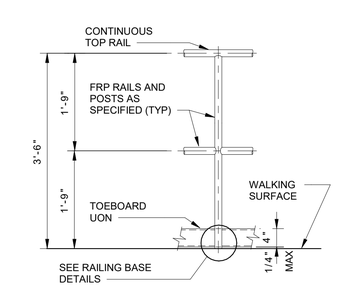
FRP TOEBOARD CORNER

G DETAIL
NTS

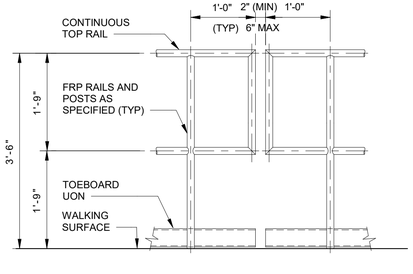


FRP GUARDRAIL OR HANDRAIL WALL FLANGE

H DETAIL
NTS



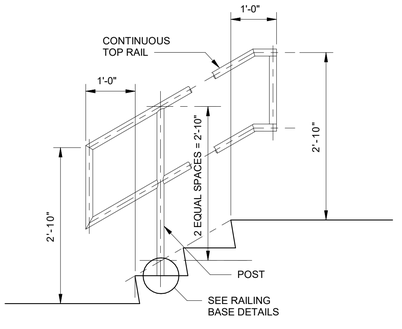
STANDARD GUARDRAIL



GUARDRAIL END POST

FRP GUARDRAIL

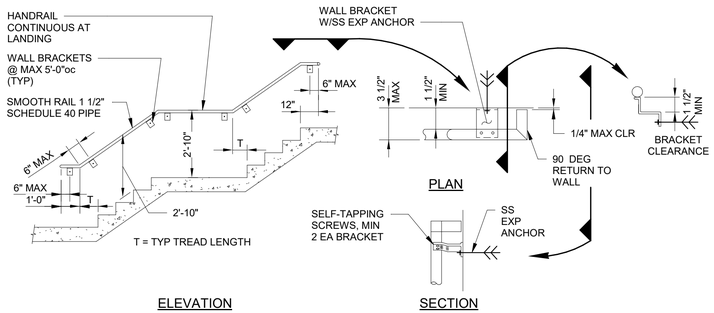
B DETAIL
NTS



HANDRAIL AT STAIR

FRP COMPONENTS NOTES:

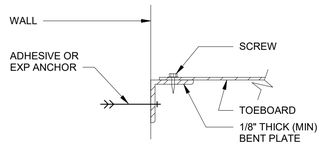
1. FIBERGLASS REINFORCED PLASTIC (FRP) COMPONENTS SHALL BE PROVIDED AT LOCATIONS INDICATED ON THE STRUCTURAL AND PROCESS MECHANICAL DRAWINGS.
2. FRP COMPONENTS, INCLUDING BUT NOT LIMITED TO, GRATING, SUPPORT BEAMS, RAILING, STAIRS, PLATFORMS, CONNECTIONS AND APPURTENANCES SHALL BE DESIGNED BY THE GRATING MANUFACTURER AS SPECIFIED.
3. ANGLE FRAMES FOR FRP GRATING SHALL BE TYPE 316 STAINLESS STEEL OR FRP WITH STAINLESS STEEL FASTENERS.
4. AT CMU WALLS, USE 1/2" DIA SS ADHESIVE ANCHORS W/ 3 1/8" MIN EMBED.



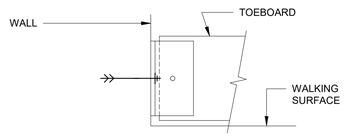
ELEVATION PLAN SECTION

ALTERNATE STAIR HANDRAIL

E DETAIL
NTS



PLAN



ELEVATION

FRP TOEBOARD AT WALL

J DETAIL
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

STANDARD FRP DETAILS

PROJECT NO. 255128-234374
FILE NAME: S00700DT.rvt
SHEET NO. S-7

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

BID SET

SCHEDULE OF SPECIAL INSPECTIONS AND TESTS

NOTES:

1. THIS DRAWING IS PROVIDED TO OUTLINE THE MINIMUM LEVEL OF SPECIAL INSPECTIONS AND TESTS DURING CONSTRUCTION TO ENSURE CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. A STATEMENT OF SPECIAL INSPECTIONS WILL BE PREPARED BY A REGISTERED DESIGN PROFESSIONAL AND SUBMITTED WITH THE BUILDING PERMIT APPLICATION. REGISTERED DESIGN PROFESSIONALS RESPONSIBLE FOR ITEMS TO BE DESIGNED IN ACCORDANCE WITH PERFORMANCE SPECIFICATIONS SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS FOR THAT PORTION OF THE WORK.

2. SPECIAL INSPECTIONS AND TESTS WILL BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE (IBC) AND CHAPTER 17 OF THE MICHIGAN BUILDING CODE.

3. IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE AND CHAPTER 17 OF THE MICHIGAN BUILDING CODE, THE OWNER WILL PROVIDE A SPECIAL INSPECTOR (AN APPROVED AGENCY OR AGENCIES, INDEPENDENT FROM THE CONTRACTOR AND EMPLOYING QUALIFIED PERSONNEL) TO PERFORM SPECIAL INSPECTIONS IDENTIFIED IN THE STATEMENT OF SPECIAL INSPECTIONS. THE SPECIAL INSPECTOR WILL FURNISH INSPECTION REPORTS TO THE ENGINEER AND BUILDING OFFICIAL.

4. SUBMIT CONTRACTOR'S QUALITY CONTROL PROGRAM IN ACCORDANCE WITH MICHIGAN BUILDING CODE. SPECIAL INSPECTIONS SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR QUALITY CONTROL OF THE WORK OR FOR CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. DETECTION, OR FAILURE TO DETECT, DEFECTS IN THE WORK SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO CORRECT ALL DEFECTS IN THE WORK, WHETHER DETECTED OR NOT, AND OF RESPONSIBILITY FOR CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

5. REMOVE AND REPLACE, OR REPAIR, DEFECTS IN THE WORK AND WORK NOT IN CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL BEAR THE COSTS FOR THE INSPECTION OF ANY REPLACED OR REPAIRED PORTIONS OF THE WORK.

6. CONTRACTOR SHALL COOPERATE WITH SPECIAL INSPECTIONS BY PROVIDING SUFFICIENT NOTICE FOR THE SCHEDULING OF PERSONNEL AND BY ALLOWING FREE AND SAFE ACCESS TO THE WORK FOR OBSERVATION, VERIFICATION, SAMPLING AND INSPECTION. PROVIDE AND PERMIT THE USE OF LADDERS, SCAFFOLDING, INCIDENTAL EQUIPMENT, AND SAFETY EQUIPMENT AS MAY BE REQUIRED TO CONDUCT SPECIAL INSPECTIONS. ALL SUCH PROVISIONS FOR FREE AND SAFE ACCESS AND EQUIPMENT SHALL BE SAFE, IN GOOD WORKING CONDITION, AND ERECTED, MAINTAINED, AND HANDLED BY QUALIFIED PERSONNEL.

7. SPECIAL INSPECTIONS DO NOT APPLY TO CONTRACTOR'S EQUIPMENT, TEMPORARY STRUCTURES USED FOR CONSTRUCTION, MEANS AND METHODS OF CONSTRUCTION, OR SITE SAFETY. CONTRACTOR SHALL REMAIN RESPONSIBLE FOR ADEQUACY AND SAFETY OF EQUIPMENT, TEMPORARY STRUCTURES USED FOR CONSTRUCTION, MEANS AND METHODS OF CONSTRUCTION AND SITE SAFETY.

8. SCHEDULE OF SPECIAL INSPECTIONS CONTINUED ON SHEET S-9.

TABLE 2 - REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS (IBC, TABLE 1705.6)

TYPE	IBC REFERENCE	INSPECTION FREQUENCY		REFERENCE STANDARD
		CONTINUOUS	PERIODIC	
VERIFY MATERIALS BELOW ALL FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	1705.6		X	CONTRACT DOCUMENTS AND GEOTECHNICAL REPORT
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	1705.6		X	
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	1705.6		X	
VERIFY USE OF PROPER MATERIALS, DENSITIES, AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	1705.6	X		
PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	1705.6		X	

TABLE 1 - REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION (IBC, TABLE 1705.3)

TYPE	IBC REFERENCE	INSPECTION FREQUENCY		REFERENCE STANDARD
		CONTINUOUS	PERIODIC	
INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT	1705.3 1908.4		X	ACI 318: CHAPTER 20, SECTION 25.2, 25.3, 26.6.1-26.6.3
REINFORCING BAR WELDING: a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A 706	1705.3		X	AWS D1.4 ACI 318: SECTION 26.6.4
b. INSPECT SINGLE PASS FILLET WELDS MAX 5/16"			X	
c. INSPECT ALL OTHER WELDS		X		
INSPECT ANCHORS CAST IN CONCRETE	1705.3		X	ACI 318: SECTION 17.8.2
INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS: a. ADHESIVE ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	1705.3	X		ACI 318: SECTION 17.8.2.4 ICC TEST REPORT FOR SPECIFIC ANCHORS.
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN a			X	ACI 318: SECTION 17.8.2 ICC TEST REPORT FOR SPECIFIC ANCHORS.
VERIFYING USE OF REQUIRED DESIGN MIX	1705.3 1904.1 1904.2		X	ACI 318: CHAPTER 19, SECTIONS 26.4.3, 26.4.4
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	1705.3	X		ACI 318: SECTIONS 26.4, 26.5, 26.12 ASTM C172 ASTM C31
INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	1705.3	X		ACI 318: SECTIONS 26.5
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	1705.3		X	ACI 318: SECTIONS 26.5.3-26.5.5
INSPECT PRESTRESSED CONCRETE FOR: a. APPLICATION OF PRESTRESSING FORCES; AND		X		ACI 318: SECTIONS 26.10 ACI 318: 26.10.1(g)
b. GROUTING OF BONDED PRESTRESSING TENDONS		X		
INSPECT ERECTION OF PRECAST CONCRETE MEMBERS			X	ACI 318: SECTIONS 26.9
VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVALOF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS			X	ACI 318: SECTIONS 26.10.2, 26.11.2
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	1705.3		X	ACI 318: SECTION 26.11

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

SPECIAL INSPECTIONS I

PROJECT NO. 255128-234374
FILE NAME: S00800DT.rvt

SHEET NO.
S-8

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

BID SET

TABLE 4 - LEVEL C REQUIRED SPECIAL INSPECTIONS AND TESTS OF MASONRY CONSTRUCTION (ACI 530.1, PER IBC 1705.4)

VERIFICATION AND INSPECTION	IBC REFERENCE	INSPECTION FREQUENCY		REFERENCE STANDARD
		CONTINUOUS	PERIODIC	
VERIFICATION OF f'_m PRIOR TO CONSTRUCTION AND FOR EVERY 5000 SQ.FT DURING CONSTRUCTION	1705.4		X	ACI 530.1 ARTICLE 1.4B
VERIFICATION OF PROPORTIONS OF MATERIALS IN PREMIXED OR PREBLENDED MORTAR AND GROUT OTHER THAN SELF CONSOLIDATING GROUT AS DELIVERED TO PROJECT SITE			X	
VERIFICATION OF SLUMP FLOW AND VSI AS DELIVERED TO THE SITE FOR SELF-CONSOLIDATING GROUT		X		ACI 530.1 ARTICLE 1.5B.1.b.3
VERIFY COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS			X	ACI 530.1 ARTICLE 1.5
VERIFY THE FOLLOWING TO ENSURE COMPLIANCE: a. PROPORTIONS OF SITE-MIXED MORTAR AND GROUT			X	ACI 530.1 ARTICLE 2.1, 2.6A, 2.6B
b. GRADE, TYPE AND SIZE OF REINFORCEMENT AND ANCHORAGES			X	ACI 530 SECTION 6.1 ACI 530.1 ARTICLE 2.4, 3.4
c. PLACEMENT OF MASONRY UNITS AND CONSTRUCTION OF MORTAR JOINTS			X	ACI 530.1 ARTICLE 3.3B
d. PLACEMENT OF REINFORCEMENT, CONNECTORS AND ANCHORAGES		X		ACI 530 SECTIONS 6.1, 6.2.1, 6.2.6, 6.2.7 ACI 530.1 ARTICLE 3.2E, 3.4
e. GROUT SPACE PRIOR TO GROUTING		X		ACI 530.1 ARTICLE 3.2D, 3.2F
f. PLACEMENT OF GROUT		X		ACI 530.1 ARTICLE 3.5
g. SIZE AND LOCATION OF STRUCTURAL ELEMENTS			X	ACI 530.1 ARTICLE 3.3F
h. TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION		X		ACI 530 SECTIONS 1.2.1(e), 6.1.4.3, 6.2.1
i. WELDING OF REINFORCING BARS (WHEN WELDING IS SPECIFIED OR APPROVED IN WRITING)		X		ACI 530 SECTIONS 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)
j. PREPARATION, CONSTRUCTION AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER (TEMPERATURE ABOVE 90°F (32.2°C))			X	ACI 530.1 ARTICLE 1.8C, 1.8D
OBSERVE PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS			X	ACI 530.1 ARTICLE 1.4B.2.a.3, 1.4B.2.b.3, 1.4B.2.c.3, 1.4.B.3, 1.4.B.4

TABLE 7 - REQUIRED SPECIAL INSPECTIONS FOR WIND RESISTANCE (IBC, SECTION 1705.11)

SYSTEM OR MATERIAL	IBC REFERENCE	INSPECTION FREQUENCY		REFERENCE STANDARD
		CONTINUOUS	PERIODIC	
ROOF CLADDING AND ROOF FRAMING CONNECTIONS	1705.11		X	CONTRACT DOCUMENTS
WALL CONNECTIONS TO ROOF AND FLOOR DIAPHRAGMS AND FRAMING			X	
ROOF AND FLOOR DIAPHRAGM SYSTEMS, INCLUDING COLLECTORS, DRAG STRUTS AND BOUNDARY ELEMENTS			X	
WIND FORCE-RESISTING SYSTEM CONNECTION TO THE FOUNDATION			X	

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. AARTI
DRAWN BY: R. NARAYANAN
SHEET CHK'D BY: S. SANKAR
CROSS CHK'D BY: J. BROZ
APPROVED BY: M. MITCHELL
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

SPECIAL INSPECTIONS II

PROJECT NO. 255128-234374
FILE NAME: S00800DT.RVT
SHEET NO.
S-9

STATE OF MICHIGAN
MICHAEL JOHN MITCHELL III
ENGINEER
No. 6201066603
LICENSED PROFESSIONAL ENGINEER
10-4-2019

BID SET

SYMBOLS (ABBREVIATIONS)

- UNCLASSIFIED. TYPE AS SHOWN ON THE DRAWINGS ADJACENT TO SYMBOL
- GATE VALVE (GV)
- KNIFE GATE VALVE (KG)
- GLOBE VALVE (GLV)
- BALL VALVE (BV)
- 3-WAY BALL VALVE (BV3)
- 4-WAY BALL VALVE (BV4)
- RECYCLE CONTROL VALVE (RCV)
- CONE VALVE (CNV)
- NEEDLE VALVE (NV)
- PINCH VALVE (PV)
- DIAPHRAGM VALVE (DV)
- BUTTERFLY VALVE (BFV)
- PLUG VALVE (PV)
- 3-WAY PLUG VALVE (PV3)
- 4-WAY PLUG VALVE (PV4)
- CHECK VALVE, GENERAL SYMBOL (CKV)
- BALL CHECK VALVE (BCV)
- DOUBLE DOOR CHECK VALVE (DDCV)
- SOLENOID VALVE (SV)
- MOTOR OPERERATED VALVE (MOV)
- 3-WAY SOLENOID VALVE (SV3)
- 4-WAY SOLENOID VALVE (SV4)
- ANGLE VALVE (AV)
- QUICK CONNECT COUPLING (QCC)
- SLUICE GATE (SLG)
- BULKHEAD GATE (BHG)
- SLIDE GATE (SG)
- WEIR SLIDE GATE (WG)
- STOP PLATE GUIDES (SPG)
- FLAP VALVE (FLV)
- SHEAR GATE (SHG)
- MUD VALVE (MV)
- PCV XXXX XX — PRESSURE REDUCING REGULATOR SELF CONTAINED (PCV)
- PCV XXXX XX — PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP (PCV)
- PDCV XXXX XX — DIFFERENTIAL PRESSURE REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESSURE TAPS (PDCV)

SYMBOLS (ABBREVIATIONS)

- CV XXXX XX — CONTROL VALVE (CV)
- FCV XXXX XX — FLOW CONTROL VALVE (FCV)
- PCV XXXX XX — BACK PRESSURE REGULATOR SELF CONTAINED (PCV)
- PCV XXXX XX — BACK PRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP (PCV)
- PCV XXXX XX — PRESSURE REDUCING REGULATOR WITH INTEGRAL OUTLET PRESSURE RELIEF VALVE (PCV)
- PSV XXXX XX — PRESSURE RELIEF OR SAFETY VALVE, STRAIGHT-THROUGH PATTERN, SPRING OR WEIGHT-LOADED, OR WITH INTEGRAL PILOT (PSV)
- PSV XXXX XX — PRESSURE RELIEF OR SAFETY VALVE, GENERAL SYMBOL (PSV)
- VACUUM RELIEF VALVE, GENERAL SYMBOL (VRV)
- PSV XXXX XX — PRESSURE AND VACUUM RELIEF VALVE, SPRING OR WEIGHT-LOADED,OR WITH INTEGRAL PILOT (PSV)
- PSE XXXX XX — RUPTURE DISK OR SAFETY HEAD FOR PRESSURE RELIEF (PSE)
- PSE XXXX XX — RUPTURE DISK OR SAFETY HEAD FOR VACUUM RELIEF (PSE)
- PSE XXXX XX — PRESSURE AND VACUUM RELIEF MANHOLE COVER (PSE)
- SLIDE PLATE (SP)
- VD — MANUAL VOLUME DAMPER
- BDD — BACKDRAFT DAMPER
- FOOT VALVE

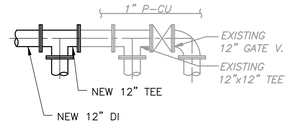
VALVE ACTUATORS

- DIAPHRAGM, SPRING OPPOSED
- DIAPHRAGM, SPRING OPPOSED WITH POSITIONER
- DIAPHRAGM, PRESSURE-BALANCED
- M — ROTARY MOTOR. (SHOWN TYPICALLY WITH ELECTRIC SIGNAL. MAY BE HYDRAULIC OR PNEUMATIC)
- S — SOLENOID
- CYLINDER, SINGLE-ACTING, SPRING OPPOSED WITHOUT POSITIONER OR PILOT.
- CYLINDER, DOUBLE ACTING, WITHOUT POSITIONER OR PILOT
- EXAMPLE OF CYLINDER WITH POSITIONER
- ANY CYLINDER THAT IS ASSEMBLED WITH A PILOT SO THAT ASSEMBLY IS ACTUATED BY ONE CONTROLLED INPUT. PILOT MAY BE POSITIONER, SOLENOID VALVE, SIGNAL CONVERTER, etc.
- FLOAT ACTUATOR
- FLOAT ACTUATOR WITH PILOT VALVE

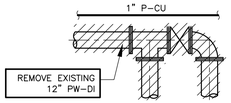
PIPE, VALVE AND FITTING SYMBOLS

DOUBLE LINE PIPING	SINGLE LINE PIPING	
	3" PIPE & SMALLER	PROCESS PIPING:
		EXISTING PROCESS PIPING
		FUTURE PROCESS PIPING
		WELDED JOINT
SEE NOTE 2		FLANGED JOINT SIMPLIFIED REPRESENTATION. (SEE NOTE 1)
		FLANGED JOINT (SEE NOTE 1)
F OR R		COUPLING FOR GROOVED END JOINTS: (F) FLEXIBLE (R) RIGID
		MECHANICAL JOINT (SEE NOTE 1)
		PUSH ON JOINT OR CAULKED BELL & SPIGOT JOINT (SEE NOTE 1)
		FLANGE x PLAIN END PIPE COUPLING (FLANGE ADAPTOR)
		PIPE COUPLING (SLEEVE-TYPE)
A — ONE OR TWO LETTERS IDENTIFYING THE TYPE. REFER TO SPECIFICATIONS.	A	FLEXIBLE COUPLING OR EXPANSION JOINT (SLEEVE TYPE)
B	B	FLEXIBLE COUPLING OR EXPANSION JOINT (BELLOWS TYPE)
		FLANGE GUARD
		EXPANSION JOINT
		GLUED (PLASTIC)
		REDUCER/INCREASER
		BALL VALVE
		PLUG VALVE
		BUTTERFLY VALVE
		CHECK VALVE
		DIAPHRAGM VALVE
		AIR/VACUUM VALVE, AIR RELEASE VALVE
		UNCLASSIFIED. TYPE AS SHOWN ON THE DRAWINGS ADJACENT TO THE SYMBOL

EXISTING FACILITIES SHOWN WITH PROPOSED WORK SYMBOLOGY AND ANNOTATION



EXISTING FACILITIES DEMOLITION SYMBOLOGY AND ANNOTATION



INDICATES EXISTING PIPING AND/OR EQUIPMENT TO BE REMOVED, REMOVED/STORED, RELOCATED OR SALVAGED.

PIPE AND FITTING SYMBOLS NOTES:

1. GENERIC JOINT SYMBOL IS USED FOR ALL SINGLE LINE PIPING SHOWN ON THE INTERIOR AND EXTERIOR PIPING DRAWINGS.
2. BOTH, DETAILED AND SIMPLIFIED FLANGE REPRESENTATION SYMBOLS MAY BE SHOWN ON THE DRAWINGS.
3. UNLESS MODIFIED BY THE GENERAL PROJECT NOTES OR DETAILED ON THE LAYOUT AND SCHEMATIC DRAWINGS PIPE AND FITTING JOINT REQUIREMENTS FOR THE VARIOUS PIPE MATERIALS ARE DEFINED IN THE SPECIFICATIONS AND ARE INDICATED ON THE PROCESS PIPE SCHEDULES

PROCESS PIPE IDENTIFICATION

PROCESS FLOW STREAMS

ACH	ALUMINUM CHLOROHYDRATE
AIR	AIR (BLOWER AIR)
BWW	BACKWASH WATER
CA	CITRIC ACID
CI	CORROSION INHIBITOR
CIP	CLEAN-IN-PLACE
CS	CAUSTIC SODA
D	DRAIN
DC	DECANT (ABOVE GROUND)
DFM	DRAIN FORCE MAIN
DW	DOMESTIC WATER
ER	EXCESS RECIRCULATION
FE	FILTRATE EXHAUST
FP	FIRE SERVICE
FW	FINISHED WATER
HF	HYDROFLUOSILICIC ACID (FLUORIDE)
IA	MF AIR
IRR	IRRIGATION WATER
LPA	LOW PRESSURE AIR (FROM BLOWERS)
NEUT	NEUTRALIZATION
OCS	CHEMICAL PIPE CONDUIT
OF	OVERFLOW
MP,P OR PMP	METERING PUMP
PA	PLANT AIR
PW	PLANT WATER
RW	RAW WATER
SA	SULFURIC ACID
SAM	SAMPLE
SB	SODIUM BISULFITE
SFM	SANITARY FORCE MAIN
SHC	SODIUM HYPOCHLORITE (CHLORINE)
SLG	SLUDGE
SS	SANITARY SEWER
STM	STORM SEWER/WATER
SW	SETTLED WATER
TW	TREATED WATER
V	VENT
WW	WASTE WASHWATER

PIPE MATERIALS

CU	COPPER
CPVC	CHLORINATED POLYVINYL CHLORIDE PIPE
CPVCT	CHLORINATED POLYVINYL CHLORIDE TUBING
CSTL	CARBON STEEL
DI	DUCTILE IRON
FRP	FIBERGLASS REINFORCED PLASTIC
GS	GALVANIZED STEEL
HDPE	HIGH DENSITY POLYETHYLENE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PVC	POLYVINYL CHLORIDE PIPE
PVC	POLYVINYL CHLORIDE PRESSURE PIPE
PVCT	POLYVINYL CHLORIDE TUBING
POLYP	POLYPROPYLENE
PPSTL	POLYPROPYLENE LINED STEEL PIPE
RC	REINFORCED CONCRETE SEWER PIPE
SS	STAINLESS STEEL
STL	STEEL
BS	BLACK STEEL PIPE
FEPT	TETLON RESIN-FLUORINATED ETHYLENE PROPYLENE TUBING
PPT	VIRGIN, RANDOM COPOLYMET POLY-PROPYLENE TUBING

PIPE JOINTS

FLG – FLANGE
PE – PLAIN END
MJ – MECHANICAL JOINT

EQUIPMENT TAG

TK – 5032 – 1A

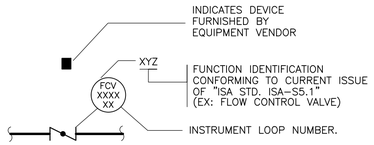
- TK — EQUIPMENT TYPE (I.E. AIR RECEIVERS TANK)
- 50 — EQUIPMENT IDENTIFICATION (FIRST TWO DIGITS DENOTE ASSOCIATED AREA)
- 32 — INDIVIDUAL EQUIPMENT NUMBER (LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES)
- A

VALVE TAG

BFV – 1027– B

- BFV — VALVE TYPE (I.E. BUTTERFLY VALVE)
- 10 — INDIVIDUAL VALVE NUMBER
- 27 — DISTINGUISHES BETWEEN MULTIPLE, SIMILAR VALVES
- B

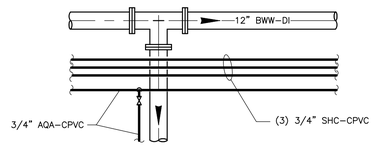
PROCESS VALVE LOOP IDENTIFICATION



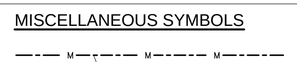
MECHANICAL DRAWINGS SHOW ONLY PRIMARY INSTRUMENT ELEMENTS. FOR ADDITIONAL DETAILS REFER TO INSTRUMENTATION SPECIFICATIONS.

TYPICAL INSTRUMENTATION AND LOOP TAG

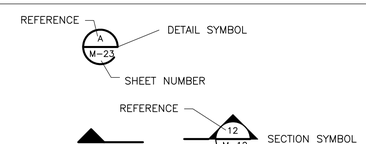
PIPE TAG



MISCELLANEOUS SYMBOLS



LIFTING HOOK ABOVE EQUIPMENT. (PLAN VIEW)



STATE OF MICHIGAN — JAMES JOSEPH BROZ — ENGINEER — No. 35875 — LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL LEGENDS I

PROJECT NO. 255128-234374
FILE NAME: M001GLSH.DWG

SHEET NO.
M-1

BID SET

EQUIPMENT SYMBOLS

CENTRIFUGAL PUMP

PISTON PUMP

ROTARY SCREW PUMP

DIAPHRAGM PUMP

ROTARY VANE PUMP

ROTARY LOBE PUMP

ROTARY GEAR PUMP

PERISTALTIC PUMP

INCLINED SCREW PUMP

CENTRIFUGAL BLOWER OR FAN COMPRESSOR

ROTARY BLOWER

RECIPROCATING COMPRESSOR

ROTARY SCREW COMPRESSOR

ROTARY VANE COMPRESSOR

ROTARY LOBE COMPRESSOR

ROTARY FEEDER OR AIR LOCK

AIR-OPERATED DIAPHRAGM PUMP

VERTICAL WET-PIT TYPE PUMP

BELT CONVEYOR

SCREW CONVEYOR

FEEDER

SCREEN

GRAVITY THICKENER

SEDIMENTATION TANK

MIXER

BUCKET ELEVATOR

EJECTOR OR EDUCTOR

FILTER PRESS

CYCLONE

VACUUM FILTER

OPEN VERTICAL STORAGE TANK

CLOSED VERTICAL STORAGE TANK

SILO OR STORAGE BIN

HORIZONTAL STORAGE TANK OR PRESSURIZED VESSEL

BELT FILTER PRESS

PRIMARY FLOW ELEMENT SYMBOLS

FLOW ELEMENT, GENERAL SYMBOL

AVERAGING PITOT TUBE

TARGET TYPE SENSOR

TURBINE-OR PROPELLER TYPE PRIMARY ELEMENT

POSITIVE-DISPLACEMENT TYPE FLOW TOTALIZING INDICATOR

SINGLE PORT PITOT TUBE OR PITOT VENTURI TUBE

MAGNETIC FLOW METER

VORTEX SENSOR

FLANGE OR CORNER TAP TEST CONNECTIONS WITHOUT ORIFICE PLATE

ORIFICE PLATE WITH VENA CONTRACTA TAPS

ORIFICE PLATE WITH FLANGE OR CORNER TAPS CONNECTED TO DIFFERENTIAL PRESSURE TYPE FLOW INDICATOR

ORIFICE PLATE IN QUICK CHANGE FITTING

VENTURI TUBE

FLOW NOZZLE

FLUME

WEIR

SONIC FLOW METER

VARIABLE AREA FLOW INDICATOR (ROTAMETER)

MISCELLANEOUS SYMBOLS

CONCENTRIC REDUCER

ECCENTRIC REDUCER

FILTER, GENERAL SYMBOL

LUBRICATOR

BASKET STRAINER

Y-STRAINER

PUMP CALIBRATION COLUMN

ACCUMULATOR, AIR CHARGED DIAPHRAGM TYPE

PULSATION DAMPENER

ACCUMULATOR, IN LINE VERTICALLY INSTALLED

OED OPEN EQUIPMENT DRAIN

DRAIN, TERMINATED IN TRENCH

DRAIN, TERMINATED ABOVE FLOOR SURFACE

UNION

DIELECTRIC COUPLING

EXAMPLES OF DIRECT CONNECTED INSTRUMENT DEVICES

INSTRUMENT DEVICE
EXTERNAL DIAPHRAGM SEAL
ISOLATION VALVE AS SPECIFIED
PROCESS LINE
INSTRUMENT ASSEMBLY TYPE A

INSTRUMENT DEVICE
ISOLATION VALVE AS SPECIFIED
PROCESS LINE
INSTRUMENT ASSEMBLY TYPE B

INSTRUMENT DEVICE
IN-LINE DIAPHRAGM SEAL AS SPECIFIED
PROCESS LINE
INSTRUMENT ASSEMBLY TYPE C

SAMPLE - FLOW DIAGRAM SHEET CONNECTOR

TO FILTER TO WASTE EQUALIZATION TANKS | FW M-1

CONTINUATION OF PROCESS LINE ON SHEET M-1

42"-FTW-DI

SHORT DESCRIPTION OF DESTINATION OR ORIGIN OF PROCESS LINE

PIPE TAG ADJACENT TO SHEET CONNECTOR

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL LEGENDS II

PROJECT NO. 255128-234374
FILE NAME: M002GLSH.DWG

SHEET NO.
M-2

BID SET

MISCELLANEOUS EQUIPMENT

SYMBOL	FEATURE
	GRINDER
	AIRLOCK
M	BELT CONVEYOR
M	SCREW CONVEYOR
	FEEDER
	SCREEN
M	MIXER
	GRAVITY THICKENER
M	BUCKET ELEVATOR
	CYCLONE
	EJECTOR
	FILTER PRESS
	BELT FILTER PRESS
	OPEN VERTICAL
	CLOSED VERTICAL
	SEDIMENTATION TANK
	PRESSURE VESSEL
	SILO OR BIN

PUMPS, BLOWERS, AND COMPRESSORS

SYMBOL	FEATURE
	CENTRIFUGAL PUMP
	PLUNGER PUMP
	DIAPHRAGM PUMP
	PROGRESSING CAVITY
	ROTARY VANE PUMP
	ROTARY LOBE PUMP
	ROTARY GEAR PUMP
	PERISTALTIC PUMP
	AIR OPERATED DIAPHRAGM
M	INCLINED SCREW
M	VERTICAL WET PIT
	RECIPROCATING COMPRESSOR
	ROTARY SCREW COMPRESSOR
	ROTARY VANE COMPRESSOR
	ROTARY LOBE COMPRESSOR
	ROTARY BLOWER
	CENTRIFUGAL BLOWER

MISCELLANEOUS COMPONENTS

SYMBOL	FEATURE
	BASKET STRAINER
	Y STRAINER
F	FILTER
L	LUBRICATOR
	CALIBRATION CYLINDER
	AIR CHARGED ACCUMULATOR
	IN LINE ACCUMULATOR
	PULSATION DAMPENER
OED	OPEN END DRAIN
	TEXT DRAIN
	DIAPHRAGM ISOLATOR

INSTRUMENT CONTROL DEVICES

SYMBOL	FEATURE
?? ???? ??	FLOW ELEMENT SYMBOL
M	MAGNETIC FLOW METER
~	SONIC FLOW METER
	TURBINE FLOW METER
	VORTEX SENSOR
	SINGLE PORT PITOT
	AVERAGING PITOT
	VENTURI TUBE
	PARSHALL FLUME
	WEIR
	ORIFICE PLATE

ACTUATORS

SYMBOL	FEATURE
S	SOLENOID OPERATOR
	PRESSURE BALANCE DIA ACT
	SPRG OPR DIA ACT
	FLOAT OPERATOR
	HAND WHEEL
	CYLINDER OPERATOR
M	MOTOR OPERATOR

MISCELLANEOUS FITTINGS

SYMBOL	FEATURE
	BELLOWS TYPE CPLG
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	DRESSER TYPE CPLG
	UNION
	FLEXIBLE HOSE COUPLE
H C	HOSE COUPLING
	QUICK CONNECT COUPLING

PRESSURE RELEASE VALVE

SYMBOL	FEATURE
	PRESSURE RELEASE DISK
	PRESSURE RELEASE VALVE
	PRESSURE RELEASE VALVE
	PRESSURE/VACUUM
	VACUUM RELEASE DISK
	PRES RED REG W/V
	VACUUM RELEASE VALVE
	PRES RED REG
	PRESSURE RELEASE MANHOLE
	PRES RED REG SC
	BACK PRESS REG EXT
	BACK PRESS REG SC

MISCELLANEOUS VALVES

SYMBOL	FEATURE
	FOOT VALVE
	MUD VALVE
	TELESCOPING VALVE
	SWING CHECK VALVE
	SILENT CHECK VALVE

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL LEGENDS III

PROJECT NO. 255128-234374
FILE NAME: M003GLSH.DWG

SHEET NO.
M-3

BID SET

PROCESS MECHANICAL GENERAL NOTES

1. PROCESS EQUIPMENT DIMENSIONS, LOCATIONS AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED AND SPECIFIED AND BY THE DESIGN ENGINEER IF THE CONTRACTOR PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFIED, THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE CM FOR APPROVAL DETAILED ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, INSTRUMENTATION, HVAC AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING ALL FEATURES OF THE EQUIPMENT AND/OR PROCESS SYSTEM PROPOSED.
THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS AND SCHEMATICS OF ALL APPURTENANCES REQUIRED.

2. SIZES OF EQUIPMENT FOUNDATIONS AND EQUIPMENT PADS INDICATED ON THE DRAWINGS ARE APPROXIMATE. EXACT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE EQUIPMENT FURNISHED. ALL FLOOR MOUNTED EQUIPMENT SHALL BE SET ON CONCRETE PADS CONFORMING TO DETAILS SHOWN ON THE STRUCTURAL AND/OR MECHANICAL DRAWINGS.

3. EXTERIOR PIPING IS SHOWN ON THE YARD PIPING DRAWINGS.

4. PROTECTED WATER SUPPLY CONNECTIONS TO PROCESS EQUIPMENT AND PROCESS PIPES ARE SHOWN ON THE MECHANICAL DRAWINGS. DETAILS OF CONTROL VALVE STATIONS, MAKE-UP WATER CONNECTIONS, FLUSHING CONNECTIONS etc. ARE SHOWN ON THE MECHANICAL DRAWINGS.
IF APPLICABLE, LIMITS OF WORK ARE SHOWN ON THE MECHANICAL AND THE PLUMBING DRAWINGS.

5. WASH HOSE STATIONS ARE SHOWN ON THE PLUMBING DRAWINGS.

6. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING.

7. MECHANICAL PLANS AND SECTIONS DO NOT SHOW ALL VALVES, GAUGES, SWITCHES, OPERATORS, DRAINS, VENTS, etc. REQUIRED FOR THE COMPLETE SYSTEM. CERTAIN SMALL DIAMETER PROCESS PIPING RUNS MAY NOT BE SHOWN IN THEIR ENTIRETY. GENERALLY SMALL PIPING IS SHOWN DIAGRAMMATICALLY. IN THE PROCESS SCHEMATICS.
FIELD ROUTE TO AVOID INTERFERENCES, SUBJECT TO THE APPROVAL OF THE CM

THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST ALL PIPING SYSTEMS AS INDICATED ON THE PROCESS FLOW SCHEMATICS AND/OR AS DEFINED PROCESS PIPING SCHEDULES TO PROVIDE THE COMPLETE SYSTEM.

8. UNLESS OTHERWISE SHOWN ON THE MECHANICAL DRAWINGS ALL FLOORSLAB, WALL AND TANK PENETRATIONS SHALL BE AS SHOWN ON THE PENETRATION DETAILS INCLUDED IN THE MECHANICAL CONSTRUCTION DETAILS. ABOVE GROUND EXTERIOR WALL AND ROOF PENETRATIONS SHALL BE AS SHOWN ON THE ARCHITECTURAL DRAWINGS.
IF APPROVED BY CM, THE CONTRACTOR MAY SUBSTITUTE ALTERNATE METHODS PROVIDING THEY MEET INTENDED DESIGN REQUIREMENTS.

9. ALL PIPE SUPPORTS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED CERTAIN PIPE SUPPORTS HAVE BEEN DESIGNED BY THE DESIGN ENGINEER, THESE SYSTEMS ARE NOTED ON THE PROCESS PIPING SCHEDULES, AND ARE SHOWN ON PS (PIPE SUPPORT) DESIGNATED DRAWINGSNOTE THAT ALL PIPING ADJACENT TO EQUIPMENT, VALVES, COUPLINGS, INSTRUMENT DEVICES AND OTHER APPURTENANCES SHALL BE PROPERLY SUPPORTED AND/OR ANCHORED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.

10. ALL EQUIPMENT BASES AND PIPING HAVING DRAIN OUTLETS SHALL BE PIPED TO THE NEAREST OPEN END DRAIN (OED) OR TRENCH DRAIN USING GALVANIZED STEEL PIPE OF APPROPRIATE DIAMETER AS INDICATED ON THE DRAWINGS OR AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

11. UNLESS OTHERWISE SHOWN ALL PIPES UNDER CONCRETE SLABS SHALL BE ENCASED IN CONCRETE AS SHOWN ON THE STRUCTURAL DRAWINGS.

12. NOT ALL VALVE AND GATE OPERATORS ARE SHOWN (i.e. HANDWHEELS, CRANKS, CHAINWHEELS, MOTORS OR LEVERS). OPERATORS SHALL BE LOCATED TO ALLOW CONVENIENT OPENING AND CLOSING OF VALVES OR GATES. ORIENTATION OF OPERATORS SHALL BE TO APPROVAL OF CM. NO VALVE SHALL BE INSTALLED WITH THE OPERATING STEM IN THE VERTICAL DOWNWARD POSITION.

13. PIPING SHALL BE INSTALLED SO THAT ANY PIPE, LAYER OF PIPING OR EQUIPMENT CAN BE REMOVED WITHOUT DISTURBING REMAINING PIPES AND SUPPORTS.

14. THE NUMBER OF UNIONS AND OTHER TYPES OF DISMANTLING COUPLINGS SHOWN IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE UNIONS OR DISMANTLING COUPLINGS WHETHER THEY ARE SHOWN ON THE DRAWINGS OR NOT ON ALL PIPELINES WITH WELDED, THREADED OR SOLVENT CEMENTED JOINTS: AT ALL EQUIPMENT CONNECTIONS, AT A MINIMUM EVERY 50 FEET AND IN BRANCH LINES TO ALLOW CONVENIENT REMOVAL OF PIPING, EQUIPMENT AND APPURTENANCES.

15. FURNISH AND INSTALL ESCUTCHEON PLATES OF SUITABLE SIZE ON ALL PROCESS LINES PASSING THROUGH INTERIOR WALLS OF NON-PROCESS AREAS SUCH AS OFFICES, LABS, LOCKER ROOMS, TOILETS AND PUBLIC CORRIDORS. ESCUTCHEON PLATES SHALL BE INSTALLED ON THE INTERIOR SIDE OF THE NON-PROCESS ROOMS. EXTERIOR, ABOVE GROUND WALL PENETRATIONS SHALL SPLIT AND MADE OF 316 SS UNLESS OTHERWISE SHOWN ON THE ARCHITECTURAL DETAILS.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING AND TAGGING ALL PROCESS PIPING VALVES AND EQUIPMENT. PROCESS IDENTIFICATION SYSTEM SHALL BE AS DETAILED IN THE SPECIFICATIONS.

17. ALL PIPING ENCASED IN CONCRETE SHALL HAVE MECHANICAL JOINTS AT ALL STRUCTURAL EXPANSION JOINTS.

18. PORTIONS OF NONPROCESS PIPING (HVAC & PLUMBING) ARE SHOWN FOR CLARITY AND FOR COORDINATION BETWEEN DISCIPLINES. REFER TO APPROPRIATE DRAWINGS AND SPECIFICATIONS.

19. FOR PUMP SEAL WATER, VENT, DRAIN, PRESSURE GAGE, VALVING AND PIPING SEE MECHANICAL PROCESS DETAILS.

20. ALL PIPING AND PROCESS SYSTEMS SHALL BE CAPABLE OF BEING VENTED AND DRAINED. TYPICAL LOCATIONS ARE INDICATED BY (V) OR (D) ON THE DRAWINGS.

21. WHERE PIPES CHANGE DIRECTION FROM HORIZONTAL TO VERTICAL VIA A BEND, A WELDED OR CAST BASE ELBOW SUPPORT SHALL BE INSTALLED.

22. ALL DIMENSIONS MARKED WITH ▲ INDICATE CONTRACTOR TO COORDINATE DIMENSIONS WITH MANUFACTURER OF APPROVED EQUIPMENT

23. ALL DIMENSIONS MARKED WITH ▲ INDICATE CONTRACTOR TO COORDINATE DIMENSIONS IN THE FIELD TO THE APPROVAL OF THE ENGINEER

24. ALL DIMENSIONS MARKED WITH ▲ INDICATE CONTRACTOR TO COORDINATE DIMENSIONS IN THE FIELD TO THE APPROVAL OF THE ENGINEER

PROCESS MECHANICAL GENERAL NOTES

NOTES:

1. ALL OF THE INFORMATION ON THESE STANDARD DRAWINGS MAY NOT APPLY TO THIS CONTRACT. SEE INDIVIDUAL DRAWINGS AND SPECIFICATIONS FOR ITEMS SPECIFIC TO THIS CONTRACT.

2. UNLESS MORE SPECIFIC REQUIREMENTS ARE INDICATED:
   2.1 INFORMATION ON GENERAL DRAWINGS ALSO APPLIES TO PROCESS MECHANICAL [M] DRAWINGS.

   2.2 INFORMATION ON GENERAL PROCESS MECHANICAL DRAWINGS AND THE PROCESS MECHANICAL STANDARD DETAIL DRAWINGS APPLY TO ALL M DRAWINGS AND YARD PIPING ON CIVIL DRAWINGS. INFORMATION MAY DIFFER FROM LEGENDS ON OTHER FUNCTION GROUP DRAWINGS. DISCIPLINE SPECIFIC SYMBOLOGY TAKES PRECEDENCE OVER GENERAL SYMBOLOGY.

3. APPLICABLIITY OF YARD PIPING NOTES FOR M DRAWINGS: YARD PIPING NOTES YP-1, 2, 3, 4, 7, 10, 12, 13, 15, 16 & 17, LISTED UNDER YARD PIPING ON SHEET GC-1, SHALL ALSO APPLY TO M DRAWINGS.

4. SEE ALSO GENERAL NOTES, AND NOTES AND DRAWINGS FOR MECHANICAL, STRUCTURAL, HVAC, FIRE PROTECTION AND ELECTRICAL FOR ADDITIONAL INFO.

5. RELATIONSHIP OF PIPES, DUCTWORK, ELECTRICAL LINES, CABLE TRAYS, CONDUIT AND OTHER TRADES WORK TO STRUCTURAL WORK-SEE GENERAL NOTES.

6. NOT ALL VALVE AND GATE ACTUATORS ARE SHOWN. ACTUATORS SHALL BE LOCATED TO ALLOW CONVENIENT OPERATION & MAINTENANCE ACCESS AND AS APPROVED BY THE ENGINEER. NO VALVE SHALL BE INSTALLED WITH THE OPERATING STEM IN THE VERTICAL DOWNWARD POSITION. THIS ALSO APPLIES TO VALVES IN VAULTS.

7. PIPING SHALL BE INSTALLED SO THAT ANY PIPE, LAYER OR PIPING OR EQUIPMENT CAN BE REMOVED WITHOUT DISTURBING REMAINING PIPES AND SUPPORTS.

8. THE MAJORITY OF LARGE PROCESS MECHANICAL PIPING IS INTENDED TO BE SHOWN ON THE M DRAWINGS, ALTHOUGH PORTIONS MAY BE SHOWN ON OTHER DRAWINGS, OR NOT SHOWN AT ALL.

9. DIELECTRIC COUPLINGS, INSULATING FLANGES AND FLANGE KITS, OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF ALL DISSIMILAR TYPES OF PIPES AND MATERIALS. SEE CP DRAWINGS.

10. DRAINS: ALL EQUIPMENT BASES AND PIPING HAVING DRAIN OUTLETS SHALL BE PIPED TO THE NEAREST FLOOR DRAIN USING SCHEDULE 80 PVC PIPE OF APPROPRIATE DIAMETER AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. PROVIDE AN AIR GAP, OF APPROX 2 X DRAIN NOMINAL DIAMETER, BETWEEN DRAIN PIPE AND DRAINS.

11. EQUIPMENT NOT IDENTIFIED ON THIS DRAWING WILL BE IDENTIFIED ON THE PROCESS MECHANICAL DRAWINGS.

12. SPLIT RING COUPLIINGS: EXCEPT AT EQUIPMENT AND VALVES, OR IF OTHERWISE NOTED, RIGID SPLIT RING ("VICTAULIC" GROOVED TYPE) COUPLINGS MAY BE UTILIZED IN PLACE OF FLANGED CONNECTIONS, AS ACCEPTABLE TO THE ENGINEER. IF MINIMUM PIPE WALL THICKNESS REQUIREMENTS CANNOT BE MET, UTILIZE SHOULDERED ENDS.

13. AT POWERED EQUIPMENT UTILIZE FLEXIBLE HARNESSED CONNECTIONS.

14. WHERE A SPLIT RING (GROOVED END) COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE USED TO JOIN THE COUPLING ADAPTER, RESTRAINT SHALL BE USED UNO.

15. ALL FLEXIBLE COUPLING, SLEEVE COUPLINGS, FLANGED COUPLING ADAPTERS AND OTHER JOINTS ON PRESSURE AND/ OR ANY TYPE OF EXPOSED PROCESS MECHANICAL PIPE SHALL BE PROVIDED WITH RESTRAINTS UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED. SEE ALSO DIVISION 15 SPECIFICATIONS ESPECIALLY 15120,AND 15061.

16 PIPE SUPPORTS: LOCATION AND NUMBER OF PIPE SUPPORTS (INCLUDING PIPE HANGERS), RESTRAINTS, AND EXPANSION APPURTENANCES (PSRE) FOR PIPE 18 INCHES AND SMALLER ARE SHOWN ONLY WHERE SPECIFIC TYPES AND LOCATIONS OF PSRE ARE REQUIRED; CONTRACTOR SHALL DESIGN, SIZE, AND LOCATE PSRE WHETHER SHOWN OR NOT. FINAL PSRE LOCATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING AND ADDITIONAL REQUIREMENTS SHALL BE AS SPECIFIED IN SPECIFICATION 15061.

   16.1 NOTE THAT ALL PIPING ADJACENT TO EQUIPMENT, FITTINGS, VALVES, COUPLINGS, AND INSTRUMENT DEVICES AND OTHER APPURTENANCES SHALL BE PROPERLY SUPPORTED AND/OR ANCHORED ACCORDING TO ALL MANUFACTURERS' RECOMMENDATIONS. SEE SPECIFICATIONS DIVISION 15.

   16.2 UNLESS OTHERWISE NOTED, PIPE WORK SHALL BE SUPPORTED USING THE STANDARD DETAILS ON THE DRAWINGS AND AS SPECIFIED IN SPECIFICATION 15061. ADD LATERAL AND VERTICAL SUPPORTS PER THE RESULTS OF THE CONTRACTOR PREPARED DESIGN REQUIRED IN SECTION 15061.

17. WALL/FLOOR PENETRATIONS (WFP): STANDARD WFP DETAILS SHALL BE USED, WHETHER SPECIFICALLY REFERENCED OR NOT, WHEREVER PIPING PASSES FROM A STRUCTURE, INCLUDING VAULTS, TO THE EXTERIOR -ABOVE OR BELOW GRADE.

18. NUMBER AND LOCATION OF UNIONS OR COUPLINGS, AS APPROPRIATE TO THE PIPE SIZE AND MATERIAL SHOWN ON DRAWINGS (IF ANY), ARE APPROXIMATE. CONTRACTOR SHALL PROVIDE ALL UNIONS AND COUPLINGS NECESSARY TO FACILITATE CONSTRUCTION AND CONVENIENT REMOVAL OF VALVES AND EQUIPMENT.

19. TUBING AND CONTAINMENT PIPING: SHALL BE INSTALLED WITHOUT KINKS. USE PVC RADIUS BLOCKS AT CHANGES IN TUBE DIRECTION - USE 45 DEGREE ELBOW FOR CARRIER PIPES INSTEAD OF 90 DEGREE ELBOWS, UNO.

20. DRAWING REPRESENTATION: FOR THE SAKE OF CLARITY M AND C DRAWINGS MAY NOT SHOW ALL VALVES, GAUGES, SWITCHES, OPERATORS, DRAINS, VENTS, ETC. REQUIRED FOR THE COMPLETE SYSTEM.

   21.1 CERTAIN SMALL DIAMETER PIPING RUNS (ESPECIALLY CONTROL, SAMPLING/ PLUMBING, CHEMICAL PIPES, ETC) MAY NOT BE SHOWN IN THEIR ENTIRETY ON C OR M DRAWINGS. IN SOME CASES PIPING IS SHOWN APPROXIMATELY TO SCALE BUT NOT EVERY FITTING, VALVE, OFFSET OR APPURTENANCES MAY BE SHOWN. SOME VALVES AND APPURTENANCES MAY BE OMITTED FOR THE SAKE OF CLARITY.

   21.2 THE MAJORITY OF VALVES AND APPURTENANCES, EXCEPT PIPE BENDS, ARE SHOWN ON THE PROCESS AND INSTRUMENTATION DRAWING(S) (P&ID). THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST ALL PIPING, EQUIPMENT AND SYSTEMS IN THE FIELD AS INDICATED AND AS DEFINED IN THE CONTRACT DOCUMENTS, AND AS ACCEPTABLE TO THE ENGINEER, TO PROVIDE CONNECTED, SMOOTH FLOW PATHS AND COMPLETE OPERATING SYSTEMS. ALSO SEE OTHER FUNCTION GROUP DRAWINGS.

22. UNLESS OTHERWISE SHOWN ALL PIPES UNDER CONCRETE SLABS OR FOUNDATIONS SHALL BE ENCASED IN CONCRETE AS DETAILED ON THE STRUCTURAL DRAWINGS.

23. EQUIPMENT DIMENSIONS, LOCATIONS, PIPING SYSTEM LAYOUTS, BASES AND ANCHORAGE - SEE GENERAL NOTES.

24. SPECIAL REQUIREMENTS FOR SODIUM HYPOCHLORITE (OCL) SYSTEMS: SEE NOTES ON DRAWING 4M-1; THESE ALSO APPLY TO THE OCL SYSTEM IN ALL OTHER LOCATIONS IN THIS CONTRACT (INCLUDING THE CHEMICAL BUILDING, VAULTS, THE MF BUILDING AND CHEMICAL INJECTION MANHOLES).

DEMOLITION GENERAL NOTES

1. DIMENSIONS AND LOCATIONS OF EXISTING PIPING, EQUIPMENT, APPURTENANCES AND STRUCTURES HAVE BEEN OBTAINED FROM EXISTING RECORD AND CONTRACT DRAWINGS. ADDITIONAL INFORMATION HAS BEEN OBTAINED THROUGH FIELD SURVEYS.

2. CERTAIN EXISTING PIPES, EQUIPMENT AND STRUCTURES NOT DIRECTLY RELATED TO THE WORK PERFORMED UNDER THIS CONTRACT HAVE BEEN OMITTED FOR THE SAKE OF CLARITY. IT IS NOT WARRANTED THAT THE LOCATIONS AND DIMENSIONS OF THE EXISTING PIPING, EQUIPMENT, APPURTENANCES AND STRUCTURES ARE EXACT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING PIPING, EQUIPMENT, ELECTRICAL CONDUITS, HVAC DUCTS etc. AS REQUIRED FOR THE NEW CONSTRUCTION.

3. THE DEMOLITION, MODIFICATIONS OR ALTERATION OF EXISTING BUILDINGS, EQUIPMENT, PIPING AND STRUCTURES SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LOCAL REGULATIONS AND STATE CODES. REFER TO SPECIFICATIONS FOR FURTHER DETAILS.

4. ALL HOLES CUT FOR NEW PIPING OR EQUIPMENT THROUGH EXISTING CONCRETE OR MASONRY WALLS, SLABS OR ARCHES SHALL BE CORE DRILLED. NO STRUCTURAL MEMBER SHALL BE CUT WITHOUT APPROVAL OF CM.

5. THE FOLLOWING SYMBOLS AND TERMS ARE USED ON THE DRAWINGS:

EXISTING	EXISTING EQUIPMENT,PIPING AND APPURTENANCES TO REMAIN IN SERVICE. CERTAIN ITEMS OF EQUIPMENT AND PIPING MAY BE DISCONNECTED TEMPORARILY TO ALLOW FOR THE CONSTRUCTION OF THE NEW FACILITIES. REFER TO CONSTRUCTION SEQUENCE FOR FURTHER DETAILS.
NEW OR NEW WORK	IDENTIFIES ALL NEW PIPING, EQUIPMENT AN STRUCTURES.
REMOVE/STORE	REMOVE EXISTING EQUIPMENT,PIPING OR APPURTENANCES AND STORE AS DEFINED IN THE SPECIFICATIONS.
RELOCATE	REMOVE EXISTING EQUIPMENT, PIPING AND APPURTENANCES AS SHOWN ON THE DRAWINGS. CLEAN, FLUSH AND DRAIN THE INTERIOR OF THE REMOVED ITEMS AND INSTALL IN THE NEW LOCATIONS SHOWN ON THE DRAWINGS.
ABANDON	EXISTING PIPING, EQUIPMENT AND APPURTENANCES TO BE TAKEN OUT OF SERVICE AND LEFT IN PLACE UNDISTURBED. SECTION OF PIPING AND/OR EQUIPMENT MAY BE REMOVED TO ALLOW FOR THE NEW CONSTRUCTION. ALL ABANDONED PIPING SHALL BE DRAINED AND ISOLATED AS DEFINED IN THE SPECIFICATIONS.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL NOTES

PROJECT NO. 255128-234374
FILE NAME: M004GLSH.DWG

SHEET NO.
M-4

BID SET

NOTE:

1. CHEMICAL PIPING IS NOT ALWAYS SHOWN IN ITS ENTIRETY. FOLLOW THE I-SHEETS FOR ADDITIONAL PIPING REQUIREMENTS. SIZES OF PIPES AND GENERAL METHOD OF RUNNING THE PIPES ARE SHOWN, BUT IT IS NOT INTENDED TO SHOW EVERY OFFSET AND FITTING NOR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED. CHEMICAL PIPING THAT IS SHOWN ARE RECOMMENDATIONS TO THE CONTRACTOR IN ORDER TO ALLOW THE CONTRACTOR FLEXIBILITY IN PIPE ROUTING. FINAL PIPING, EQUIPMENT, AND APPURTENANCE LOCATIONS WILL BE FINALIZED DURING THE SHOP DRAWING AND COORDINATION MEETING PROCESS AS DESCRIBED IN SECTIONS 434113, 434143, AND 463342.

2. PIPE SUPPORTS WHEN SHOWN SERVE TO DENOTE CONCEPTUAL METHOD OF SUPPORT. EXACT NUMBER AND SPACING OF SUPPORTS TO BE DETERMINED BY CONTRACTOR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3. ALL CHEMICAL PIPING SHALL BE SCH 80 SOLVENT WELDED AND ALL CHEMICAL BALL VALVES FOR SHC SERVICE SHALL BE VENTED CAVITY. SEE SECTION 400563.

4. SEE SECTION 400531 FOR DOUBLE WALL PIPING AND LEAK MONITORING REQUIREMENTS.

5. FIELD LOCATE ADDITIONAL PRV AT THE HIGHEST POINTS FOR SHC PIPES WITH THE PRV DISCHARGE PIPED TO THE CONTAINMENT SUMP OR PRV DISCHARGE HEADER.

6. ALL CHEMICAL LINES SHALL BE SLOPED TO ALLOW FOR COMPLETE DRAINING. PLACE TEES WITH BALL VALVES AS NEEDED FOR DRAWING INTO CONTAINMENT AREAS.

7. THE DOUBLE CONTAINED CHEMICAL LINES SHALL BE HEAT TRACED AND INSULATED BEFORE LEAVING THE BUILDING AND AT LEAST 1-FT BELOW THE FROST DEPTH.

8. CONTRACTOR SHALL MOUNT AND INSTALL ALL PIPING VALVES RELATED TO THE PIPING SYSTEM SUCH THAT VALVE ACTUATION AND MAINTENANCE IS EASILY ACCESSIBLE. ANY VARIANCE FROM THIS NOT WILL REQUIRE ENGINEER APPROVAL.

9. ADD PROTECTIVE SECONDARY CONTAINMENT COATING PRIOR TO INSTALLING THE PUMP SKIDS. SEE SECTION 099100.

10. 3/4"(3")-PVC(PVC) CHEMICAL LINE TO THE CHEMICAL INJECTION VAULT IS CAPPED AND SERVES AS A REDUNDANT LINE.

11. THERMOPLASTIC VALVES NOT COVERED BY SPECIFICATIONS ARE THE BACKPRESSURE VALVES (BPV), BALL CHECK VALVES (BCV), AND BUTTERFLY VALVES (BFV). SEE NOTE 12. ADDITIONALLY, THE STEEL BFV AND BV FOR THE CS SYSTEM ARE NOT COVERED BY THE SPECIFICATIONS. SEE NOTES 13 BELOW.

12. THERMOPLASTIC VALVES:
    -BPV SHALL BE SPRING LOADED DIAPHRAGM, FULLY ADJUSTABLE PRESSURE SETTING, AND SET TO ASSURE CONTINUOUS POSITIVE PRESSURE AT THE PUMP DISCHARGE AS WELL AS SERVING AS ANTI-SIPHON VALVES AT THE INJECTION POINTS. CONTRACTOR SHALL FURNISH WITH TEFLON/PTFE DIAPHRAGMS AND ELASTOMER COATED SPRINGS. BODY SHALL BE OF THE SAME MATERIAL AS PIPELINE IN WHICH IT IS INSTALLED. VALVES SHALL BE MANUFACTURED BY PLAST-O-MATIC, OR EQUAL.

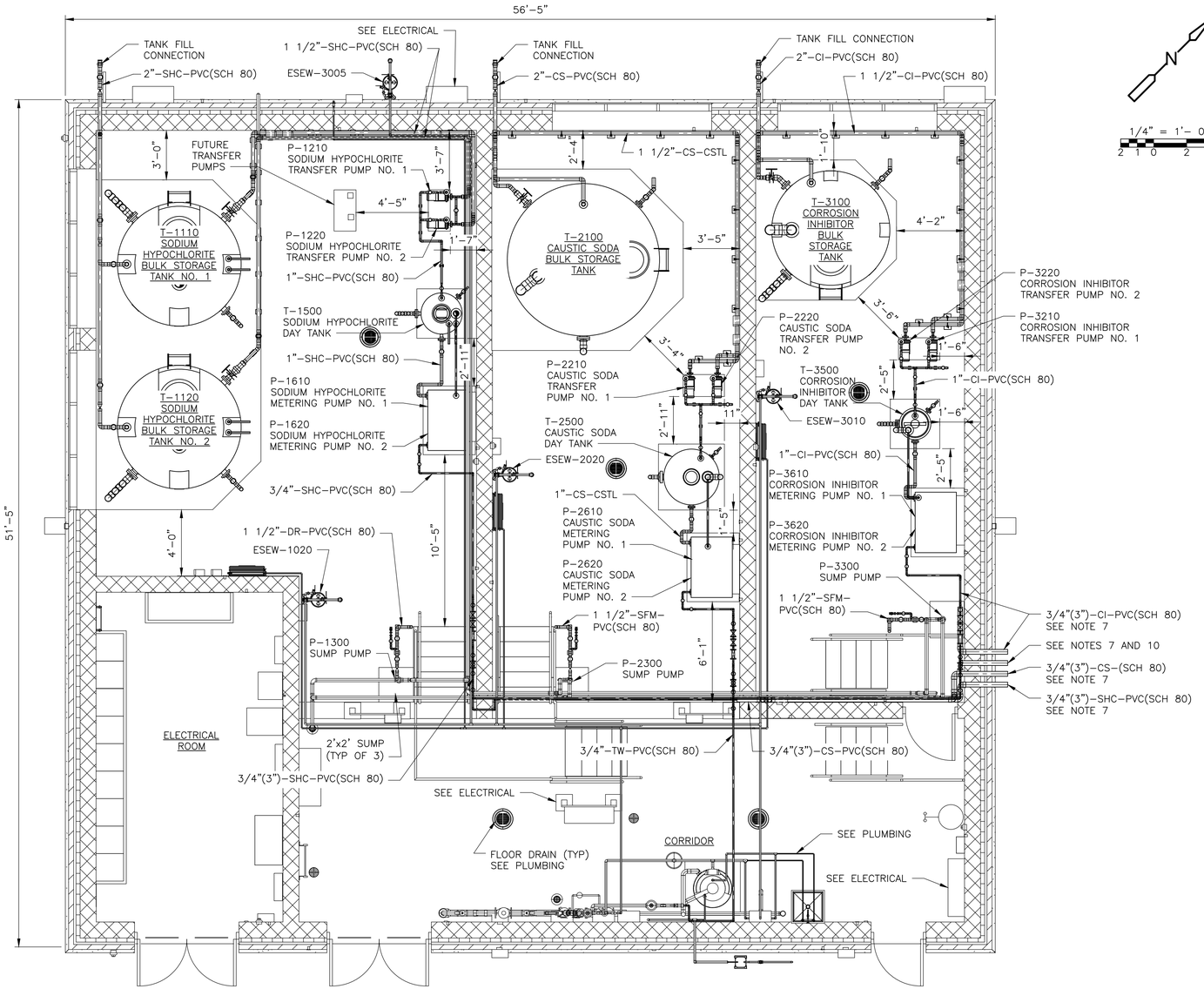
    -BCV SHALL BE DOUBLE UNION STYLE WITH SOCKET ENDS, SOLID AND COMPLETELY SPHERICAL BALL, EPDM SEALS, PTFE SEAT, CAPABLE OF EITHER HORIZONTAL OR VERTICAL MOUNTING. BALL CHECK VALVES SHALL BE SXE SERIES AS MANUFACTURED BY IPEX OR EQUAL.

    -BFV SHALL BE OF THE LINED BODY DESIGN WITH BODY TO MATCH PIPING MATERIAL AND PP DISC WITH ONLY THE LINER AND THE DISC AS WETTED PARTS. THE LINER SHALL BE MOLDED AND FORMED AROUND THE BODY, FUNCTIONING AS A GASKET ON EACH SIDE OF THE VALVE. DOUBLE-O-RING SEALS ON TOP AND BOTTOM DISC TRUNNIONS WILL FULLY ISOLATE A TYPE 316 STAINLESS STEEL STRAIGHT-THROUGH STEM. LINER, SEAT, O-RINGS, AND SEAL SHALL BE TEFLON/PTFE. THE VALVES SHALL BE LUG STYLE FOR DEAD END SERVICE AS APPLICABLE TO INCLUDE CHEMICAL TANK OUTLET VALVES. MANUAL LEVER ACTUATION ONLY. BUTTERFLY VALVES SHALL BE TYPE 57 AS MANUFACTURED BY ASAHI-AMERICA, FK SERIES AS MANUFACTURED BY IPEX OR EQUAL.

13. CS STEEL VALVES:
    -CSTL BV SHALL BE 2 PIECE, FULL PORT, FLANGED PER ANSI B16.5, CLASS 150 WITH STAINLESS STEEL BALL AND STEM. MANUAL LEVER OPERATOR AND NSF 61 CERTIFIED.

    -CSTL BFV BODY SHALL BE FLANGED X FLANGED ENDS. FLANGED FLAT FACE AND DRILLED IN ACCORDANCE WITH ANSI B16.1 CLASS 125 STANDARDS. WORKING PRESSURE IS 150 PSIG AND THE PRESSURE CLASS IS 150B PER AWWA C504. MANUAL LEVER ACTUATION AND NSF 61 CERTIFIED. MANUFACTURED BY PRATT OR EQUAL.

TRANSFORMER
SEE ELECTRICAL



PLAN
1/4" = 1'-0"

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BORZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

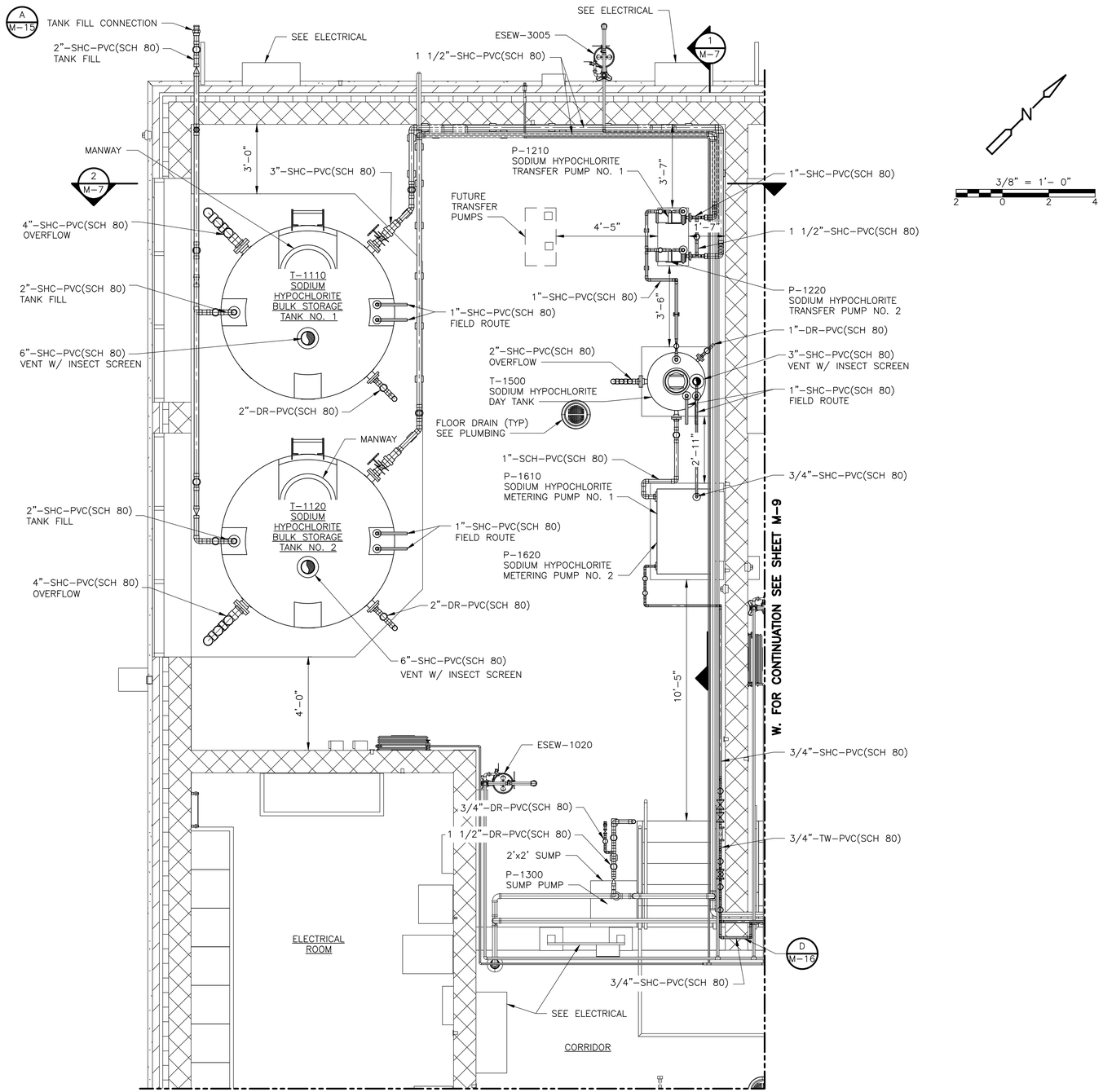
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING PLAN

PROJECT NO. 255128-234374
FILE NAME: M005CMPL.DWG

SHEET NO.
M-5

BID SET



PLAN
3/8" = 1'-0"

NOTE:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

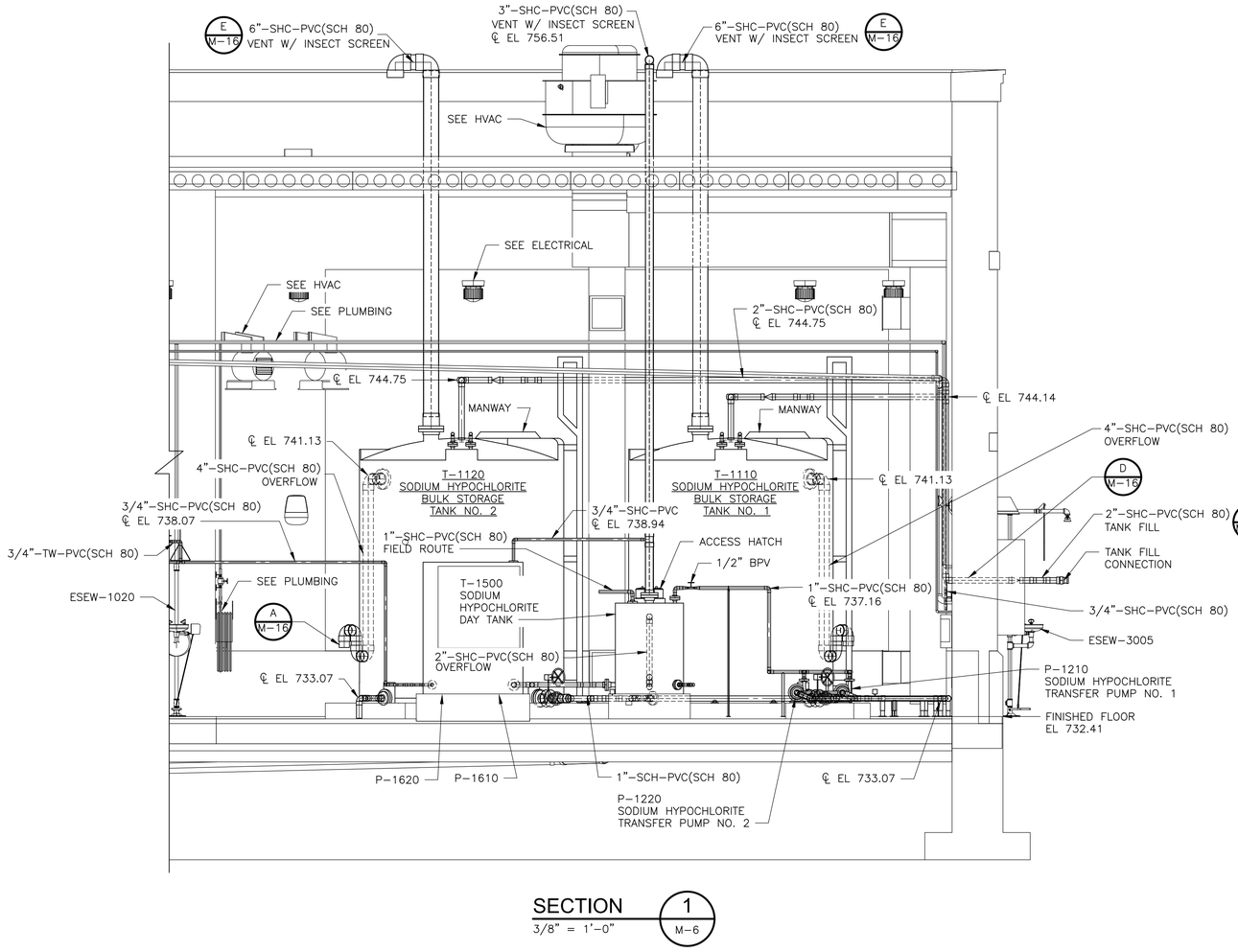
CHEMICAL SYSTEMS FEED BUILDING

SODIUM HYPOCHLORITE ROOM PLAN

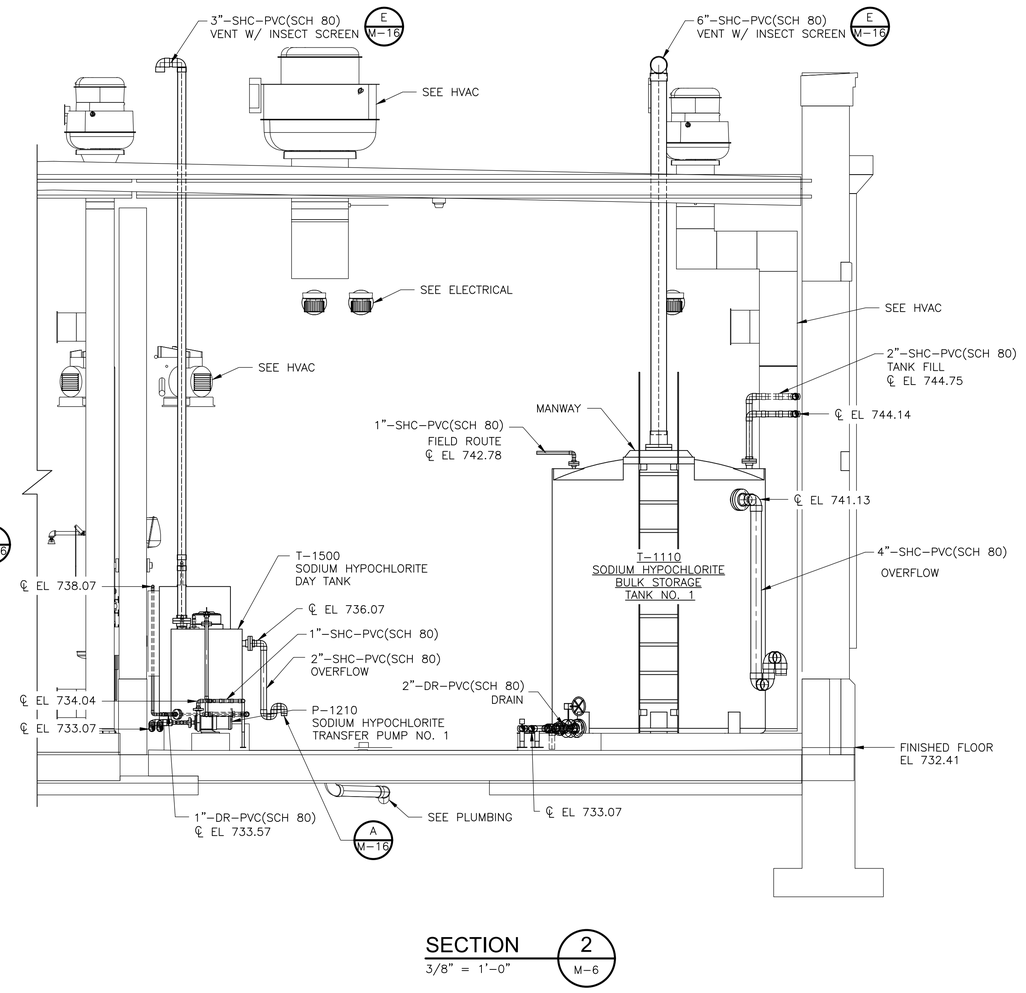
PROJECT NO. 255128-234374
FILE NAME: M006HYPL.DWG

SHEET NO.
M-6

BID SET



SECTION 1
3/8" = 1'-0"
M-6



SECTION 2
3/8" = 1'-0"
M-6

NOTE:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

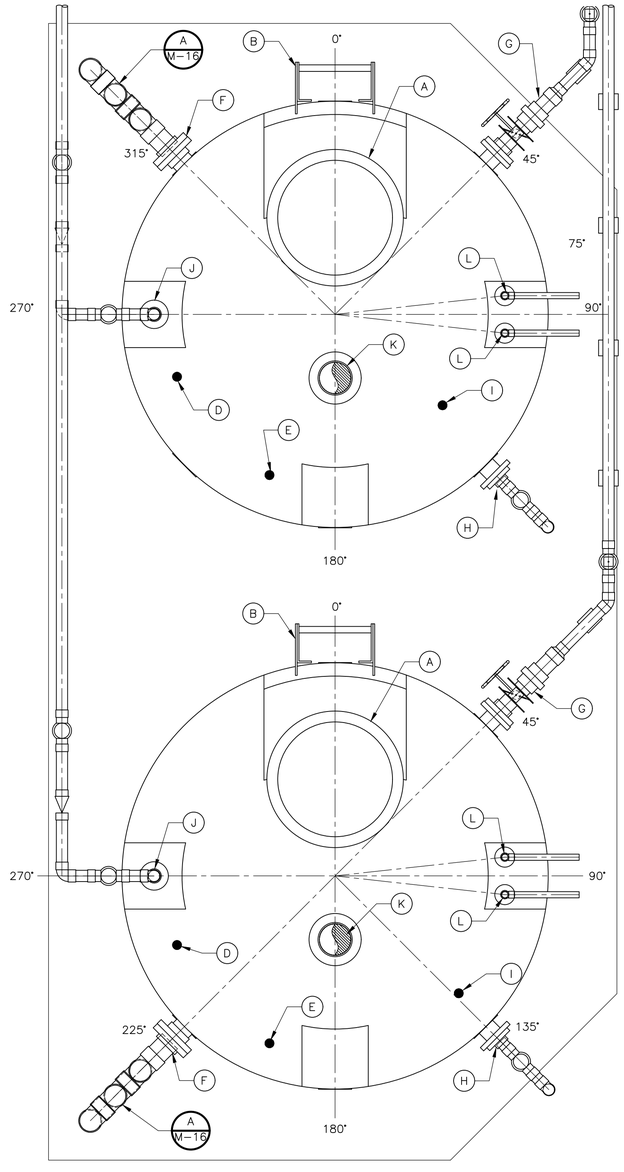
CHEMICAL SYSTEMS FEED BUILDING

SODIUM HYPOCHLORITE ROOM SECTIONS

PROJECT NO. 255128-234374
FILE NAME: M007HYSC.DWG

SHEET NO.
M-7

BID SET



SODIUM HYPOCHLORITE BULK STORAGE TANK CONNECTIONS

DETAIL A
3/4" = 1'-0"

SODIUM HYPOCHLORITE BULK STORAGE TANK CONNECTION SCHEDULE			
TANKS	T-1110	T-1120	-
SIDEWALL HEIGHT	8'-11" TO 10'-6"	8'-11" TO 10'-6"	NOTE 3
DIAMETER	7'-1" TO 7'-6"	7'-1" TO 7'-6"	NOTE 3
CAPACITY	3,000 GALLONS	3,000 GALLONS	-
MATERIAL	POLY	CROSSLINKED HIGH DENSITY POLYETHYLENE (XLDHPE)	-
NO.	**SIZE**	**SERVICE**	**DISTANCE (FROM TANK BOTTOM)**
A	36"	VIEW HATCH (TOP)	-
B	24"	LADDER	-
D	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 5
E	2"	LEVEL INDICATOR LOW LOW (NOTE 1)	NOTE 5
F	4"	OVERFLOW INVERT	NOTE 4
G	3"	TANK DISCHARGE	6"
H	2"	DRAIN OBVERT	NOTE 4
I	4"	ULTRASONIC LEVEL (NOTE 1) (TOP)	NOTE 5
J	2"	TANK FILL (TOP)	NOTE 5
K	6"	VENT (TOP)	NOTE 5
L	1"	PRV DISCHARGE	NOTE 5

NOTE:

1. CONTRACTOR SHALL CONFIRM SIZE OF CONNECTION WITH THE INSTRUMENT SUPPLIER.
2. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.
3. SPECIFIED MANUFACTURERS HAVE SLIGHTLY DIFFERENT DIMENSIONS AND/OR UNIT TANK CAPACITIES.
4. OVERFLOWS AND DRAINS SHALL BE LOCATED AT THE HIGHEST AND LOWEST POSSIBLE POINTS TO MAXIMIZE THE TANK'S EFFECTIVE VOLUME THEREFORE ORIENTATION MAY VARY BY TANK SUPPLIER.
5. TANK CONNECTION PLACEMENT FOR THE DOME SHALL BE PLACED ON THE FLATTER PORTIONS. IF THERE IS LIMITED SPACE OR A NEED TO PLACE A CONNECTION ON THE DOMED PORTION, THEN AN ENGINEER APPROVED FITTING MAY BE PROPOSED.

SODIUM HYPOCHLORITE DAY TANK CONNECTION SCHEDULE			
TANKS	T-1500	-	-
SIDEWALL HEIGHT	3'-11" TO 4'-4"	-	NOTE 3
DIAMETER	2'-5" TO 2'-6"	-	NOTE 3
CAPACITY	110 TO 120 GALLONS	-	-
MATERIAL	CROSSLINKED HIGH DENSITY POLYETHYLENE (XLDHPE)	-	-
NO.	**SIZE**	**DESCRIPTION**	**DISTANCE (FROM TANK BOTTOM)**
A	6" - 12"	VIEW HATCH (TOP)	
C	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 5
E	2"	OVERFLOW INVERT	NOTE 4
F	1"	TANK DISCHARGE	3"
G	1"	DRAIN OBVERT	NOTE 4
H	2"	TANK FILL (TOP)	NOTE 5
I	3"	VENT (TOP)	NOTE 5
J	1"	PRV DISCHARGE	NOTE 5

SODIUM HYPOCHLORITE DAY TANK CONNECTIONS

DETAIL B
1 1/2" = 1'-0"

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

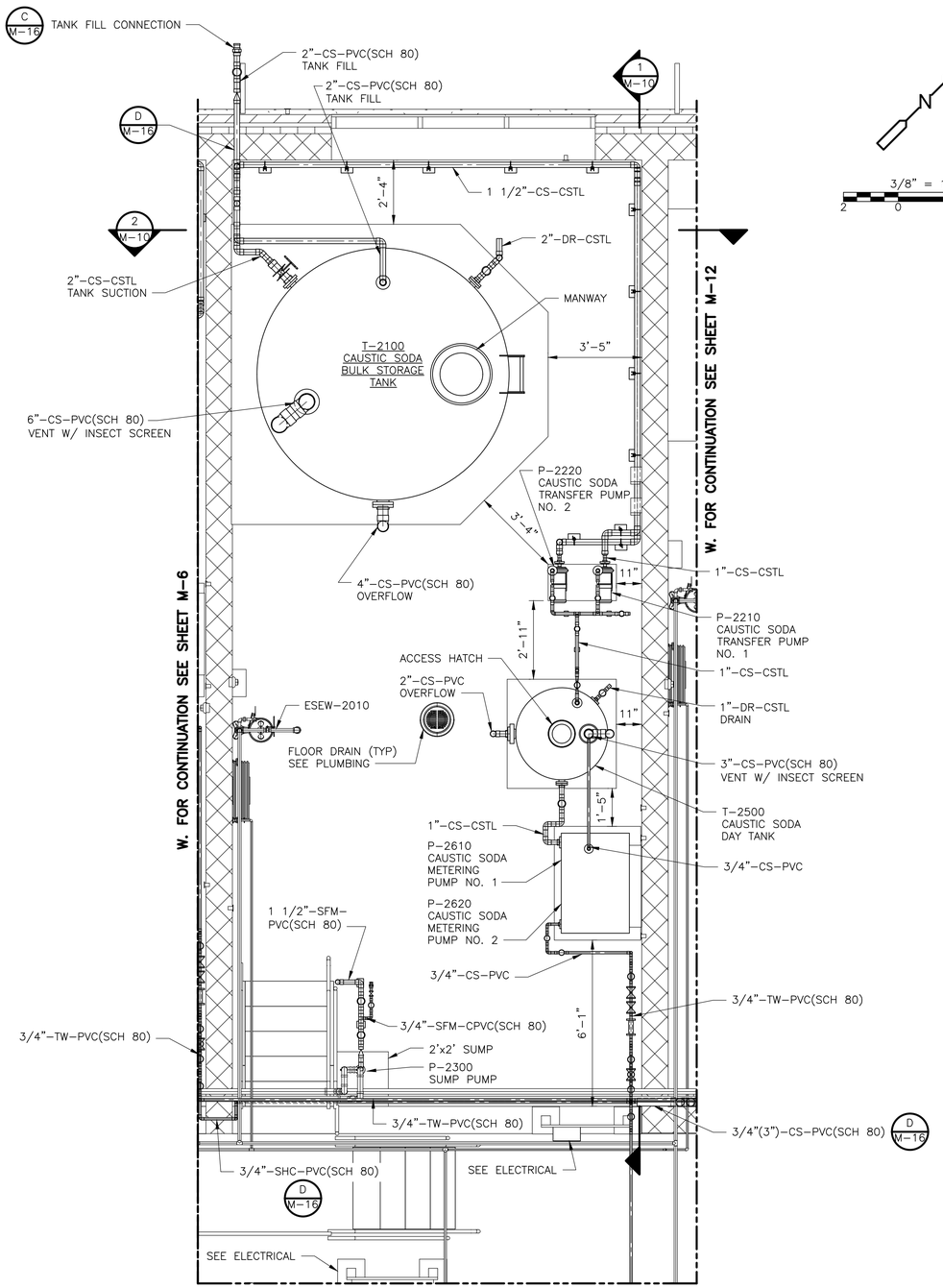
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

SODIUM HYPOCHLORITE ROOM DETAILS

PROJECT NO. 255128-234374
FILE NAME: M008HYDT.DWG
SHEET NO.
M-8

BID SET



PLAN
3/8" = 1'-0"

NOTE:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

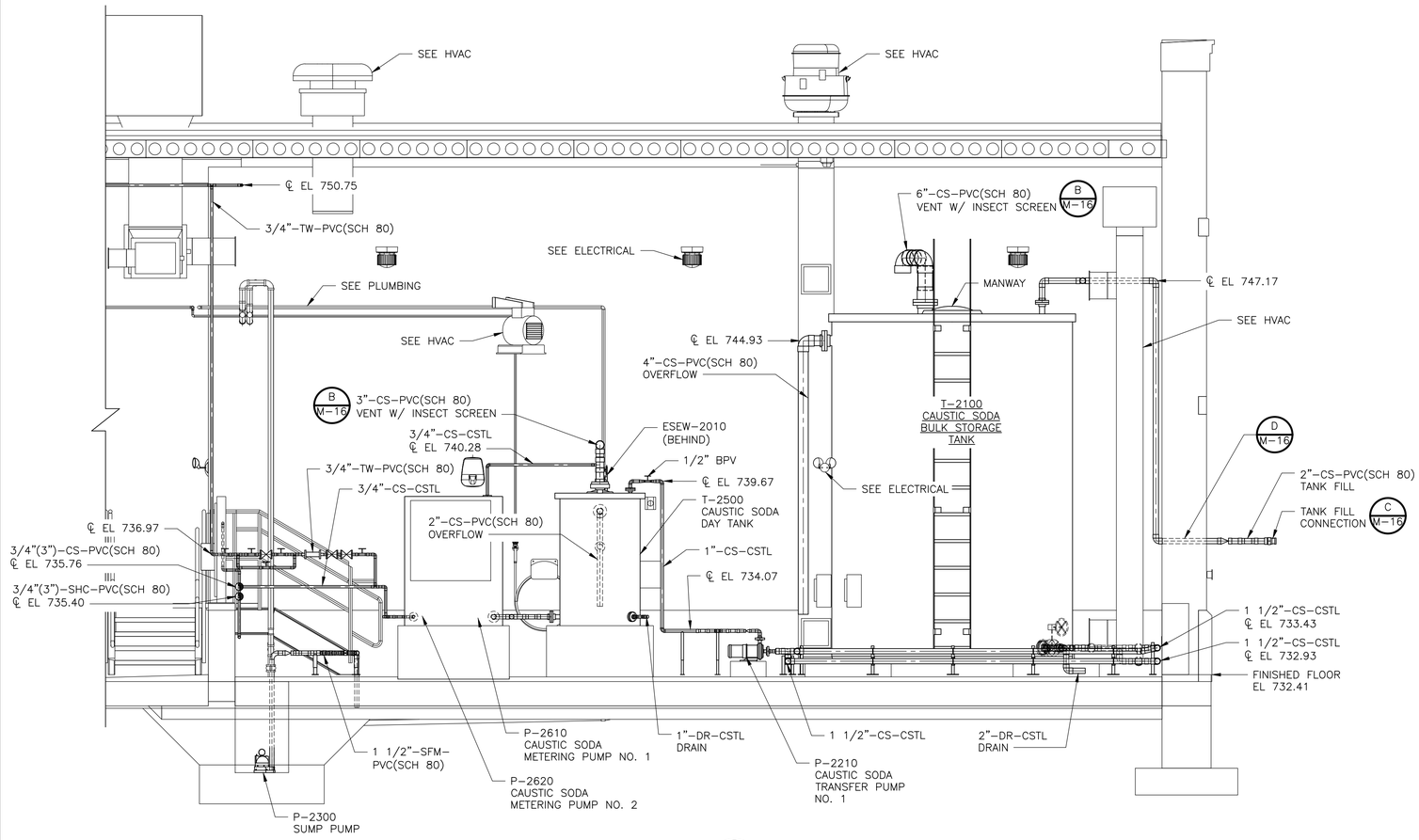
CHEMICAL SYSTEMS FEED BUILDING

CAUSTIC SODA ROOM PLAN

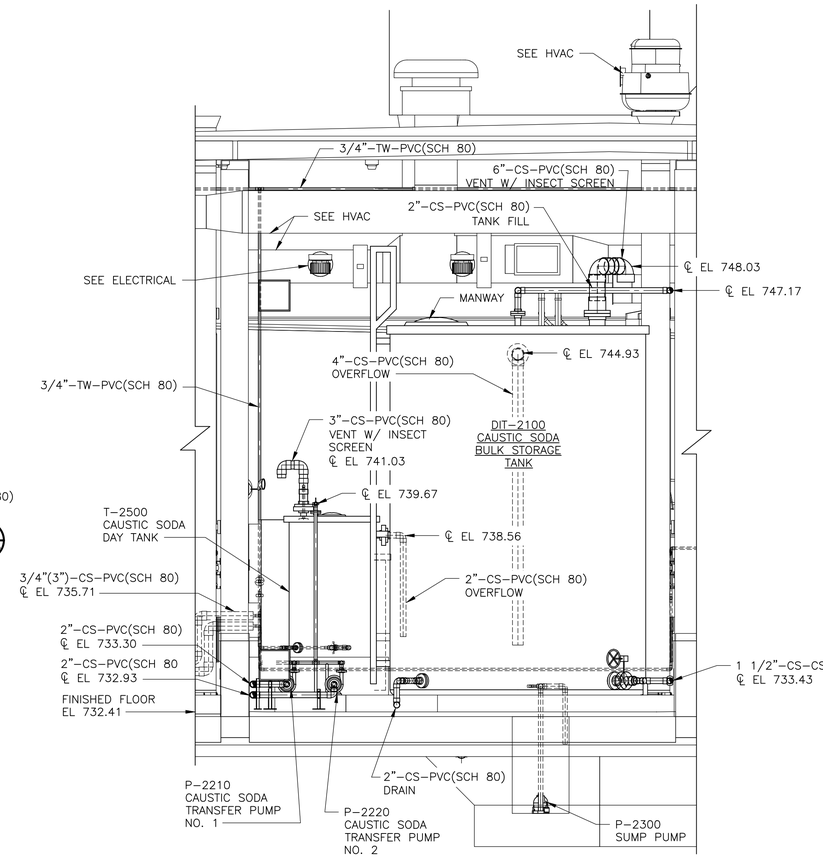
PROJECT NO. 255128-234374
FILE NAME: M009SHPL.DWG

SHEET NO.
M-9

BID SET



SECTION 1
3/8" = 1'–0"
M–9



SECTION 2
3/8" = 1'–0"
M–9

NOTE:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

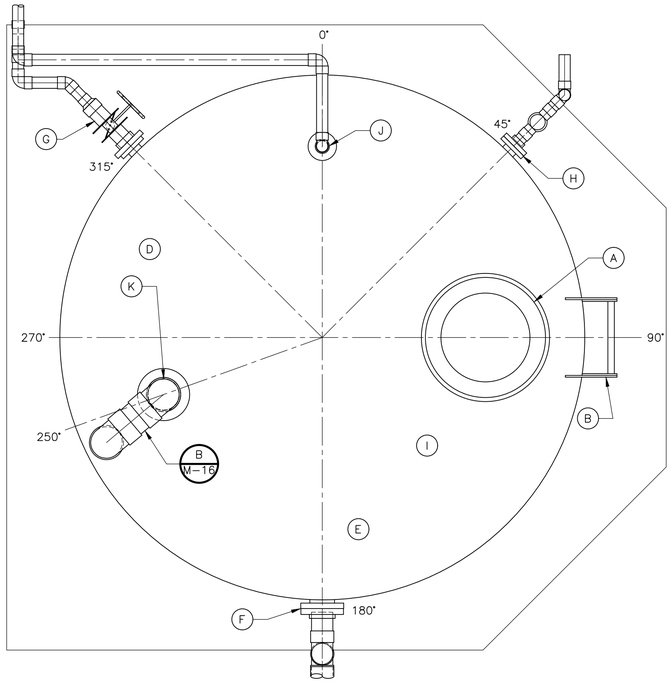
CAUSTIC SODA ROOM SECTIONS

PROJECT NO. 255128–234374
FILE NAME: M010SHSC.DWG
SHEET NO.
M-10

BID SET

CAUSTIC SODA BULK STORAGE TANK CONNECTION SCHEDULE			
TANKS	T-2100	-	-
SIDEWALL HEIGHT	13'-0"	-	-
DIAMETER	9'-0"	-	-
CAPACITY	6,000 GALLONS	-	-
MATERIAL	CARBON STEEL	-	-
NO.	**SIZE**	**DESCRIPTION**	**DISTANCE (FROM TANK BOTTOM)**
A	24"	VIEW HATCH (TOP)	-
B	24"	LADDER	-
D	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 4
E	2"	LEVEL INDICATOR LOW LOW (NOTE 1)	NOTE 4
F	4"	OVERFLOW INVERT	NOTE 3
G	1-1/2"	TANK DISCHARGE	6"
H	2"	DRAIN OBVERT	NOTE 3
I	4"	ULTRASONIC LEVEL (NOTE 1) (TOP)	NOTE 4
J	2"	TANK FILL (TOP)	-
K	6"	VENT (TOP)	-

CAUSTIC SODA DAY TANK CONNECTION SCHEDULE			
TANKS	T-2500	-	-
SIDEWALL HEIGHT	5'-0"	-	-
DIAMETER	3'-0"	-	-
CAPACITY	210 GALLONS	-	-
MATERIAL	CARBON STEEL	-	-
NO.	**SIZE**	**DESCRIPTION**	**DISTANCE (FROM TANK BOTTOM)**
A	12"	VIEW HATCH (TOP)	-
C	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 5
E	2"	OVERFLOW INVERT	NOTE 3
F	1"	TANK DISCHARGE	3"
G	1"	DRAIN OBVERT	NOTE 3
H	1"	TANK FILL (TOP)	-
I	2"	VENT (TOP)	-

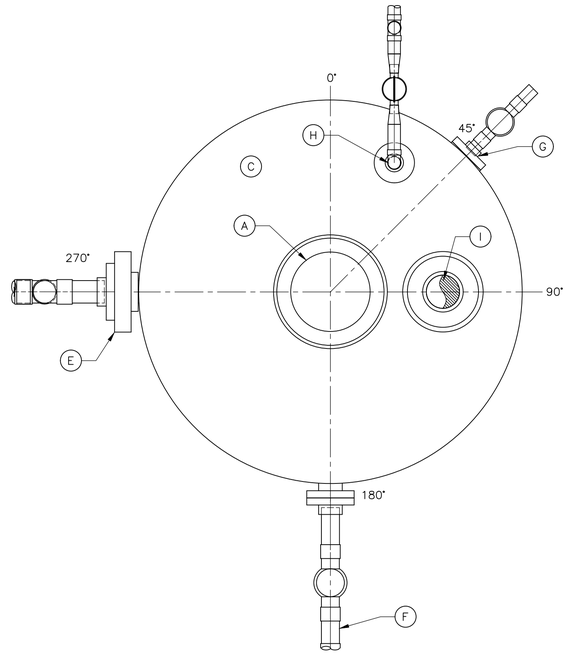


CAUSTIC SODA BULK STORAGE TANK CONNECTIONS

DETAIL A
3/4" = 1'-0"

NOTES:

1. CONTRACTOR SHALL CONFIRM SIZE OF CONNECTION WITH THE INSTRUMENT SUPPLIER.
2. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. REFER TO P&IDS FOR ADDITIONAL DETAILS.
3. OVERFLOWS AND DRAINS SHALL BE LOCATED AT THE HIGHEST AND LOWEST POSSIBLE POINTS TO MAXIMIZE THE TANK'S EFFECTIVE VOLUME.
4. TANK CONNECTIONS FOR INSTRUMENTATION ON THE TOP OF THE BULK TANK SHALL BE LOCATED AS CLOSE TO THE VIEW HATCH AS POSSIBLE FOR EASE OF OPERATOR ACCESS.
5. TANK CONNECTIONS FOR INSTRUMENTATION ON THE TOP OF THE DAY TANK SHALL BE LOCATED IN AN ACCESSIBLE LOCATION.



CAUSTIC SODA DAY TANK CONNECTIONS

DETAIL B
1 1/2" = 1'-0"

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

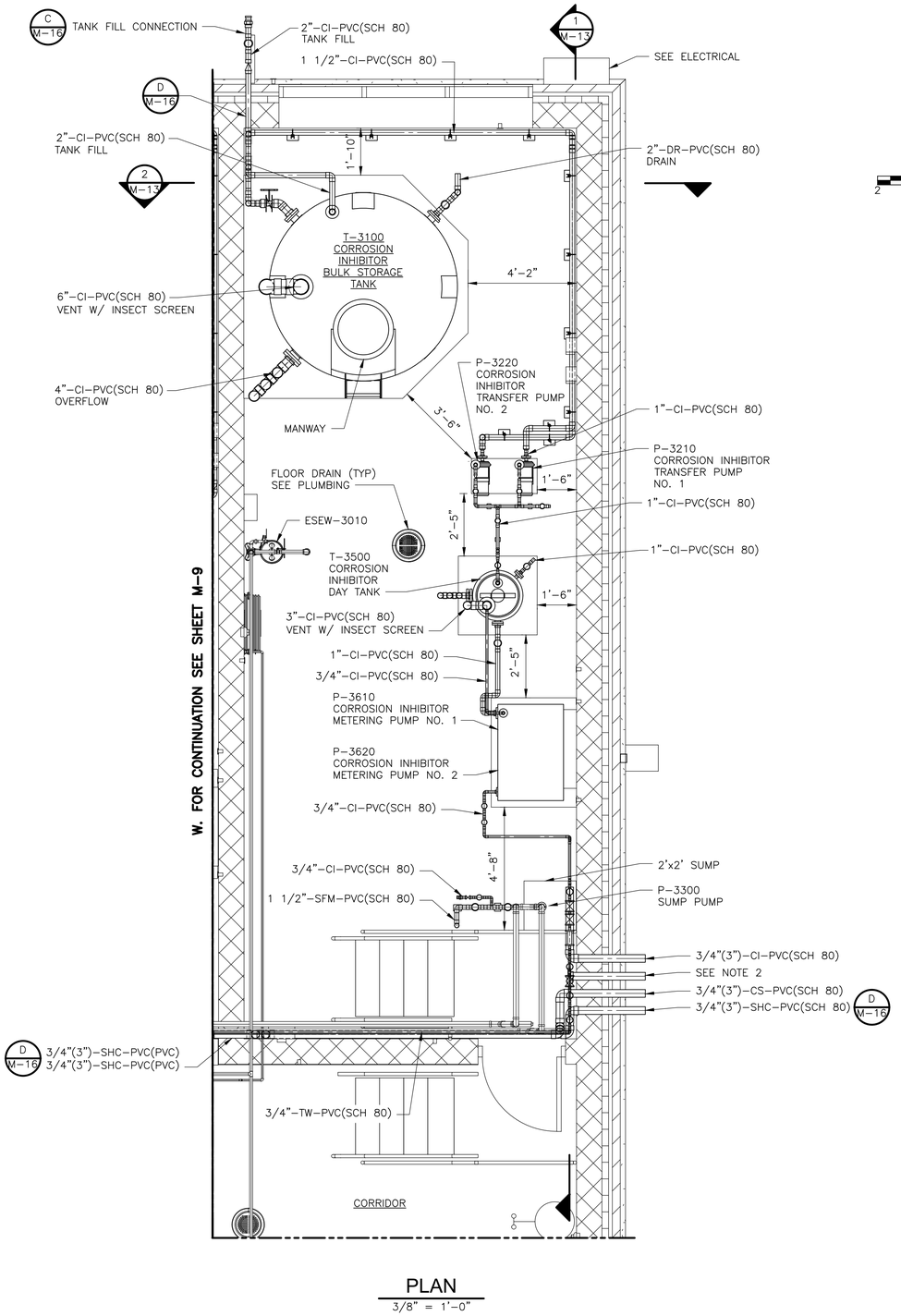
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

CAUSTIC SODA ROOM DETAILS

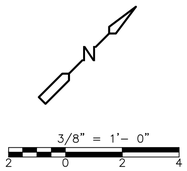
PROJECT NO. 255128-234374
FILE NAME: M011SHDT.DWG
SHEET NO. M-11

BID SET



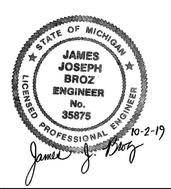
PLAN

3/8" = 1'-0"



NOTES:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.
2. 3/4"(3")-PVC(PVC) CHEMICAL LINE TO THE CHEMICAL INJECTION VAULT IS CAPPED AND SERVES AS A REDUNDANT LINE.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

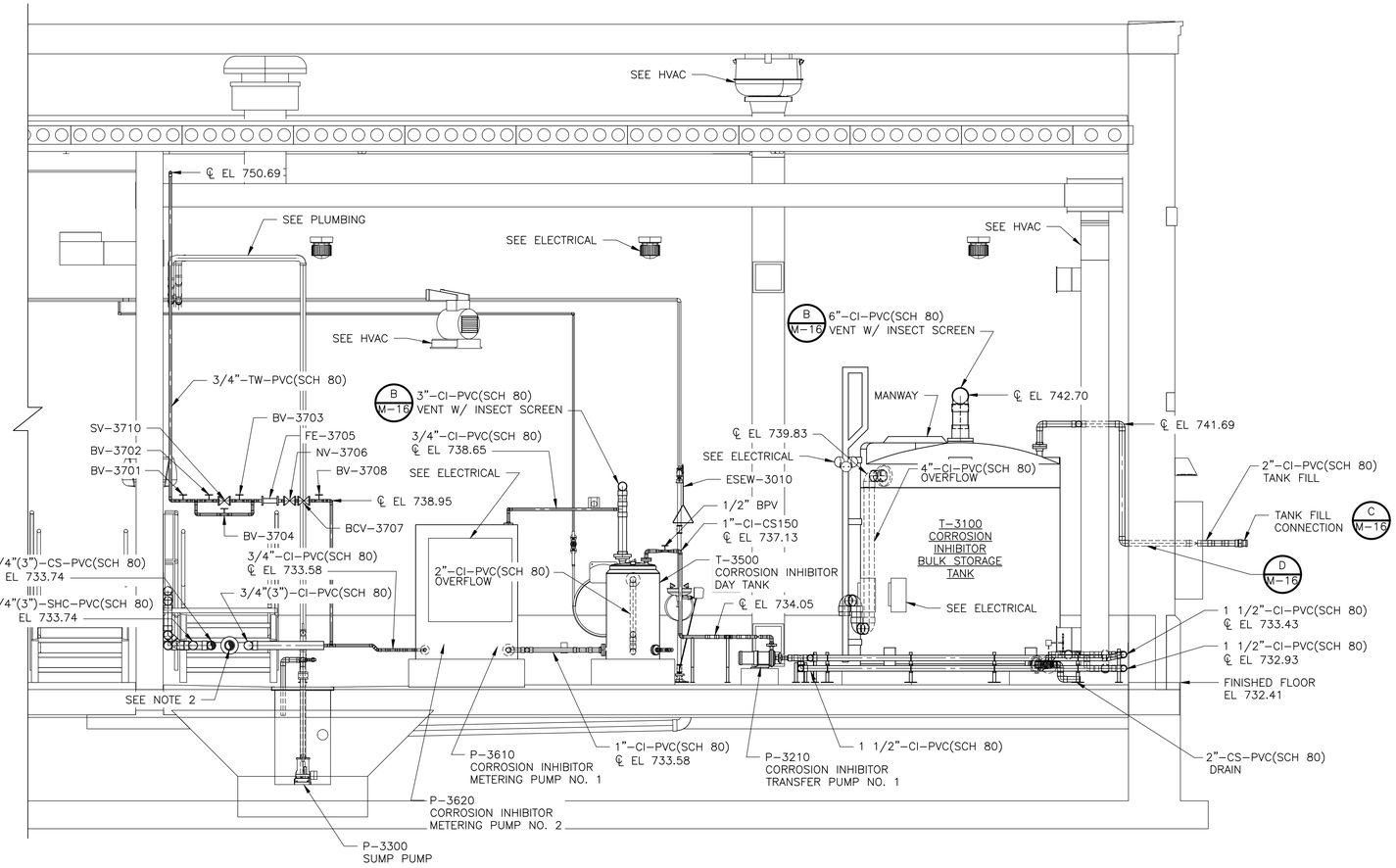
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

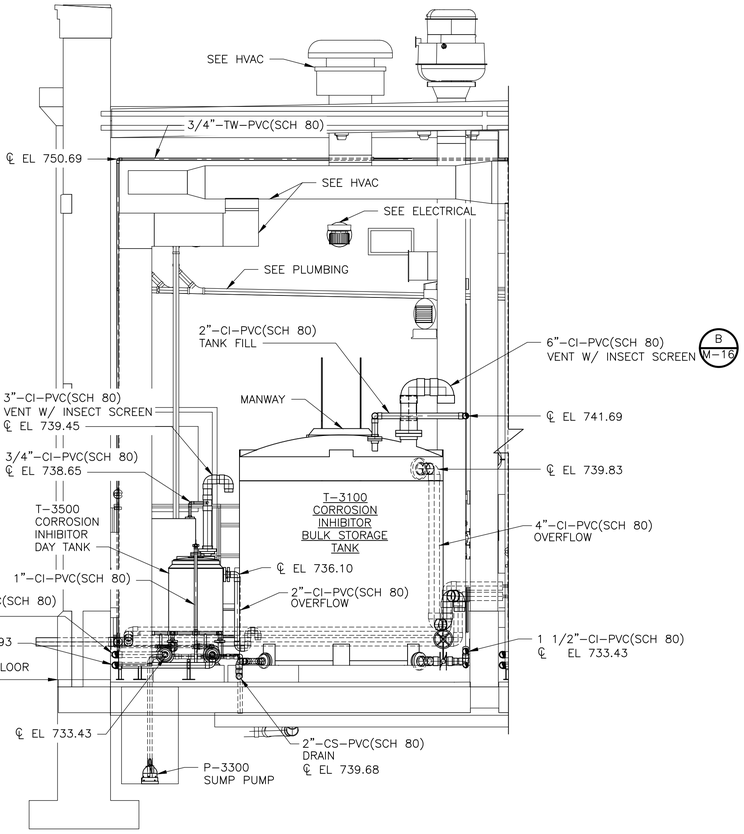
CORROSION INHIBITOR ROOM PLAN

PROJECT NO. 255128-234374
FILE NAME: M012ORPL.DWG
SHEET NO.
M-12

BID SET



SECTION 1
3/8" = 1'-0"
M-12



SECTION 2
3/8" = 1'-0"
M-12

NOTES:

1. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. PLEASE REFER TO P&IDs FOR ADDITIONAL DETAILS.
2. 3/4"(3")-PVC(PVC) CHEMICAL LINE TO THE CHEMICAL INJECTION VAULT IS CAPPED AND SERVES AS A REDUNDANT LINE.

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

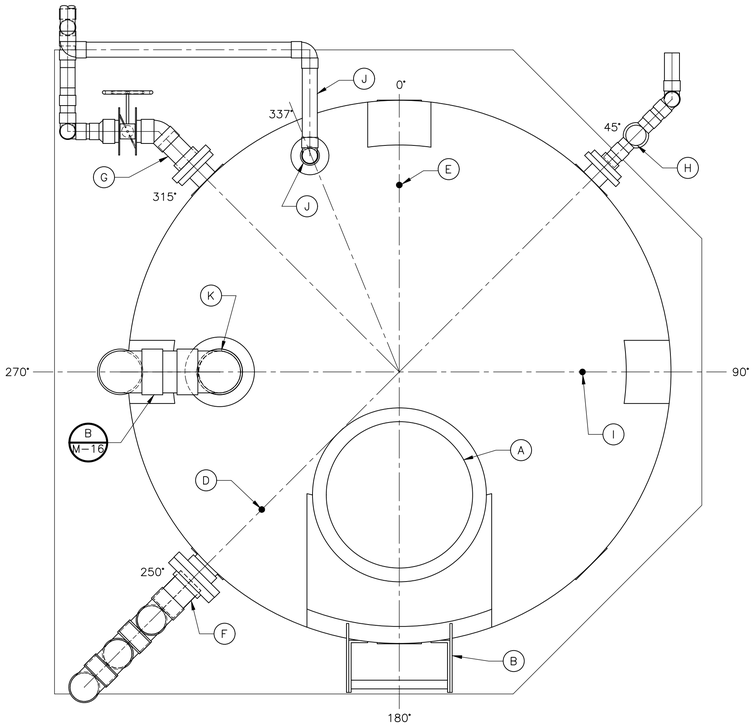
CHEMICAL SYSTEMS FEED BUILDING

CORROSION INHIBITOR ROOM SECTIONS

PROJECT NO. 255128-234374
FILE NAME: M0130RSC.DWG

SHEET NO.
M-13

BID SET



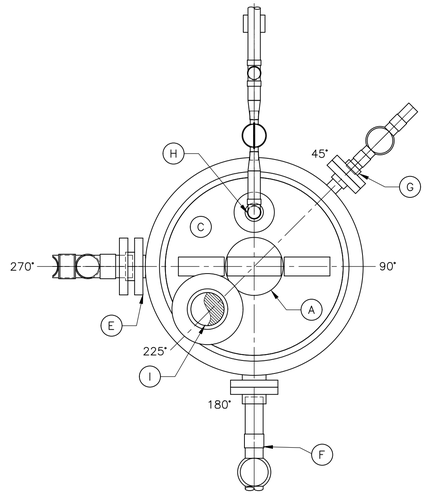
CORROSION INHIBITOR BULK STORAGE TANK CONNECTIONS

DETAIL A / –

1" = 1'-0"

CORROSION INHIBITOR BULK STORAGE TANK CONNECTION SCHEDULE			
TANKS	T-3100	-	-
SIDEWALL HEIGHT	6'-6" TO 7'-2"	-	NOTE 3
DIAMETER	7'-1" TO 7'-2"	-	NOTE 3
CAPACITY	2,000 GALLONS	-	-
MATERIAL	CROSSLINKED HIGH-DENSITY POLYETHYLENET (XLHDPE)	-	-
NO.	**SIZE**	**DESCRIPTION**	**DISTANCE (FROM TANK BOTTOM)**
A	16" - 24"	VIEW HATCH (TOP)	NOTE 3
B	24"	LADDER	-
D	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 5
E	2"	LEVEL INDICATOR LOW LOW (NOTE 1)	NOTE 5
F	4"	OVERFLOW INVERT	NOTE 4
G	3"	TANK DISCHARGE	6"
H	2"	DRAIN OBVERT	NOTE 4
I	4"	ULTRASONIC LEVEL (NOTE 1) (TOP)	NOTE 5
J	2"	TANK FILL (TOP)	NOTE 5
K	6"	VENT (TOP)	NOTE 5

CORROSION INHIBITOR DAY STORAGE TANK CONNECTION SCHEDULE			
TANKS	T-3500	-	-
OVERALL HEIGHT	3'-6"	-	-
DIAMETER	1'-11"	-	-
CAPACITY	60 GALLONS	-	-
MATERIAL	CROSSLINKED HIGH-DENSITY POLYETHYLENET (XLHDPE)	-	-
NO.	**SIZE**	**DESCRIPTION**	**DISTANCE (FROM TANK BOTTOM)**
A	12"	VIEW HATCH (TOP)	
C	2"	LEVEL INDICATOR HIGH HIGH (NOTE 1)	NOTE 5
E	2"	OVERFLOW	NOTE 4
F	1"	TANK DISCHARGE	3"
G	1"	DRAIN (NOTE 2)	NOTE 4
H	1"	TANK FILL (TOP)	NOTE 5
I	2"	VENT (TOP)	NOTE 5



CORROSION INHIBITOR DAY TANK CONNECTIONS

DETAIL B / –

1 1/2" = 1'-0"

NOTES:

1. CONTRACTOR SHALL CONFIRM SIZE OF CONNECTION WITH THE INSTRUMENT SUPPLIER.
2. ALL PIPES, VALVES, AND APPURTENANCES ARE NOT SHOWN FOR CLARITY. REFER TO P&IDS FOR ADDITIONAL DETAILS.
3. SPECIFIED MANUFACTURERS HAVE SLIGHTLY DIFFERENT DIMENSIONS AND/OR UNIT TANK CAPACITIES.
4. OVERFLOWS AND DRAINS SHALL BE LOCATED AT THE HIGHEST AND LOWEST POSSIBLE POINTS TO MAXIMIZE THE TANK'S EFFECTIVE VOLUME THEREFORE ORIENTATION MAY VARY BY TANK SUPPLIER.
5. TANK CONNECTION PLACEMENT FOR THE DOME SHALL BE PLACED ON THE FLATTER PORTIONS. IF THERE IS LIMITED SPACE OR A NEED TO PLACE A CONNECTION ON THE DOMED PORTION, THEN AN ENGINEER APPROVED FITTING MAY BE PROPOSED.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

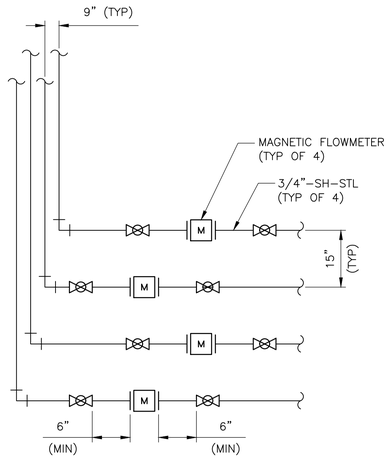
CORROSION INHIBITOR ROOM DETAILS

PROJECT NO. 255128-234374
FILE NAME: M014ORDT.DWG

SHEET NO.
M-14

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

BID SET

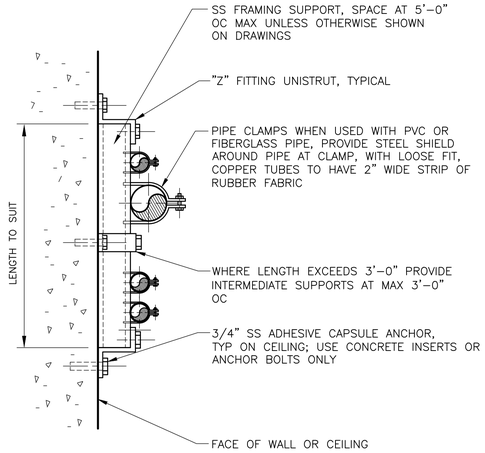


NOTE:

1. CONTRACTOR SHALL CONFIRM THAT THE FLOW METERS ACTUALLY PROVIDED CAN BE DISASSEMBLED WITHIN THE SPACE ALLOWED.

MAGNETIC FLOWMETER LAYOUT

DETAIL A
NTS

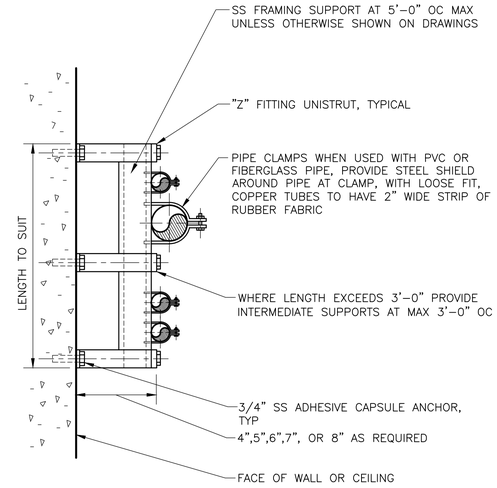


NOTE:

ALL SUPPORTS, BOLTS, WASHERS AND SHIELD SHALL BE TYPE 316 STAINLESS STEEL

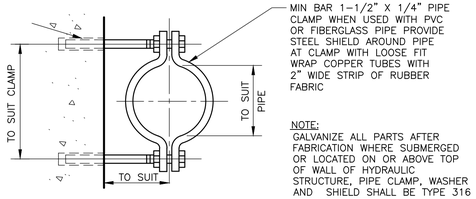
FLUSH MOUNTED PIPE SUPPORT

DETAIL B
NTS



EXTENDED PIPE SUPPORT

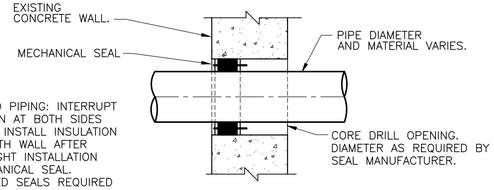
DETAIL C
NTS



NOTE:
GALVANIZE ALL PARTS AFTER FABRICATION WHERE SUBMERGED OR LOCATED ON OR ABOVE TOP OF WALL OF HYDRAULIC STRUCTURE, PIPE CLAMP, WASHER AND SHIELD SHALL BE TYPE 316 STAINLESS STEEL

PIPE CLAMP

DETAIL D
NTS

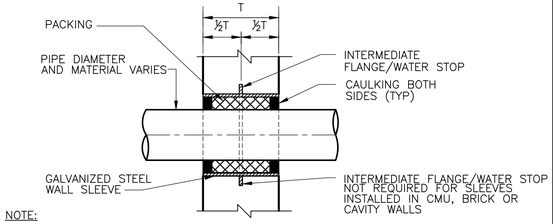


NOTE:

1. INSULATED PIPING: INTERRUPT INSULATION AT BOTH SIDES OF WALL. INSTALL INSULATION FLUSH WITH WALL AFTER WATER TIGHT INSTALLATION OF MECHANICAL SEAL.
2. FIRE RATED SEALS REQUIRED FOR ALL PENETRATIONS IN SODIUM HYDROXIDE ROOM.

CORE DRILLED OPENING AND MECHANICAL SEAL PENETRATION THROUGH EXISTING CONCRETE

DETAIL E
NTS

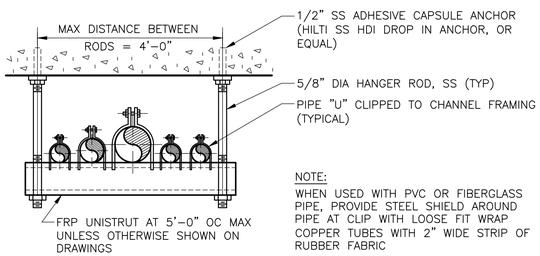


NOTE:

WALL SLEEVES INSTALLED IN BRICK, CMU OR CAVITY WALLS SHALL BE GROUTED IN PLACE WITH NON-SHRINK GROUT. APPLY BONDING AGENT TO CLEAN DRY SURFACES BEFORE PLACING GROUT.

CAULKED WALL SLEEVE FOR CONCRETE, CMU, BRICK OR CAVITY WALLS

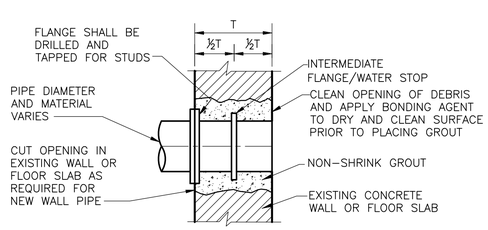
DETAIL F
NTS



NOTE:
WHEN USED WITH PVC OR FIBERGLASS PIPE, PROVIDE STEEL SHIELD AROUND PIPE AT CLIP WITH LOOSE FIT WRAP COPPER TUBES WITH 2" WIDE STRIP OF RUBBER FABRIC

TRAPEZE PIPE HANGER

DETAIL G
NTS



IN EXISTING WALLS OR FLOOR SLABS WALL PIPE TO BE INSTALLED

DETAIL H
NTS

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

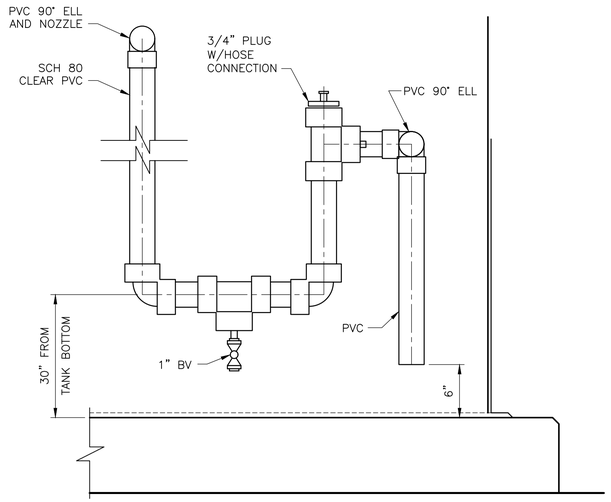
CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL STANDARD DETAILS

PROJECT NO. 255128-234374
FILE NAME: M015STDT.DWG

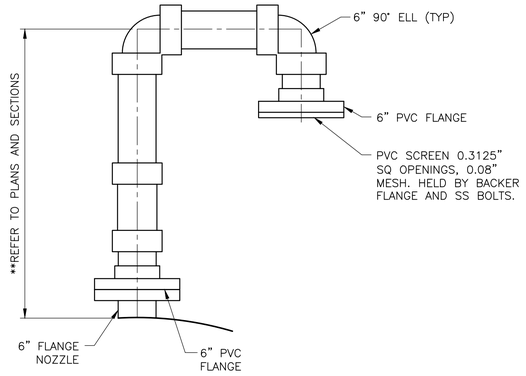
SHEET NO.
M-15

BID SET



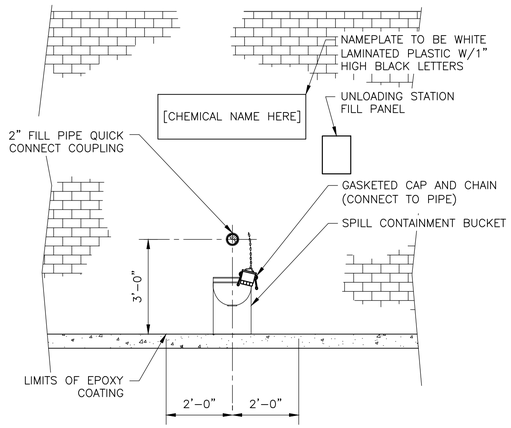
OVERFLOW TRAP

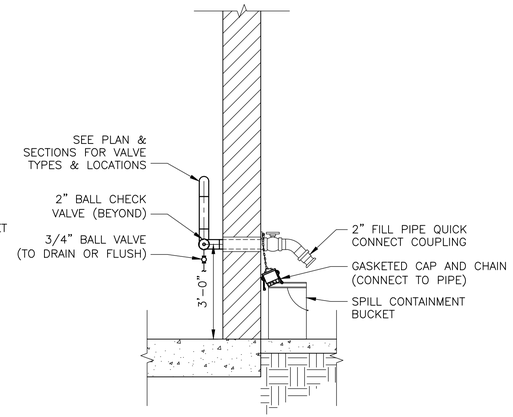
DETAIL A
NTS



TANK VENT

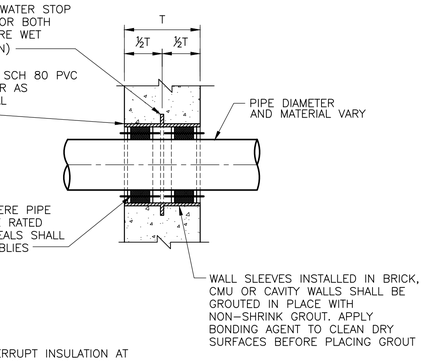
DETAIL B
NTS





FILL STATION

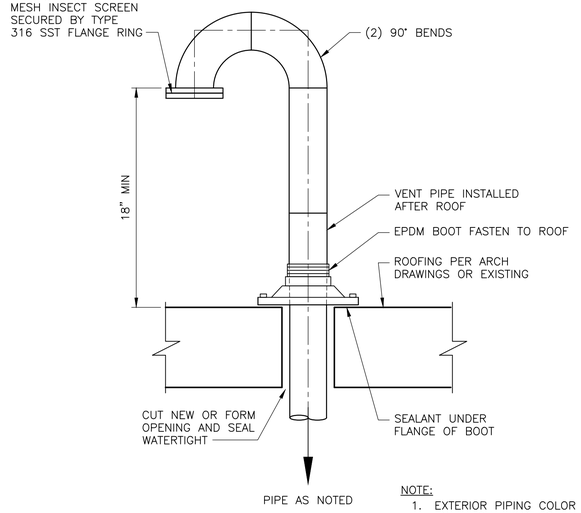
DETAIL C
NTS



NOTE:
1. INSULATED PIPING: INTERRUPT INSULATION AT BOTH SIDES OF WALL. INSTALL INSULATION FLUSH WITH WALL AFTER WATER TIGHT INSTALLATION OF MECHANICAL SEAL.

CHEMICAL PIPE WALL PENETRATION

DETAIL D
NTS



NOTE:
1. EXTERIOR PIPING COLOR TO MATCH. EXISTING BUILDING COLOR.

TANK ROOF VENT

DETAIL E
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. SHARMA
DRAWN BY: D. ISLAS
SHEET CHK'D BY: C. FAHLIN
CROSS CHK'D BY: J. BROZ
APPROVED BY: J. BROZ
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS MECHANICAL
STANDARD DETAILS

PROJECT NO. 255128-234374
FILE NAME: M016STDT.DWG

SHEET NO.
M-16

STATE OF MICHIGAN
JAMES JOSEPH BROZ
ENGINEER
No. 35875
LICENSED PROFESSIONAL ENGINEER
10-2-19

BID SET

LEGEND

SINGLE LINE	DOUBLE LINE	
20X12	20X12	FIRST DIMENSION DENOTES VIEW SHOWN; RECT. OR OVAL
		TRANSITION, 18" MIN. LENGTH, 15° MAX. EACH SIDE. ROUND OR RECT.
		RECT. TO ROUND TRANSITION
		90° ELL W/TURNING VANES
		45° HEEL TAKE-OFF FITTING, RECT.
		CONICAL OR FLARED SPIN-IN OR CONICAL TAP
18ø	18ø	18 INCH ROUND DUCT
		ROUND DUCT ELBOW; R/D=1.5MIN.
		90° STRAIGHT TEE FITTING
		90° CONICAL TEE FITTING
		45° LATERAL FITTING
		45° CONICAL LATERAL FITTING
		DIVIDED FLOW FITTING
		Y - FITTING
		SUPPLY DUCT TURNING TOWARD
		SUPPLY DUCT TURNING AWAY
		EXHAUST DUCT TURNING TOWARD
		EXHAUST DUCT TURNING AWAY
		ROUND DUCT TURNING TOWARD
		ROUND DUCT RUNNING AWAY
L		BALANCE DAMPER OR VOLUME DAMPER
M	M	MOTORIZED DAMPER

(FS) FLOW SWITCH

(T) THERMOSTAT/TEMPERATURE SWITCH

(SD) SMOKE DUCT DETECTOR

(E) EMERGENCY VENTILATION SWITCH

PIPING LEGEND

RL	REFRIGERANT LIQUID LINE
RS	REFRIGERANT SUCTION LINE
CD	CONDENSATE DRAIN PIPING
	PIPE TURNING DOWN
	PIPE TURNING UP
	ISOLATION VALVE
	BALL VALVE

ABBREVATIONS

ACC	AIR COOLED CONDENSING UNIT
ACH	AIR CHANGES PER HOUR
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AL	ALUMINUM
ATC	AUTOMATIC TEMPERATURE CONTROL
BD	BALANCING DAMPER
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSE POWER
BI	BACKWARD-INCLINED
BOD	BOTTOM OF DUCT
BTUH	BRITISH THERMAL UNITS PER HOUR
CD	CONDENSATE DRAIN
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CU. FT.	CUBIC FEET
DB	DRY BULB
DIA	DIAMETER
DIV	DIVISION
DN	DOWN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ESD	EMERGENCY SHUTDOWN
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
°F	DEGREES FAHRENHEIT
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FT	FEET
GAL	GALLON
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HP	HORSE POWER
HVAC	HEATING, VENTILATING & AIR CONDITIONING
Hz	HERTZ
IH	INTAKE HOOD
IN.WG	INCHES WATER GAUGE
KW	KILO WATTS
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
MAU	MAKE-UP AIR UNIT
MBH	1000 BTUH
MFR	MANUFACTURER
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OSA	OUTSIDE AIR
PD	PRESSURE DROP
PH	PHASE
PSI	POUNDS PER SQUARE INCH
RH	ROOF HOOD
RL	REFRIGERANT LIQUID
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
SA	SUPPLY AIR
SP	STATIC PRESSURE
SQ. FT	SQUARE FEET
SR	SUPPLY REGISTER
TON	TONNAGE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
V	VENT
W	WATTS
W/	WITH
WB	WET BULB
WC	WATER COLUMN
WG SP	INCHES OF WATER STATIC PRESSURE
WMS	WIRE MESH SCREEN

HVAC GENERAL NOTES

1) HVAC EQUIPMENT DIMENSIONS, LOCATIONS, DUCTWORK AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED BY THE ENGINEER. IF THE CONTRACTOR PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFIED, THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ENGINEER FOR APPROVAL, DETAILED ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, INSTRUMENTATION, HVAC AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING ALL FEATURES OF THE EQUIPMENT HE/SHE PROPOSES TO FURNISH. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS, AND SCHEMATICS OF ALL SUCH CHANGES IF APPROVED BY THE ENGINEER. APPURTENANCES REQUIRED SHALL BE AT NO EXTRA COST TO THE OWNER. THE CONTRACTOR SHALL ASSUME THE COST OF, AND THE RESPONSIBILITY FOR SATISFACTORILY ACCOMPLISHING ALL THE NECESSARY CHANGES CORRESPONDING TO THE DIMENSIONS AND CHARACTERISTICS OF THE EQUIPMENT SUBMITTED AND APPROVED BY THE ENGINEER, INCLUDING COORDINATION AND COSTS TO OTHER BUILDING SYSTEMS AND SERVICES CREATED BY THE PROPOSED CHANGES. REFER TO SPECIFICATIONS FOR FURTHER DETAILS.

2) DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING.

3) UNLESS OTHERWISE SHOWN ON THE DRAWING ALL WALL PENETRATIONS SHALL BE AS SHOWN ON THE PENETRATION DETAILS. IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY SUBSTITUTE ALTERNATE METHODS PROVIDING THEY MEET INTENDED DESIGN REQUIREMENTS.

4) NOT ALL AND ONLY CERTAIN TYPES OF SUPPORTS ARE SHOWN ON THE HVAC DRAWINGS. UNLESS OTHERWISE DETAILED ON THE DRAWINGS ALL PIPE AND DUCT SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED AND TO THE APPROVAL OF THE ENGINEER.

5) REFER TO ELECTRICAL PLANS FOR SPACE CLASSIFICATIONS.

6) REFER TO ARCHITECTURAL PLANS FOR LOCATION OF RATED WALLS, PARTITIONS, AND FLOORS.

7) REFER ALSO TO HVAC SECTIONS IN DIVISION 23 SPECIFICATIONS.

NOTE: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
LICENSED PROFESSIONAL ENGINEER
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

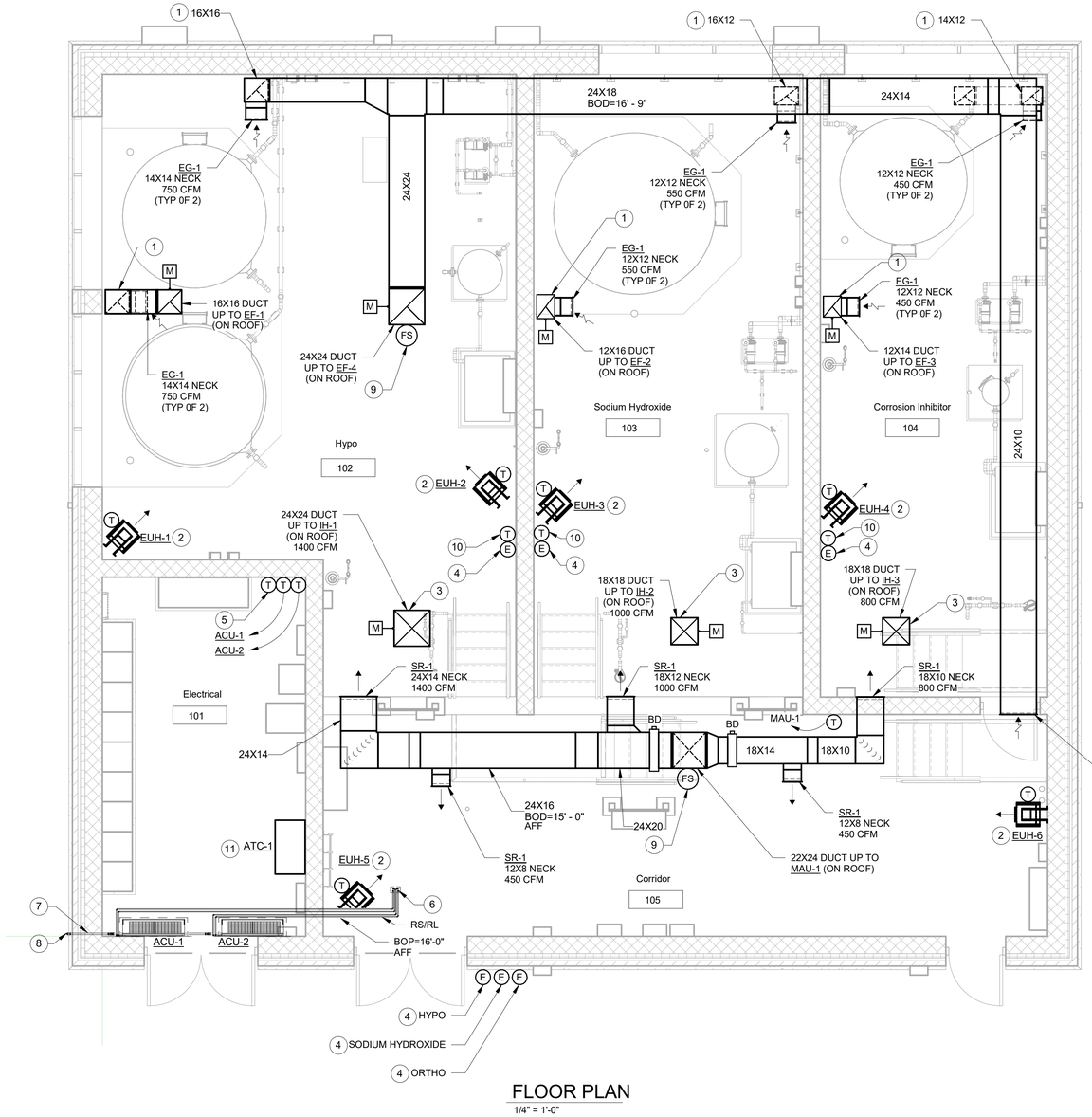
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

H□AC
LEGEND, ABBRE□IATIONS AND GENERAL NOTES

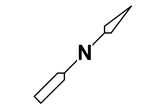
PROJECT NO. 255128-234374
FILE NAME: H001NFLG.DWG
SHEET NO.
H-1

BID SET



FLOOR PLAN

1/4" = 1'-0"



0 2' 4' 8'

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. COORDINATE INSTALLATION OF HVAC DUCT ROUTING WITH PROCESS EQUIPMENT AND STRUCTURAL CONSTRAINTS.
2. OUTDOOR AIR AND SUPPLY AIR DUCTS SHALL BE ALUMINUM. EXHAUST AIR DUCTS SHALL BE FRP. REFER TO SECTIONS 233116 AND 233113, ACCORDINGLY.

KEYED NOTES:

(1) EXHAUST DUCT DOWN TO FLOOR AND CAP. INSTALL BOTTOM OF LOWER GRILLE AT 1'-0" AFF AND INSTALL BOTTOM OF UPPER GRILLE AT 14'-0" AFF. REFER TO DETAIL E/H-5.

(2) BOTTOM OF EUH APPROXIMATELY AT 12'-0" AFF. SET THERMOSTAT TO 55°F.

(3) DUCT DOWN TO 2'-0" BELOW CEILING AND TERMINATED WITH WIRE MESH SCREEN.

(4) MAINTAINED "PULL TO RESET" EMERGENCY VENTILATION SWITCH IN NEMA 4X ENCLOSURE. PILLA MODEL ST120SL, OR EQUAL. PROVIDE WITH LABEL INDICATING WHICH ROOM/SYSTEM THEY SERVE.

(5) NEMA 4X HIGH TEMPERATURE SENSOR SET AT 85°F. PECO TF115-001, OR EQUAL.

(6) REFRIGERANT PIPING UP TO CONDENSING UNIT ON ROOF. SIZE PIPING PER MANUFACTURER'S REQUIREMENTS.

(7) PUMPED CONDENSATE DRAIN. SIZE PER MANUFACTURER'S REQUIREMENTS. SLOPE PIPING AWAY FROM CONDITIONING UNIT.

(8) CONDENSATE DRAIN PIPING DOWN TO 1'-0" ABOVE GRADE ONTO SPLASH BLOCK.

(9) NEMA 4X HEATED RTD FLOW SWITCH. FLUID COMPONENTS FLT 93 SERIES, OR EQUAL.

(10) NEMA 4X LOW TEMPERATURE SENSOR SET AT 45°F. PECO TF115-001, OR EQUAL.

(11) CONTROL SEQUENCES FOR HVAC SYSTEM.

1. A DEDICATED ON-OFF SWITCH ON THE ATC PANEL SHALL CONTROL MAU-1 AND EF-4.
2. ON MODE: WHEN THE SELECTOR SWITCH AT THE ATC PANEL IS SET TO "ON",
   A. MAU-1 SHALL BE ON AND OPERATE UNDER ITS OWN CONTROLS TO MAINTAIN THE SPACE TEMPERATURE AT A MINIMUM OF 55°F (ADJ.). THE SUPPLY FAN SHALL RUN CONTINUOUSLY.
   B. EF-4 SHALL BE ON AND OPERATE CONTINUOUSLY AND ITS MOTORIZED DAMPER SHALL BE OPEN.
3. OFF MODE: WHEN THE SELECTOR SWITCH AT THE ATC PANEL IS SET TO "OFF",
   A. MAU-1 SHALL BE OFF.
   B. EF-4 SHALL BE OFF AND ITS MOTORIZED DAMPER SHALL BE CLOSED.
4. EMERGENCY MODE: WHEN ANY OF THE INTERIOR OR EXTERIOR EMERGENCY VENTILATION SWITCHES ARE ACTIVATED,
   A. MAU-1 AND EF-4 SHALL BE ON AND OPERATING CONTINUOUSLY.
   B. THE MOTORIZED DAMPERS AT THE ASSOCIATED IH AND EF SHALL BE OPEN.
   C. THE ASSOCIATED EF SHALL BE ON AND OPERATING CONTINUOUSLY.
   D. WHEN BOTH INTERIOR AND EXTERIOR EMERGENCY VENTILATION SWITCHES ARE DEACTIVATED, THE MOTORIZED DAMPERS AT THE ASSOCIATED IH AND EF SHALL BE CLOSED AND THE EF SHALL BE OFF.
5. A GENERAL ALARM SHALL BE SENT TO SCADA IF:
   A. MAU-1 FAILS TO OPERATE.
   B. THE FLOW SWITCH AT EITHER MAU-1 OR EF-4 IS ACTIVATED. THE FLOW SWITCH SHALL BE SET AT 75% OF DESIGN FLOW.
   C. HYPO, SODIUM HYDROXIDE, OR ORTHO ROOM LOW SPACE TEMPERATURE.
   D. ELECTRICAL ROOM HIGH SPACE TEMPERATURE.
   E. WHEN ANY EMERGENCY VENTILATION SWITCH IS ACTIVATED.
6. PROVIDE LIGHTS AT THE ATC PANEL FOR:
   A. MAU-1 ON-OFF LIGHTS AND LOW AIRFLOW.
   B. MAU-1 DIRTY FILTER SWITCH.
   C. EF-1 ON-OFF LIGHTS.
   D. EF-2 ON-OFF LIGHTS.
   E. EF-3 ON-OFF LIGHTS.
   F. EF-4 ON-OFF LIGHTS AND LOW AIRFLOW.
   G. IH-1 DAMPER OPEN-CLOSED LIGHTS.
   H. IH-2 DAMPER OPEN-CLOSED LIGHTS.
   I. IH-3 DAMPER OPEN-CLOSED LIGHTS.
   J. ELECTRICAL ROOM HIGH SPACE TEMPERATURE ALARM.
   K. HYPO ROOM LOW SPACE TEMPERATURE.
   L. SODIUM HYDROXIDE ROOM LOW SPACE TEMPERATURE.
   M. ORTHO ROOM LOW SPACE TEMPERATURE.
   N. EMERGENCY VENTILATION ALARM.

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
PROFESSIONAL ENGINEER
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

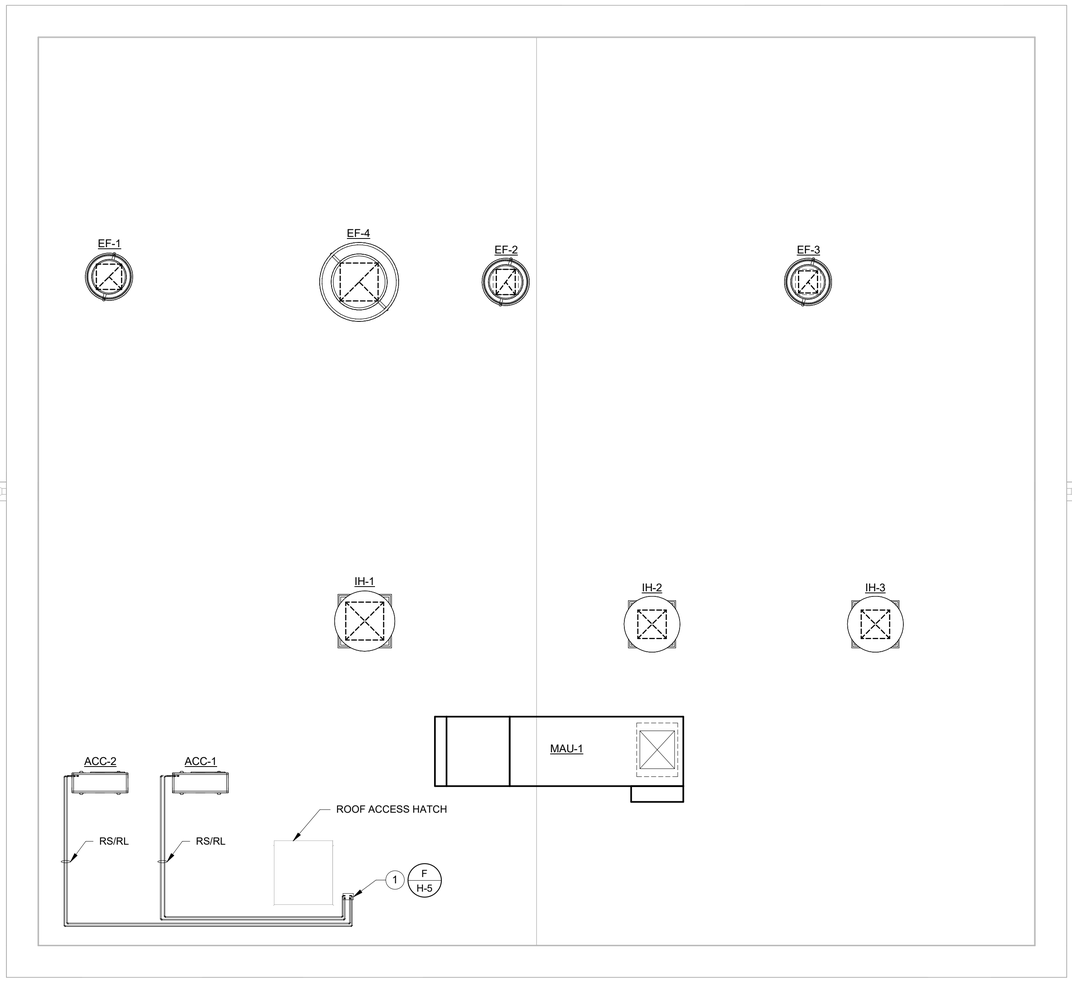
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING
HVAC FLOOR PLAN

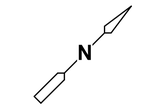
PROJECT NO. 255128-234374
FILE NAME: HWZ000CB.rvt

SHEET NO.
H-2

BID SET



ROOF PLAN
1/4" = 1'-0"



0 2' 4' 8'
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. EXHAUST AIR OUTLETS SHALL BE AT LEAST 10 FEET FROM OUTSIDE AIR INLETS.

KEYED NOTES:

(1) REFRIGERANT PIPING DOWN TO AIR CONDITIONING UNIT IN ELECTRICAL ROOM. SIZE PIPING PER MANUFACTURER'S REQUIREMENTS.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING
HVAC ROOF PLAN

PROJECT NO. 255128-234374
FILE NAME: HWZ000CB.rvt
SHEET NO.
H-3

BID SET

MAKEUP AIR UNIT SCHEDULE

TAG	AREA SERVED	CFM	TYPE	FAN						HEATING SECTION							ELECTRICAL			WEIGHT (LBS)	BASIS OF DESIGN	NOTES
				FAN TYPE (NOTE 2)	ESP. IN WG (NOTE 3)	TSP. IN WG	DRIVE	BHP	MINIMUM MOTOR HP	TYPE	FUEL	INPUT MBH	OUTPUT MBH	EAT (°F)	LAT (°F)	MIN/MAX INLET GAS PRESSURE (IN. WC.)	V/PH/HZ	MCA	MOP			
MAU-1	HYPO, SODIUM HYDROXIDE, CORROSION INHIBITOR, CORRIDOR	4100	HORIZONTAL	FC	0.5	0.70	BELT	2.80	3	INDIRECT	NAT. GAS	400	324	0	70	6/14	460/60/3	4.7	15	1400	MODINE HDP400TMRHN23F2EG2JDA00	SEE BELOW

NOTES:
1. DESIGN
   SUMMER 87°F WINTER 0°F
2. WHEEL; AF: AIRFOIL FC: FORWARD CURVE C: CENTRIFUGAL
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE UNIT CASING, DIFFUSER SECTION, BUT DOES INCLUDE FILTERS.
4. REFER TO THE ELECTRICAL DRAWINGS FOR EQUIPMENT ELECTRICAL CHARACTERISTICS.
5. PROVIDE INTERNAL VIBRATION ISOLATION.
6. SINGLE POINT ELECTRICAL CONNECTION.
7. PROVIDE ALL CONTROL COMPONENTS AS REQUIRED BY THE CONTROL SEQUENCES.
8. STAINLESS STEEL HEAT EXCHANGER.
9. ANTI-CORROISION COATING.
10. PROVIDE WITH 24" ROOF CURB.
11. PROVIDE WITH GFCI RECEPTACLE.
12. PROVIDE STARTER.
13. PROVIDE DIRTY FILTER SWITCH.
14. PROVIDE WITH INLET WEATHER HOOD.
15. PROVIDE WITH OPEN PROTOCOL COMMUNICATION.
16. PROVIDE WITH MERV 8 FILTERS.

EXHAUST FAN SCHEDULE

TAG	SERVES	FAN DATA					MOTOR			WEIGHT (LBS)	BASIS OF DESIGN	NOTES
		FAN TYPE	WHEEL TYPE	CFM	ESP	FAN RPM	DRIVE TYPE	MIN. HP	VOLTS/ PHASE			
EF-1	HYPO	ROOFTOP UPBLAST	BI	1500	0.375	1979	BELT	3/4	460/3	200	HARTZELL A88-0-121FE100FGFCG3	1,2,3
EF-2	SODIUM HYDROXIDE	ROOFTOP UPBLAST	BI	1100	0.375	1541	BELT	1/3	120/1	200	HARTZELL A88-0-121FE100FGFCE3	1,2,3
EF-3	CORROSION INHIBITOR	ROOFTOP UPBLAST	BI	900	0.375	1333	BELT	1/4	120/1	200	HARTZELL A88-0-121FE100FGFCD3	1,2,3
EF-4	CORRIDOR, HYPO, SODIUM HYDROXIDE, CORROSION INHIBITOR	ROOFTOP UPBLAST	BI	4500	0.5	907	BELT	1	460/3	400	HARTZELL A88-0-241FE-66FGFCH3	1,2,3

NOTES:
1. FRP CONSTRUCTION
2. PROVIDE WITH 24" ROOF CURB.
3. BIRDSCREEN.

ROOF INTAKE HOOD SCHEDULE

TAG	SERVES	TYPE	CAPACITY (CFM)	OPENING (INxIN)	THROAT AREA (SQ. FT)	MAX PRESSURE DROP (IN. WG)	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
IH-1	HYPO	INTAKE	1400	31.5X31.5	3.34	0.05	105	LOREN COOK PR-24	1,2,3,4
IH-2	SODIUM HYDROXIDE	INTAKE	1000	27.5X27.5	2.29	0.05	80	LOREN COOK PR-20	1,2,3,4
IH-3	CORROSION INHIBITOR	INTAKE	800	27.5X27.5	2.29	0.05	80	LOREN COOK PR-20	1,2,3,4

NOTES:
1. ALUMINUM CONSTRUCTION.
2. BIRD SCREEN.
3. MOTORIZED INTAKE DAMPER.
4. 24" MINIMUM INSULATED ROOF CURB.

ELECTRIC UNIT HEATER SCHEDULE

TAG	BUILDING	AREA SERVED	CAPACITY (KW)	NOMINAL (CFM)	MOTOR (W)	VOLTAGE /PHASE	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
EUH-1	CHEMICAL SYSTEMS FEED BUILDING	HYPO	5	400	21	460/3	45	TRANE UHRA	1,2,3
EUH-2	CHEMICAL SYSTEMS FEED BUILDING	HYPO	5	400	21	460/3	45	TRANE UHRA	1,2,3
EUH-3	CHEMICAL SYSTEMS FEED BUILDING	SODIUM HYDROXIDE	5	400	21	460/3	45	TRANE UHRA	1,2,3
EUH-4	CHEMICAL SYSTEMS FEED BUILDING	CORROSION INHIBITOR	5	400	21	460/3	45	TRANE UHRA	1,2,3
EUH-5	CHEMICAL SYSTEMS FEED BUILDING	CORRIDOR	5	400	21	460/3	45	TRANE UHRA	1,2,3
EUH-6	CHEMICAL SYSTEMS FEED BUILDING	CORRIDOR	5	400	21	460/3	45	TRANE UHRA	1,2,3

NOTES:
1. STAINLESS STEEL CONSTRUCTION WITH EPOXY COATED FAN BLADES.
2. PROVIDE WALL SUPPORT BRACKET.
3. INTEGRAL DISCONNECT AND THERMOSTAT.

SPLIT SYSTEM HEAT PUMP/AIR CONDITIONING UNITS

TAG	BUILDING	AREA SERVED	EVAPORATOR UNIT – ACU						AIR COOLED – ACC				BASIS OF DESIGN	NOTES
			FAN		EXTERNAL SP (IN.WC)	TOTAL (MBH)	MCA	WEIGHT (LBS)	REFRIGERENT	ELECTRICAL		WEIGHT (LBS)		
			AIRFLOW (CFM)	MINIMUM OSA (CFM)						MCA	V/PH			
ACU-1 & ACC-1	CHEMICAL SYSTEMS FEED BUILDING	ELECTRICAL ROOM	705	0	–	24	1	50	R-410A	19	208/1	160	MITSUBISHI PKA-A24KA7/PUZ-A24NHA7	1,2,3,4,5,6
ACU-2 & ACC-2	CHEMICAL SYSTEMS FEED BUILDING	ELECTRICAL ROOM	705	0	–	24	1	50	R-410A	19	208/1	160	MITSUBISHI PKA-A24KA7/PUZ-A24NHA7	1,2,3,4,5,6

NOTES:
1. INDOOR UNIT TO BE WALL MOUNTED.
2. PROVIDE MANUFACTURER SUPPLIED THERMOSTAT AND CONTROLS.
3. UNIT SHALL BE PROVIDED WITH CONDENSATE DRAIN PUMP.
4. OUTDOOR UNIT TO POWER INDOOR UNIT.
5. LOW AMBIENT COOLING WITH WIND BAFFLE.
6. PROVIDE 24" ROOF EQUIPMENT CURB FOR OUTDOOR UNIT.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

TAG	TYPE	MATERIAL	OBD	MODULE SIZE	BASIS OF DESIGN	NOTES
EG-1	EXHAUST AIR GRILLE. SURFACE MOUNTED	ALUMINUM	–	PER PLANS	TITUS 355 FL	–
SR-1	SUPPLY AIR REGISTER	ALUMINUM	YES	PER PLANS	TITUS 300 FS	1

NOTES:
1. DOUBLE DEFLECTION. SET DEFLECTION TOWARDS FLOOR 30° FROM HORIZONTAL.

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
LICENSED PROFESSIONAL ENGINEER
10/25/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

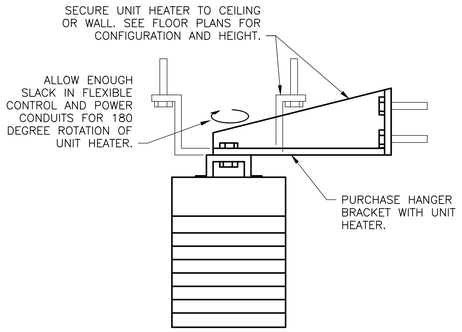
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

H□AC
SCHEDULES

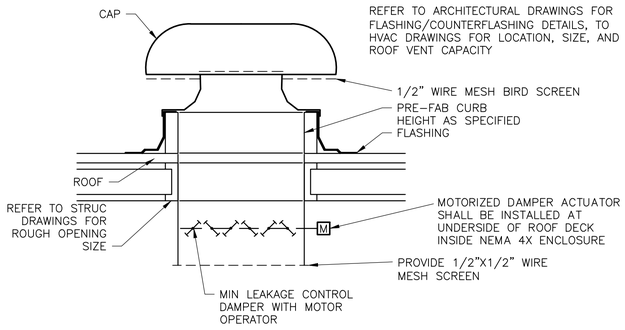
PROJECT NO. 255128-234374
FILE NAME: H004NFSH.DWG
SHEET NO.
H-4

BID SET



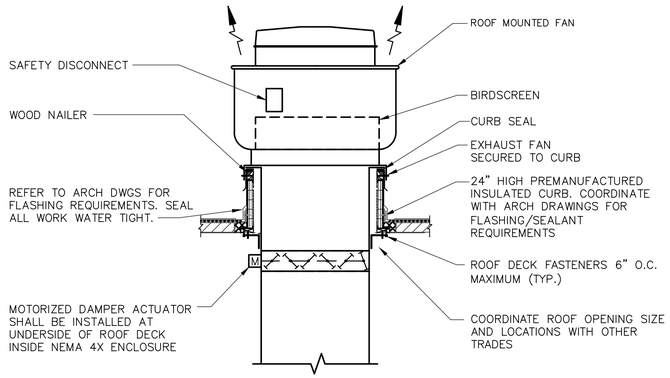
HORIZONTAL ELECTRIC UNIT HEATER

DETAIL A / NTS



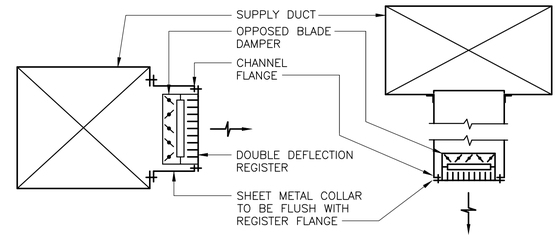
INTAKE HOOD

DETAIL B / NTS



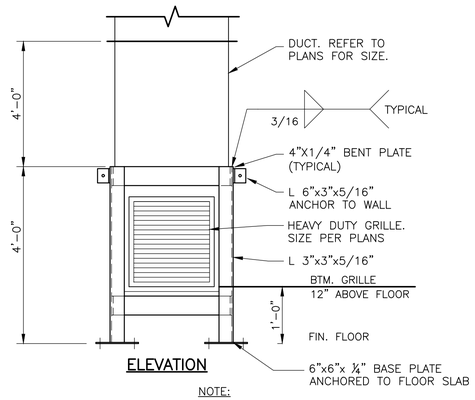
ROOF EXHAUST FAN – HAZARDOUS AREAS

DETAIL C / NTS



SUPPLY REGISTER

DETAIL D / NTS

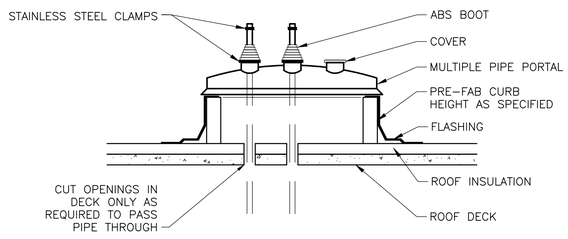


NOTE:

1. ALL HARDWARE CONSTRUCTED OF 316 STAINLESS STEEL

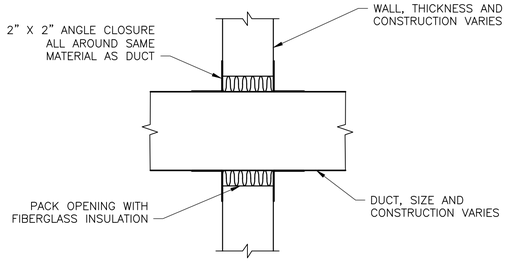
HEAVY DUTY DUCT DROP

DETAIL E / NTS



PIPE PORTAL

DETAIL F / NTS



DUCT WALL PENETRATIONS TO BE USED FOR ALL NON-FIRE RATED WALLS

DETAIL G / NTS

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
LICENSED PROFESSIONAL ENGINEER
10/25/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

H□AC
DETAILS

PROJECT NO. 255128-234374
FILE NAME: H005NFDT.DWG

SHEET NO.
H-5

BID SET

PLUMBING LEGEND

SYMBOL	ABBR.	DESCRIPTION
CW	CW	DOMESTIC COLD WATER
PW	PW	PROTECTED WATER
HW	HW	DOMESTIC HOT WATER
TW	TW	TEMPERED WATER
V	V	PLUMBING VENT
F	F	FIRE SYSTEM PIPING
W	W	WASTE
SPD	SPD	SUMP PUMP DISCHARGE
G	G	NATURAL GAS
	S.O.V.	SHUTOFF VALVE
		CHECK VALVE
		PRESSURE RELIEF VALVE
		TEE
		UNION
		TEE UP
		TEE DOWN
		ELBOW TURNING DOWN
		ELBOW TURNING UP
		WASH STATION HOSE
	HB	HOSE BIBB
	FD	FLOOR DRAIN
		PIPE TO FLOOR DRAIN WITH P-TRAP
FCO	FCO	FLOOR CLEAN OUT
WCO	WCO	WALL CLEANOUT
WHA	WHA	WATER HAMMER ARRESTOR
BFP	BFP	BACKFLOW PREVENTER
ESEW	ESEW	EMERGENCY SHOWER/ EMERGENCY EYEWASH
		GAS PRESSURE REGULATOR
		2-WAY SURFACE CLEANOUT

ABBREVIATIONS

ABBR	ABBREVIATION
AFF	ABOVE FINISHED FLOOR
APPROX	APPROXIMATELY
&	AND
BETW	BETWEEN
BLDG	BUILDING
BOP	BOTTOM OF PIPE
CD	CONDENSATE DRAIN
CFH	CUBIC FEET PER HOUR
CHEM	CHEMICAL
℄	CENTERLINE
CO	CLEAN OUT
CMU	CONCRETE MASONRY UNIT
CU	COPPER
CW	COLD WATER (DOMESTIC)
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DET	DETAIL
DWG	DRAWING
DN	DOWN
D	PROCESS DRAIN
EA	EACH
EL	ELEVATION
ESEW	EMERGENCY SHOWER/ EYEWASH
EQ	EQUIPMENT
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
G	NATURAL GAS
GALV	GALVANIZED
GPM	GALLON PER MINUTE
GWH	GAS-FIRED WATER HEATER
HB	HOSE BIBB
HD	HUB DRAIN
HP	HORSE POWER
HW	HOT WATER (DOMESTIC)
IE	INVERT ELEVATION
IN	INCHES
INSUL	INSULATION
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
MS	MOP SINK
LBS	POUNDS
NO.	NUMBER
O.C.	ON CENTER
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PW	PROTECTED WATER
RPZ	REDUCED PRESSURE ZONE VALVE ASSEMBLY
SHT	SHEET
SPD	SUMP PUMP DISCHARGE
SPECS	SPECIFICATIONS
SS	SANITARY SEWER
STD	STANDARD
TYP	TYPICAL
TOC	TOP OF CONCRETE
THRU	THROUGH
TMV	THERMOSTATIC MIXING VALVE
TW	TEMPERED WATER
UNO	UNLESS NOTED OTHERWISE
V	VENT
VTR	VENT RISER
W	WASTE / SOIL
WCO	WALL CLEAN OUT
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTER
WHS	WASH HOSE STATION

PLUMBING GENERAL NOTES

1) ALL NEW EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND TO THE INDUSTRY STANDARDS FOR THE WORK, UNLESS A HIGHER STANDARD IS SPECIFIED IN THE DOCUMENTS.
2) ACCESS AND WORKING SPACE SHALL BE PROVIDED AND MAINTAINED AROUND ALL MECHANICAL, ELECTRICAL, CONTROL EQUIPMENT PER LATEST EDITION OF THE MECHANICAL, ELECTRICAL AND BUILDING CODES TO PERMIT READY AND SAFE OPERATION, EXAMINATION AND MAINTENANCE.
3) OFFSETS IN VERTICAL DRAINAGE AND VENT LINES SHALL BE MADE AT 45° WHEREVER POSSIBLE.
4) FOR PIPING SIZES NOT INDICATED ON FLOOR PLAN, REFER TO APPLICABLE PIPING DIAGRAMS.
5) DRAWINGS ARE DIAGRAMATIC AND DO NOT NECESSARILY SHOW ALL OFFSETS OF FITTINGS REQUIRED. PLUMBING CONTRACTOR IS TO COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS WITH DUCTS, LIGHT FIXTURES, PIPES, ETC.
6) INSTALL HORIZONTAL DRAINAGE LINES WITH 1/4" PER FOOT SLOPE FOR 2-1/2" OR LESS AND 1/8" PER FOOT SLOPE FOR 3 TO 6 INCHES UNLESS OTHERWISE NOTED.
7) PLUMBING VENT-THRU-ROOF SHALL EXTEND A MINIMUM OF 12" ABOVE ROOF.
8) REFER ALSO TO PLUMBING SECTIONS IN DIVISION 22 SPECIFICATIONS.

NOTES: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

PLUMBING FIXTURE CONNECTION SCHEDULE

TAG	LOCATION	DESCRIPTION	WASTE (IN.) MIN.	VENT (IN.) MIN.	TRAP (IN.) MIN.	CW (IN.) MIN.	HW (IN.) MIN.	BASIS OF DESIGN	REMARKS
ESEW-1020 ESEW-2020 ESEW-3010	HYPO, SODIUM HYDROXIDE, CORROSION INHIBITOR	COMBINATION EMERGENCY SHOWER/EYEWASH - INDOOR	-	-	-	-	-	BRADLEY S19-310AC	TEMPERED WATER SUPPLY DELIVERED BY ASSE 1071 THERMOSTATIC MIXING VALVE.
ESEW-3005	CHEMICAL LOADING AREA	COMBINATION EMERGENCY SHOWER/EYEWASH - OUTDOOR	-	-	-	-	-	BRADLEY S19-310PVC	TEMPERED WATER SUPPLY DELIVERED BY ASSE 1071 THERMOSTATIC MIXING VALVE.
FD-1	HYPO, SODIUM HYDROXIDE, CORROSION INHIBITOR	PROCESS FLOOR DRAIN	4	2	-	-	-	ZURN Z541	ACID REISTANT EXPOXY COATED. NO TRAPS ON PROCESS DRAIN.
FD-2	CORRIDOR	SANITARY FLOOR DRAIN	4	2	4	-	-	ZURN Z541	ACID RESISTANT EPOXY COATED. PROVIDE TRAP SEAL DEVICE CONFORMING TO ASSE 1072.
MS-1	CORRIDOR	MOP SINK	3	2	3	1/2	1/2	ELKAY EFS2523C SINK WITH LK940BR07T6S FAUCET	
TMV-1	HYPO, SODIUM HYDROXIDE, CORROSION INHIBITOR	THERMOSTATIC MIXING VALVE	-	-	-	1	1	LEONARD TM-800-LF	ASSE 1071 CERTIFIED
WH-1	CHEMICAL LOADING AREA	NON-FREEZE WALL HYDRANT	-	-	-	3/4	-	ZURN Z1300	
WHS-1	REFER TO DRAWINGS	WASH HOSE STATION	-	-	-	3/4	-	LEONARD ST-75-1572-LF	

EXPANSION TANK SCHEDULE

TAG	BASIS OF DESIGN MAKE/MODEL	TYPE	SERVES	TANK VOLUME (GAL)	MINIMUM ACCEPTANCE VOLUME (GAL)	DIMENSIONS (INCHES)		CONNECTION SIZE (IN)	DRY WEIGHT (LBS)
						DIAMETER	HEIGHT		
ET-1	THERM-X-TROL ST-12C	DIAPHRAGM	POTABLE HOT WATER SYSTEM	6.4	3.2	12	18	3/4	17

WATER HEATER SCHEDULE

TAG	LOCATION	TYPE	TANK CAPACITY (GAL)	RECOVERY AT ΔT (GAL/HR)	WATER TEMPERATURE		GAS INPUT (MBH)	MIN/MAX GAS PRESSURE (IN. W.C.)	THERMAL EFFICIENCY	AIR INTAKE CONNECTION (IN)	EXHAUST VENT CONNECTION (IN)	VOLT/ PHASE	MIN AMP	BASIS OF DESIGN	NOTES
					INLET	OUTLET									
GWH-1	CORRIDOR	GAS	100	175	40	140	150	5/14	98%	4	4	120/1	15	AO SMITH BTH-150	1,2

NOTES:
1. PROVIDE ASME-RATED TEMPERATURE AND PRESSURE RELIEF VALVE, PIPE VALVE DISCHARGE TO WITHIN 12 INCHES OF FINISHED FLOOR.
2. PROVIDE WITH CONCENTRIC VENT KIT AND CONDENSATE NEUTRALIZATION KIT.

SUMP PUMP SCHEDULE

TAG	LOCATION	TYPE	DISCHARGE PIPE SIZE (IN)	GPM	HEAD (FT)	RPM	MOTOR				BASIS OF DESIGN	NOTES
							HP	VOLTS	PH	HZ		
P-1300	HYPO	SUBMERGED	2	40	32	1750	1	480	3	60	WEIL 1413	1,2,3,4
P-2300	SODIUM HYDROXIDE	SUBMERGED	2	40	32	1750	1	480	3	60	WEIL 1413	1,2,3,4
P-3300	CORROSION INHIBITOR	SUBMERGED	2	40	32	1750	1	480	3	60	WEIL 1413	1,2,3,4

NOTES:
1. SIMPLEX.
2. STAINLESS STEEL SHAFT.
3. BRONZE IMPELLER.
4. PROVIDE WITH BREAK-AWAY FITTING; MERCURY-FREE HIGH LEVEL ALARM FLOAT, AND CONTROL PANEL WITH MANUAL PUMP OPERATION SWITCH IN NEMA 4X ENCLOSURE.

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
LICENSED PROFESSIONAL ENGINEER
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

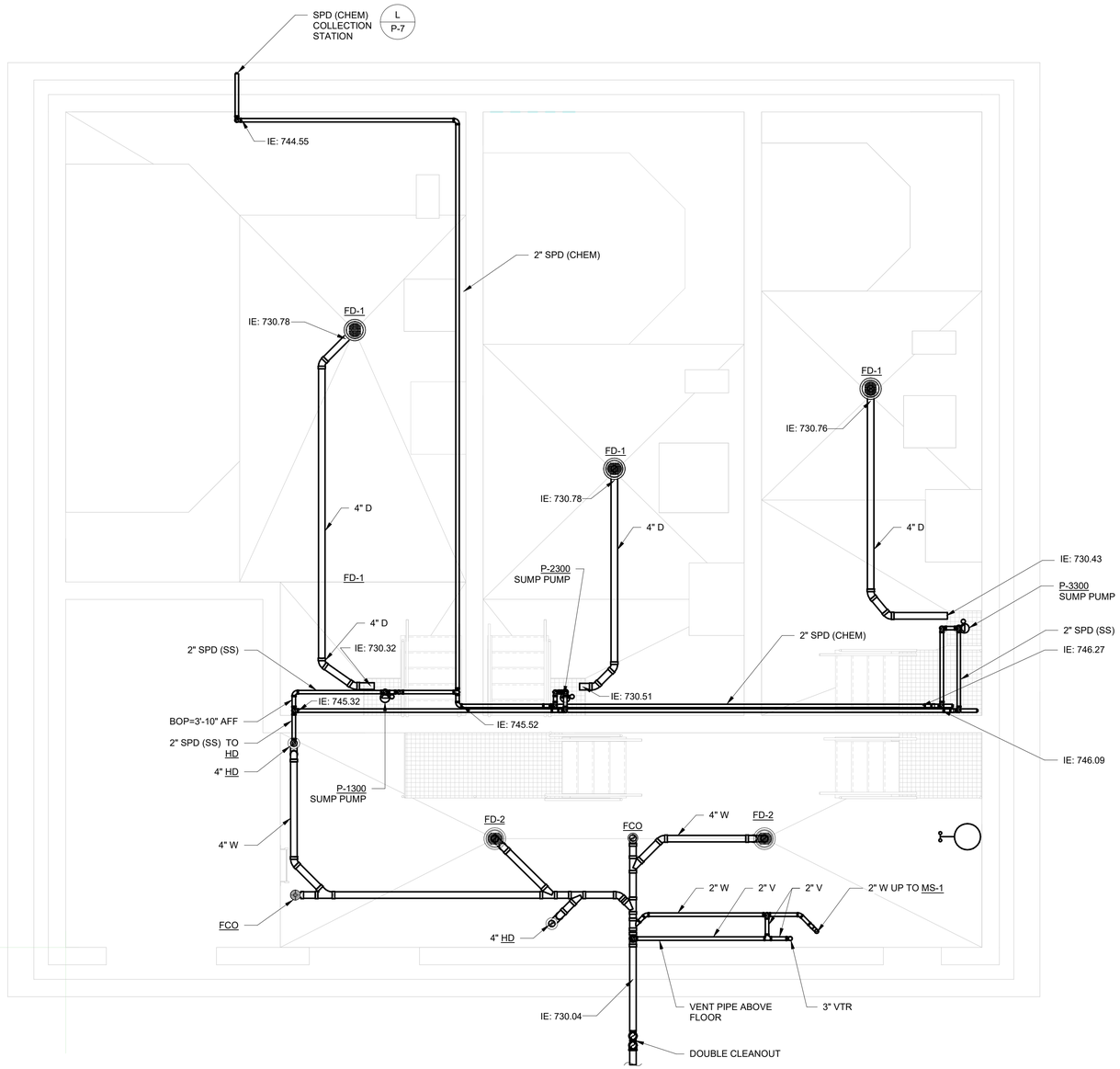
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PLUMBING
LEGEND, ABBRE□IATIONS, GENERAL NOTES, AND SCHEDULES

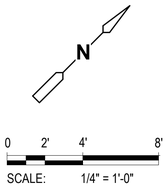
PROJECT NO. 255128-234374
FILE NAME: P001NFLG.DWG
SHEET NO.
P-1

BID SET



PLUMBING DRAIN, WASTE, AND VENT PLAN

1/4" = 1'-0"



GENERAL NOTES:

1. ALL PROCESS DRAIN AND SANITARY WASTE PIPING SHALL SLOPE MINIMUM 1/4" PER FOOT IN THE DIRECTION OF FLOW, UNLESS NOTED OTHERWISE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: K. ASHOK
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

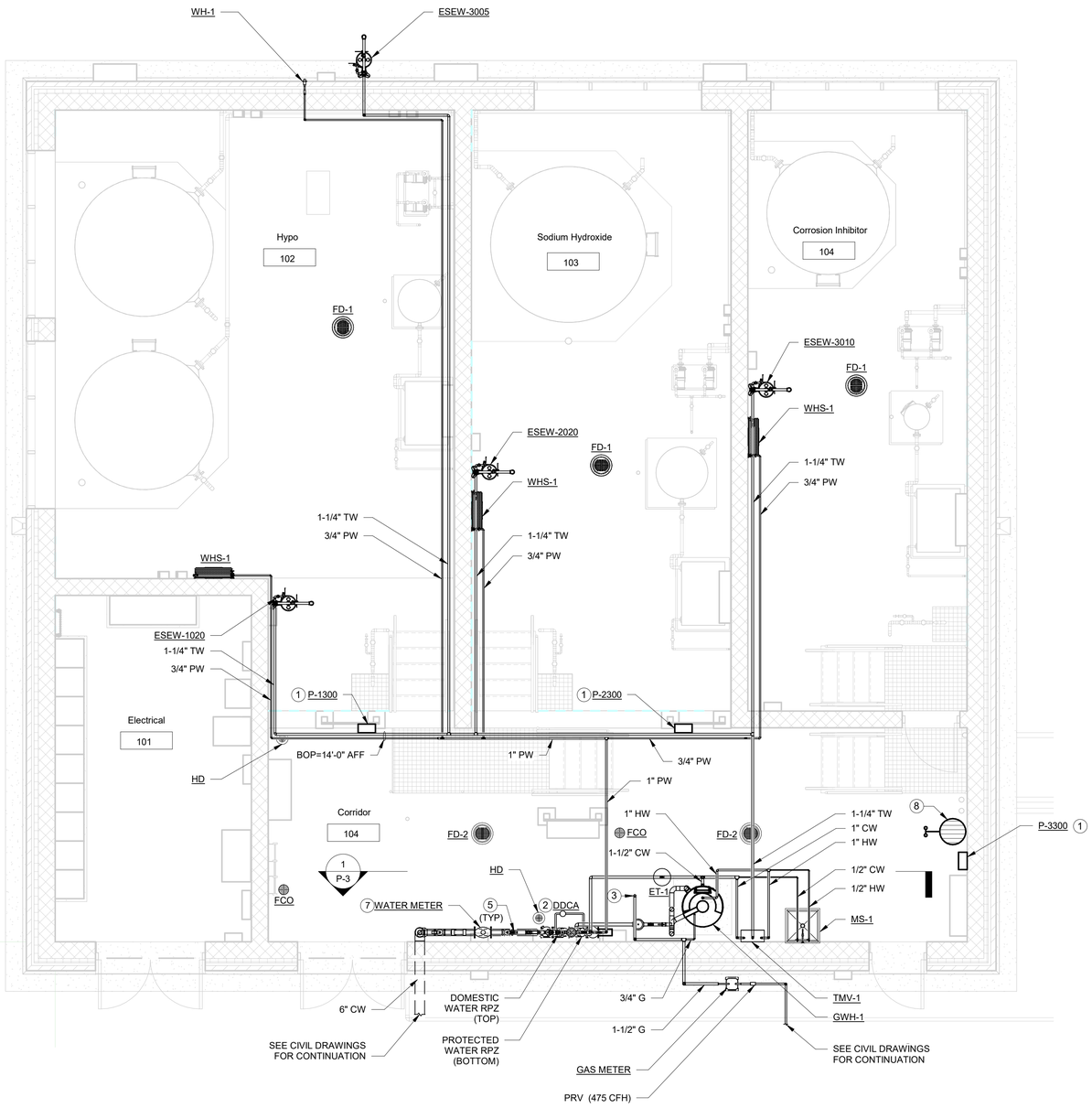
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING
PLUMBING DRAIN, WASTE, AND VENT PLAN

PROJECT NO. 255128-234374
FILE NAME: PWZ000CB.rvt

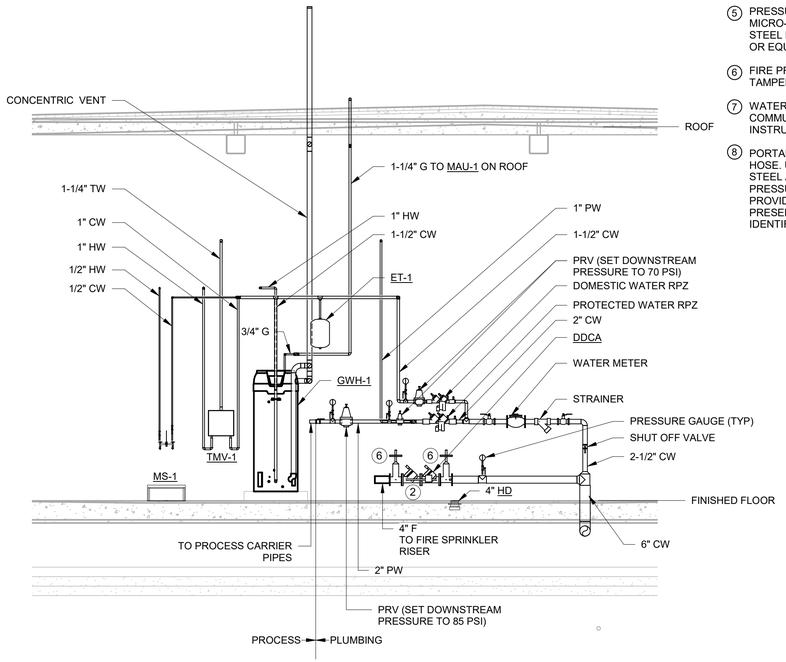
SHEET NO.
P-2

BID SET

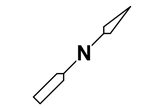


PLUMBING WATER PLAN

1/4" = 1'-0"



1 P-3 SECTION
1/4" = 1'-0"



GENERAL NOTES:

1. COORDINATE INSTALLATION OF PLUMBING PIPING WITH PROCESS EQUIPMENT AND PIPING.
2. NO PLUMBING PIPING SHALL BE ROUTED IN OR THROUGH ELECTRICAL ROOM.

KEYED NOTES:

1. SUMP PUMP CONTROL PANEL. PUMP SHALL BE MANUALLY OPERATED. PROVIDE SIGN AT CONTROL PANEL INDICATING CHEMICAL WASTE SHALL NOT BE PUMPED TO SANITARY SYSTEM. REFER TO DETAIL E/P-6.
2. FIRE PROTECTION DOUBLE DETECTOR BACKFLOW PREVENTER. REFER TO FIRE PROTECTION SHEETS.
3. GAS PIPING UP TO MAU-1 ON ROOF.
4. GAS PRV TO REDUCE PRESSURE TO 14 IN. W.C.
5. PRESSURE GAUGE. 4-1/2" DIAL, PHENOLIC TURRNET CASE, MICRO-ADJUSTABLE POINTER AND TYPE 316 STAINLESS STEEL BOURDON TUBE. AMETEK/US GAUGE SERIES 1900, OR EQUAL. PROVIDE STOP COCK OR BALL VALVE.
6. FIRE PROTECTION SUPERVISORY VALVE FITTED WITH TAMPER SWITCH.
7. WATER METER WITH 4-20MA TRANSMITTER CAPABLE OF COMMUNICATING TO SCADA. REFER TO INSTRUMENTATION DRAWINGS.
8. PORTABLE EMERGENCY EYEWASH UNIT WITH DRENCH HOSE. UNIT SHALL INCLUDE A 37 GALLON STAINLESS STEEL ASME RATED PRESSURE TANK, AIR FILL AVLVE, PRESSURE GAUGE, AND PRESSURE RELIEF VALVE. PROVIDE UNIT WITH 8 5-OZ BOTTLES OF WATER PRESERVATIVE CONCENTRATE AND AN EMERGENCY IDENTIFICATION SIGN. HAWS MODEL 7601.37, OR EQUAL.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

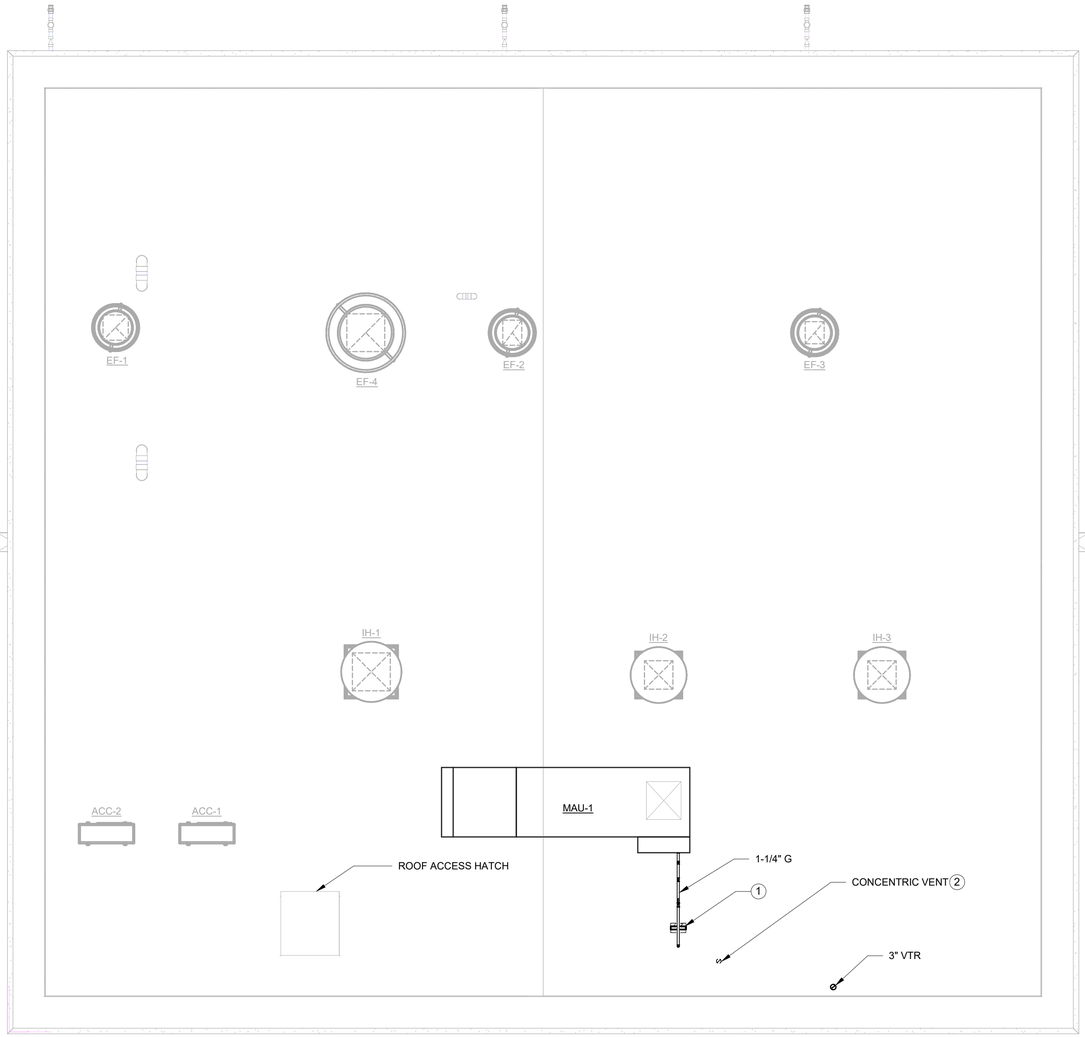
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

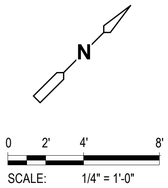
CHEMICAL BUILDING
PLUMBING WATER PLAN

PROJECT NO. 255128-234374
FILE NAME: PWZ000CB.rvt
SHEET NO. P-3

BID SET



PLUMBING ROOF PLAN
1/4" = 1'-0"



GENERAL NOTES:

1. PLUMBING VENTS SHALL BE AT LEAST 10 FEET FROM OUTSIDE AIR INLETS.

KEYED NOTES:

(1) ROOF PIPING SUPPORT. MIFAB # C10 RUBBER ROOF SUPPORT, OR EQUAL.

(2) EXTEND ABOVE PARAPET HEIGHT.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

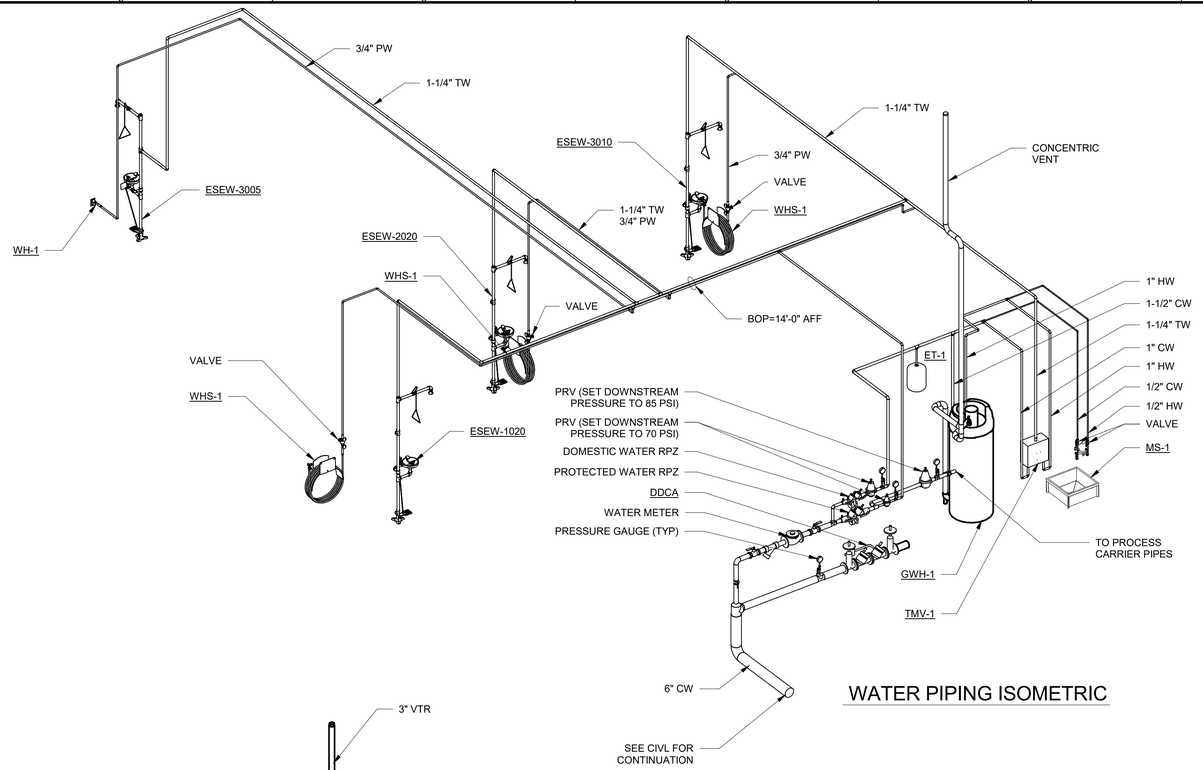
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING
PLUMBING ROOF PLAN

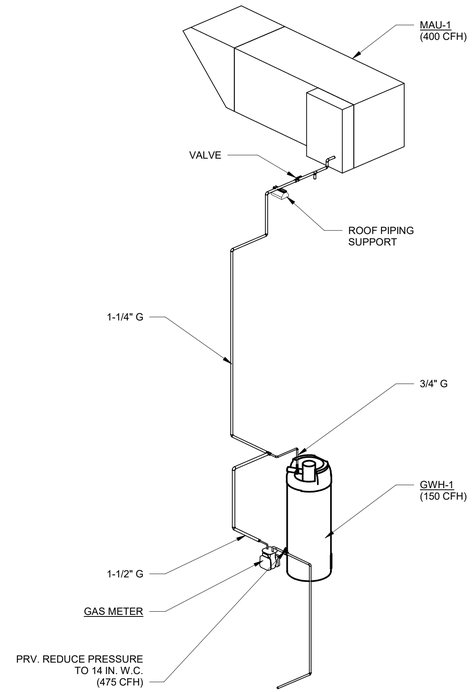
PROJECT NO. 255128-234374
FILE NAME: PWZ000CB.rvt

SHEET NO.
P-4

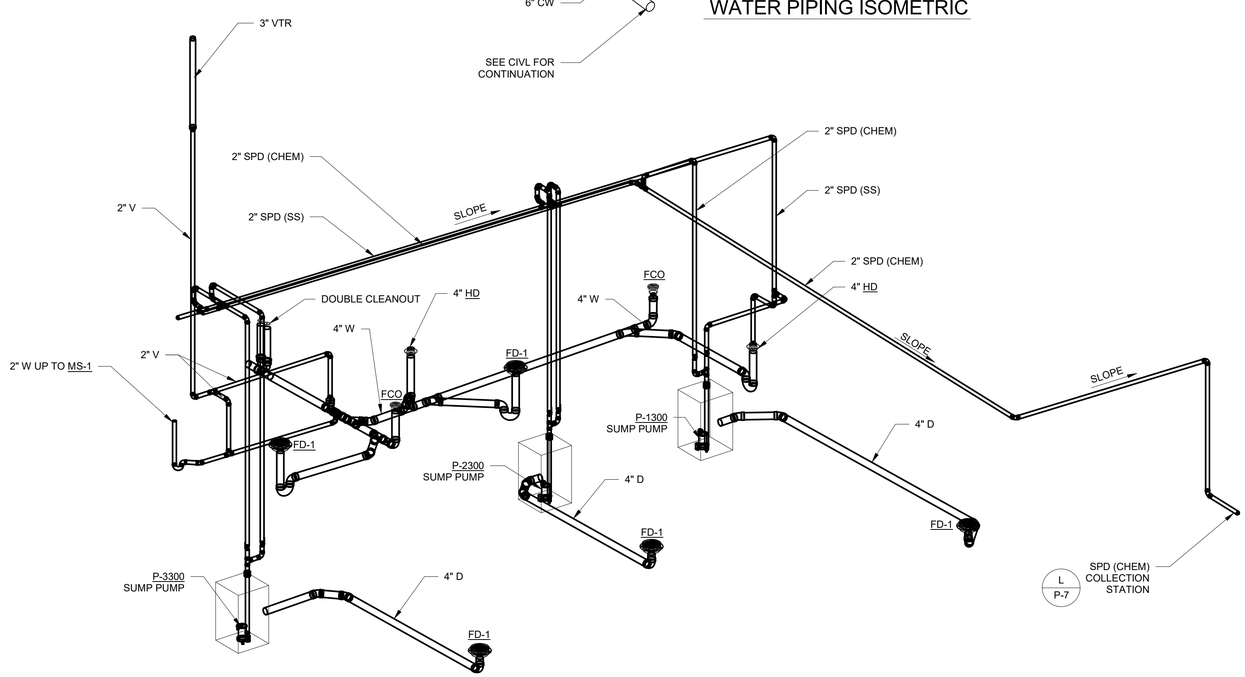
BID SET



WATER PIPING ISOMETRIC



NATURAL GAS PIPING ISOMETRIC



WASTE AND VENT PIPING ISOMETRIC

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

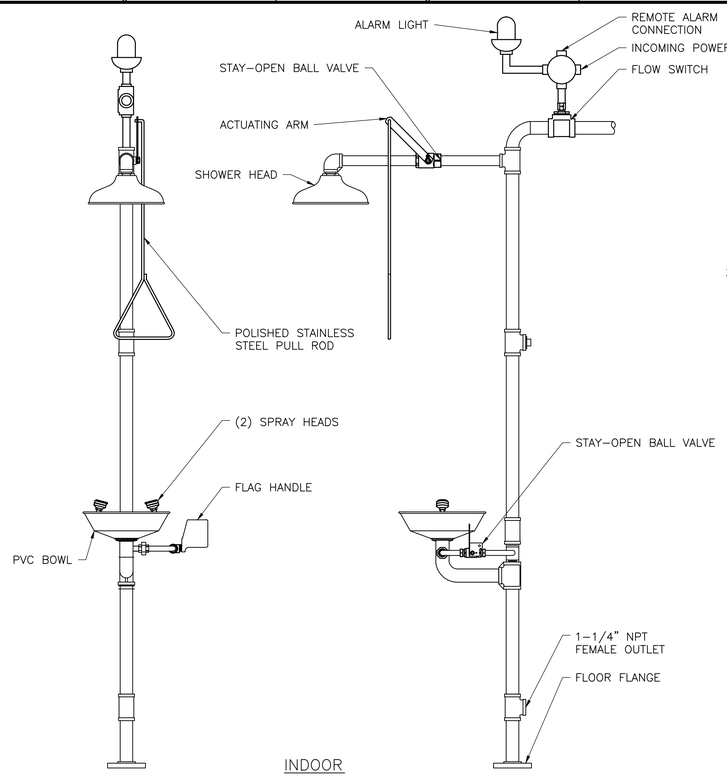
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

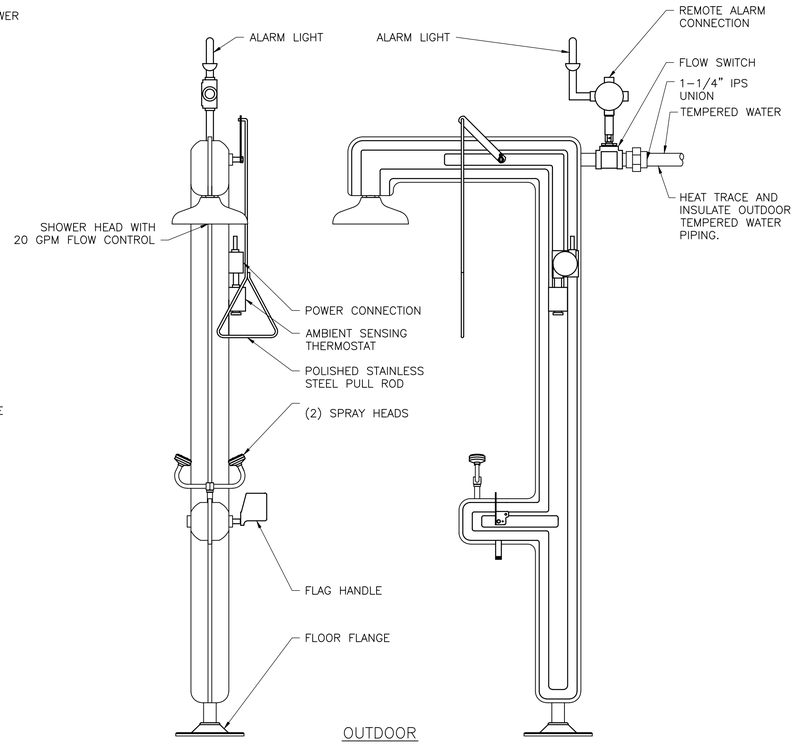
CHEMICAL BUILDING
PLUMBING PIPING ISOMETRICS

PROJECT NO. 255128-234374
FILE NAME: PWZ000CB.rvt
SHEET NO. P-5

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 8201062212
LICENSED PROFESSIONAL ENGINEER
10/02/2019

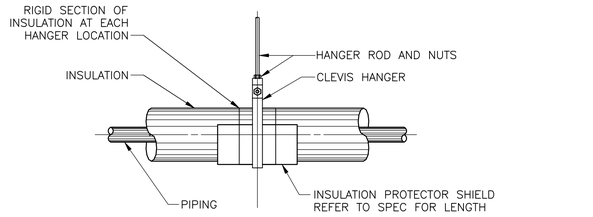
BID SET





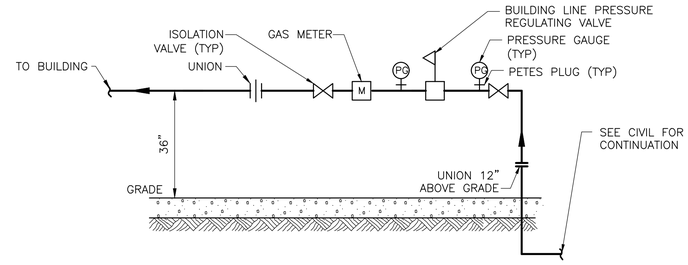
TYPICAL COMBINATION SAFETY SHOWER/EYE WASH UNITS

DETAIL A
NTS



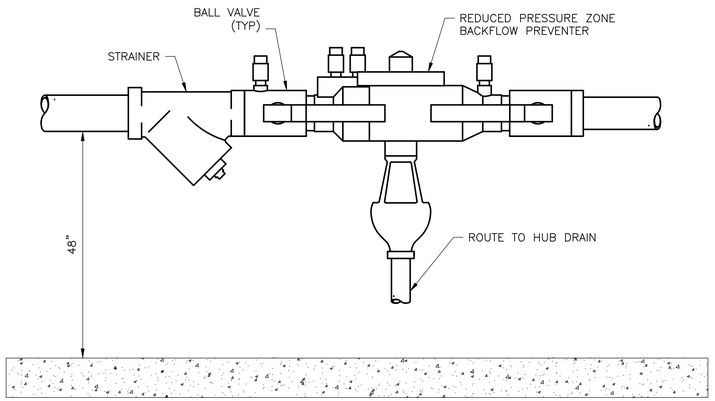
HANGER SUPPORT SYSTEM INSULATED HORIZONTAL PIPING

DETAIL B
NTS



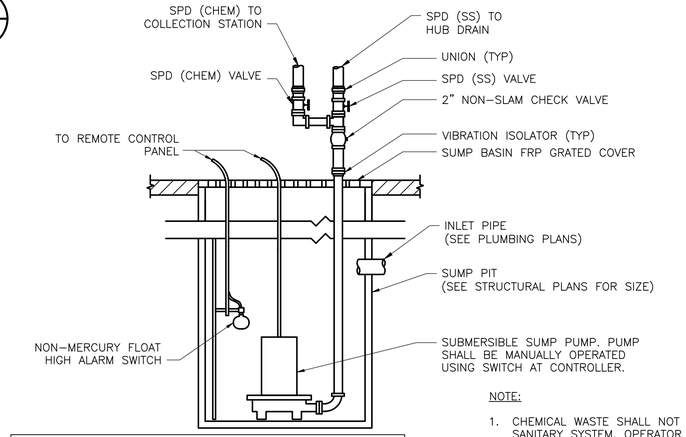
NATURAL GAS LINE PRESSURE REGULATOR

DETAIL C
NTS



BACKFLOW PREVENTER

DETAIL D
NTS



FLOAT ALARMS
– HIGH ALARM SWITCH AT 3 INCHES BELOW INLET PIPE INVERT.

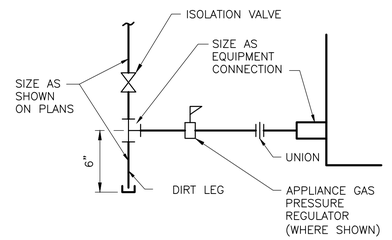
SIMPLEX SUMP PUMP WITH CONTROL PANEL

DETAIL E
NTS

NOTE:

1. CHEMICAL WASTE SHALL NOT BE PUMPED TO SANITARY SYSTEM. OPERATOR SHALL ENSURE PROPER VALVE POSITIONS PRIOR TO PUMP OPERATION.
2. PROVIDE SIGN AT PUMP CONTROL PANEL. SIGN TO BE WHITE LAMINATED PLASTIC WITH BLACK LETTERS STATING THE FOLLOWING:

   "UNDER NORMAL CONDITIONS, VALVES SHALL BE CLOSED. WHEN PUMPING CHEMICAL WASTE, SPD (CHEM) VALVE SHALL BE OPEN AND SPD (SS) VALVE SHALL BE CLOSED. WHEN PUMPING CLEAR WASTE, SPD (CHEM) VALVE SHALL BE CLOSED AND SPD (SS) VALVE SHALL BE OPEN."



GAS–FIRED EQUIPMENT CONNECTION

DETAIL F
NTS

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

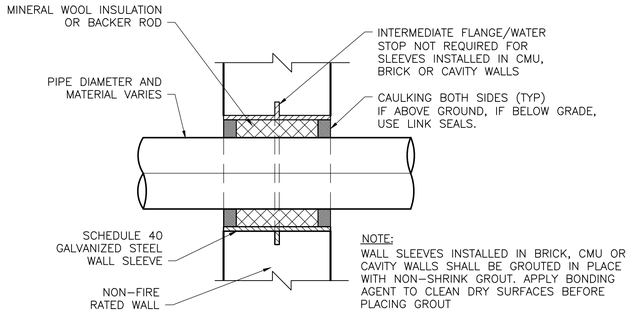
CHEMICAL SYSTEMS FEED BUILDING

PLUMBING DETAILS I

PROJECT NO. 255128–234374
FILE NAME: P006FDT.DWG

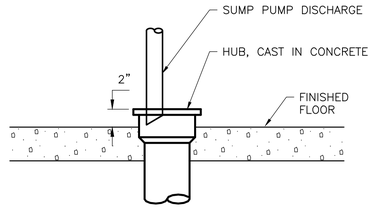
SHEET NO.
P-6

BID SET



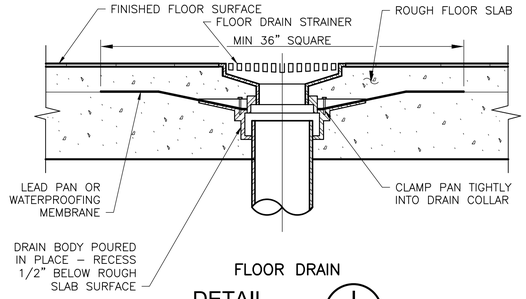
CAULKED WALL SLEEVE FOR CONCRETE, CMU, BRICK OR CAVITY WALLS

DETAIL G
NTS



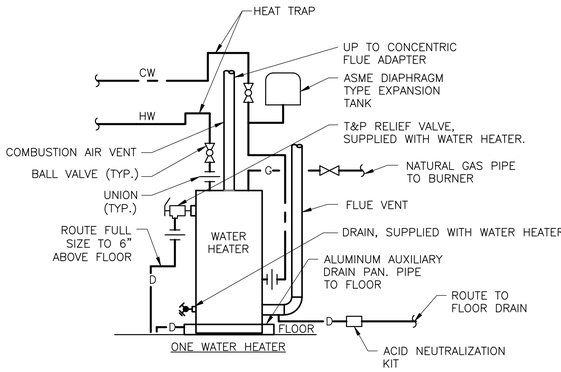
HUB DRAIN

DETAIL H
NTS



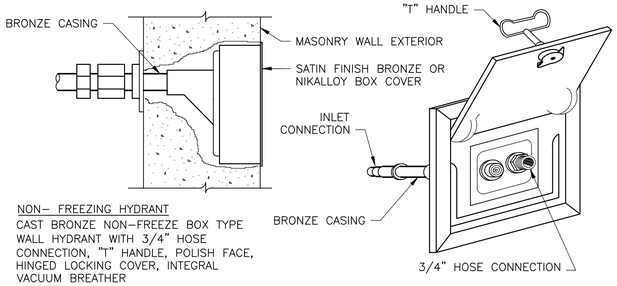
FLOOR DRAIN

DETAIL I
NTS



GAS–FIRED WATER HEATER

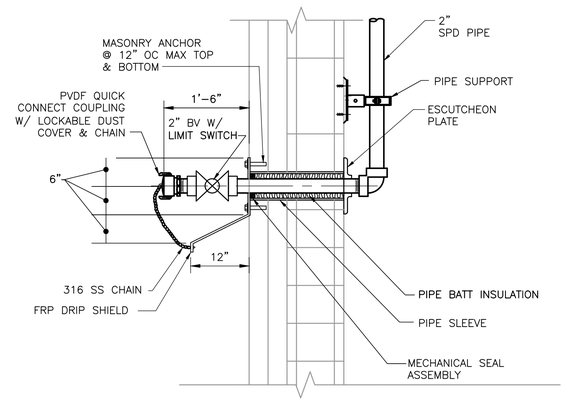
DETAIL
NTS



NON– FREEZING HYDRANT
CAST BRONZE NON–FREEZE BOX TYPE WALL HYDRANT WITH 3/4" HOSE CONNECTION, "T" HANDLE, POLISH FACE, HINGED LOCKING COVER, INTEGRAL VACUUM BREATHER

NON–FREEZE HOSE STATION

DETAIL K
NTS



SUMP PUMP DISCHARGE (CHEMICAL) COLLECTION STATION

DETAIL L
NTS

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
LICENSED PROFESSIONAL ENGINEER
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PLUMBING
DETAILS II

PROJECT NO. 255128–234374
FILE NAME: P007NFDT.DWG
SHEET NO.
P-7

BID SET

FIRE PROTECTION LEGEND

SYMBOL	DESCRIPTION
F	FIRE SPRINKLER PIPING
	CHECK VALVE
FS	FLOW SWITCH WITH ADJUSTABLE RETARD
	ANGLE VALVE
	FLANGED OR GROOVED CONNECTION
DDCA	DOUBLE DETECTOR CHECK ASSEMBLY BACKFLOW PREVENTER
	PRESSURE GAUGE WITH COCK
	OS&Y VALVE WITH TAMPER SWITCH
	RISER CHECK WITH INTEGRAL MAIN DRAIN AND PRESSURE GAUGE TAPPINGS
	REDUCER
AHJ	AUTHORITY HAVING JURISDICTION
FDC	FIRE DEPARTMENT CONNECTION
SPDT	SINGLE POLE DOUBLE THROW
FM	FACTORY MUTUAL
OED	OPEN END DRAIN
UL	UNDERWRITERS LABORATORY
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
IN	INCHES
PSI	POUNDS PER SQUARE INCH
GPM	GALLONS PER MINUTE
TS	TAMPER SWITCH
	DENOTES PROTECTED AREAS

FIRE PROTECTION GENERAL NOTES

A. INSTALL SYSTEM IN ACCORDANCE WITH NFPA 13 & 24, INTERNATIONAL FIRE CODE AND THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION. ALL MATERIALS SHALL BE FM/UL LISTED FOR USE IN FIRE PROTECTION SYSTEMS.

B. ABOVE GROUND PIPING SHALL BE SCHEDULE 40 BLACK STEEL.

C. HANGER LOCATIONS SHALL BE COORDINATED WITH THE BUILDING STRUCTURAL STEEL. SUPPORT PIPING IN ACCORDANCE WITH NFPA-13, PROVIDE ALL MISCELLANEOUS STEEL FRAMING AS REQUIRED TO SUPPORT PIPING FROM STRUCTURE. HANG ALL PIPING TIGHT TO STRUCTURE FOR MAXIMUM WORKING CLEARANCE IN SPACE.

D. PROVIDE CHROME ESCUTCHEONS WHERE PIPING PENETRATES WALLS IN EXPOSED AREAS.

E. SPRINKLERS SHALL BE FROM A SINGLE MANUFACTURER.

F. ALL MEASUREMENTS AND ELEVATIONS SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO FABRICATION OF PIPE AND COORDINATED WITH THE BUILDING STRUCTURE, DUCTWORK SHOP DRAWINGS AND THE WORK OF OTHER TRADES. PROVIDE OFFSETS WHERE REQUIRED DUE TO OBSTRUCTIONS OR INTERFERENCE AT NO ADDITIONAL COST TO THE OWNER.

G. THE CONTRACTOR SHALL PREPARE FABRICATION / WORKING PLANS AS DEFINED BY NFPA-13 WHICH CLEARLY INDICATE ALL CUT PIPE DIMENSIONS, HANGER TYPES AND LOCATIONS, ANY TRAPPED SECTIONS OF PIPING, AND DEVIATIONS FROM THIS LAYOUT REQUIRED FOR COORDINATION. PROVIDE AUXILIARY DRAINS FOR ANY TRAPPED PIPING.

H. TIE-IN OF FLOW SWITCH AND TAMPER SWITCHES TO FIRE ALARM SYSTEM SHALL BE PERFORMED UNDER DIVISION 26.

I. SYSTEMS SHALL BE HYDRAULICALLY DESIGNED BY A PROFESSIONAL ENGINEER OR NICET LEVEL IV. REFER TO THE NOTES ON THE DRAWINGS FOR DENSITIES AND AREA OF APPLICATION.

J. ALL SPRINKLER PIPING SHALL BE PAINTED RED, WITH ONE PRIMER COAT AND TWO ADDITIONAL COATS OF PAINT. REFER TO DIVISION 9.

K. TEST SYSTEMS IN ACCORDANCE WITH NFPA-13 AND 24 AND REQUIREMENTS OF AUTHORITY HAVING JURISDICTION (AHJ) AND PREPARE "CONTRACTORS MATERIAL AND TEST CERTIFICATE "AS PRESCRIBED BY NFPA-13 AND NFPA-24.

L. PROVIDE SPRINKLER HEAD CABINET WITH EACH TYPE AND TEMPERATURE RATING USED ON THE PROJECT, MINIMUM QUANTITY AS PER NFPA-13.

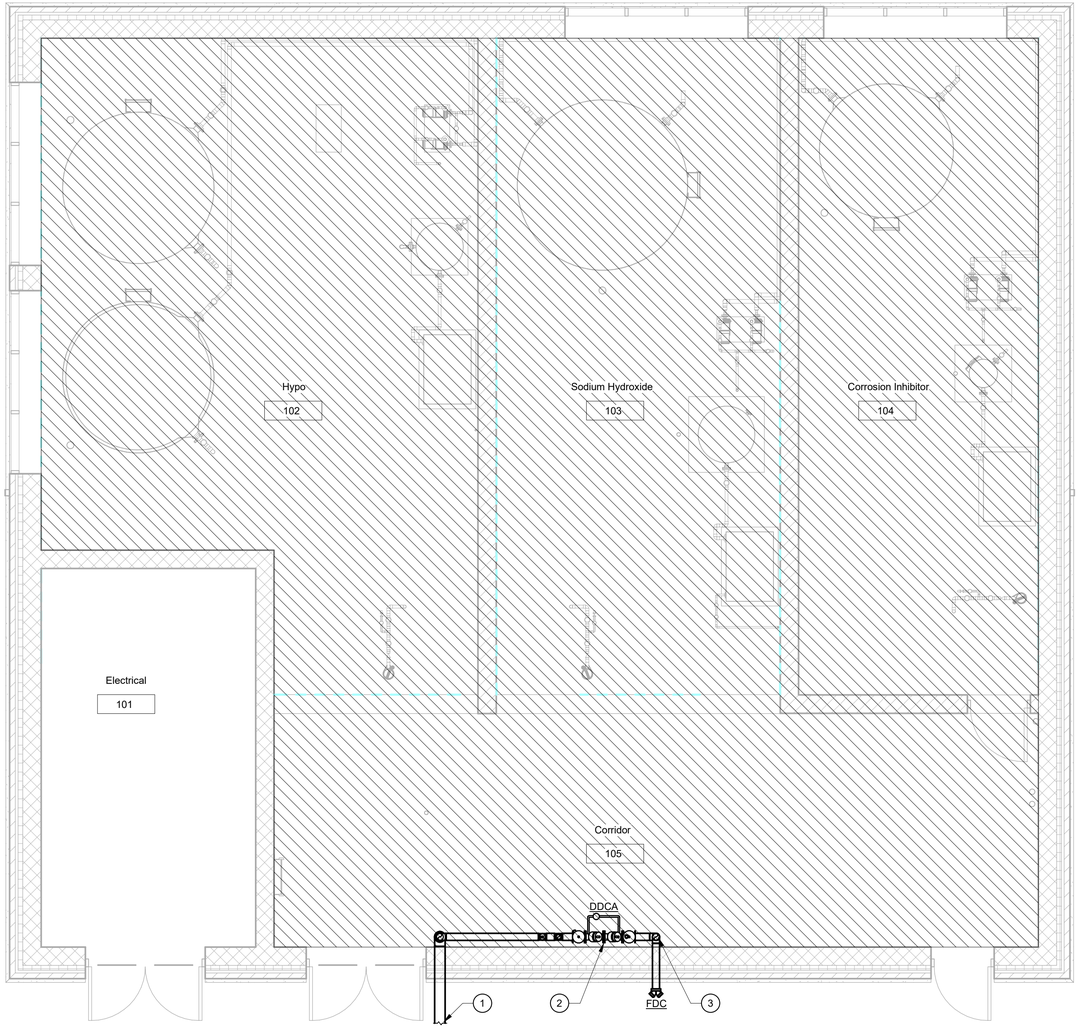
M. LABEL DRAIN PIPING, INSPECTOR'S TEST, MAIN DRAIN, FIRE DEPARTMENT CONNECTION, RISER SHUT-OFF VALVE AND SIMILAR COMPONENTS.

N. ALL PIPE SIZES ARE INDUSTRY STANDARD ASTM A53 PIPE DESIGNATED BY THEIR NOMINAL DIAMETER

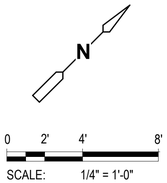
O. THE CHEMICAL BUILDING SHALL BE FULLY SPRINKLED, UNLESS OTHER WISE NOTED ON THE DRAWINGS.

P. PIPE SIZES INDICATED ARE THE MINIMUM ALLOWABLE. ACTUAL SIZES TO BE BASED UPON HYDRAULIC CALCULATIONS.

Q. CONTRACTOR SHALL PERFORM A NEW FLOW TEST AS PART OF THIS SCOPE OF WORK. REFER TO THE SPECIFICATIONS.



FIRE FLOOR PLAN
1/4" = 1'-0"



FIRE SUPPRESSION SYSTEM SCHEDULE

SUPPRESSION SYSTEM ZONE NO.	BUILDING DESCRIPTION	SYSTEM TYPE	OCCUPANCY HAZARD CLASSIFICATION	WATER APPLICATION DENSITY	MINIMUM CALCULATED AREA	COMBINED HOSE STREAM	MAXIMUM HEAD SPACING	MAXIMUM HEAD PROTECTION AREA
1	CHEMICAL SYSTEMS FEED BUILDING	WET SPRINKLER	ORDINARY HAZARD GROUP 2	0.20 GPM/SQ FT	1500 SQ FT	250 GPM SEE NOTE 3	15 FT	130 SQ FT

NOTES:
1. LOCATE FIRE DEPARTMENT CONNECTIONS PER THE REQUIREMENTS OF THE LOCAL FIRE DEPARTMENT. PROPOSED LOCATION IS SHOWN ON THE FIRE PROTECTION DRAWINGS. VERIFY SIZE AND THREADS OF THE FDC REQUIRED BY THE AHJ.
2. CONTRACTOR SHALL VERIFY WITH THE AUTHORITY HAVING JURISDICTION AND THE OWNER'S INSURANCE CARRIER (IF APPLICABLE) THE DENSITIES AND OCCUPANCY CLASSIFICATIONS IN THIS BUILDING.
3. HOSE STREAM ALLOWANCE SHALL BE APPLIED AT THE RISER.
4. HAZARD OCCUPANCY AND HOSE STREAM DEMANDS LISTED ARE ESTIMATIONS. ACTUAL CRITERIA TO BE DETERMINED BY THE FIRE SPRINKLER SYSTEM DESIGNER PER NFPA 13 REQUIREMENTS.

GENERAL NOTES:

1. PIPE SIZES FOR THE SPRINKLER SYSTEM ARE ESTIMATES. ACTUAL PIPE SIZES TO BE CALCULATED BY THE FIRE SPRINKLER SYSTEM DESIGNER.
2. NO FIRE SPRINKLER PIPING SHALL BE ROUTED IN OR THROUGH ELECTRICAL ROOM.

KEYED NOTES:

(1) 6" WATER. SEE PLUMBING PLANS FOR CONTINUATION.
(2) DOUBLE DETECTOR CHECK ASSEMBLY BACKFLOW PREVENTER.
(3) WET PIPE SPRINKLER SYSTEM RISER.

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

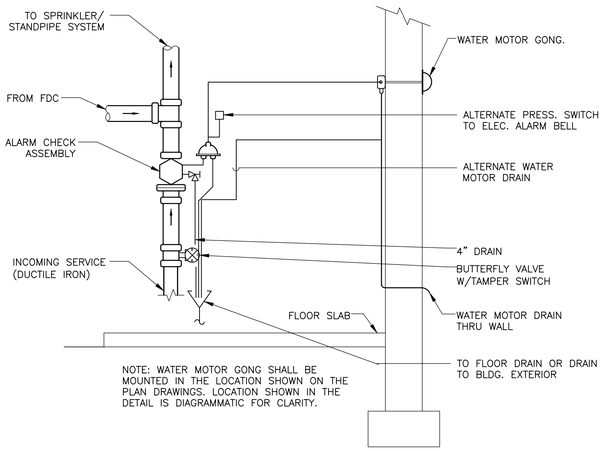
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL BUILDING
FIRE PROTECTION LEGEND, GENERAL NOTES, SCHEDULE, AND OVERALL PLAN

PROJECT NO. 255128-234374
FILE NAME: FWZ000CB.rvt
SHEET NO. F-1

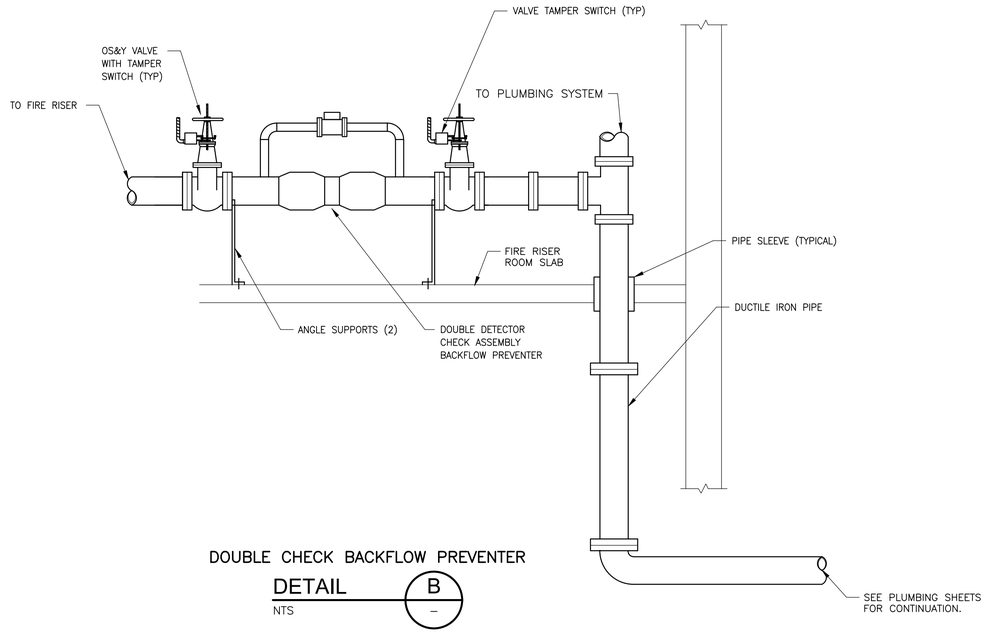
BID SET



FIRE RISER (WET PIPE)

DETAIL A

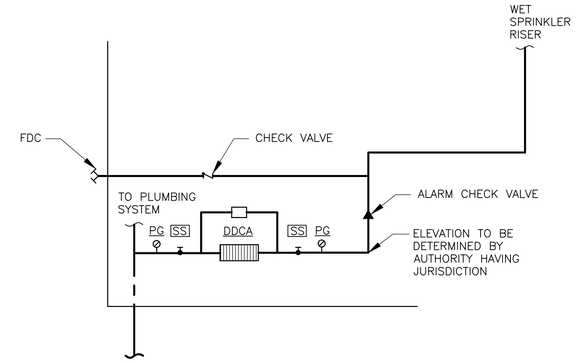
NTS



DOUBLE CHECK BACKFLOW PREVENTER

DETAIL B

NTS



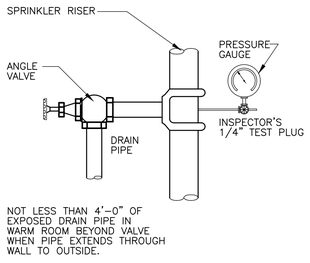
FIRE PROTECTION ENTRANCE

DIAGRAM

NTS

LEGEND

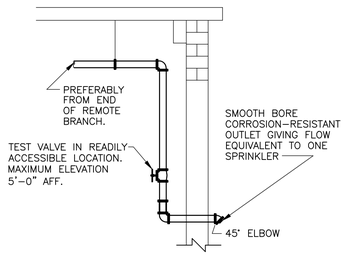
RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER		CHECK VALVE
		▲	ALARM CHECK VALVE
PIV	POST INDICATOR VALVE		
PG	PRESSURE GAUGE		PUMPER CONNECTION
SS	SUPERVISORY SWITCH		DENOTES PROTECTED AREAS



DRAIN CONNECTION
FOR SYSTEM RISER

DETAIL C

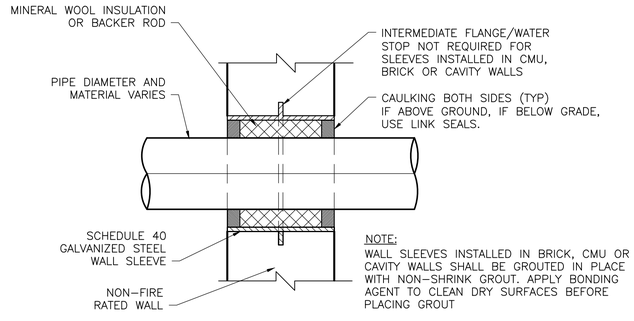
NTS



SYSTEM TEST CONNECTION
ON WET PIPE SYSTEM

DETAIL D

NTS



CAULKED WALL SLEEVE FOR CONCRETE, CMU, BRICK OR CAVITY WALLS

DETAIL E

NTS

STATE OF MICHIGAN
APRIL L RICKETTS
ENGINEER
No. 6201062212
10/02/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. DEBNAR
DRAWN BY: E. SAMY
SHEET CHK'D BY: A. RICKETTS
CROSS CHK'D BY: M. DEBNAR
APPROVED BY: A. RICKETTS
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

FIRE PROTECTION
DETAILS

PROJECT NO. 255128-234374
FILE NAME: F002NFDT

SHEET NO.
F-2

BID SET

ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION
52 CS	——	MEDIUM VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER CS=CONTROL SWITCH
FRAME TRIP	CB	LOW VOLTAGE AIR OR MOLDED CASE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED.
SIZE # AMPS TYPE *		COMBINATION MOTOR CIRCUIT PROTECTOR AND MAGNETIC MOTOR STARTER, FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE NOTED: * FVR – FULL VOLTAGE REVERSING RVNR – REDUCED VOLTAGE NON-REVERSING RVAT – REDUCED VOLTAGE AUTOTRANSFORMER RVSS – REDUCED VOLTAGE SOLID STATE 2S1W – TWO SPEED, ONE WINDING 2S2W – TWO SPEED, TWO WINDING (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE)
*		NON-FUSIBLE DISCONNECT SWITCH, 600 VOLT, 3 POLE * AMPERE RATING NOTED IF OTHER THAN 30A (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE)
*	F	FUSIBLE DISCONNECT SWITCH, 600 VOLT, 3 POLE, * AMPERE RATING AND FUSE SIZE AS NOTED * AMPERE RATING NOTED IF OTHER THAN 30A FUSE RATING (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE)
	P 2	MANUAL MOTOR STARTER WITH THERMAL OVERLOAD HEATER, 1 POLE UNLESS OTHERWISE NOTED "P" INDICATES WITH PILOT LIGHT "2" INDICATES TWO POLE (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE)
	——	DRAWOUT TYPE EQUIPMENT OR DEVICE
	——	MEDIUM VOLTAGE CABLE TERMINATION
	——	MEDIUM VOLTAGE AIR INTERRUPTER SWITCH
*	——	MEDIUM VOLTAGE FUSED AIR INTERRUPTER SWITCH * FUSE RATING
	——	MEDIUM VOLTAGE FUSED MOTOR CONTROLLER
XFMR NO. 1 480V KVA 120/208V 3P, 4W	T	TRANSFORMER, RATINGS AND CONNECTIONS AS NOTED. UNLESS OTHERWISE NOTED ON THE SINGLE LINE DIAGRAMS, ALL DRY TYPE TRANSFORMERS SERVICING ADMINISTRATIVE AND LABORATORY SPACES SHALL HAVE A K FACTOR OF 4. ISOLATION TRANSFORMERS SHALL HAVE A K-20 RATING
* A TO 5	——	CURRENT TRANSFORMER * QUANTITY A = PRIMARY AMPERES
* V TO 120	——	POTENTIAL TRANSFORMER * QUANTITY V = PRIMARY VOLTAGE
	G	GENERATOR, RATINGS AND CONNECTIONS AS NOTED
ATS N S 100A	——	AUTOMATIC OR MANUAL TRANSFER SWITCH NO.1 (ATS-1), (MTS-1) "N" INDICATES NORMAL OR PREFERRED SOURCE "S" INDICATES STANDBY OR ALTERNATE SOURCE 100A INDICATES CONTINUOUS CURRENT RATING
*	*	VARIABLE SPEED DRIVE CONTROLLER * D.C. = D.C. DRIVE CONTROLLER SCR = SILICON CONTROLLED RECTIFIER VFD = VARIABLE FREQUENCY DRIVE
#KW	E	UNIT HEATER – ELECTRIC HEATING COIL AND FAN # – RATING
——	U	UNIT HEATER – GAS FIRED, STEAM OR WATER HEATING COIL AND FAN
5	M	MOTOR, NUMERAL INDICATES HORSEPOWER
VS VM *	——	VOLTMETER WITH SWITCH, 3 PHASE
AS AM *	——	AMMETER WITH SWITCH, 3 PHASE

ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION
*	——	METER * WM – WATTMETER WHM – WATTHOUR METER WHDM – WATTHOUR DEMAND METER WHDR – WATTHOUR DEMAND RECORDER PF – POWER FACTOR METER DMU – DIGITAL METERING UNIT TRANSDUCER AX – CURRENT TRANSDUCER WX – WATT TRANSDUCER WHX – WATTHOUR TRANSDUCER
*	*	RELAY, NO. AS INDICATED 25 – SYNCHRONISM CHECK RELAY 27 – UNDERVOLTAGE RELAY 32 – DIRECTIONAL POWER RELAY 38 – BEARING PROTECTIVE DEVICE 40 – LOSS OF EXCITATION RELAY 42 – RUNNING CONTACTOR/PILOT RELAY 46 – REVERSE PHASE/PHASE BALANCE/CURRENT RELAY 47 – PHASE SEQUENCE VOLTAGE RELAY 49 – MACHINE OR TRANSFORMER THERMAL RELAY 50/51 – INSTANTANEOUS/TIME OVERCURRENT RELAY 50G – INSTANTANEOUS GROUND 51 – TIME OVERCURRENT RELAY 51G – TIME OVERCURRENT RELAY, GROUNDING RESISTOR TYPE 51N – TIME OVERCURRENT RELAY, RESIDUAL TYPE 51V – TIME OVERCURRENT RELAY WITH VOLTAGE RESTRAINT 51X – AUXILIARY RELAY (TRIPS CB AND ALARMS) 59 – OVERVOLTAGE RELAY 60 – NEGATIVE SEQUENCE VOLTAGE RELAY 62 – TIME DELAY RELAY 63 – OVERPRESSURE RELAY 64 – GENERATOR FIELD GROUND RELAY 67 – AC DIRECTIONAL OVERCURRENT RELAY 74 – ALARM LATCHING RELAY 83 – AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY 86 – LOCKING-OUT RELAY 87 – DIFFERENTIAL PROTECTIVE RELAY B – SUFFIX INDICATES "BUS" G – SUFFIX INDICATES "GENERATOR" GF – GROUND FAULT ST – SHUNT TRIP T – SUFFIX INDICATES "TRANSFORMER" X – SUFFIX INDICATES "AUXILIARY"
*	——	SPECIAL CAPACITOR * SC – SURGE CAPACITOR PF – POWER FACTOR CORRECTION CAPACITOR
*	——	TUNED POWER FACTOR CORRECTION CAPACITOR
	——	PUSHBUTTON, MOMENTARY CONTACT, SPRING RETURN, NORMALLY CLOSED
	——	PUSHBUTTON, MOMENTARY CONTACT, SPRING RETURN, NORMALLY OPEN
	ES	EMERGENCY STOP PUSHBUTTON WITH RED MUSHROOM HEAD OPERATOR (MAINTAINED CONTACT)
STOP START	PBL	START-STOP PUSHBUTTON CONTROL STATION (MOMENTARY CONTACT) WITH LOCKOUT DEVICE ON STOP
	PBM	START-STOP PUSHBUTTON CONTROL STATION, MAINTAINED CONTACT WITH LOCKOUT DEVICE ON STOP
OFF ON	S/S	OFF/ON SELECTOR SWITCH
L R (XO) (OX)	LR	LOCAL/REMOTE SELECTOR SWITCH
A B C* (XOO) (OXO) (OOX)	*	3 POSITION SELECTOR SWITCH, MAINTAINED CONTACT O–OPEN X–CLOSED POSITION / TOP CONTACT / MIDDLE CONTACT / BOTTOM CONTACT A / X / O / O B / O / X / O C / O / O / X NAMEPLATE (A/B/C) HOA – HAND/OFF/AUTO HOR – HAND/OFF/REMOTE LOR – LOCAL/OFF/REMOTE RSL – RAISE/STOP/LOWER TOA – TEST/OFF/AUTO

GD/VF #	GD/VF #	GAS DETECTOR / VENTILATION FAILURE ALARM
		# INDICATES TYPE OF UNIT
		1=MASTER, 2=REMOTE

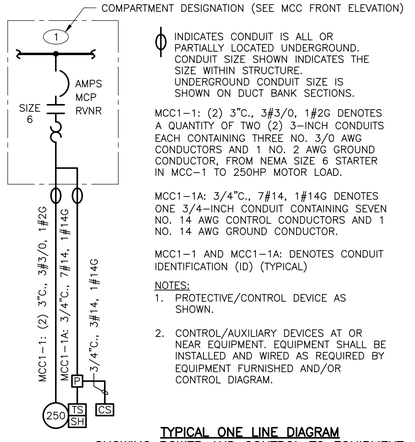
42 #	——	MOTOR STARTER COIL, NUMBER AS INDICATED TO DENOTE INTERLOCKING ONLY
CR #	——	CONTROL RELAY COIL, NUMBER AS INDICATED

ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION
*	——	PILOT LIGHT, COLOR AS NOTED * R – RED G – GREEN B – BLUE W – WHITE A – AMBER
*	——	PILOT LIGHT, PUSH-TO-TEST TYPE, COLOR AS NOTED ABOVE.
* # RANGE SETPOINT * NOTC NCTO NOTO NCTC		TIME DELAY RELAY RANGE AS NOTED SETPOINT AS NOTED # NUMBER AS INDICATED * TDE – TIME DELAY AFTER ENERGIZATION ON DELAY TDD – TIME DELAY AFTER DE-ENERGIZATION OFF DELAY NOTC– NORMALLY OPEN, TIMED CLOSING WHEN ENERGIZED NCTO– NORMALLY CLOSED, TIMED OPENING WHEN ENERGIZED NOTO– NORMALLY OPEN, TIMED OPENING WHEN DE-ENERGIZED NCTC– NORMALLY CLOSED, TIMED CLOSING WHEN DE-ENERGIZED
——	* - ##	FIELD INSTRUMENT, TAG NO. AS INDICATED * INDICATES INSTRUMENT TYPE DEFINED ON LOOP SHEETS OR P & ID ## INDICATES LOOP NO.
	LS OR ■	LIQUID LEVEL (FLOAT) SWITCH NORMALLY OPEN, CLOSES ON RISING LEVEL NORMALLY CLOSED, OPENS ON RISING LEVEL
	PS OR ■	PRESSURE OR VACUUM SWITCH NORMALLY OPEN, CLOSES ON RISING PRESSURE NORMALLY OPEN, CLOSES ON DROPPING PRESSURE NORMALLY CLOSED, OPENS ON RISING PRESSURE NORMALLY CLOSED, OPENS ON DROPPING PRESSURE
	TS OR T OR ■	TEMPERATURE SWITCH OR THERMOSTAT NORMALLY OPEN, CLOSES ON RISING TEMPERATURE NORMALLY OPEN, CLOSES ON DROPPING TEMPERATURE NORMALLY CLOSED, OPENS ON RISING TEMPERATURE NORMALLY CLOSED, OPENS ON DROPPING TEMPERATURE
	FS OR ■	FLOW SWITCH (AIR, WATER, ETC.) NORMALLY OPEN, CLOSES ON INCREASED FLOW NORMALLY CLOSED, OPENS ON INCREASED FLOW
	ZS OR ■	POSITION (LIMIT) SWITCH NORMALLY OPEN NORMALLY OPEN – HELD CLOSED NORMALLY CLOSED NORMALLY CLOSED – HELD OPEN
	WS OR ■	TORQUE SWITCH NORMALLY OPEN, CLOSES ON HIGH TORQUE NORMALLY CLOSED, OPENS ON HIGH TORQUE
#	——	UTILIZED IN CONJUNCTION WITH OTHER CONTROL SCHEMATIC SYMBOLS TO DEPICT THE PHYSICAL LOCATION OF THE DEVICE # REPRESENTS LOCATION SEE LOCATION LEGEND ON DRAWING
	——	CONDUCTORS OR CONDUITS CROSSING PATHS BUT NOT CONNECTED
	——	CONDUCTORS ELECTRICALLY CONNECTED
	S	SOLENOID VALVE

ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION
LA	——	LIGHTNING ARRESTER
		GROUND OR GROUND ROD
30A	——	FUSE, AMPERE RATING AS NOTED
	HTR	STRIP HEATER OR HEATING ELEMENT
	——	INDUCTOR
TG	TG	TACHOMETER GENERATOR
	——	CONTACT, NORMALLY OPEN (NO)
	——	CONTACT, NORMALLY CLOSED (NC)
	——	OVERLOAD RELAY HEATER
*	——	* K = KEY INTERLOCK E = ELECTRICAL INTERLOCK
TB	——	TERMINAL OR TEST BLOCK
RTD	——	RESISTANCE TEMPERATURE DETECTOR
VE OR VE	——	VIBRATION DETECTOR
DM	DM	DAMPER MOTOR
ETM	——	ELAPSED TIME METER
M	M	MOTOR OPERATED VALVE OR GATE
	——	INDICATES LIMITS OF ELECTRICAL EQUIPMENT OR WIRING ENCLOSURE

EXISTING WORK | NEW WORK | FUTURE EXPANSION

EXISTING, NEW OR FUTURE CONDITION DESIGNATION



INDICATES CONDUIT IS ALL OR PARTIALLY LOCATED UNDERGROUND. CONDUIT SIZE SHOWN INDICATES THE SIZE WITHIN STRUCTURE. UNDERGROUND CONDUIT SIZE IS SHOWN ON DUCT BANK SECTIONS.

MCC1–1: (2) 3"C., 3#3/0, 1#2G DENOTES A QUANTITY OF TWO (2) 3–INCH CONDUITS EACH CONTAINING THREE NO. 3/0 AWG CONDUCTORS AND 1 NO. 2 AWG GROUND CONDUCTOR, FROM NEMA SIZE 6 STARTER IN MCC–1 TO 250HP MOTOR LOAD.

MCC1–1A: 3/4"C., 7#14, 1#14G DENOTES ONE 3/4–INCH CONDUIT CONTAINING SEVEN NO. 14 AWG CONTROL CONDUCTORS AND 1 NO. 14 AWG GROUND CONDUCTOR.

MCC1–1 AND MCC1–1A: DENOTES CONDUIT IDENTIFICATION (ID) (TYPICAL)

NOTES:
1. PROTECTIVE/CONTROL DEVICE AS SHOWN.
2. CONTROL/AUXILIARY DEVICES AT OR NEAR EQUIPMENT. EQUIPMENT SHALL BE INSTALLED AND WIRED AS REQUIRED BY EQUIPMENT FURNISHED AND/OR CONTROL DIAGRAM.

TYPICAL ONE LINE DIAGRAM SHOWING POWER AND CONTROL TO EQUIPMENT

GENERAL NOTE
THIS IS A STANDARD LEGEND. SOME SYMBOLS MAY NOT APPEAR ON THE DRAWINGS.

NOTES:

1. IN GENERAL CONDUIT ROUTING FOR EQUIPMENT AND DEVICES IS NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS WHICH SHALL INCLUDE CONDUITS SHOWN ON ONE–LINE AND RISER DIAGRAMS AND HOME–RUNS SHOWN ON PLAN DRAWINGS. REFER TO SPECIFICATIONS FOR MATERIALS AND INSTALLATION REQUIREMENTS.
2. THE WIRING DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUITS REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.
3. SWITCHGEAR AND MOTOR CONTROL CENTER COMPARTMENT DESIGNATIONS AS INDICATED BELOW:
   - BLANK: NOT INTENDED FOR USE. PLATE ONLY
   - SPACE: EQUIPPED WITH REQUIRED BUS AND HARDWARE FOR THE FUTURE ADDITION OF BREAKERS AND/OR STARTERS WITHIN THE SIZE AND RANGE SHOWN
   - SPARE: CONTAINS A COMPLETELY INSTALLED BREAKER AND/OR STARTER OF SIZE AND TYPE INDICATED FOR FUTURE USE.
4. INTERPRETATION OF ELECTRICAL DRAWINGS: CIRCUIT IDENTIFICATION, ROUTING, AND SIZES OF CONDUITS AND WIRES ARE SHOWN ON THE FOLLOWING DRAWINGS:

A. ONE LINE POWER DIAGRAMS: POWER, CONTROL AND SIGNAL WIRING REQUIREMENTS FOR ELECTRICAL DISTRIBUTION EQUIPMENT AND UTILIZATION EQUIPMENT POWERED FROM SWITCHGEAR, SWITCHBOARDS, MOTOR CONTROL CENTERS AND MAJOR POWER DISTRIBUTION PANELBOARDS ARE TYPICALLY SHOWN ON THE ONE LINE DIAGRAMS. THE PARAMETERS IDENTIFIED ON THE ONE LINE DIAGRAMS ARE: CIRCUIT IDENTIFICATION, CIRCUIT ORIGIN AND DESTINATION, CONDUIT SIZE, WIRE SIZE AND QUANTITY FOR COMPLETE CIRCUIT LENGTH, AND AUXILIARY DEVICES ASSOCIATED WITH THE CONTROL/PROTECTION OF THE POWERED EQUIPMENT, AND SIZE OF THE GROUNDING ELECTRODE CONDUCTORS.

B. INSTRUMENTATION AND CONTROL RISER DIAGRAMS: POWER, CONTROL, SIGNAL AND DATA HIGHWAY WIRING REQUIREMENTS FOR INSTRUMENTS AND CONTROL DEVICES CONTROLLED/MONITORED FROM INSTRUMENTATION AND CONTROL PANELS SUCH AS RTUS, PLCS, TERMINAL CABINETS, AND REMOTE I/O PANELS ARE TYPICALLY SHOWN ON THE INSTRUMENTATION AND CONTROL ONE LINE DIAGRAMS. THE PARAMETERS IDENTIFIED ON THE ONE LINE DIAGRAMS ARE: CIRCUIT IDENTIFICATION, CIRCUIT ORIGIN AND DESTINATION, CONDUIT SIZE, WIRE SIZE, QUANTITY AND TYPE FOR COMPLETE CIRCUIT LENGTH, AND AUXILIARY DEVICES ASSOCIATED WITH THE CONTROL/PROTECTION OF THE POWERED EQUIPMENT.

C. FLOOR PLANS: FOR DETERMINING THE LENGTH OF CIRCUITS LOCATED WITHIN STRUCTURES, FLOOR PLANS SHOW THE LOCATION OF ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, UTILIZATION EQUIPMENT, INSTRUMENTS, ANCILLARY EQUIPMENT AND DEVICES AND THE ANTICIPATED PENETRATION LOCATIONS WHERE CONDUITS EXIT/ENTER THE STRUCTURE. HOMERUNS MAY ALSO BE SHOWN FROM MISCELLANEOUS EQUIPMENT NOT SHOWN ON A ONE LINE OR RISER DIAGRAM.

D. SITE PLANS: FOR DETERMINING THE LENGTH OF CIRCUITS EXTERIOR TO STRUCTURES AND TO IDENTIFY THE SPECIFIC REQUIREMENTS OF THE UNDERGROUND CONDUITS OR DUCT BANKS, SITE PLANS SHOW THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS WITH SECTIONS INDICATING THE CONDUIT SIZE, ARRANGEMENT AND CIRCUIT ROUTING.

E. NOTE THAT CONDUIT SIZE WITHIN THE STRUCTURE IS INDICATED ON ONE–LINE DIAGRAM AND UNDERGROUND SIZE IS INDICATED ON DUCT BANK SECTIONS.

STATE OF MICHIGAN
VINCENT J PLANSKY
ENGINEER
10/16/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL LEGEND AND ABBRE□IATIONS I

PROJECT NO. 255128–234374
FILE NAME: E001NFLG.DWG
SHEET NO. E-1

BID SET

SYMBOL	DESCRIPTION
A 3 b	LIGHTING FIXTURE "A" – FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) "b" – CONTROLLED BY SWITCH "b" "3" – CIRCUIT NUMBER
A 3 b	LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE
A 3 b	WALL MOUNTED TYPE LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE
A 3 OR A 3	CROSS HATCH INDICATES LIGHTING FIXTURE THAT IS UNSWITCHED AND SHALL REMAIN ON AT ALL TIMES. NOTATIONS SAME AS ABOVE.
A 3 b OR A 3 b	SHADED AREA INDICATES LIGHTING FIXTURE THAT IS EQUIPPED WITH EMERGENCY BACKUP POWER SOURCE. NOTATIONS SAME AS ABOVE.
A 3	POLE MOUNTED AREA TYPE LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE
A 3	POLE MOUNTED ROADWAY TYPE LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE
EM 3 (*)	EMERGENCY LIGHTING BATTERY UNIT WITH TWO LAMP HEADS "EM" – FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) "3" – SUPERVISORY CIRCUIT * – FIXTURE TAG #
R-2 BU-1(*)	REMOTE EMERGENCY ADJUSTABLE WALL LIGHTING FIXTURE WITH TWO LAMP HEADS "R-2" – FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) * – HOME RUN TO BATTERY UNIT INDICATED. CONDUIT SHALL BE 3/4" AND CONTAIN (2) NO. 12 AWG BRANCH CIRCUIT CONDUCTORS AND (1) NO. 12 AWG GROUND CONDUCTOR UNLESS OTHERWISE INDICATED.
A 3	COMBINATION BATTERY UNIT AND EXIT SIGN. FILLED QUADRANT REPRESENTS FACE SIDE OF SIGN.
A 3	CEILING MOUNTED EXIT SIGN, NOTATIONS SAME AS ABOVE. WHEN USED, ARROW INDICATES DIRECTION OF EGRESS. FILLED QUADRANT REPRESENTS FACE SIDE OF SIGN. (DOUBLE FACE DOUBLE CHEVRONS SHOWN)
A 3	WALL MOUNTED EXIT SIGN, NOTATIONS SAME AS ABOVE. WHEN USED, ARROW INDICATES DIRECTION OF EGRESS. FILLED QUADRANT REPRESENTS FACE SIDE OF SIGN.
RH-3 E 3 BU-1(*)	REMOTE EMERGENCY CEILING LIGHTING FIXTURE. "RH-3" – FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) "3" – SUPERVISORY CIRCUIT * – HOME RUN TO BATTERY UNIT INDICATED. CONDUIT SHALL BE 3/4" AND CONTAIN 2 NO. 12 AWG BRANCH CIRCUIT CONDUCTORS AND 1 NO. 12 AWG GROUND CONDUCTOR UNLESS OTHERWISE INDICATED.
	HOME RUN TO DESIGNATED EQUIPMENT. BRANCH CIRCUIT CONDUIT WITH 2 NO. 12 AWG BRANCH CIRCUIT CONDUCTORS AND 1 NO. 12 AWG GROUND CONDUCTOR UNLESS OTHERWISE NOTED. NUMBER OF ARROWS INDICATE NUMBER OF CIRCUITS. FOR MINIMUM SIZE CONDUIT PERMITTED REFER TO THE SPECIFICATIONS.
	CONDUIT CONCEALED IN WALL, IN SLAB ABOVE, OR ABOVE CEILING.
	CONDUIT CONCEALED IN OR BELOW FLOOR OR UNDERGROUND.
	CONDUIT RUN EXPOSED. RUN PARALLEL OR PERPENDICULAR TO STRUCTURE OR WALL.
	'X' INDICATES EXPLOSION PROOF CONDUIT SEAL FITTING.
	CONCRETE ENCASED DUCTBANK. WIDTH VARIES, SEE DUCTBANK SECTION/DETAILS FOR REQUIREMENTS AND WIDTH
	CONDUIT STUBBED OUT AND CAPPED
(2) 3"C., 3#3/0, 1#2G	DENOTES A QUANTITY OF TWO (2) 3-INCH CONDUITS EACH CONTAINING THREE NO. 3/0 AWG CONDUCTORS AND 1 NO. 2 AWG GROUND CONDUCTOR.
2-2/C#16 SH	DENOTES A QUANTITY OF TWO INSTRUMENT CABLES. EACH CABLE TO CONSIST OF TWO NO. 16 AWG CONDUCTORS TWISTED TOGETHER AND COVERED WITH A METALLIC SHIELD AND AN OVERALL PROTECTIVE JACKET. REFER TO THE SPECIFICATIONS FOR THE EXACT CABLE TO BE PROVIDED.
2-3/C#16 SH	SAME AS ABOVE EXCEPT CABLE TO CONSIST OF THREE NO. 16 AWG CONDUCTORS TWISTED, SHIELDED AND COVERED WITH AN OVERALL PROTECTIVE JACKET. REFER TO THE SPECIFICATIONS FOR THE EXACT CABLE TO BE PROVIDED.
(3) 4"C.	THREE 4-INCH CONDUITS
	FLEXIBLE METAL CONDUIT "WHIP" (3/4"C., 2#12, 1#12G UNLESS OTHERWISE NOTED) FOR LIQUID TIGHT MOTOR CONNECTIONS
	'X' INDICATES CONDUIT SEAL FITTING IN OTHER THAN CODE REQUIRED LOCATIONS.
⊠	INDICATES MOTOR STARTER AND/OR MOTOR CONTROL EQUIPMENT WITHIN THE ENCLOSURE.

SYMBOL	DESCRIPTION
$a	SINGLE POLE SWITCH "a" INDICATES FIXTURES CONTROLLED.
$a 2	DOUBLE POLE SWITCH "a" INDICATES FIXTURES CONTROLLED.
$c 3	THREE WAY SWITCH "c" INDICATES FIXTURES CONTROLLED.
$a 4	FOUR WAY SWITCH "a" INDICATES FIXTURES CONTROLLED.
$m	MOTOR RATED SWITCH
$OS	SINGLE POLE SWITCH "OS" INDICATES A PASSIVE INFRARED OCCUPANCY SENSOR
$OS 2	DOUBLE POLE SWITCH "OS" INDICATES PROGRAMMABLE OCCUPANCY SENSOR CAPABLE OF INBOARD/OUTBOARD SWITCHING
$DT	SINGLE POLE SWITCH "DT" INDICATES DUAL TECHNOLOGY PROGRAMMABLE OCCUPANCY SENSOR CAPABLE OF SENSING MOTION AND SOUND
C 3	LIGHTING CONTACTOR WITH NUMBER OF POLES AS INDICATED
TM	TIME SWITCH
	PUSH BUTTON STATION
TYPE A	INDICATES ALL LIGHTING FIXTURES WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL BE TYPE "A" UNLESS OTHERWISE NOTED. SEE LIGHTING FIXTURE SCHEDULE FOR TYPES
	LIGHTING PANELBOARD (LP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS
	POWER PANELBOARD (PP-#) OR DISTRIBUTION PANELBOARD (DP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS
	LIGHTING CONTACTOR PANELBOARD (LCP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS
* 4	DUPLEX RECEPTACLE, 20A, 120V, 2P, 3W * GFCI – GROUND FAULT CIRCUIT INTERRUPTER TYPE WP – WEATHERPROOF XP – EXPLOSION PROOF T – TRANSIENT VOLTAGE SURGE SUPPRESSOR IC – ISOLATED GROUND 4 – CIRCUIT NUMBER
* 4	DUPLEX RECEPTACLE, 20A, 120V, 2P, 3W MOUNTED ABOVE COUNTER-TOP OR 42" AFF * NOTATIONS SAME AS ABOVE
* 60 3 4W	SPECIAL PURPOSE RECEPTACLE * – VOLT RATING "3" – NUMBER OF POLES "60" – AMPERE RATING "4W" – 4 WIRES IN ADDITION TO GROUND
	MULTI-OUTLET ASSEMBLY, SYMBOL DENOTES RECEPTACLE TYPE
	FLUSH FLOOR OUTLET BOX WITH TYPE OUTLET INDICATED
	UNDER FLOOR DUCT SYSTEM WITH TYPE OUTLETS INDICATED
	THREE CELL UNDER FLOOR DUCT SYSTEM JUNCTION BOX
J OR J	JUNCTION BOX
P	PULL BOX
TC	TERMINAL CABINET
OS	OCCUPANCY SENSOR
PC	PHOTOCELL
ESA	EMERGENCY EYEWASH/SHOWER ALARM STATION WITH FLOW SWITCH(ES)
	INDICATED EQUIPMENT AND MATERIALS TO BE DEMOLISHED
DUST	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL BE OF NEMA 12 CONSTRUCTION (OR GASKETED AND SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.
DAMP OR WET	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL BE OF NEMA 4X CONSTRUCTION (OR GASKETED AND SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.
CORROSIVE	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL BE OF NEMA 4X CONSTRUCTION (OR CORROSION RESISTANT CONSTRUCTION SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.
CLASS I, DIV. 1 GROUP D	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL CONFORM TO N.E.C. REQUIREMENTS FOR THE HAZARDOUS AREA CLASSIFICATION SHOWN.

SYMBOL	DESCRIPTION
	GROUND SYSTEM GRID OR LOOP, 36" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED.
	EXOTHERMIC WELD CONNECTION
	3/4" x 10'-0" GROUND ROD. UNLESS SPECIFIED OTHERWISE.
	GROUND ROD TEST WELL STATION (SEE DETAIL SHEET FOR REQUIREMENTS)
	COMMUNICATION SYSTEMS
K	TELEPHONE OUTLET FOR DESK TYPE HANDSET K = KEY SYSTEM
K	TELEPHONE OUTLET FOR WALL TYPE HANDSET (MOUNT UP 4'-6") K = KEY SYSTEM
	PAGE/PARTY TELEPHONE OUTLET FOR DESK TYPE HANDSET
	PAGE/PARTY TELEPHONE OUTLET FOR WALL TYPE HANDSET, MOUNT UP 4'-6"
S H W	PAGING SPEAKER, WALL MOUNTED H = HORN TYPE W = WIDE ANGLE TYPE
S W	PAGING SPEAKER, WALL MOUNTED, BI-DIRECTIONAL, HORN TYPE W = WIDE ANGLE TYPE
S	PAGING SPEAKER, FLUSH MOUNTED CEILING TYPE
S	PAGING SPEAKER, SURFACE MOUNTED CEILING TYPE
VC	REMOTE WALL MOUNTED VOLUME CONTROL FOR CEILING SPEAKER, MOUNT UP 5'-0"
A	PAGING SPEAKER AMPLIFIER ASSEMBLY
TM	TELEPHONE CABINET OR BACKBOARD AS NOTED
P OR C	"C" – DATA INPUT/OUTPUT CABLE OUTLET "P" – PROCESS COMPUTER SYSTEM (CAT6 RJ-45 JACK)

GD/VF #	GAS DETECTOR/VENTILATION FAILURE ALARM,
	# INDICATES TYPE OF UNIT.
	1 = MASTER, 2 = REMOTE

GB	GAS DETECTION/VENTILATION FAILURE WEATHERPROOF DUAL-LITE BEACON MOUNT TOP OF DEVICE UP 6'-8" A.F.F.
FB G	GAS DETECTION/VENTILATION FAILURE HORN/STROBE MOUNT TOP OF DEVICE UP 6'-8" A.F.F.
G	GAS DETECTION/VENTILATION FAILURE HORN, MOUNT TOP OF DEVICE UP 6'-8" A.F.F.
G	GAS DETECTION/VENTILATION FAILURE STROBE, MOUNT TOP OF DEVICE UP 6'-8" A.F.F.
	SECURITY SYSTEMS
SACP	SECURITY ALARM CONTROL PANEL
DS	SECURITY ALARM DOOR SWITCH
K	SECURITY ALARM KEY PAD
R	SECURITY SYSTEM CARD ACCESS READER
WS	SECURITY ALARM WINDOW SWITCH
	SECURITY ALARM MOTION DETECTOR
CCTV	CLOSED CIRCUIT TV CAMERA
PTZ	PAN, TILT, ZOOM CAMERA LENS CONTROLS
GB	GLASS BREAK DETECTOR
	FIRE ALARM SYSTEMS
H 200 R	FIRE ALARM HEAT DETECTOR 135 FIXED TEMPERATURE UNLESS OTHERWISE NOTED. "200" – 200 FIXED TEMPERATURE "R" – FIXED TEMPERATURE RATE-OF-RISE TYPE
I	FIRE ALARM SMOKE DETECTOR PHOTOELECTRIC TYPE UNLESS OTHERWISE NOTED. "I" – IONIZATION TYPE.
D	FIRE ALARM DUCT SMOKE DETECTOR
FACP	FIRE ALARM CONTROL PANEL
FV	FIRE ALARM VENTILATION PANEL WITH GRAPHIC PANEL
FA	REMOTE FIRE ALARM ANNUNCIATOR PANEL

SYMBOL	DESCRIPTION
F	FIRE ALARM MASTER BOX
F	FIRE ALARM HORN, MOUNT UP 7'-6"
15 F	FIRE ALARM STROBE, MOUNT UP 6'-8" 15 = CANDELA RATING
15 F	FIRE ALARM HORN AND STROBE LIGHT COMBINATION, MOUNT UP 6'-8" 15 = CANDELA RATING
F	FIRE ALARM MANUAL PULL STATION, MOUNT UP 4'-0"
VSS	SPRINKLER VALVE SUPERVISORY SWITCH
SFS	SPRINKLER FLOW ALARM SWITCH
F	FIRE ALARM BELL
FB	WEATHERPROOF HI-INTENSITY FIRE ALARM STROBE LIGHT WITH HORN
PIR	PASSIVE INFRARED DETECTOR
R	SMOKE BEAM DETECTOR (RECEIVER)
T	SMOKE BEAM DETECTOR (TRANSMITTER)
	FIRE ALARM SMOKE DETECTOR REMOTE INDICATOR AND TEST SWITCH
M	MANUAL BEACON/HORN STATION
A	COMMON ALARM BEACON

ABBREVIATIONS	
A	AMPS
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AL	ALUMINUM
AIC	AMPERE INTERRUPTING CAPACITY
AMP	AMPERE
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CGD	COMBUSTIBLE GAS DETECTOR
CKT	CIRCUIT
CLB	CURRENT LIMITING BREAKER
CLF	CURRENT LIMITING FUSE
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CS	CONTROL SWITCH/CONTROL STATION
CT	CURRENT TRANSFORMER
CU	COPPER
CWS	CONDUIT WALL SEAL
DC	DIRECT CURRENT
DIA	DIAMETER
DMU	DIGITAL METERING UNIT
DN	DOWN
EC	EMPTY CONDUIT
ELEC	ELECTRICAL

ABBREVIATIONS (CONTINUED)	
ELEV	ELEVATION
EM	EMERGENCY
ENCL	ENCLOSURE OR ENCLOSED
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EX	EXISTING
FO	FIBER OPTIC
FU	FUSE
GCDC	GENESEE COUNTY DRAIN COMMISSION
GCP	GENERATOR CONTROL PANEL
GEN	GENERATOR
G, GND	GROUND
GFI	GROUND FAULT INTERRUPTER
GRS	GALVANIZED RIGID STEEL
HACR	HEATING & AIR CONDITIONING RATED
HH	HANDHOLE
HT	HEIGHT
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HZ	HERTZ
ID	IDENTIFICATION
INSTR	INSTRUMENT
K	KILO (PREFIX)
kcmil	1000 CIRCULAR MILS
KVA	KILOVOLT AMPERES
KW	KILOWATTS
LA	LIGHTNING ARRESTER
LTG	LIGHTING
LP	LIGHTING PANEL
LV	LOW VOLTAGE
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
MV	MEDIUM VOLTAGE
N	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
OH	OVERHEAD
OL	OVERLOAD
PB	PULL BOX
PCP	PUMP CONTROL PANEL
PH	PHASE
PMH	POWER MANHOLE
PNL	PANEL OR PANELBOARD
PR	PAIR
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RECPT	RECEPTACLE
REQD	REQUIRED
QTY	QUANTITY
SA	SURGE ARRESTER
SEC	SECONDS OR SECONDARY
SH	SHIELDED OR SPACE HEATER
SHH	SIGNAL HANDHOLE
SPD	SURGE PROTECTIVE DEVICE
SS	STAINLESS STEEL
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TC	TIME TO CLOSE OR TRAY CABLE
TEL	TELEPHONE
TO	TIME TO OPEN
TS	TWISTED SHIELDED OR THERMAL SWITCH
TYP	TYPICAL
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPS
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS, WIDTH, WITH, WIRE
WP	WEATHERPROOF
XP	EXPLOSION PROOF
XFMR	TRANSFORMER

A / E-4 — SHEET NO. WHERE DETAIL IS DRAWN

SYMBOL WHERE THERE IS A DETAIL

DETAIL A — 1/4"=1'-0" — E-3 — SHEET NO. WHERE SECTION IS A DETAIL

SYMBOL WHERE DETAIL IS DRAWN

DETAIL SYMBOL

1 / E-4 — SHEET NO. WHERE SECTION IS DRAWN

SYMBOL WHERE THERE IS A SECTION

SECTION 1 — 1/4"=1'-0" — E-3 — SHEET NO. WHERE SECTION IS TAKEN

SYMBOL WHERE SECTION IS DRAWN

SECTION SYMBOL

GENERAL NOTE
THIS IS A STANDARD LEGEND. SOME SYMBOLS MAY NOT APPEAR ON THE DRAWINGS.

STATE OF MICHIGAN — LICENSED PROFESSIONAL ENGINEER — VINCENT J. PLANSKY — ENGINEER — 10/8/2019 — 6201043535

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
LEGEND AND ABBRE□IATIONS II

PROJECT NO. 255128-234374
FILE NAME: E002NFLG.DWG
SHEET NO. E-2

BID SET

SCOPE OF WORK:

1. FURNISH ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED AND INSTALL COMPLETE AND MAKE OPERATIONAL, ELECTRICAL AND PROCESS INSTRUMENTATION SYSTEM AT THE CITY OF FLINT WATER TREATMENT PLANT AS SHOWN ON THE DRAWINGS AND AS SPECIFIED.

GENERAL NOTES:

1. ELECTRICAL DRAWINGS ARE INTENDED TO SHOW THE GENERAL LAYOUT OF WORK TO BE INSTALLED UNDER THIS CONTRACT WITHOUT ATTEMPTING TO SHOW ALL DETAILS. FURNISH LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED FOR A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM AS SHOWN ON THE CONTRACT DOCUMENTS.
2. COORDINATE WORK WITH OTHER TRADES AND THE OWNER.
3. MAINTAIN EXISTING PROCESS OPERATIONS. POWER INTERRUPTIONS TO ELECTRICAL EQUIPMENT SHALL BE AT OWNER'S CONVENIENCE WITH 72 HOURS MINIMUM NOTICE. EACH INTERRUPTION SHALL HAVE PRIOR WRITTEN APPROVAL.
4. FIELD VERIFY EXISTING UNDERGROUND ELECTRICAL CONDUIT, CONCRETE DUCT BANKS, MANHOLES, PULL BOXES, ETC. AND MECHANICAL PIPING. CONTRACTOR SHALL INCLUDE IN BID COSTS ASSOCIATED WITH RELOCATION OR REMOVAL OF UNDERGROUND EQUIPMENT AS REQUIRED BY THIS CONTRACT. USE DUE CARE IN CONGESTED AREAS TO AVOID DAMAGE TO EXISTING UNDERGROUND UTILITIES.
5. CONTRACTOR'S WORK SHALL INCLUDE COMPLETE TESTING OF EQUIPMENT AND WIRING INCLUDING MAKING MINOR CORRECTIONS, CHANGES, OR ADJUSTMENTS NECESSARY FOR THE PROPER FUNCTIONING OF THE SYSTEM AND EQUIPMENT. WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY; SUBSTANDARD WORK WILL BE REJECTED.
6. DO NOT SCALE ELECTRICAL DRAWINGS. REFER TO MECHANICAL, STRUCTURAL DRAWINGS, AND APPROVED MANUFACTURER'S SHOP DRAWINGS FOR EXACT LOCATION OF EQUIPMENT. EXCEPT WHERE DIMENSIONS ARE SHOWN, LOCATIONS OF EQUIPMENT, FIXTURES, OUTLETS, AND SIMILAR DEVICES ARE APPROXIMATE.
7. WORK SHALL COMPLY WITH NEC AND LOCAL CODES.
8. DO NOT SPLICE CONDUCTORS EXCEPT AS NOTED.
9. POWER AND CONTROL CONDUITS SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR WIRE SIZED PER TABLE 250.122 OF THE NEC (UNLESS OTHERWISE NOTED).
10. COORDINATE SEQUENCE OF CONSTRUCTION WITH CIVIL, MECHANICAL, AND STRUCTURAL DISCIPLINES. PROVIDE TEMPORARY POWER AND CONTROL CIRCUITS AS REQUIRED TO MAINTAIN FACILITY OPERATION. VERIFY EXISTING UTILITIES IN AREA OF CONSTRUCTION. REFER TO CIVIL DRAWINGS FOR ADDITIONAL UNDERGROUND INFORMATION.
11. REPAIR, IN ACCORDANCE WITH SPECIFICATIONS, SIDEWALKS, WALLS, ROADWAYS, ETC. DISTURBED BY CONSTRUCTION ACTIVITIES WHETHER OR NOT SHOWN FOR REPAIR/REPAVING ON CIVIL DRAWINGS.
12. CONCEAL CONDUITS TO GREATEST EXTENT PRACTICABLE. CONDUITS RUN AT EXISTING STRUCTURES SHALL BE RUN EXPOSED.
13. WHERE LOCAL DISCONNECTS AND CONTROL PANELS ARE SHOWN ON PLAN VIEWS, LOCATIONS ARE APPROXIMATE. ADJUST LOCATION AS REQUIRED TO COMPLY WITH NEC ARTICLE 110 FOR WORKING CLEARANCES.
14. DO NOT INSTALL MAJOR CONDUIT RUNS THROUGH AREAS DESIGNATED FOR FUTURE STRUCTURES.

SUBMITTALS:

1. SUBMIT SHOP DRAWINGS FOR EQUIPMENT, MATERIALS AND OTHER ITEMS FURNISHED UNDER DIVISION 26.
2. SUBMIT CONDUIT SHOP DRAWINGS FOR YARD ELECTRICAL, WITHIN AND UNDER ROADS, BUILDINGS AND STRUCTURES PRIOR TO COMMENCING WORK. DO NOT POUR CONCRETE UNTIL ENGINEER HAS APPROVED THE ASSOCIATED SHOP DRAWING.
3. SUBMIT OPERATION AND MAINTENANCE MANUALS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
4. SUBMIT STARTUP/COMMISSIONING PLANS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
5. SUBMIT TESTING AND SERVICE REPORTS FOR EQUIPMENT AND MATERIALS FURNISHED UNDER DIVISION 26.
6. SUBMIT TRAINING PLANS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
7. SUBMIT RECORD DOCUMENTATION TO ACCURATELY SHOW COMPLETED INSTALLATION. INCLUDE MODIFICATIONS TO CONTRACT DOCUMENTS (ONE-LINE DIAGRAMS, EQUIPMENT ELEVATIONS, PANELBOARD SCHEDULES, SCHEMATIC DIAGRAMS, RISER DIAGRAMS,, PLANS, CONDUIT AND DUCTBANK ROUTING, ETC) ALONG WITH ADDITIONAL DRAWINGS OR SKETCHES CREATED TO CONVEY COMPLETED INSTALLATION.

INTERPRETATION OF CONTRACT DOCUMENTS:

1. IF DURING PERFORMANCE OF WORK, THERE IS A CONFLICT, ERROR, OR DISCREPANCY BETWEEN OR AMONG CONTRACT DOCUMENTS AND LAWS AND REGULATIONS, PROVIDE THE HIGHER PERFORMANCE STANDARD UNLESS OTHERWISE DIRECTED BY ENGINEER.
2. PRIORITY OF DOCUMENTS: FIGURED DIMENSIONS GOVERN OVER SCALED DIMENSIONS, DETAILED DRAWINGS GOVERN OVER GENERAL DRAWINGS, LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALLER SCALE DRAWINGS, CHANGE ORDER DRAWINGS SUPERCEDE ORIGINAL CONTRACT DRAWINGS, AND CONTRACT DRAWINGS GOVERN SHOP DRAWINGS.
3. IN GENERAL, DRAWINGS DO NOT SHOW CONDUIT ROUTING. PLAN AND ROUTE CONDUITS IN COMPLIANCE WITH SPECIFICATIONS AND DRAWING DETAILS. COORDINATE INSTALLATION WITH OTHER TRADES AND ACTUAL SUPPLIED EQUIPMENT.
4. DUCTBANK ROUTING SHOWN ON ELECTRICAL SITE PLANS IS DIAGRAMMATIC IN NATURE AND MAY NOT INCLUDE INTERFERENCES THAT MAY BE PRESENT.
5. SEE ADDITIONAL NOTES ON ELECTRICAL LEGEND II SHEET.

ENCLOSURE TYPES:

PROVIDE THE FOLLOWING NEMA TYPE ELECTRICAL ENCLOSURES, UNLESS OTHERWISE NOTED:

1. NEMA 12 IN DRY, NON-PROCESS INDOOR LOCATIONS.
2. NEMA 4X IN OUTDOOR LOCATIONS OR "DAMP" LOCATIONS SHOWN ON THE DRAWINGS.
3. NEMA 4X IN "CORROSIVE" LOCATIONS SHOWN ON THE DRAWINGS.

MATERIALS AND EQUIPMENT:

1. PROVIDE NEW MATERIALS AND EQUIPMENT UNLESS SPECIFICALLY NOTED OTHERWISE.
2. ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE LISTED BY UNDERWRITER'S LABORATORIES, INC., AND SHALL BEAR APPROPRIATE UL LISTING MARK OR CLASSIFICATION MARKING. EQUIPMENT, MATERIALS, ETC. UTILIZED NOT BEARING A UL CERTIFICATION SHALL BE FIELD OR FACTORY UL CERTIFIED PRIOR TO EQUIPMENT ACCEPTANCE AND USE.
3. PROVIDE MAJOR ELECTRICAL EQUIPMENT BY A SINGLE MANUFACTURER: I.E. MOTOR CONTROL CENTERS, DISCONNECT SWITCHES, TRANSFORMERS, PANELBOARDS, ETC.

EQUIPMENT SIZE, HANDLING AND STORAGE:

1. COORDINATE WITH EQUIPMENT MANUFACTURER SHIPPING SPLITS TO PERMIT SAFE HANDLING AND PASSAGE OF EQUIPMENT TO FINAL INSTALLATION LOCATION.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS FOR UPRIGHT EQUIPMENT ORIENTATION DURING TRANSPORTATION.
3. PROTECT EQUIPMENT FROM MECHANICAL INJURY, OR EXPOSURE TO MOISTURE, CHEMICALS, OR CORROSIVE GASES. DO NOT STORE ELECTRICAL EQUIPMENT OUTDOORS.
4. PROVIDE AND ENERGIZE TEMPORARY SPACE HEATERS IF REQUIRED TO CONTROL MOISTURE DURING STORAGE.

CUTTING AND PATCHING:

1. CUT AND PATCH IN A WORKMANLIKE MANNER AS REQUIRED TO INSTALL ELECTRICAL WORK.
2. CUTTING OF STRUCTURAL MEMBERS SUCH AS JOISTS, BEAMS, GIRDERS OR COLUMNS IS PROHIBITED.
3. PATCH SURFACES TO RESTORE TO ORIGINAL INTEGRITY (WATERPROOF OR FIREPROOF AS REQUIRED) AND APPEARANCE.

CLEANING:

1. REMOVE ALL RUBBISH AND DEBRIS FROM INSIDE AND AROUND ELECTRICAL EQUIPMENT AND ENCLOSURES.
2. REMOVE DIRT, DUST OR CONCRETE SPATTER FROM INTERIOR AND EXTERIOR OF EQUIPMENT USING BRUSHES, VACUUM CLEANER OR CLEAN LINT-FREE RAGS. DO NOT USE COMPRESSED AIR.

DELEGATED DESIGN / PROFESSIONAL ENGINEERING SERVICES:

1. WHEN ENGINEERING SERVICES ARE SPECIFIED TO BE PROVIDED BY CONTRACTOR, CONTRACTOR SHALL RETAIN A LICENSED PROFESSIONAL ENGINEER TO PERFORM THE SERVICES. ENGINEER SHALL BE LICENSED AT THE TIME SERVICES ARE PERFORMED AND LICENSED IN THE STATE IN WHICH PROJECT IS LOCATED. IF THE STATE ISSUES DISCIPLINE SPECIFIC LICENSES, ENGINEER SHALL BE LICENSED IN THE APPLICABLE DISCIPLINE. ENGINEER SHALL BE EXPERIENCED IN THE TYPE OF WORK BEING PERFORMED.
2. ENGINEERING WORK SHALL BE DONE ACCORDING TO THE APPLICABLE REGULATIONS FOR PROFESSIONAL ENGINEERS TO INCLUDE SIGNING, SEALING AND DATING DOCUMENTS.

LUMINAIRE SCHEDULE

TYPE	LOCATION	LAMPS	MOUNTING	DESCRIPTION	MANUFACTURER CATALOG NUMBER
GL1	ELECTRICAL ROOM DRY	LED-34W	PENDANT	COLD ROLLED STEEL ENCLOSURE, WHITE ENAMEL PAINT FINISH 4' STRIPLIGHT WITH DIFFUSE LENS 5000 LUMENS, 80CRI 40K AND MULTI VOLT INPUT, DAMP LOCATION UL LISTED	LITHONIA ZL1N L48 5000LM FST 120V 40K 80CRI WH OR EQUAL
GL1E	ELECTRICAL ROOM DRY	LED-34W	PENDANT	COLD ROLLED STEEL ENCLOSURE, WHITE ENAMEL PAINT FINISH 4' STRIPLIGHT WITH DIFFUSE LENS 5000 LUMENS, 80CRI 40K, MULTI VOLT INPUT, 90 MINUTE BATTERY BACKUP AND DAMP LOCATION UL LISTED	LITHONIA ZL1N L48 5000LM FST 120V 40K 80CRI E10WLCP WH OR EQUAL
CL1	CHEMICAL AREA CORROSIVE	LED-74W	PENDANT	DIE CAST ALUMINUM HOUSING WITH CORRO-FREE EPOXY POWDER COAT, HEAT AND IMPACT RESISTANT GLASS LENS, SILICONE GASKETS, FACTORY SEALED, NEMA 4X, IP66 SEALED LED COMPARTMENT; 5 YEAR WARRANTY.	EATON CHAMP PRO PVM SERIES LED PART #: PVM9L2A/UNV1 OR EQUAL
OL1	OUTDOOR WET	LED-30W	WALL MOUNT	LED ARCHITECTURAL WALL SCONCE LED MODULE 3000 LUMENS, 80CRI 40K 120VOLT INPUT, WET LOCATION UL LISTED	LITHONIA WST LED P2 40K VF 120 OR EQUAL
OL1E	OUTDOOR WET	LED-30W	WALL MOUNT	LED ARCHITECTURAL WALL SCONCE LED MODULE 3000 LUMENS, 80CRI 40K 120VOLT INPUT WITH BATTERY UNIT, WET LOCATION UL LISTED	LITHONIA WST LED P2 40K VF 120 OR EQUAL
BU	CHEMICAL AREA CORROSIVE, NEMA 4X	LED-20.5W	WALL MOUNT	5KVA FLAME RATED, IMPACT-RESISTANT, SCARTCH RESISTANT AND CORROSION PROOF AND LITHIUM IRON PHOSPHATE BATTERY 1100 LUMEN, SPOT DISTRIBUTION, CORROSIVE LOCATION, NEMA 4X RATED UL LISTED	LITHONIA EXTL SP1100L UVOLT LTP SDRT HO OR EQUAL
RH	CHEMICAL AREA CORROSIVE, NEMA 4X	LED-10.6W	WALL MOUNT	5KVA FLAME RATED, IMPACT-RESISTANT, SCARTCH RESISTANT AND CORROSION PROOF AND LITHIUM IRON PHOSPHATE BATTERY 1100 LUMEN, SPOT DISTRIBUTION, CORROSIVE LOCATION, NEMA 4X RATED UL LISTED	LITHONIA EXTLRE SP1100L T OR EQUAL
E1	INDUSTRIAL DRY	LED	UNIVERSAL MOUNT	SINGLE FACE LED SELF POWERED EXIT SIGN WITH DUAL VOLTAGE - 120/277V, RED LETTERS ON A STENCIL FACE PANEL, UNIVERSAL ARROW/MOUNT AND UL LISTING	LITHONIA LE S W1R ELN SD OR EQUAL
E2	INDUSTRIAL CORROSIVE, NEMA 4X	LED	UNIVERSAL MOUNT	SINGLE FACE LED SELF POWERED EXIT SIGN WITH DUAL VOLTAGE - 120/277V, RED LETTERS ON A STENCIL FACE PANEL, 20 YEAR LIFE, SELF DIAGNOSTICS, UNIVERSAL ARROW/MOUNT & NEMA 4X UL LIST	LITHONIA LV S W 1 R 120/277 UM 4X OR EQUAL

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
10/18/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

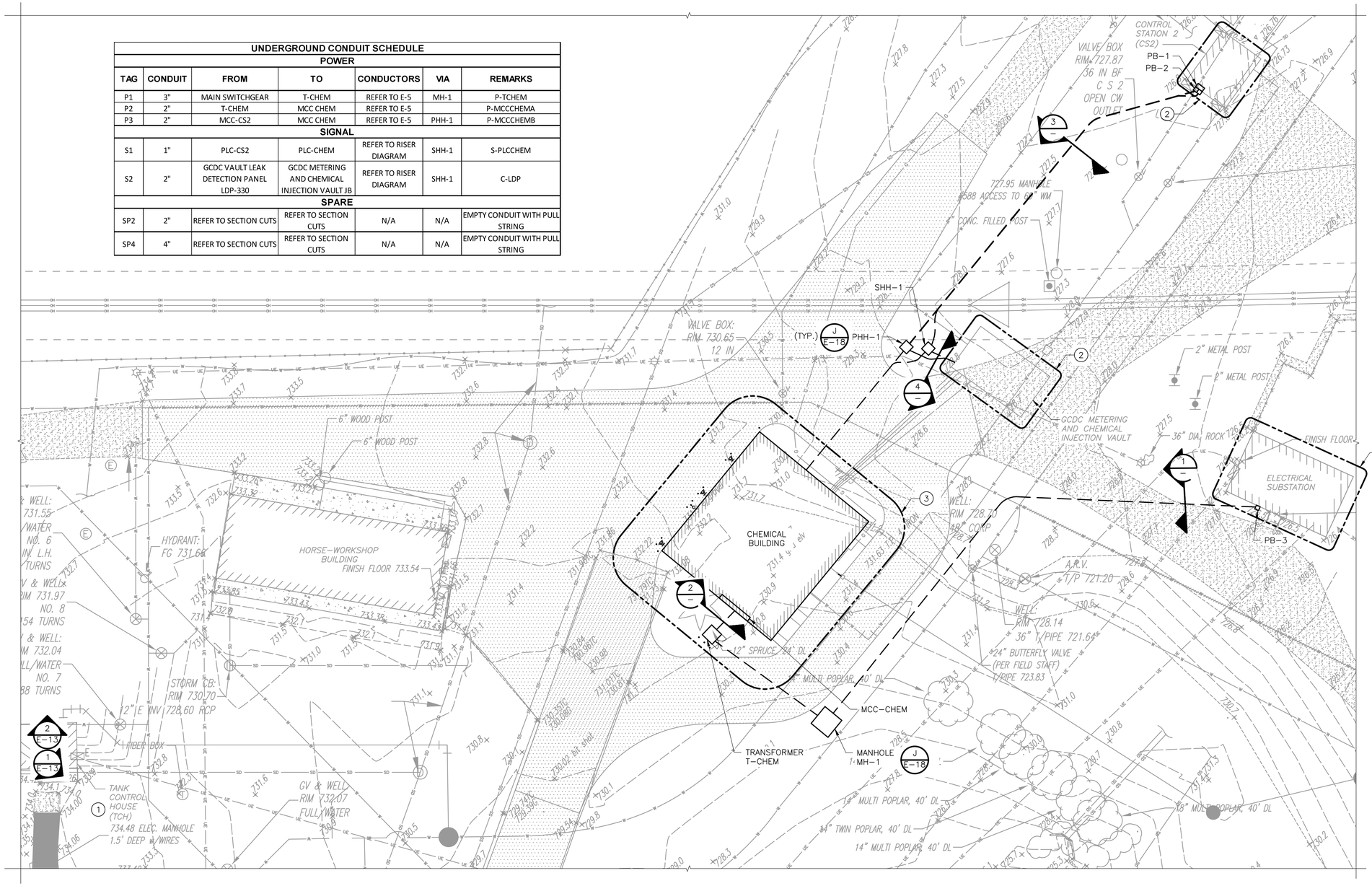
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
GENERAL NOTES AND LUMINAIRE SCHEDULE

PROJECT NO. 255128-234374
FILE NAME: E003NFGN.DWG
SHEET NO.
E-3

BID SET

UNDERGROUND CONDUIT SCHEDULE						
POWER						
TAG	**CONDUIT**	**FROM**	**TO**	**CONDUCTORS**	**VIA**	**REMARKS**
P1	3"	MAIN SWITCHGEAR	T-CHEM	REFER TO E-5	MH-1	P-TCHEM
P2	2"	T-CHEM	MCC CHEM	REFER TO E-5		P-MCCCHEMA
P3	2"	MCC-CS2	MCC CHEM	REFER TO E-5	PHH-1	P-MCCCHEMB
SIGNAL						
S1	1"	PLC-CS2	PLC-CHEM	REFER TO RISER DIAGRAM	SHH-1	S-PLCCHEM
S2	2"	GCDC VAULT LEAK DETECTION PANEL LDP-330	GCDC METERING AND CHEMICAL INJECTION VAULT JB	REFER TO RISER DIAGRAM	SHH-1	C-LDP
SPARE						
SP2	2"	REFER TO SECTION CUTS	REFER TO SECTION CUTS	N/A	N/A	EMPTY CONDUIT WITH PULL STRING
SP4	4"	REFER TO SECTION CUTS	REFER TO SECTION CUTS	N/A	N/A	EMPTY CONDUIT WITH PULL STRING



ELECTRICAL SITE

PLAN

1"=20'

N

1" = 20'

10 0 20

GENERAL NOTES:

1. REFER TO UNDERGROUND DUCT BANK DETAIL FOR DIMENSION OF THE DUCTBANK.
2. REFER TO CIVIL SHEETS FOR OVERALL WTP SITE PLAN.

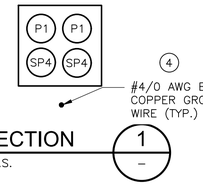
KEYED NOTES:

(1) INSTALL NEW 20A/1P CIRCUIT BREAKER IN EXISTING PANELBOARD LP-TCH AND NEW UPS-TCH ADJACENT TO EXISTING PANELBOARD TCH. REFER TO PANELBOARD SCHEDULE FOR CONDUIT AND WIRE REQUIREMENTS.

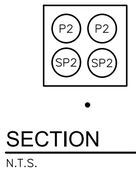
(2) REFER TO SHEET E-13 FOR PLAN VIEW.

(3) REFER TO SHEETS E-8 TO E-12 FOR PLAN VIEWS.

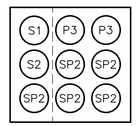
(4) LOCATE EXISTING GROUND GRID AT EXISTING STRUCTURES AND BOND DUCTBANK GROUND WIRE TO THE ELECTRICAL GROUND GRID AT EACH END.



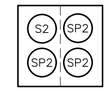
SECTION 1 — N.T.S.



SECTION 2 — N.T.S.



SECTION 3 — N.T.S.



SECTION 4 — N.T.S.

STATE OF MICHIGAN
VINCENT J PLANSKY
ENGINEER
10/8/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith

CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

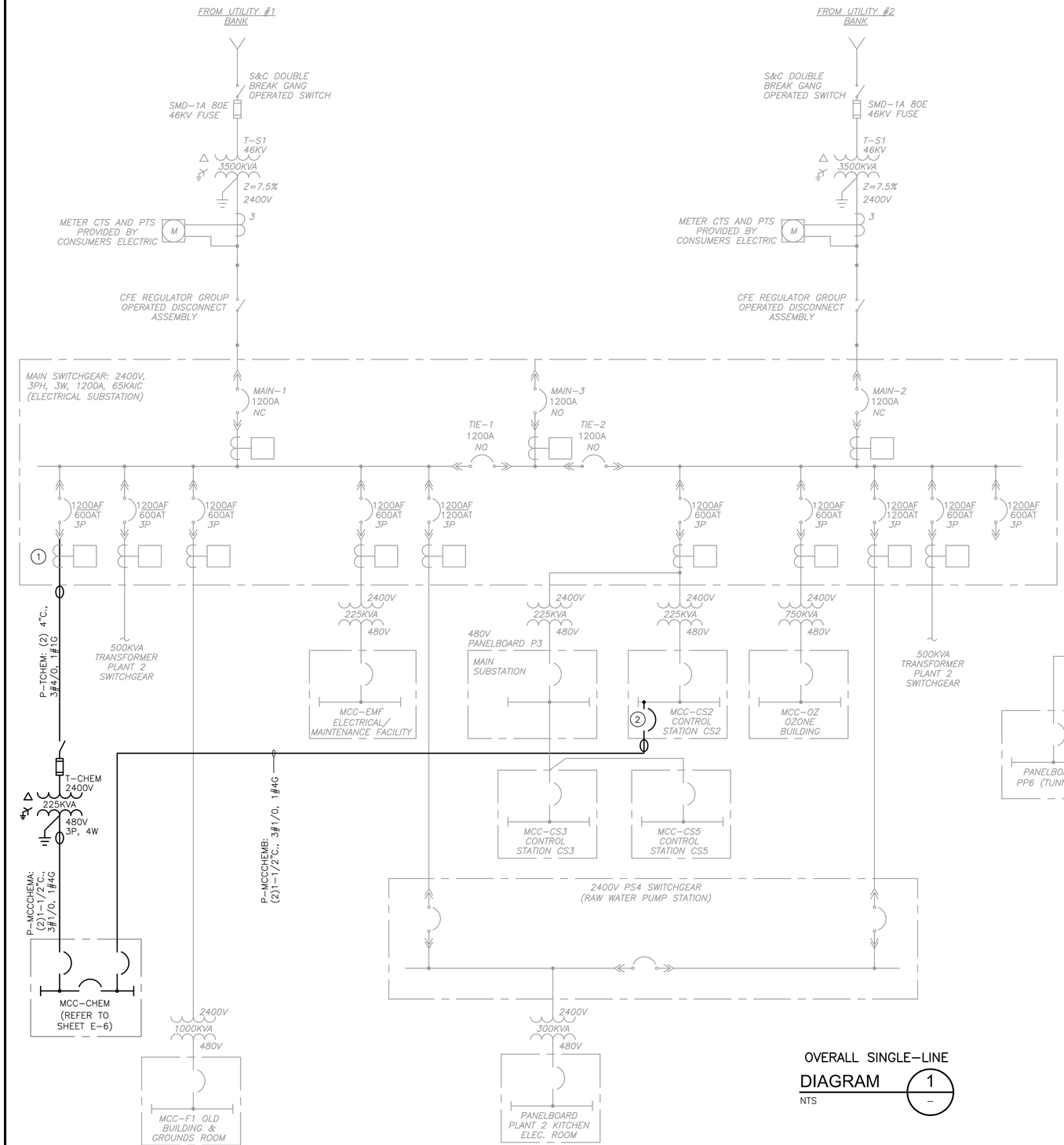
CHEMICAL SYSTEMS FEED BUILDING

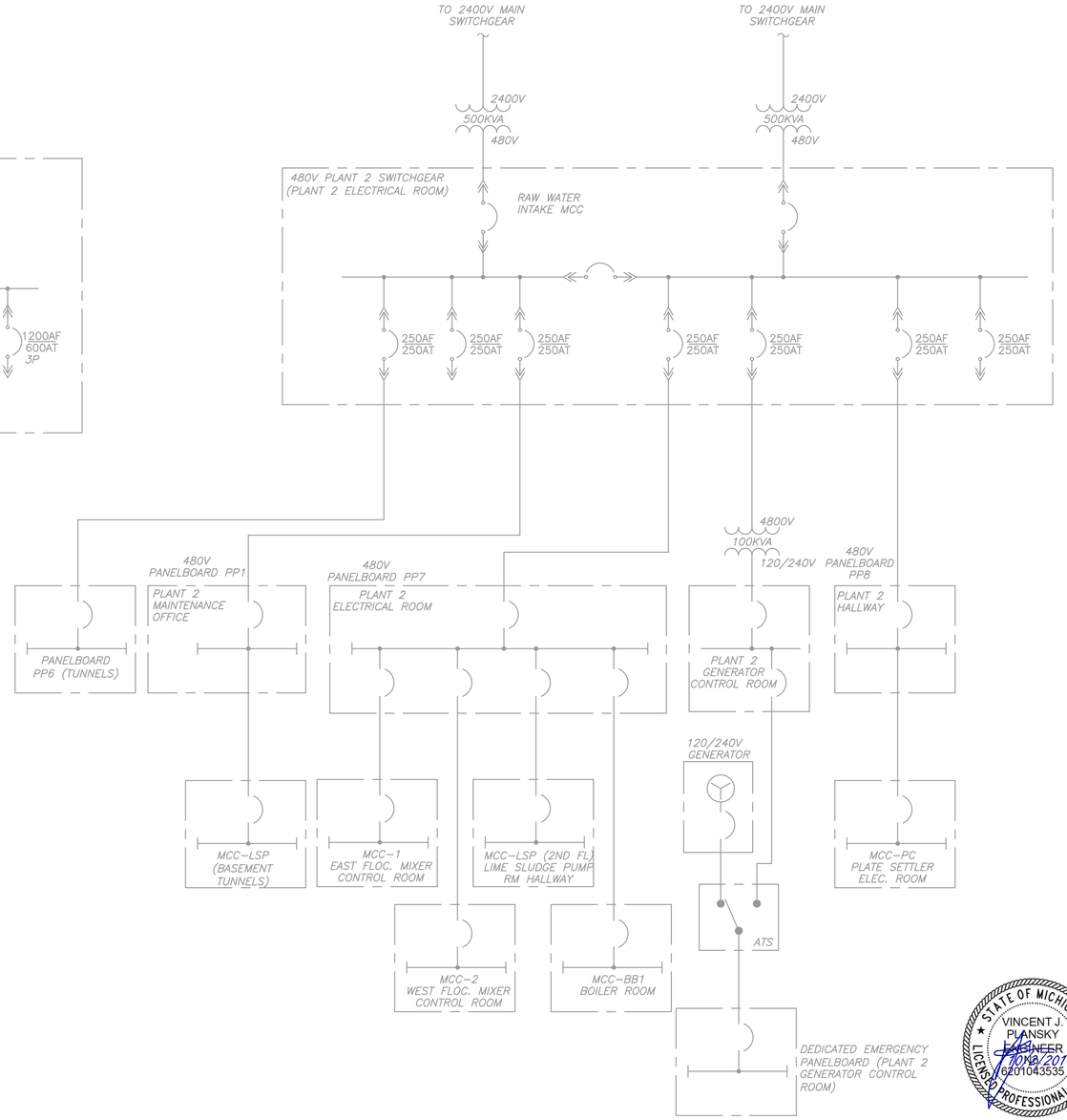
ELECTRICAL SITE PLAN

PROJECT NO. 255128-234374
FILE NAME: E004STPL.DWG

SHEET NO.
E-4

BID SET





KEYED NOTES:

1. PROVIDE NEW ENCLOSURE DOOR WITH IDENTIFICATION PLATE.
2. REFER TO SHEET E-6 FOR MODIFICATION OF EXISTING MCC-CS2.

OVERALL SINGLE-LINE DIAGRAM 1

NTS

VINCENT J. PLANSKY ENGINEER 10/8/2019 6201043535 STATE OF MICHIGAN LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

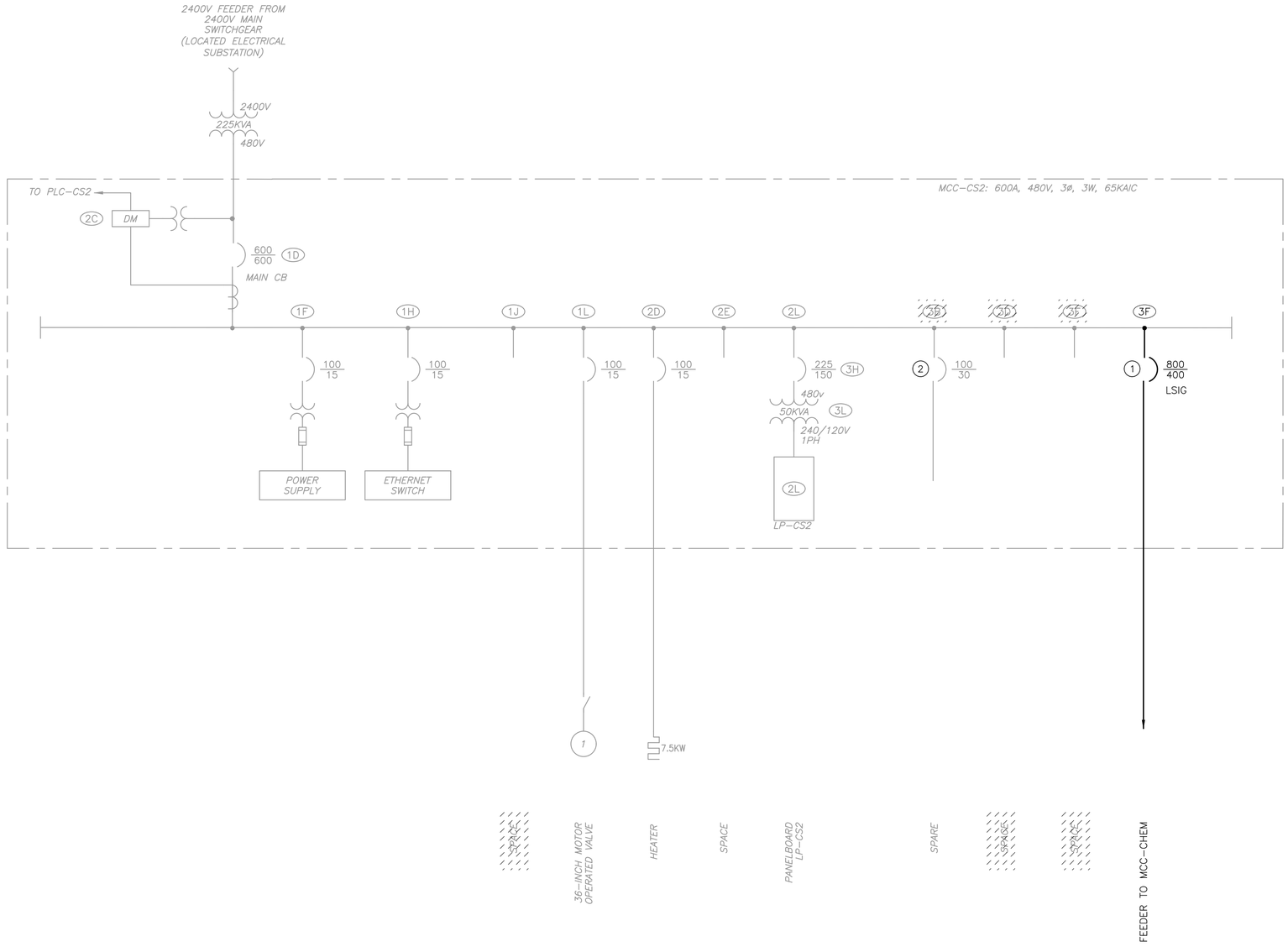
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL OVERALL SINGLE-LINE DIAGRAM MODIFICATIONS

PROJECT NO. 255128-234374
FILE NAME: E005NFOL.DWG
SHEET NO. E-5

BID SET



MCC-CS2 SINGLE-LINE MODIFICATION

DIAGRAM 1/–

NTS

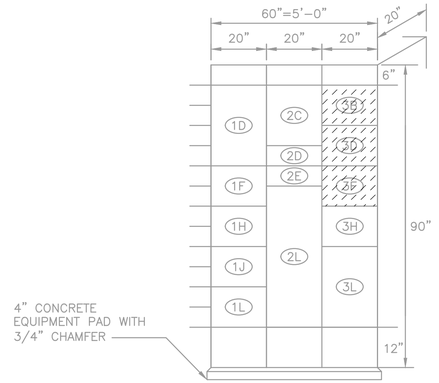
GENERAL NOTES:

1. MANUFACTURER SHALL SELECT CIRCUIT BREAKER TYPES WITH CHARACTERISTICS THAT PROVIDE 100% SELECTIVE COORDINATION.

KEYED NOTES:

(1) CONTRACTOR SHALL MODIFY EXISTING MCC-CS2 COMPARTMENT AND PROVIDE NEW 600A L.S.I.G. CIRCUIT BREAKER COMPLETE WITH ENCLOSURE DOOR, THRU-DOOR OPERATING HANDLE, IDENTIFICATION PLATE, AND ALL OTHER NECESSARY ANCILLARY EQUIPMENT. CIRCUIT BREAKER SHALL MATCH EXISTING MCC-CS2 IN ALL RESPECTS INCLUDING, BUT NOT LIMITED TO, MANUFACTURER, SHORT CIRCUIT RATING (KAIC), ETC.

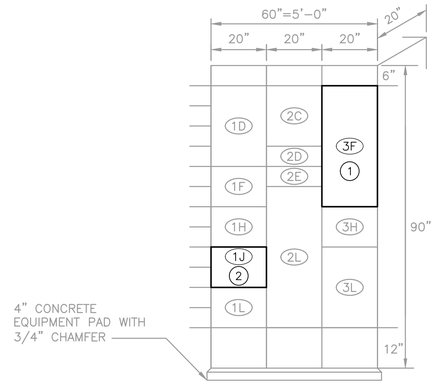
(2) RELOCATE EXISTING CIRCUIT BREAKER TO BUCKET 1J. PROVIDE NEW ENCLOSURE DOOR AND IDENTIFICATION NAMEPLATE.



EXISTING MCC-CS2

ELE□ATION

NTS



MCC-CS2 MODIFICATION

ELE□ATION

NTS

VINCENT J. PLANSKY
LICENSED PROFESSIONAL ENGINEER
STATE OF MICHIGAN
6201043535
10/8/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
E□ISTING MCC-CS2 SINGLE-LINE DIAGRAM AND ELE□ATION MODIFICATIONS

PROJECT NO. 255128-234374
FILE NAME: E006NFOL.DWG

SHEET NO.
E-6

BID SET

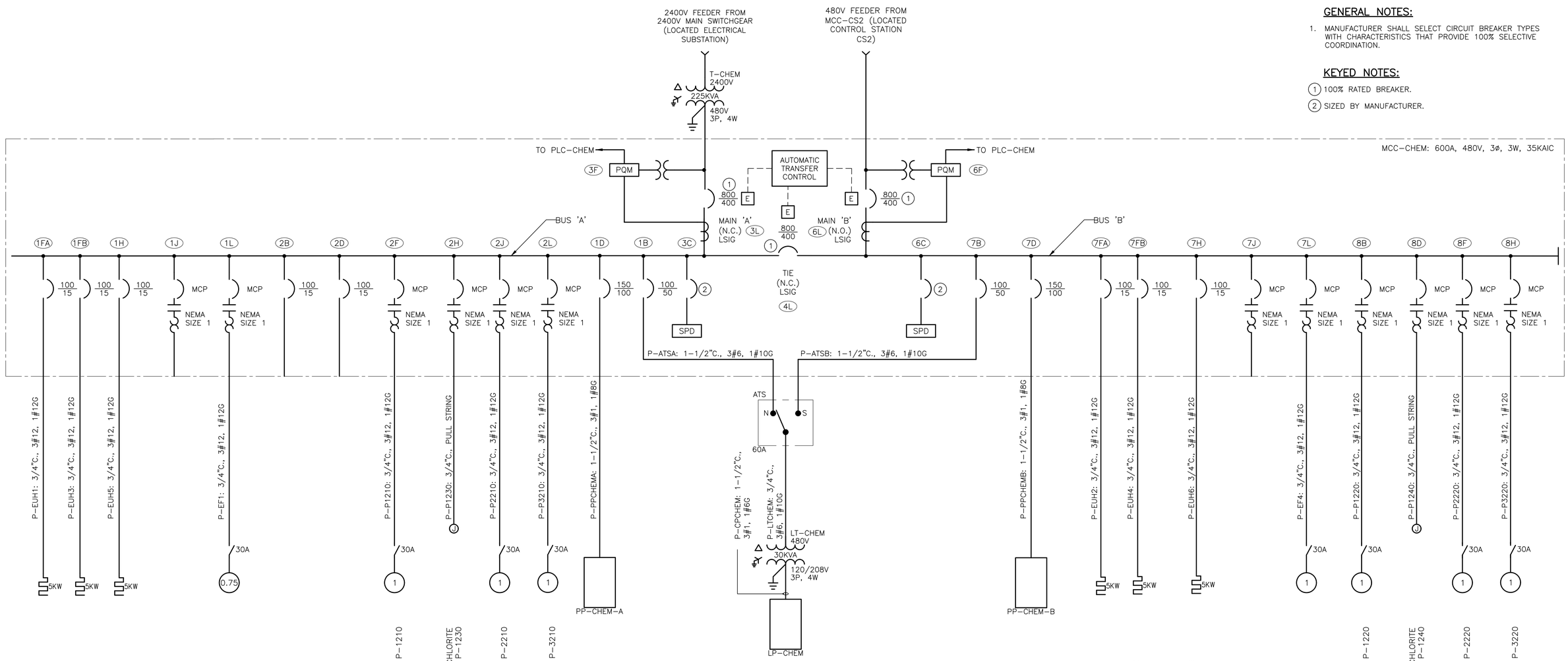
GENERAL NOTES:

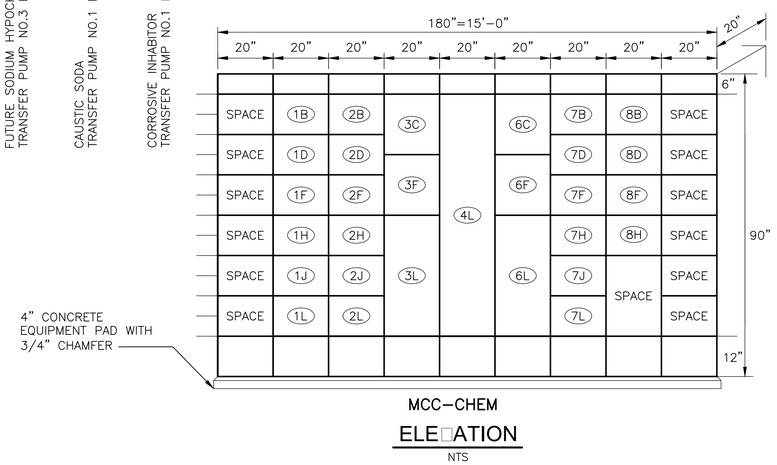
1. MANUFACTURER SHALL SELECT CIRCUIT BREAKER TYPES WITH CHARACTERISTICS THAT PROVIDE 100% SELECTIVE COORDINATION.

KEYED NOTES:

(1) 100% RATED BREAKER.

(2) SIZED BY MANUFACTURER.





MCC-CHEM ELE□ATION

NTS

MCC-CHEM SINGLE-LINE DIAGRAM 1

NTS

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
MCC-CHEM SINGLE-LINE DIAGRAM AND ELE□ATION

PROJECT NO. 255128-234374
FILE NAME: E007NFOL.DWG

SHEET NO.
E-7

BID SET

GENERAL NOTES:

1. CONDUITS IN THE HYPO, SODIUM HYDROXIDE AND ORTHO ROOM SHALL BE RUN EXPOSED. CONDUITS SHALL NOT PENETRATE THE FLOOR SLABS IN THESE ROOM.
2. CONDUITS ROUTED IN HYPO, SODIUM HYDROXIDE AND ORTHO ROOMS SHALL BE MOUNTED NEAR THE CEILING AND DROP DOWN TO FEED THE EQUIPMENT.

KEYED NOTES:

(1) CONDUIT AND JUNCTION BOXES FOR FUTURE SODIUM HYPOCHLORITE TRANSFER PUMPS SHALL BE INSTALLED NEAR THE CEILING TO THE CLOSEST DROP POINT.

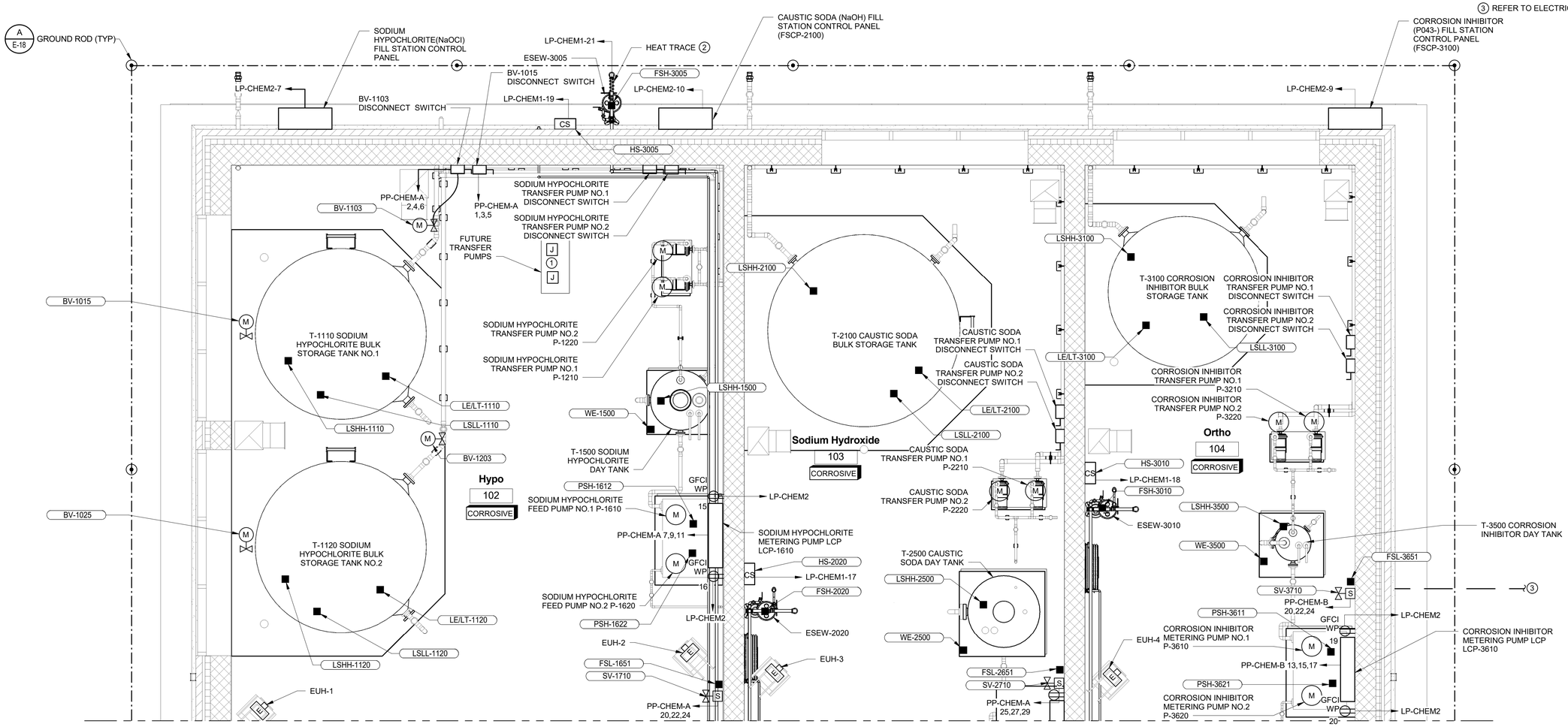
(2) HEAT TRACE PROVIDED BY PLUMBING.

(3) REFER TO ELECTRICAL SITE PLAN FOR CONTINUATION.

N

0 1' 2' 3' 5'

SCALE: 3/8" = 1'-0"



CHEMICAL BUILDING POWER PLAN I

3/8" = 1'-0"

VINCENT J. PLANSKY
LICENSED PROFESSIONAL ENGINEER
6201043535
7/09/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: JULY 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
CHEMICAL BUILDING POWER PLAN I

PROJECT NO. 255128-234374
FILE NAME: EWZ000CH.RVT
SHEET NO. E-8

BID SET

GENERAL NOTES:

1. CONDUITS IN THE HYPO, SODIUM HYDROXIDE AND ORTHO ROOM SHALL BE RUN EXPOSED. CONDUITS SHALL NOT PENETRATE THE FLOOR SLABS IN THESE ROOM.
2. CONDUITS ROUTED IN HYPO, SODIUM HYDROXIDE AND ORTHO ROOMS SHALL BE MOUNTED NEAR THE CEILING AND DROP DOWN TO FEED THE EQUIPMENT.

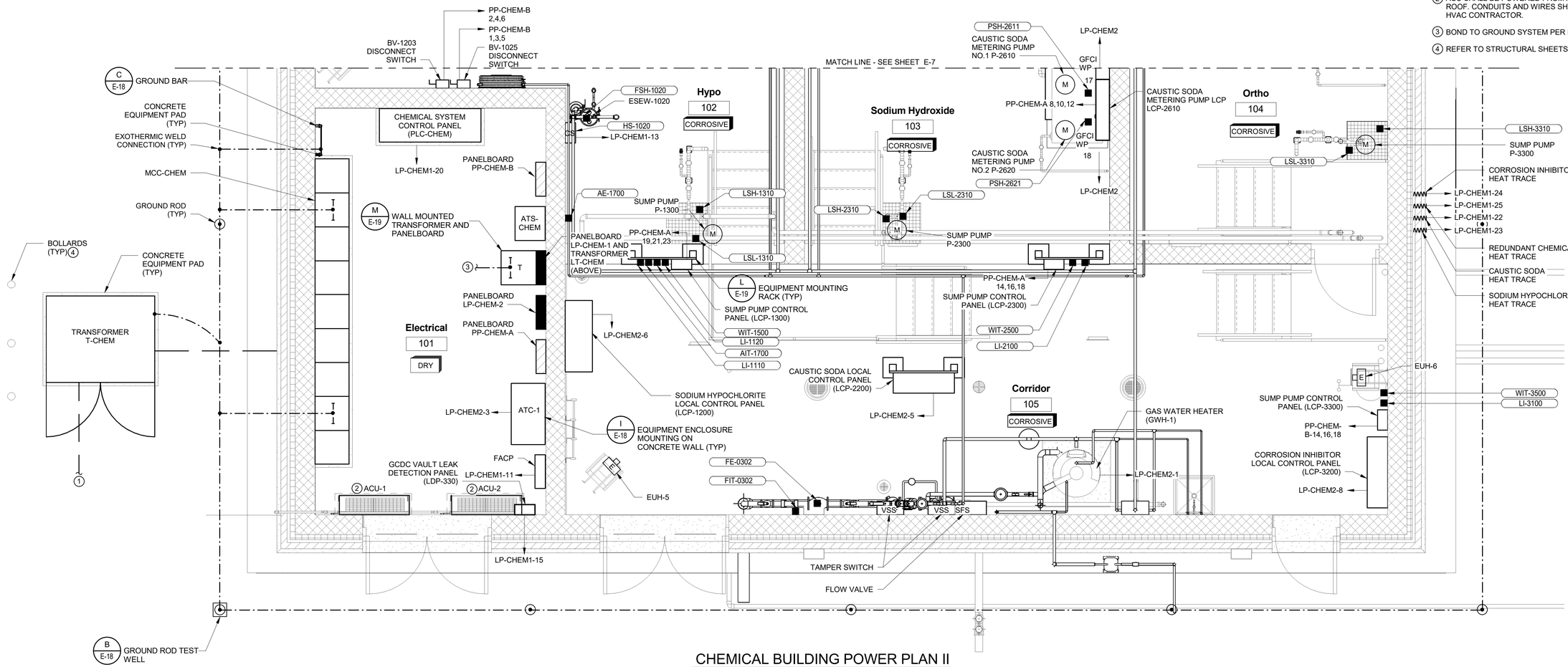
KEYED NOTES:

1. REFER TO ELECTRICAL SITE PLAN FOR CONTINUATION.
2. ACU SHALL BE POWERED FROM ACC'S LOCATED ON THE ROOF. CONDUITS AND WIRES SHALL BE PROVIDED BY THE HVAC CONTRACTOR.
3. BOND TO GROUND SYSTEM PER NEC.
4. REFER TO STRUCTURAL SHEETS FOR DETAIL.

N

0 1' 2' 3' 5'

SCALE: 3/8" = 1'-0"



CHEMICAL BUILDING POWER PLAN II

3/8" = 1'-0"

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
7/08/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: JULY 2019

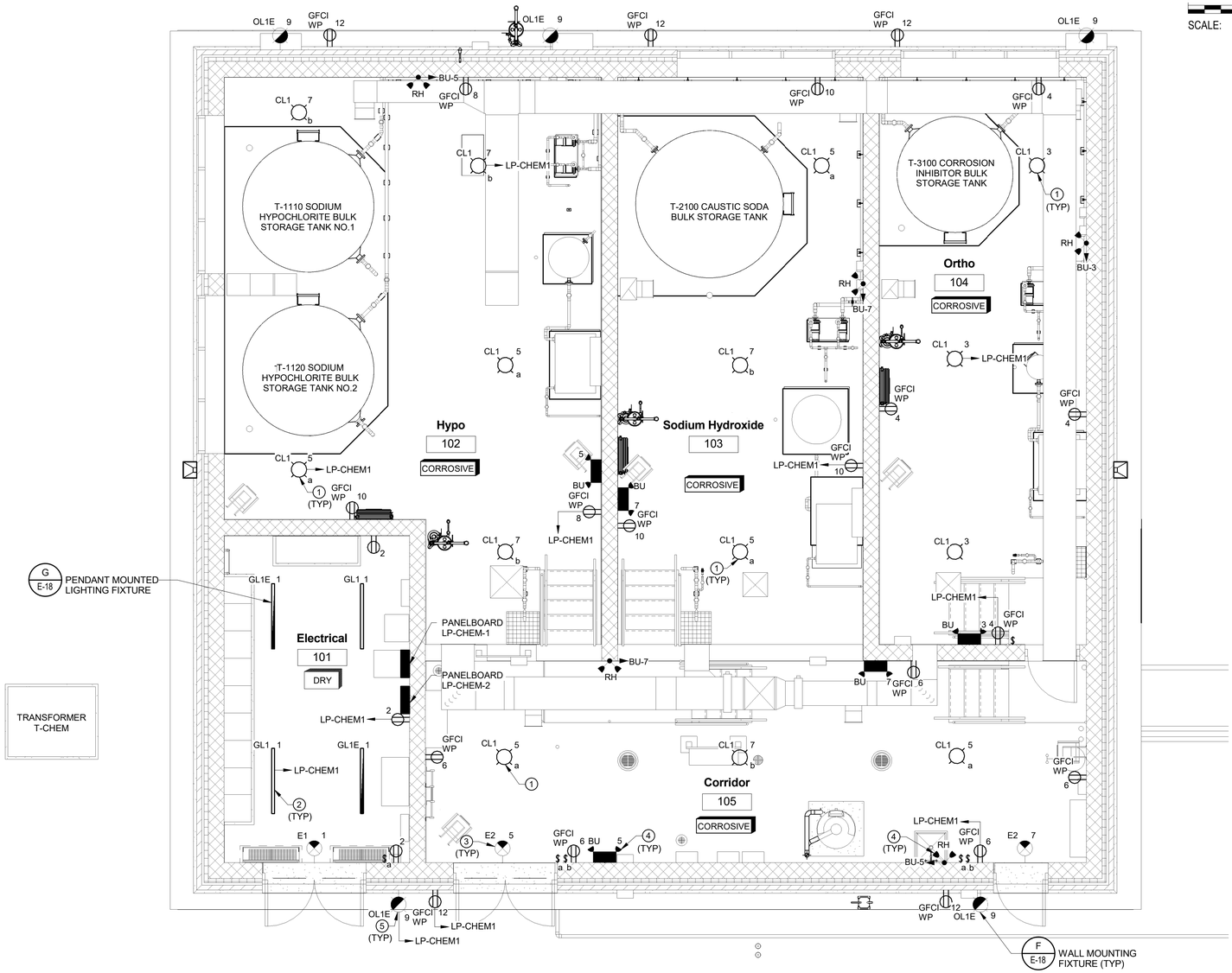
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
CHEMICAL BUILDING POWER PLAN II

PROJECT NO. 255128-234374
FILE NAME: EWZ000CH.RVT
SHEET NO. E-9

BID SET



CHEMICAL BUILDING LIGHTING PLAN

1/4" = 1'-0"

N

0 2' 4' 8'

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. CONDUITS IN THE HYPO, SODIUM HYDROXIDE AND ORTHO ROOM SHALL BE RUN EXPOSED. CONDUITS SHALL NOT PENETRATE THE FLOOR SLABS IN THESE ROOM.
2. CONDUITS ROUTED IN HYPO, SODIUM HYDROXIDE AND ORTHO ROOMS SHALL BE MOUNTED NEAR THE CEILING AND DROP DOWN TO FEED THE EQUIPMENT.
3. ALL LIGHT FIXTURES AND RECEPTACLES SHALL BE CONNECTED TO PANELBOARD LP-CHEM-1.

KEYED NOTES:

1. PENDANT MOUNT THE BOTTOM OF LIGHTING FIXTURES 16'-0" A.F.F. LEVEL.
2. PENDANT MOUNT THE BOTTOM OF LIGHTING FIXTURES 12'-0" A.F.F. LEVEL.
3. WALL MOUNT THE EXIT SIGN ABOVE THE DOOR OR 8'-0" A.F.F. LEVEL.
4. WALL MOUNT THE BATTERY UNIT 8'-0" A.F.F. LEVEL.
5. WALL MOUNT THE EXTERIOR LIGHT ABOVE THE DOOR OR 8'-0" A.F.F. LEVEL.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: JULY 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

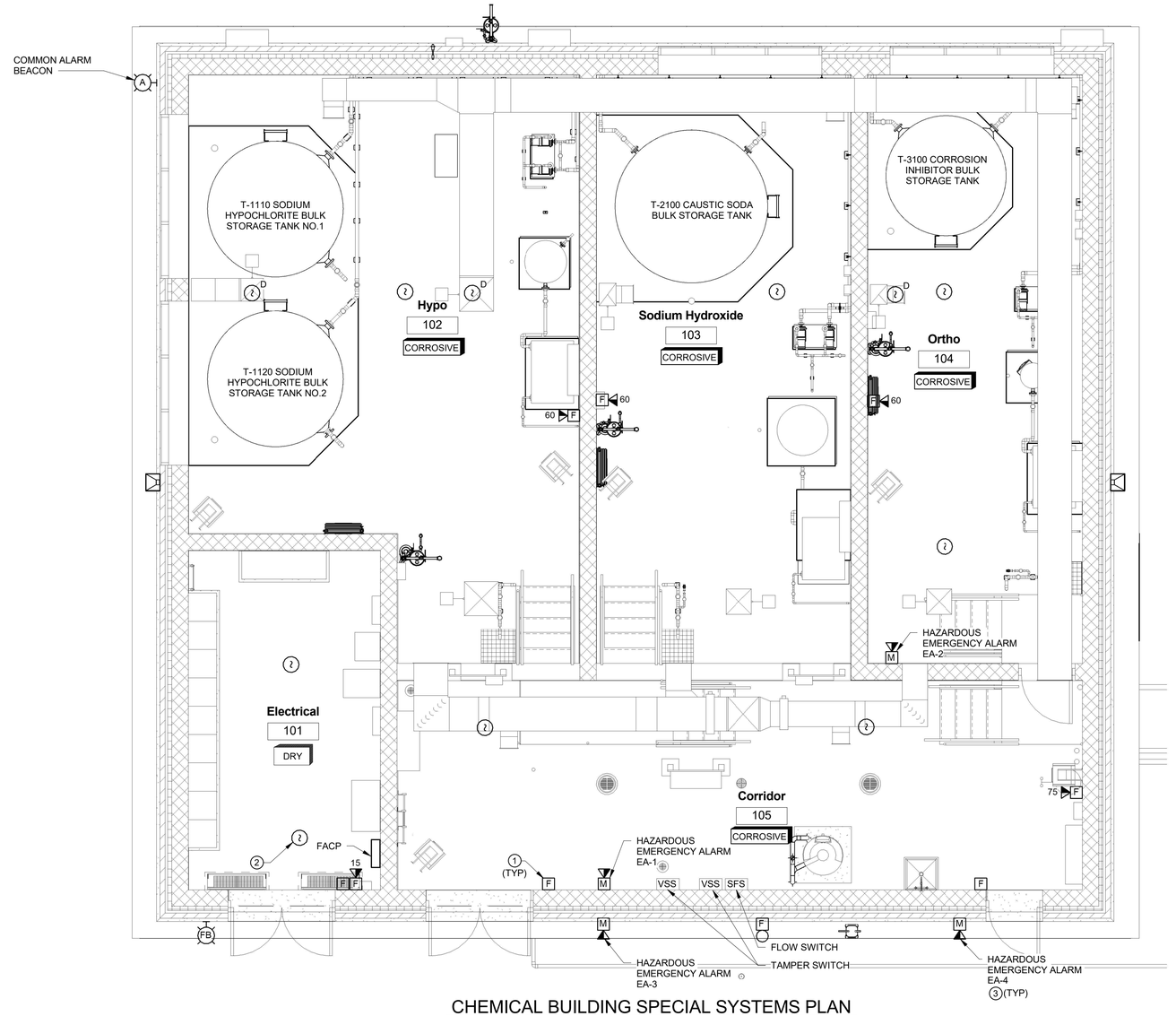
ELECTRICAL
CHEMICAL BUILDING LIGHTING PLAN

PROJECT NO. 255128-234374
FILE NAME: EWZ000CH.RVT

SHEET NO.
E-10

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
10/9/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

BID SET



CHEMICAL BUILDING SPECIAL SYSTEMS PLAN

1/4" = 1'-0"

N

0 2' 4' 8'

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. CONDUITS IN THE HYPO, SODIUM HYDROXIDE AND ORTHO ROOM SHALL BE RUN EXPOSED. CONDUITS SHALL NOT PENETRATE THE FLOOR SLABS IN THESE ROOM.
2. CONDUITS ROUTED IN HYPO, SODIUM HYDROXIDE AND ORTHO ROOMS SHALL BE MOUNTED NEAR THE CEILING AND DROP DOWN TO FEED THE EQUIPMENT.
3. REFER TO SHEET E-15 FOR FIRE ALARM RISER DIAGRAM.

KEYED NOTES:

1. MANUAL PULL STATION SHALL BE LOCATED WITHIN 5'-0" OF EXIT DOOR.
2. SMOKE DETECTOR SHALL BE LOCATED WITHIN 6'-0" OF FACP.
3. PROVIDE SIGN ABOVE HAZARDOUS ALARM PANEL. SIGN SHALL STATE "WARNING - HAZARDOUS CHEMICAL SPILL - DO NOT ENTER IF LIGHT IS FLASHING".

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
7/10/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: JULY 2019

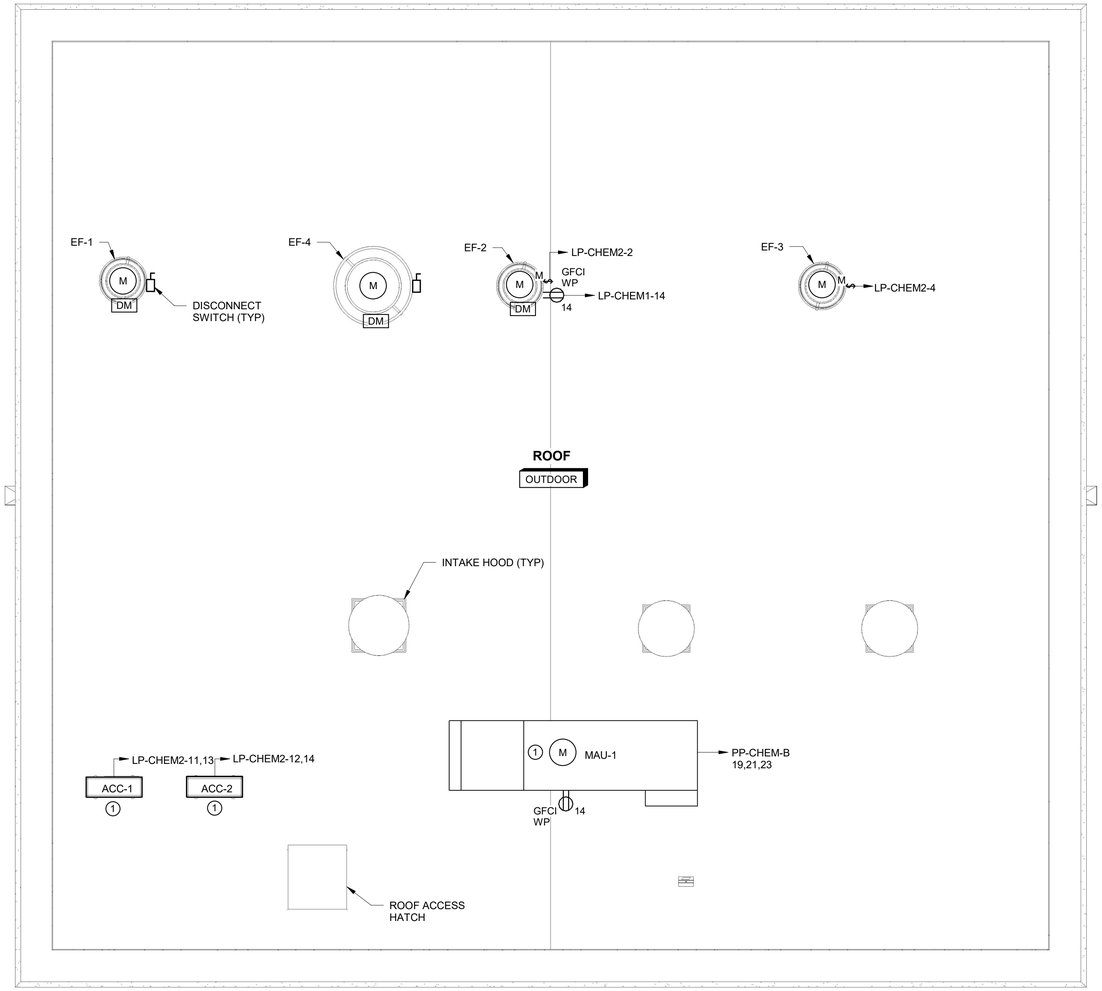
CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
CHEMICAL BUILDING SPECIAL SYSTEMS PLAN

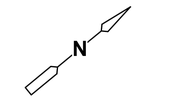
PROJECT NO. 255128-234374
FILE NAME: EWZ000CH.RVT
SHEET NO. E-11

BID SET



CHEMICAL BUILDING ROOF PLAN

1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. RECEPTACLES AND DISCONNECT SWITCH SHALL BE LOCATED IN THE EQUIPMENT CURB.
2. PROVIDE WIRING TO HAVC MOTORIZED DAMPERS PER SPECIFICATIONS.

KEYED NOTES:

(1) DISCONNECT SWITCH INTERNAL TO THE UNIT.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: JULY 2019

CDM Smith
CDM Smith Michigan, Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

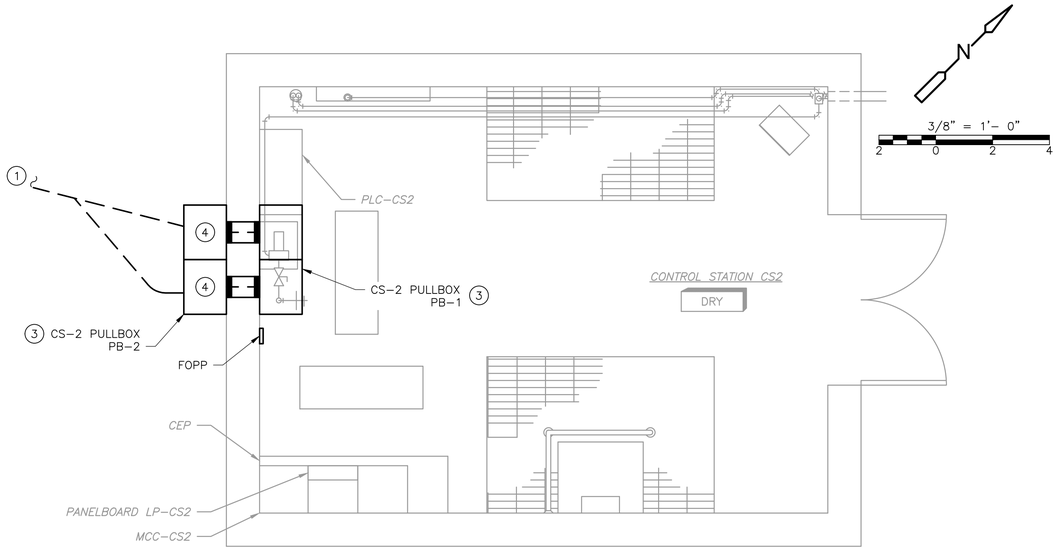
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
CHEMICAL BUILDING ROOF PLAN

PROJECT NO. 255128-234374
FILE NAME: EWZ000CH.RVT

SHEET NO.
E-12

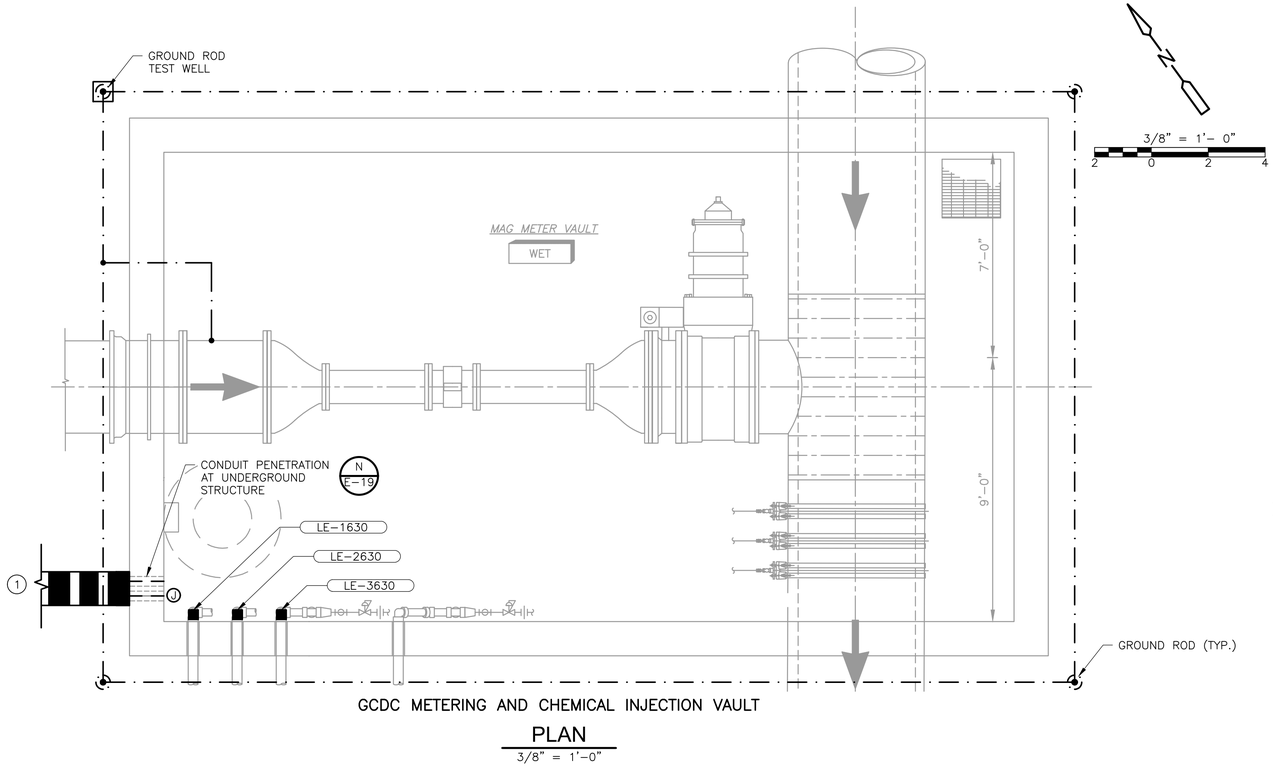
BID SET



CONTROL STATION CS2 BUILDING

PLAN

3/8" = 1'-0"



GCDC METERING AND CHEMICAL INJECTION VAULT

PLAN

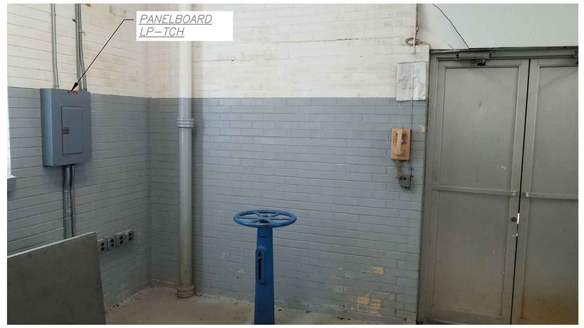
3/8" = 1'-0"

GENERAL NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY THE EQUIPMENT LAYOUT INSIDE CONTROL STATION CS2 AND ELECTRICAL SUBSTATION.
2. CONDUIT ROUTINGS ARE SHOWN DIAGRAMMATICALLY. NOT ALL CONDUITS ARE SHOWN FOR CLARITY.
3. INSTALL PULLBOXES ABOVE THE EXISTING EQUIPMENT IN CONTROL STATION CS-2.

KEYED NOTES:

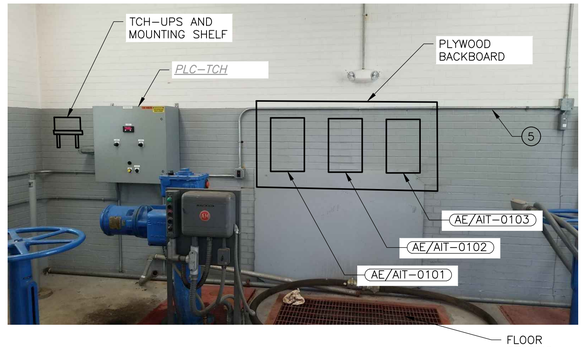
1. FOR CONTINUATION, REFER TO ELECTRICAL SITE PLAN.
2. REFER TO SHEET E-5 FOR CONNECTION TO MAIN SWITCHGEAR.
3. PROVIDE DIVIDER INSIDE CS-2 PULLBOXES TO SEPARATE CONTROL WIRES FROM SIGNAL WIRES.
4. INSTALL ALL SPARE CONDUITS IN THE DUCTBANK TO CS-2 PULLBOX PB-1.
5. DISCONNECT AND RELOCATE EXISTING CONDUIT & WIRE AS NECESSARY FOR INSTALLATION OF PLYWOOD BACKBOARD AND INSTRUMENTS.



TANK CONTROL HOUSE SE CORNER WALL

SECTION 1 / E-4

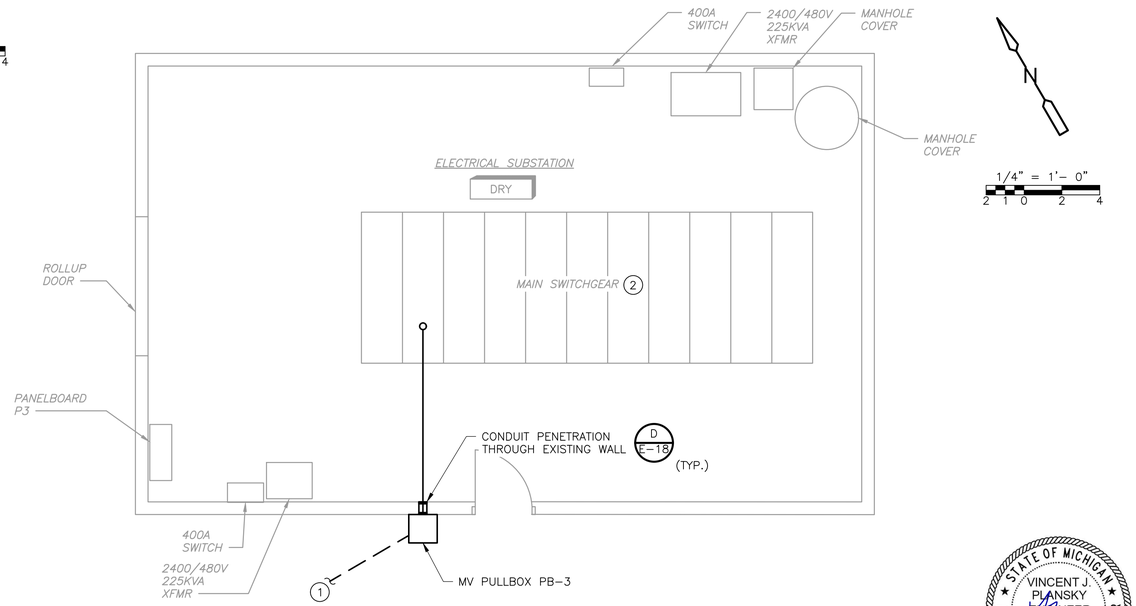
NTS



TANK CONTROL HOUSE NORTH WALL

SECTION 2 / E-4

NTS



ELECTRICAL SUBSTATION

PLAN

1/4" = 1'-0"

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
10/8/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

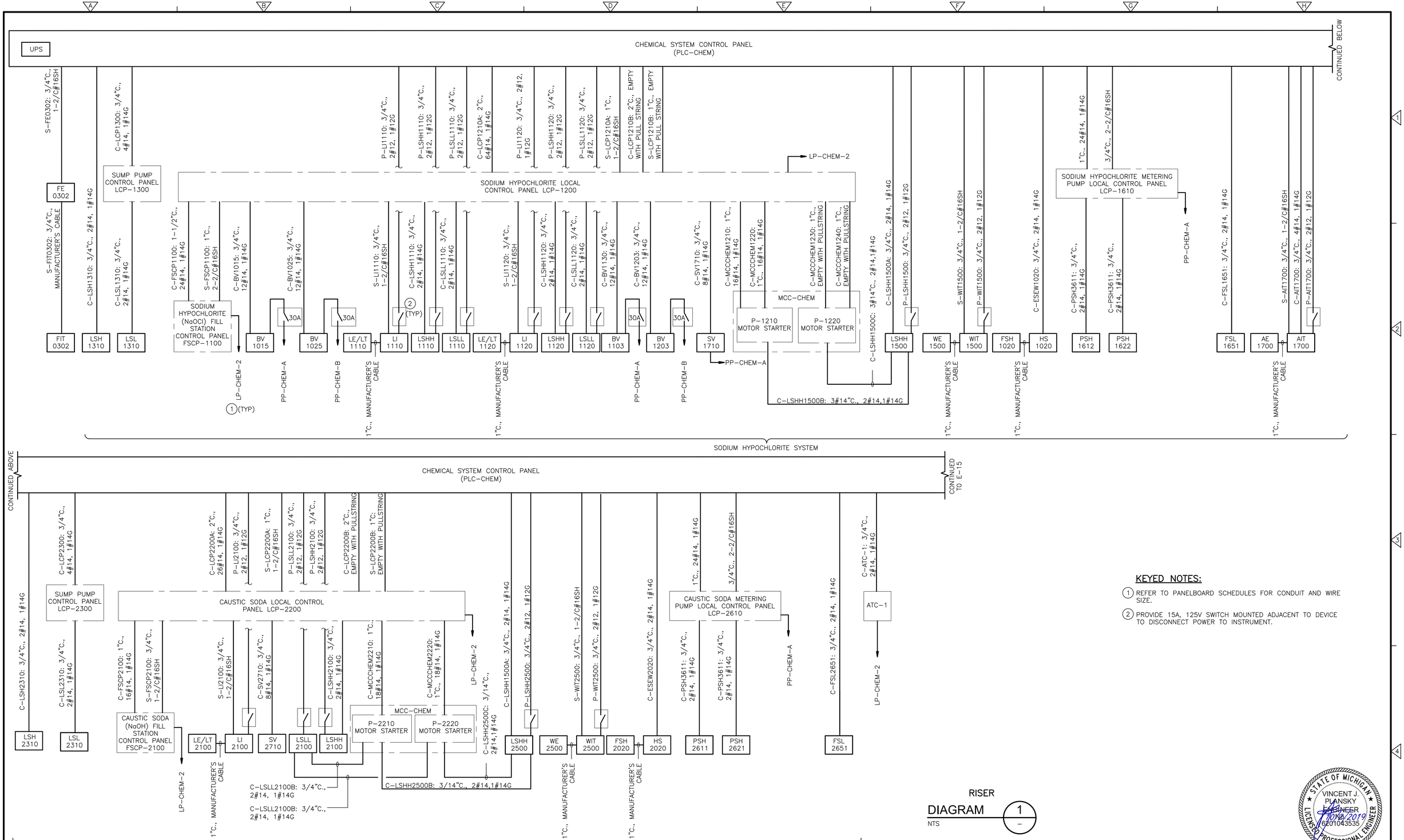
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL MISCELLANEOUS STRUCTURES

PROJECT NO. 255128-234374
FILE NAME: E013MSPL.DWG

SHEET NO.
E-13

BID SET



KEYED NOTES:

1. REFER TO PANELBOARD SCHEDULES FOR CONDUIT AND WIRE SIZE.
2. PROVIDE 15A, 125V SWITCH MOUNTED ADJACENT TO DEVICE TO DISCONNECT POWER TO INSTRUMENT.

RISER DIAGRAM 1 / –
NTS

STATE OF MICHIGAN · LICENSED PROFESSIONAL ENGINEER · VINCENT J. PLANSKY · ENGINEER · 10/9/2019 · 62011043535

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

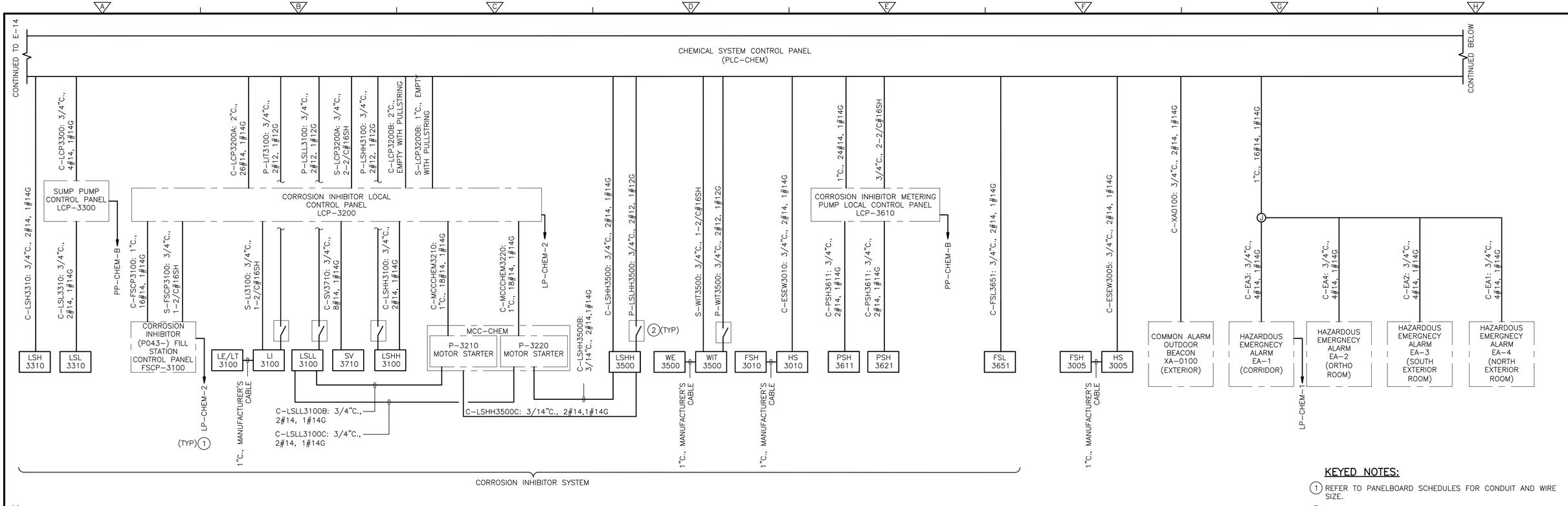
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

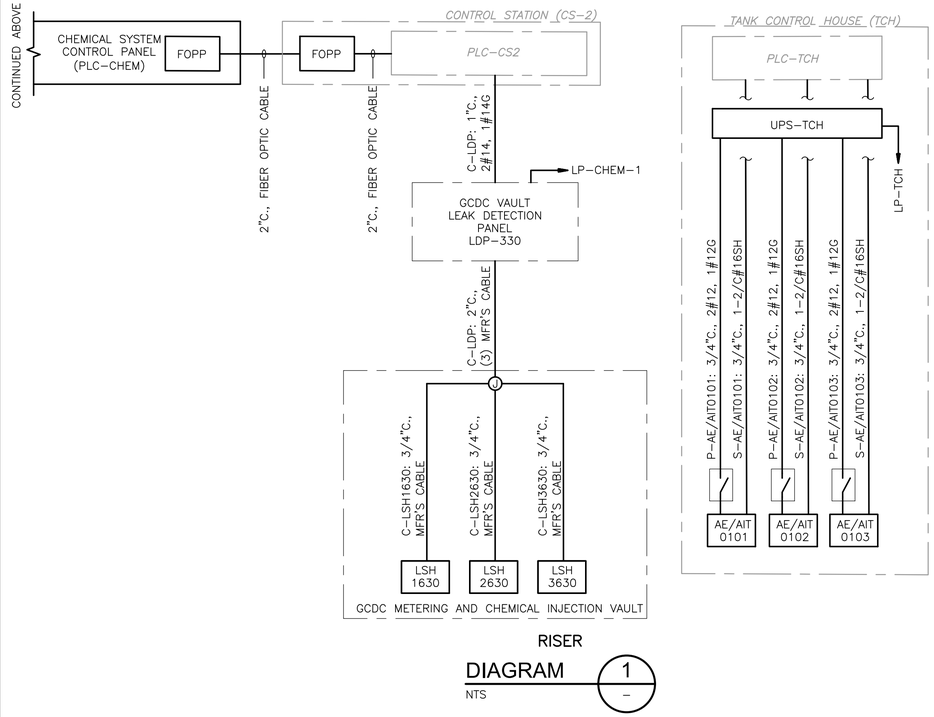
CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
RISER DIAGRAM

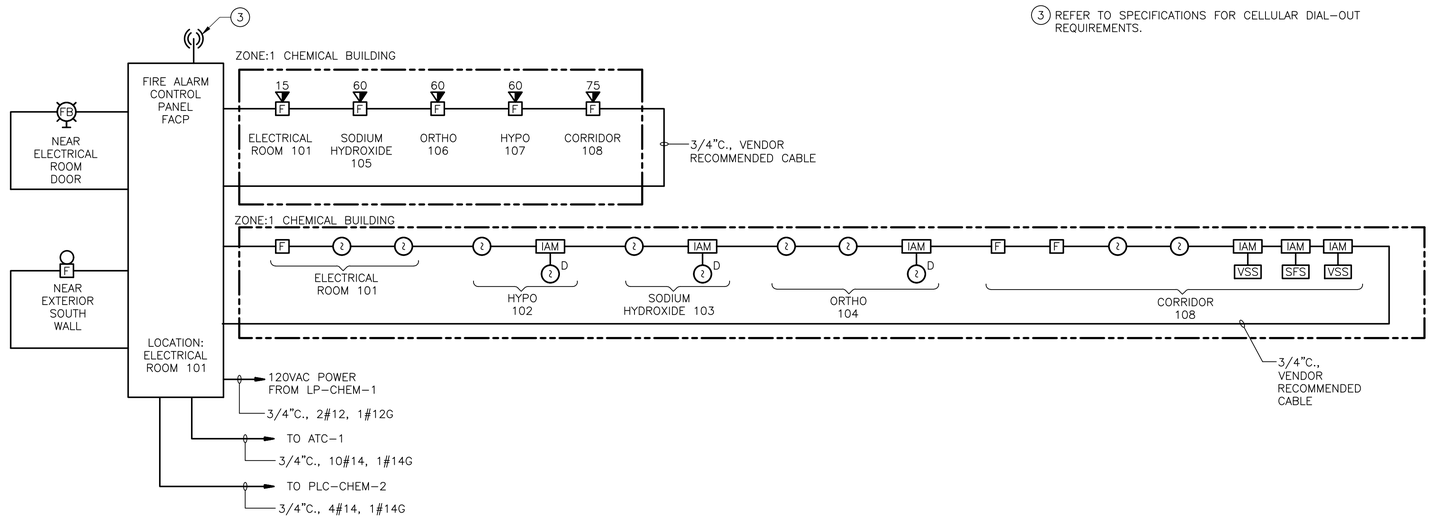
PROJECT NO. 255128-234374
FILE NAME: E014NFRD.DWG
SHEET NO.
E-14

BID SET





RISER DIAGRAM 1 — NTS



CHEMICAL BUILDING FIRE ALARM RISER DIAGRAM 2 — NTS

KEYED NOTES:

1. REFER TO PANELBOARD SCHEDULES FOR CONDUIT AND WIRE SIZE.
2. PROVIDE 15A, 125V SWITCH MOUNTED ADJACENT TO DEVICE TO DISCONNECT POWER TO INSTRUMENT.
3. REFER TO SPECIFICATIONS FOR CELLULAR DIAL-OUT REQUIREMENTS.

STATE OF MICHIGAN — VINCENT J. PLANSKY — ENGINEER — 10/4/2019 — 6201043535 — LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL RISER DIAGRAMS

PROJECT NO. 255128-234374
FILE NAME: E015NFRD.DWG
SHEET NO. E-15

BID SET

PANELBOARD LP-CHEM-1

100 AMP MAIN BREAKER — LOCATION: **CHEMICAL BUILDING - ELECTRICAL ROOM**
100 AMP BUS RATING **42** POLES **10** KA SHORT CIRCUIT RATING — ENCLOSURE RATING: **NEMA 12 ,**
208/120 VOLTS **3** PHASE **4** WIRE **60 Hz.** ELECTRONIC GRADE: **NO** — MOUNTING: **SURFACE**

CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES	CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES
1	ELECTRICAL ROOM - LIGHTS	0.16			15 /1	7	2	ELECTRICAL ROOM RECEPTACLES	0.54			15 /1	7
3	ORTHO ROOM - LIGHTS		0.29		15 /1	7	4	ORTHO ROOM - RECEPTACLES		0.72		15 /1	7, 2
5	CORRIDOR, SOD. HYD. & HYPO ROOM-LIGHTS			0.58	15 /1	7	6	CORRIDOR - RECEPTACLES			0.72	15 /1	7, 2
7	CORRIDOR, SOD. HYD. & HYPO ROOM-LIGHTS	0.49			15 /1	7	8	HYPO ROOM - RECEPTACLES	0.54			15 /1	7, 2
9	OUTDOOR ROOM LIGHTS		0.19		15 /1	7	10	SOD. HYDROXIDE ROOM-RECEPTACLES		0.54		15 /1	7, 2
11	FIRE ALARM CONTROL PANEL (FACP)			0.50	15 /1	7	12	OUTDOOR - RECEPTACLES			0.90	15 /1	7, 2
13	ESEW-1020 CS	0.07			15 /1	7	14	ROOF RECEPTACLES	0.36			15 /1	7, 2
15	GCDC VAULT CHEMICAL PIPING LEAK DETECTION SYSTEM CP		0.10		15 /1	7	16	HAZARDOUS EMERGENCY ALARM EA-1, 2, 3 & 4		0.10		15 /1	7
17	ESEW-2020 CS			0.07	15 /1	7	18	ESEW-3010 CS			0.50	15 /1	7
19	ESEW-3005 CS	0.07			15 /1	7	20	PLC-CHEM	0.50			15 /1	7
21	ESEW-3005 HEAT TRACE		0.05		15 /1	3,7	22	CAUSTIC SODA HEAT TRACE		0.05		15 /1	3,7
23	SODIUM HYPOCHLORITE HEAT TRACE			0.05	15 /1	3,7	24	CORROSION INHIBITOR HEAT TRACE			0.05	15 /1	3,7
25	REDUNDANT CHEMICAL HEAT TRACE	0.05			15 /1	3,7	26	COMMON ALARM OUTDOOR BEACON XA-0100	0.10			15 /1	7
27	SPARE				15 /1		28	SPARE				15 /1	
29	SPARE				15 /1		30	SPARE				15 /1	
31	SPARE				15 /1		32	SPARE				15 /1	
33	SPARE				15 /1		34	SPARE				15 /1	
35	SPARE				15 /1		36	SPARE				15 /1	
37	SPARE				15 /1		38		3.79				
39	SPARE				15 /1		40	PANELBOARD LP-CHEM-2		2.13		50 /3	9
41	SPARE				15 /1		42				3.34		
	TOTAL PHASE KVA THIS SIDE	0.84	0.63	1.20				TOTAL PHASE KVA THIS SIDE	5.83	3.54	5.51		
								TOTAL KVA PER PHASE	6.67	4.17	6.71		
								TOTAL THREE PHASE KVA		17.55			

NOTES:
1. PROVIDE LOCKING HARDWARE
3. 30 ma GFI CIRCUIT BREAKER FOR EQUIPMENT PROTECTION ONLY (HEAT TRACE)
5. BRANCH CIRCUIT WIRING: 3/4"C., 3#12 & 1#12G
7. BRANCH CIRCUIT WIRING: 3/4"C., 2#12 & 1#12G
9 BRANCH CIRCUIT WIRING: 3/4"C., 3#6, 1#10G

NOTES CONT.:
2. 5 ma GROUND FAULT INTERRUPTER (GFI) CIRCUIT BREAKER
4. PROVIDE LOCKING HARDWARE & PAINT BREAKER HANDLE RED (FACP)
6. BRANCH CIRCUIT WIRING: 3/4"C., 2#10 & 1#10G
8. VIA MOTOR RATED SWITCH

PANELBOARD LP-CHEM-2

AMP MAIN LUG ONLY — LOCATION: **CHEMICAL BUILDING - ELECTRICAL ROOM**
100 AMP BUS RATING **42** POLES **10** KA SHORT CIRCUIT RATING — ENCLOSURE RATING: **NEMA 12 ,**
208/120 VOLTS **3** PHASE **4** WIRE **60 Hz.** ELECTRONIC GRADE: **NO** — MOUNTING: **SURFACE**

CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES	CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES
1	GAS WATER HEATER GWH-1	0.10			15 /1	7	2	EXHAUST FAN EF-2	0.35			15 /1	7,8
3	AUTOMATIC TEMPERATURE CONTROL ATC-1		0.50		15 /1	7	4	EXHAUST FAN EF-3		0.27		15 /1	7,8
5	CAUSTIC SODA LOCAL CONTROL PANEL (LCP-2200)			0.50	15 /1	7	6	SODIUM HYPOCHLORITE LOCAL CONTROL PANEL (LCP-1200)			0.50	15 /1	7
7	SODIUM HYPOCHLORITE FILL STATION CONTROL PANEL (FSCP-1100)	0.50			15 /1	7	8	CORROSION INHIBITOR LOCAL CONTROL PANEL (LCP-3200)	0.50			15 /1	7
9	CORROSION INHIBTOR (P043-) FILL STATION CONTROL PANEL(FSCP-3100)		0.50		15 /1	7	10	CAUSTIC SODA FILL STATION CONTROL PANEL (FSCP-2100)		0.50		15 /1	7
11	SPLIT SYSTEM HEAT PUMP			1.98	25 /2	6	12	SPLIT SYSTEM HEAT PUMP				25 /3	6
13	ACU-1/ACC-1	1.98					14	ACU-2/ACC-2					
15	SODIUM HYPOCHLORITE METERING PUMP NO. 1 P-1610 RECEPTACLE		0.18		15 /1	7	16	SODIUM HYPOCHLORITE METERING PUMP NO. 2 P-1620 RECEPTACLE		0.18		15 /1	7
17	CAUSTIC SODA METERING PUMP NO. 1 P-2610 RECEPTACLE			0.18	15 /1	7	18	CAUSTIC SODA METERING PUMP NO. 2 P-2620 RECEPTACLE			0.18	15 /1	7
19	CORROSION INHIBITOR METERING PUMP NO. 1 P-3610 RECEPTACLE	0.18			15 /1	7	20	CORROSION INHIBITOR METERING PUMP NO. 2 P-3620 RECEPTACLE	0.18			15 /1	7
21	SPARE				15 /1		22	SPARE				15 /1	
23	SPARE				15 /1		24	SPARE				15 /1	
25	SPARE				15 /1		26	SPARE				15 /1	
27	SPARE				15 /1		28	SPARE				15 /1	
29	SPARE				15 /1		30	SPARE				15 /1	
31	SPARE				15 /1		32	SPARE				15 /1	
33	SPARE				15 /1		34	SPARE				15 /1	
35	SPARE				15 /1		36	SPARE				15 /1	
37	SPARE				15 /1		38	SPACE				15 /1	
39	SPARE				15 /1		40	SPACE				15 /1	
41	SPARE				15 /1		42	SPACE				15 /1	
	TOTAL PHASE KVA THIS SIDE	2.76	1.18	2.66				TOTAL PHASE KVA THIS SIDE	1.03	0.95	0.68		
								TOTAL KVA PER PHASE	3.79	2.13	3.34		
								TOTAL THREE PHASE KVA		9.26			

NOTES:
1. PROVIDE LOCKING HARDWARE
3. 30 ma GFI CIRCUIT BREAKER FOR EQUIPMENT PROTECTION ONLY (HEAT TRACE)
5. BRANCH CIRCUIT WIRING: 3/4"C, 3#12 & 1#12G
7. BRANCH CIRCUIT WIRING: 3/4"C, 2#12 & 1#12G

NOTES CONT.:
2. 5 ma GROUND FAULT INTERRUPTER (GFI) CIRCUIT BREAKER
4. PROVIDE LOCKING HARDWARE & PAINT BREAKER HANDLE RED (FACP)
6. BRANCH CIRCUIT WIRING: 3/4"C., 2#10 & 1#10G
8. VIA MOTOR RATED SWITCH

PANELBOARD PP-CHEM-A

100 AMP MAIN BREAKER — LOCATION: **CHEMICAL BUILDING - ELECTRICAL ROOM**
100 AMP BUS RATING **42** POLES **22** KA SHORT CIRCUIT RATING — ENCLOSURE RATING: **NEMA 12 ,**
480 VOLTS **3** PHASE **3** WIRE **60 Hz.** ELECTRONIC GRADE: **NO** — MOUNTING: **SURFACE**

CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES	CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES
1		0.57					2		0.57				
3	BV-1015		0.57		20 /3	5	4	BV-1103		0.57		20 /3	5
5				0.57			6				0.57		
7	SODIUM HYPOCHLORITE METERING	0.57					8	CAUSTIC SODA METERING	0.57				
9	PUMP LOCAL CONTROL PANEL		0.57		20 /3	5,9	10	PUMP LOCAL CONTROL PANEL		0.57		20 /3	5,9
11	LCP-1610			0.57			12	LCP-2610			0.57		
13							14		0.57				
15	SPARE				20 /3		16	SUMP PUMP P-2300		0.57		20 /3	5,8
17							18				0.57		
19							20		0.2				
21	SUMP PUMP P-1300				20 /3	5,8	22	SOLENOID VALVE SV-1710		0.2		15 /3	5
23							24				0.2		
25		0.2					26						
27	SOLENOID VALVE SV-2710		0.2		15 /3	5	28	SPARE				15 /3	
29				0.2			30						
31							32						
33	SPARE				15 /3		34	SPACE				15 /3	
35							36						
37							38						
39	SPARE				15 /3		40	SPACE				15 /3	
41							42						
	TOTAL PHASE KVA THIS SIDE	1.34	1.34	1.34				TOTAL PHASE KVA THIS SIDE	1.91	1.91	1.91		
								TOTAL KVA PER PHASE	3.25	3.25	3.25		
								TOTAL THREE PHASE KVA		9.75			

NOTES:
1. PROVIDE LOCKING HARDWARE
3. 30 ma GFI CIRCUIT BREAKER FOR EQUIPMENT PROTECTION ONLY (HEAT TRACE)
5. BRANCH CIRCUIT WIRING: 3/4"C., 3#12 & 1#12G
7. BRANCH CIRCUIT WIRING: 3/4"C., 2#12 & 1#12G
9. VIA METERING PUMP JUNCTION BOX

NOTES CONT.:
2. 5 ma GROUND FAULT INTERRUPTER (GFI) CIRCUIT BREAKER
4. PROVIDE LOCKING HARDWARE & PAINT BREAKER HANDLE RED (FACP)
6. BRANCH CIRCUIT WIRING: 3/4"C., 3#10 & 1#10G
8. VIA VENDOR CONTROL PANEL
10.

PANELBOARD PP-CHEM-B

100 AMP MAIN BREAKER — LOCATION: **CHEMICAL BUILDING - ELECTRICAL ROOM**
100 AMP BUS RATING **42** POLES **22** KA SHORT CIRCUIT RATING — ENCLOSURE RATING: **NEMA 12 ,**
480 VOLTS **3** PHASE **3** WIRE **60 Hz.** ELECTRONIC GRADE: **NO** — MOUNTING: **SURFACE**

CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES	CIRCUIT NO.	DESCRIPTION	LOAD KVA PHASE A	LOAD KVA PHASE B	LOAD KVA PHASE C	BREAKER AMPS/ POLES	NOTES
1		0.57					2		0.57				
3	BV-1025		0.57		20 /3	5	4	BV-1203		0.57		20 /3	5
5				0.57			6				0.57		
7							8						
9	SPARE				20 /3		10	SPARE				20 /3	
11							12						
13	CORROSION INHIBITOR METERING	0.57					14		0.57				
15	PUMP LOCAL CONTROL PANEL		0.57		20 /3	5,9	16	SUMP PUMP P-3300		0.57		20 /3	5,8
17	LCP-3610			0.57			18				0.57		
19		1.27					20		0.2				
21	MAKEUP AIR UNIT		1.27		20 /3	5	22	SOLENOID VALVE 3710		0.2		15 /3	5
23	MAU-1			1.27			24				0.2		
25							26						
27	SPARE				15 /3		28	SPARE				15 /3	
29							30						
31							32						
33	SPARE				15 /3		34	SPACE				/3	
35							36						
37							38						
39	SPARE				15 /3		40	SPACE				/3	
41							42						
	TOTAL PHASE KVA THIS SIDE	2.41	2.41	2.41				TOTAL PHASE KVA THIS SIDE	1.34	1.34	1.34		
								TOTAL KVA PER PHASE	3.75	3.75	3.75		
								TOTAL THREE PHASE KVA		11.25			

NOTES:
1. PROVIDE LOCKING HARDWARE
3. 30 ma GFI CIRCUIT BREAKER FOR EQUIPMENT PROTECTION ONLY (HEAT TRACE)
5. BRANCH CIRCUIT WIRING: 3/4"C., 3#12 & 1#12G
7. BRANCH CIRCUIT WIRING: 3/4"C., 2#12 & 1#12G
9. VIA METERING PUMP JUNCTION BOX

NOTES CONT.:
2. 5 ma GROUND FAULT INTERRUPTER (GFI) CIRCUIT BREAKER
4. PROVIDE LOCKING HARDWARE & PAINT BREAKER HANDLE RED (FACP)
6. BRANCH CIRCUIT WIRING: 3/4"C., 3#10 & 1#10G
8. VIA VENDOR CONTROL PANEL
10.

PANELBOARD LP-TCH

50** AMP MAIN BREAKER* — LOCATION: ***TANK CONTROL HOUSE
70** AMP BUS RATING **24** POLES **10** KA SHORT CIRCUIT RATING — ENCLOSURE RATING: **NEMA 1 ,
120/240** VOLTS **1** PHASE **3** WIRE **60 Hz.** ELECTRONIC GRADE: **NO** — MOUNTING: **SURFACE

CIRCUIT NO.	DESCRIPTION	LOAD KVA LINE 1	LOAD KVA LINE 2	BREAKER AMPS/ POLES	NOTES	CIRCUIT NO.	DESCRIPTION	LOAD KVA LINE 1	LOAD KVA LINE 2	BREAKER AMPS/ POLES	NOTES
1	MAIN			50 /2		2	PLUG			15 /1	
3						4	PLUG			15 /1	
5	GFI			15 /1		6	DEHUMIDIFIER			15 /1	
7	SCADA PANEL			15 /1		8	PLUG			15 /1	
9	PLUG			15 /1		10	PLUG			15 /1	
11	PLUG			15 /1		12	NOT LABELED			/1	
13	NOT LABELED			15 /1		14	NOT LABELED			/2	
15	NOT LABELED			/1		16					
17	NOT LABELED			/1		18	**UPS-TCH**			**20 /1**	5 (1)
19	SPACE			/1		20	SPACE			/1	
21	SPACE			/1		22	SPACE			/1	
23	SPACE			/1		24	SPACE			/1	

NOTES:
1. PROVIDE LOCKING HARDWARE
3. 30 ma GFI CIRCUIT BREAKER FOR EQUIPMENT PROTECTION ONLY (HEAT TRACE)
5. BRANCH CIRCUIT WIRING: 3/4"C, 2#12 & 1#12G
7.

NOTES CONT.:
2. 5 ma GROUND FAULT INTERRUPTER (GFI) CIRCUIT BREAKER
4. PROVIDE LOCKING HARDWARE & PAINT BREAKER HANDLE RED (FACP)
6. BRANCH CIRCUIT WIRING: 3/4"C, 2#10 & 1#10G
8.

KEYED NOTES:

(1) CIRCUIT BREAKER SHALL MATCH THE EXISTING CIRCUIT BREAKERS IN THE PANELBOARD INCLUDING BUT NOT LIMITED TO THE MANUFACTURER AND SHORT CIRCUIT RATING.

STATE OF MICHIGAN — VINCENT J. PLANSKY — ENGINEER — 10/8/2019 — 6201043535 — LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

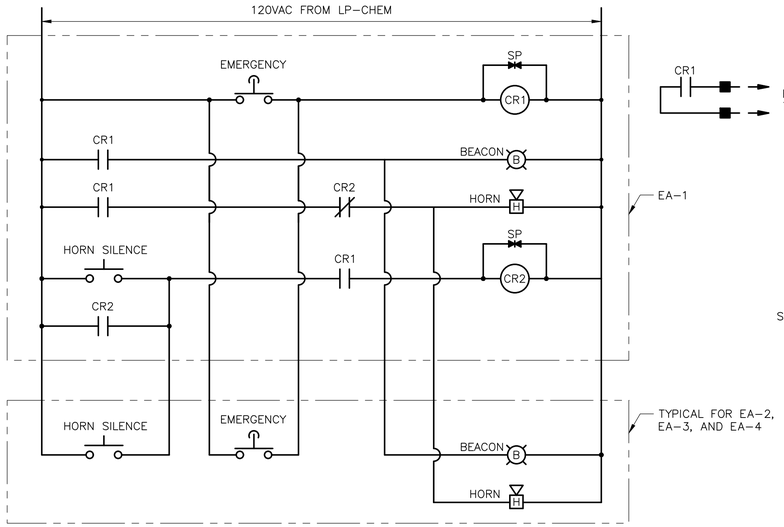
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
PANELBOARD SCHEDULES

PROJECT NO. 255128-234374
FILE NAME: E016PLSH.DWG
SHEET NO.
E-16

BID SET



EA-1

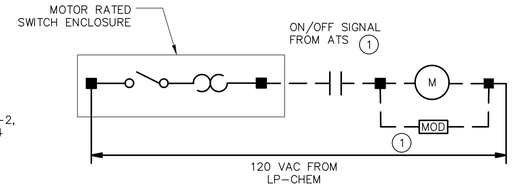
TYPICAL FOR EA-2, EA-3, AND EA-4

HAZARDOUS EMERGENCY ALARM SCHEMATIC

DIAGRAM 1

N.T.S

(EA-1, EA-2, EA-3, AND EA-4)

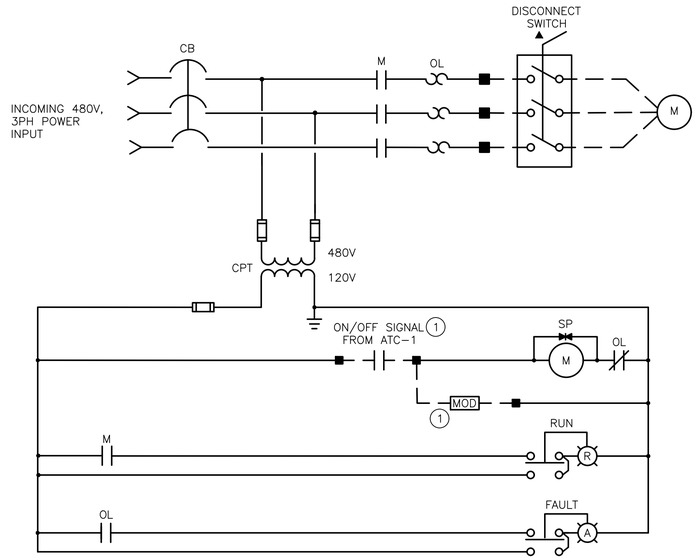


EXHAUST FAN SCHEMATIC

DIAGRAM 2

N.T.S

(TYP. FOR EF-2 AND EF-3)

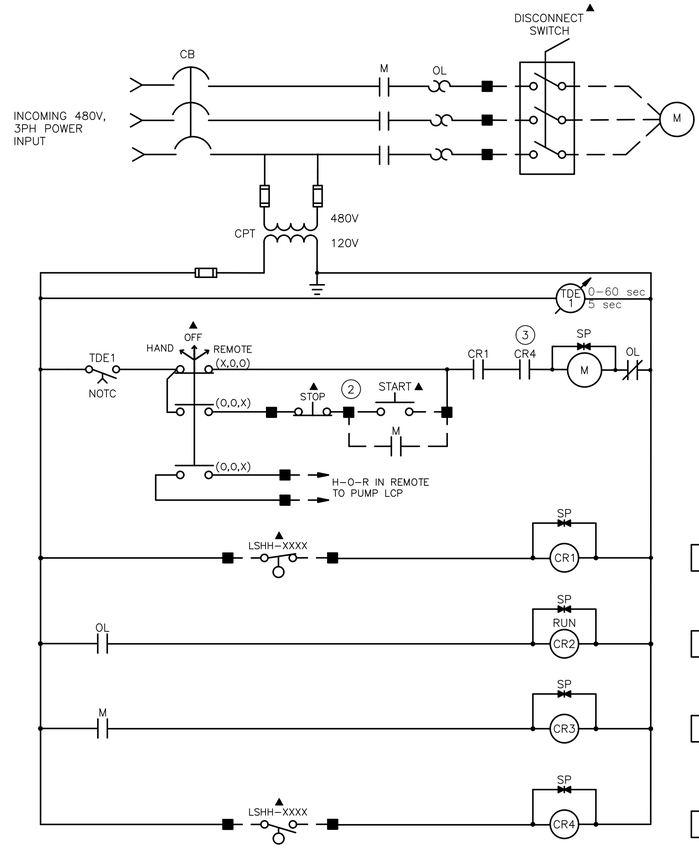


EXHAUST FAN SCHEMATIC

DIAGRAM 3

N.T.S

(TYP. FOR EF-1 AND EF-4)



TRANSFER PUMP SCHEMATIC

DIAGRAM 4

N.T.S

(TYPICAL FOR P-1210, P-12220, P-2210, P-2220, P-3210, AND P-3220)

LEGEND

▲ DEVICE LOCATED IN FIELD

● DEVICE LOCATED IN PLC OR RIO

ETM ELAPSED TIME METER
SP SURGE PROTECTION

NOTE: ALL DEVICES ARE LOCATED IN THE VFD CABINET OR STARTER BUCKET UNLESS CALLED OUT OTHERWISE.

KEYED NOTES:

1. FIELD WIRING TO BE PROVIDED BY HVAC.
2. START/STOP PUSH BUTTON LOCATED AT PUMP LCP.
3. FOR CAUSTIC SODA AND CORROSION INHIBITOR TRANSFER PUMPS ONLY.
4. REFER TO MOTOR STARTER EQUIPMENT SCHEDULE FOR CORRESPONDING PUMP LCP.

MOTOR STARTER E□UIPMENT SCHEDULE

EQUIPMENT NO.	LSHH-XXXX	PUMP LCP	DAY TANK	LSLL-XXXX	BULK STORAGE TANK
SODIUM HYPOCHLORITE TRANSFER PUMP NO.1 P-1210	LSHH-1500	SODIUM HYPOCHLORITE LOCAL CONTROL PANEL L-1210	T-1500	N/A	N/A
SODIUM HYPOCHLORITE TRANSFER PUMP NO.2 P-1220					
CAUSTIC SODA TRANSFER PUMP NO.1 P-2210	LSHH-2500	CAUSTIC SODA LOCAL CONTROL PANEL LCP-2200	T-2500	LSLL-2100	T-2100
CAUSTIC SODA TRANSFER PUMP NO.2 P-2220					
CORROSIVE INHIBITOR TRANSFER PUMP NO.1 P-3210	LSHH-3500	CORROSIVE INHIBITOR LOCAL CONTROL PANEL LCP-3200	T-3500	LSLL-3100	T-3100
CORROSIVE INHIBITOR TRANSFER PUMP NO.2 P-3220					

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
6201043535
LICENSED PROFESSIONAL ENGINEER
10/16/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

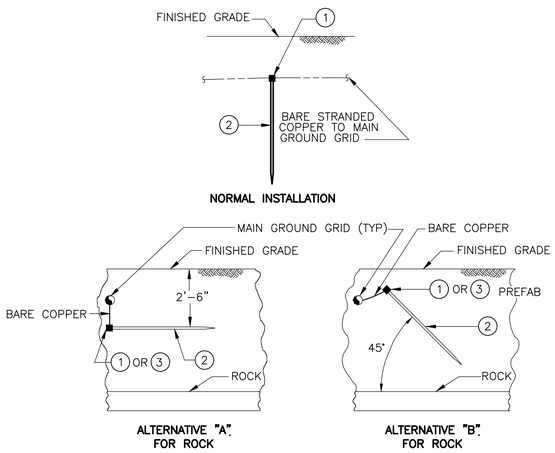
ELECTRICAL
SCHEMATIC DIAGRAMS

PROJECT NO. 255128-234374
FILE NAME: E017NFSC.DWG

SHEET NO.
E-17

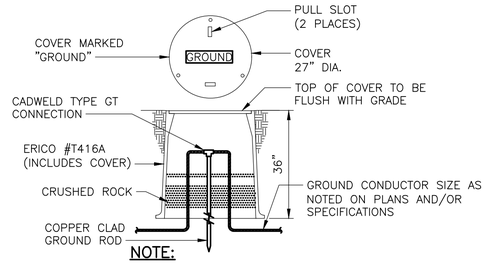
BID SET

ITEM NUMBER	QUANTITY	DESCRIPTION	MANUFACTURER	CAT #
1	1	CADWELD CABLE TO ROD	CADWELD	TYPE GT
2	1	GROUND ROD, COPPER CLAD, 8 FT MIN.	ERITECH	
3	1	CADWELD CABLE TO ROD	CADWELD	TYPE GS



GROUND ROD INSTALLATIONS PER NEC 250-83(c) (3)

DETAIL A — N.T.S. — E-8

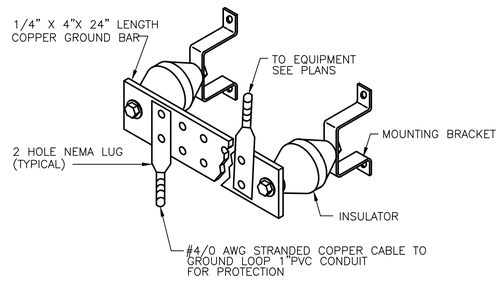


NOTE:

1. TO IMPROVE SYSTEM RESISTANCE, ERICO GEM MAY BE USED AS A BACKFILL MATERIAL IN AN AUGERED HOLE

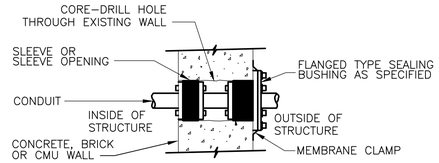
GROUND ROD TEST WELL

DETAIL B — NTS — E-9



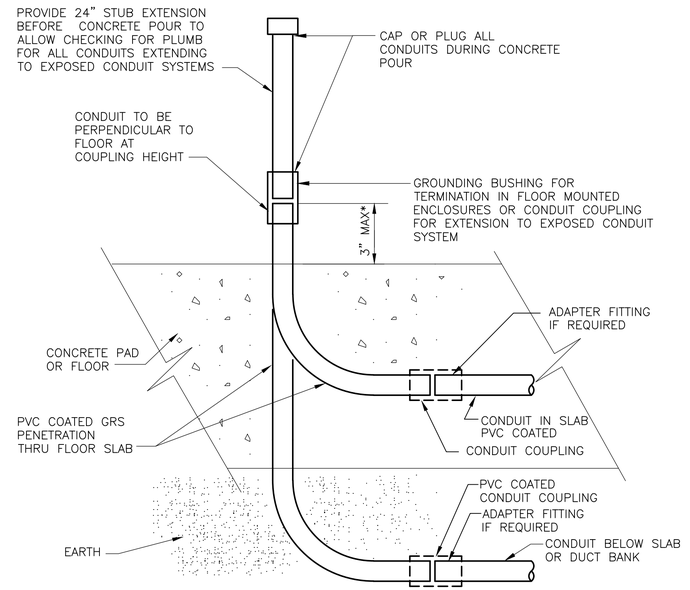
TYPICAL GROUND BAR

DETAIL C — N.T.S. — E-9



CONDUIT PENETRATION THROUGH EXISTING WALL

DETAIL D — N.T.S. — E-13

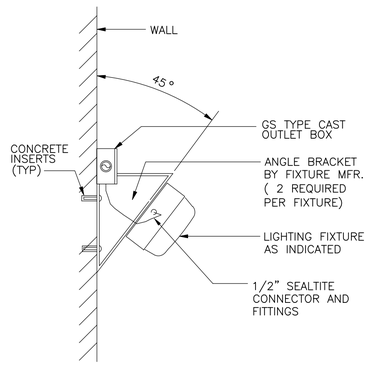


NOTE:
1. APPLICABLE IN ALL AREAS UNLESS NOTED OTHERWISE.
2. FOR DUCT BANKS, MAINTAIN MINIMUM DEPTH TO MEET NEC REQUIREMENTS. DO NOT ROUTE DUCT BANK THROUGH BUILDING FOOTINGS. ROUTE DUCT BANK ABOVE OR BELOW FOOTINGS AS REQUIRED TO MAINTAIN MINIMUM DEPTH REQUIREMENT.

* = 3" SHALL BE MEASURED FROM TOP OF EQUIPMENT PAD IF APPLICABLE, EXCEPT WHERE THIS INTERFERES WITH THE EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTION. REFER TO SPECIFICATION SECTION 26 05 33.

CONDUIT STUB UP/FLOOR PENETRATION

DETAIL E — N.T.S. — –

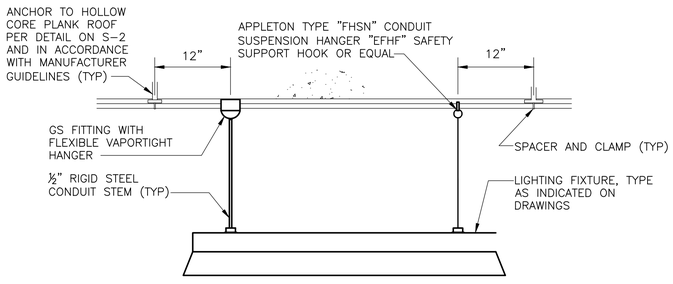


GENERAL NOTES:

1. LUMINAIRE SHALL BE FULL CUT-OFF AND DARK SKY COMPLIANT.

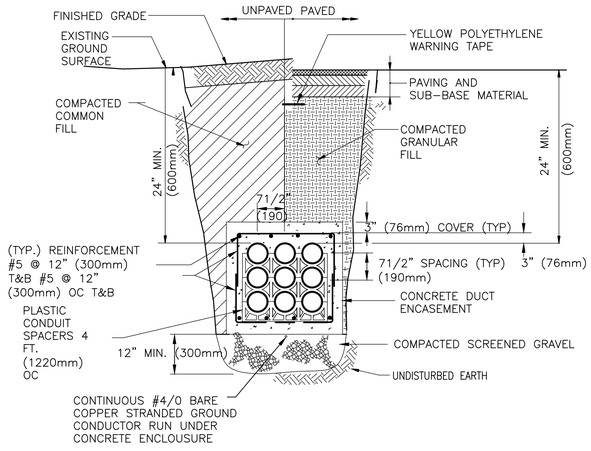
WALL MOUNTING FIXTURE

DETAIL F — NTS — E-10



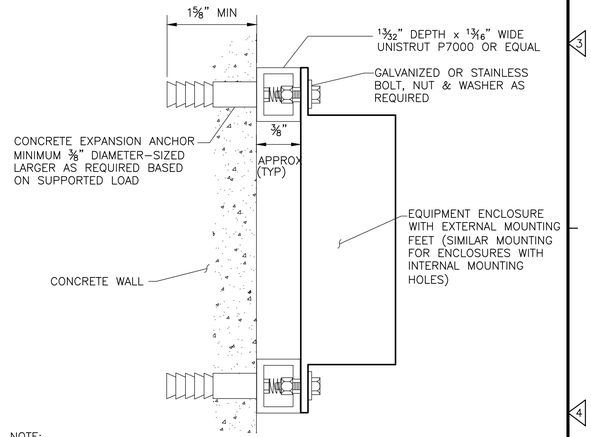
PENDANT MOUNTED LIGHTING FIXTURE

DETAIL G — NTS — E-10



UNDERGROUND DUCT BANK

DETAIL H — NTS — E-4



NOTE:
APPLICABLE FOR ALL NON CAST-IRON ENCLOSURES OR BOXES

EQUIPMENT ENCLOSURE MOUNTING ON CONCRETE WALL

DETAIL I — NTS — –

STATE OF MICHIGAN
VINCENT J. PLANSKY
ENGINEER
10/8/2019
6201043535
LICENSED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: T. MOHAMMED
CROSS CHK'D BY: J. BROZ
APPROVED BY: V. PLANSKY
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

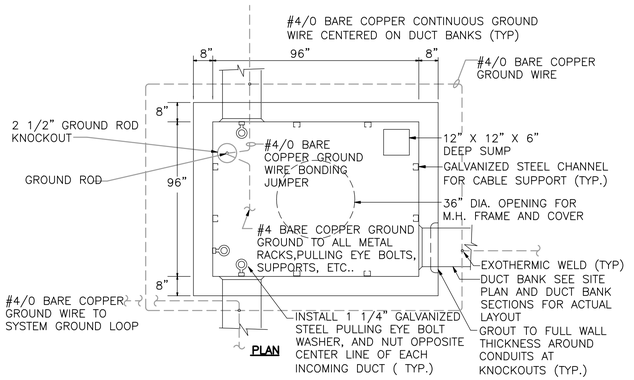
CHEMICAL SYSTEMS FEED BUILDING

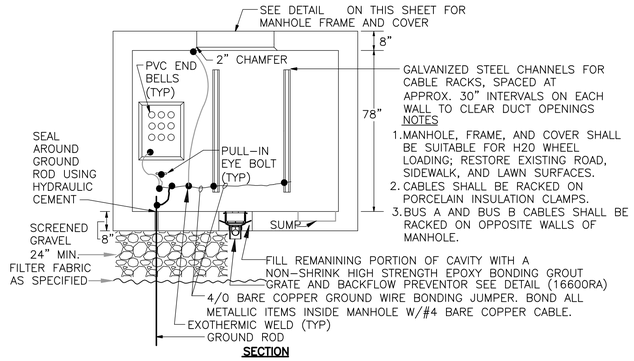
ELECTRICAL
STANDARD DETAILS I

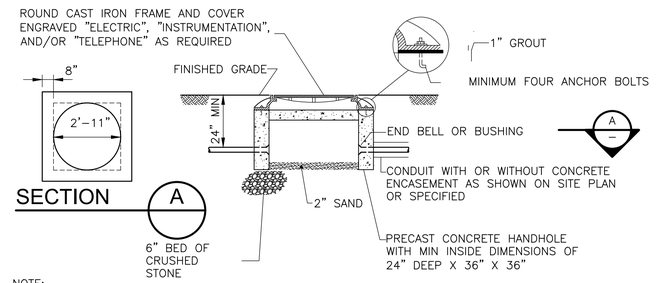
PROJECT NO. 255128-234374
FILE NAME: E018NFSD.DWG

SHEET NO.
E-18

BID SET

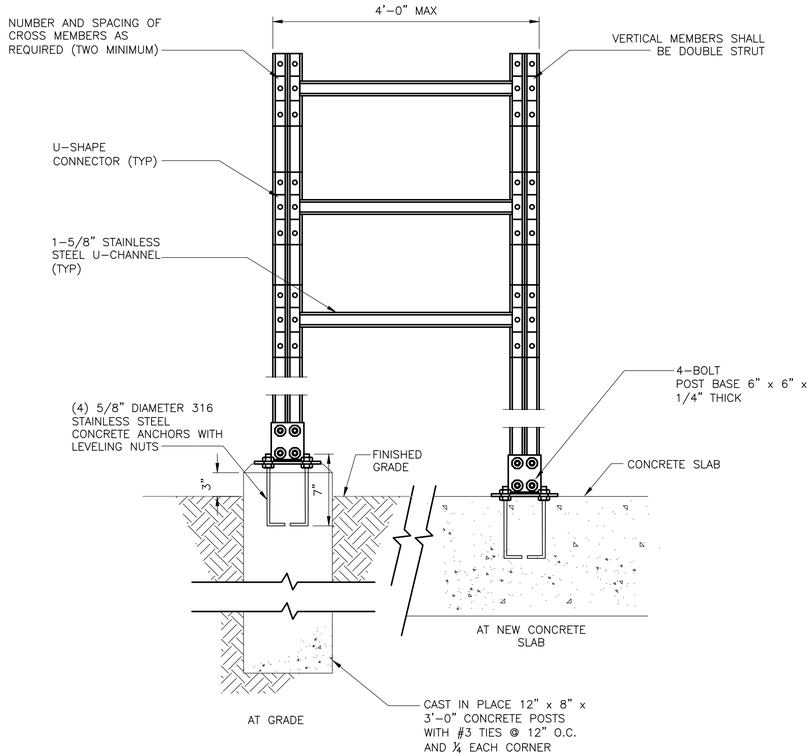






ELECTRICAL HANDHOLE
DETAIL K (E-4)
NTS

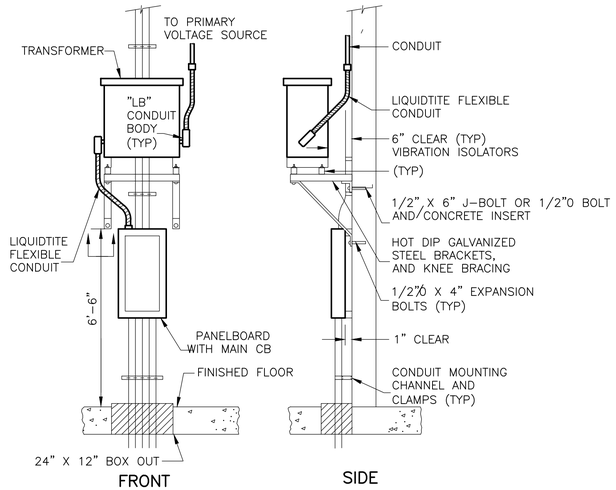
TYPICAL POWER MANHOLE DETAIL
DETAIL □ (E-4)
N.T.S.



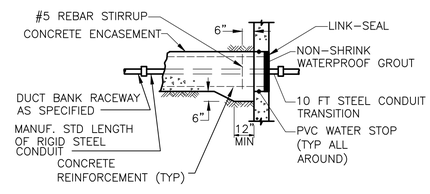
NOTES:

1. PROVIDE GALVANIZED STEEL CHANNEL END-CAPS AND FITTINGS.

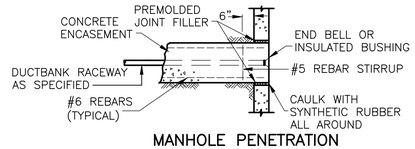
EQUIPMENT MOUNTING RACK
DETAIL L (-)
N.T.S.



WALL-MOUNTED TRANSFORMER AND PANELBOARD
DETAIL M (E-9)
NTS

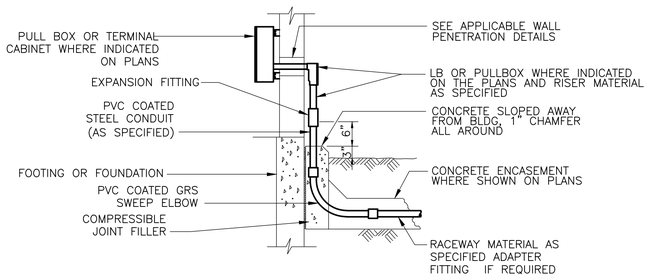


VAULT PENETRATION

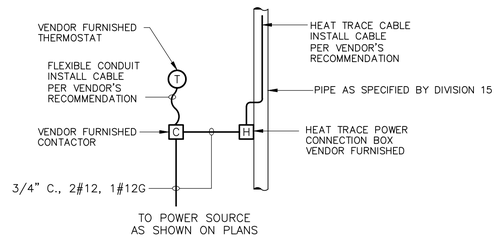


MANHOLE PENETRATION

CONCRETE ENCASED CONDUIT PENETRATION AT MANHOLE OR VAULT
DETAIL N (-)
NTS



ABOVE GRADE CONDUIT PENETRATIONS THROUGH EXISTING BUILDING OR STRUCTURES
DETAIL O (E-12)
NTS



HEAT TRACE CONNECTION WIRING DIAGRAM
DETAIL P (-)
NTS

STATE OF MICHIGAN
VINCENT J PLANSKY
ENGINEER
6201043535
LICENSED PROFESSIONAL ENGINEER
10/8/2019

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. MAGSIPOC
DRAWN BY: N. PARI
SHEET CHK'D BY: R. MAGSIPOC
CROSS CHK'D BY: T. MOHAMMED
APPROVED BY: T. MOHAMMED
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

ELECTRICAL
STANDARD DETAILS II

PROJECT NO. 255128-234374
FILE NAME: E019NFSD.DWG
SHEET NO.
E-19

BID SET

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

SHARED DISPLAY/ SHARED CONTROL				
PRIMARY CHOICE	SECONDARY CHOICE	COMPUTER SOFTWARE	DISCRETE	LOCATION AND ACCESSIBILITY
○	◇	⬡	○	FIELD MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	PRIMARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	PRIMARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	SECONDARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	SECONDARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE

INSTRUMENTS SHARING COMMON HOUSING

FUTURE INSTRUMENTS

PILOT LIGHT

TYPICAL TAG NUMBERS & DESIGNATION

HS 1000A HOA 40

- INSTRUMENT TYPE SEE "INSTRUMENTATION FUNCTION CODE" TABLE
- ADDITIONAL INSTRUMENT IDENTIFICATION SEE "HAND SWITCH ABBREVIATIONS"
- INSTRUMENT IDENTIFICATION LOOP NUMBER
- USED TO DENOTE THE DIVISION THE INSTRUMENT IS SUPPLIED UNDER OR IF THE INSTRUMENT IS EXISTING OR FUTURE.
- WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES.

HAND SWITCH ABBREVIATIONS

E-STOP	= EMERGENCY STOP	S/S	= START/STOP
HOA	= HAND/OFF/AUTO	SRTC	= SPRING RETURN TO CENTER
LOR	= LOCAL/OFF/REMOTE		
LR	= LOCAL/REMOTE		
OCA	= OPEN/CLOSE/AUTO		
OSA	= OPEN/STOP/AUTO		
OSC	= OPEN/STOP/CLOSE		

INSTRUMENT LINE SYMBOLS

- ELECTRICAL SIGNAL
- FUTURE
- VENDOR SUPPLIED CABLE
- COMMUNICATION LINK – FIBER OPTICS
- COMMUNICATION LINK – CAT6 ETHERNET CABLE

INSTRUMENTATION FUNCTION CODE

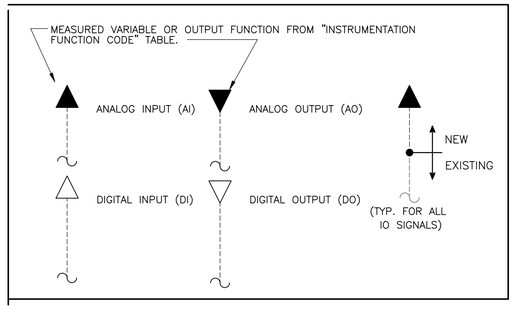
	FIRST LETTERS		SUCCEEDING LETTERS		
	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
	MEASURED/INITIATING VARIABLE	VARIABLE MODIFIER	READOUT/PASSIVE FUNCTION	OUTPUT/ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSED
D	USER'S CHOICE	DIFFERENCE, DIFFERENTIAL			DEVIATION
E	VOLTAGE		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER		SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE		MOMENTARY		MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION, MECHANICAL, ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL, PROBE		
X	UNCLASSIFIED (1)	X-AXIS	ACCESSORY DEVICES, UNCLASSIFIED (1)	UNCLASSIFIED (1)	UNCLASSIFIED (1)
Y	EVENT, STATE, PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS, SAFETY INSTRUMENT SYSTEM		DRIVER, ACTUATOR, UNCLASSIFIED, FINAL CONTROL ELEMENT	

TABLE NOTES:
(1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED.

PRIMARY ELEMENTS

- LS* — ULTRASONIC GAP LEVEL SWITCH — LL=LOW LOW, HH=HIGH HIGH
- FS* — FLOW SWITCH — H=HIGH, L=LOW
- PS* — PRESSURE SWITCH — H=HIGH
- WIT — WEIGHT INDICATING TRANSMITTER
- LE — RADAR LEVEL SENSOR
- PI — PRESSURE GAUGE
- LS* — FLOAT SWITCH — H=HIGH
- VENTURI TUBE — FE

I/O SIGNALS



ELECTRICAL / AIR SOURCES

- UPS → UPS SOURCE (VOLTAGE AS NOTED)
- ES → NON-UPS ELECTRICAL SOURCE (VOLTAGE AS NOTED)

GENERAL ABBREVIATIONS

AI	ANALOG INPUT
AO	ANALOG OUTPUT
CSPCP	CAUSTIC SODA METERING PUMP CONTROL PANEL
CIPCP	CORROSION INHIBITOR METERING PUMP CONTROL PANEL
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
FOPP	FIBER OPTIC PATCH PANEL
FSCP	FILL STATION CONTROL PANEL
GLDC	GENESEE COUNTY DRAIN COMMISSIONER
GLWA	GREAT LAKES WATER AUTHORITY
HIM	HUMAN INTERFACE MODULE
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
MC	MEDIA CONVERTER
MCC	MOTOR CONTROL CENTER
NC	NORMALLY CLOSED
PLC	PROGRAMMABLE LOGIC CONTROLLER
OIT	OPERATOR INTERFACE TERMINAL
PS	POWER SUPPLY
SHCPCP	SODIUM HYPOCHLORITE METERING PUMP CONTROL PANEL
SPD	SURGE PROTECTION DEVICE
TCH	TANK CONTROL HOUSE
UPS	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE

PIPE SERVICE IDENTIFICATION

CI	CORROSION INHIBITOR
CS	CAUSTIC SODA
DR	DRAIN
PW	PLANT WATER
SAM	SAMPLE
SHC	SODIUM HYPOCHLORITE
TW	TREATED WATER
VT	VENT

PIPE SPECIFICATION IDENTIFICATION

CSTL	CARBON STEEL
DIP	DUCTILE IRON PIPE
HDPE	HIGH DENSITY POLYETHYLENE
PVC(SCH 80)	POLYVINYL CHLORIDE SCHEDULE 80

GENERAL NOTES

1. THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.
2. IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON THE INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS FOR PRACTICES FOR INSTRUMENTATION. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMODATE PROJECT REQUIREMENTS.
3. SOME PROCESS ITEMS SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.
4. SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS.
5. LIGHTER WEIGHT LINES, SHOWN AS ———— , INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS ———— OR HEAVIER ———— , INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS — - — - — , INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.

STATE OF MICHIGAN — JOHN M. ROBINSON — ENGINEER — No. 6201069387 — LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

INSTRUMENTATION LEGEND I

PROJECT NO. 255128-234374
FILE NAME: I001SYMB.DWG
SHEET NO. I-1

BID SET

PIPE LINE SYMBOLS

- PIPE UNION
- FLEXIBLE BELLOWS TYPE COUPLING
- FLEXIBLE COUPLING (GENERAL SYMBOL)
- QUICK CONNECT TYPE COUPLING
- HOSE CONNECTION
- Y-STRAINER
- REDUCER/ENLARGER
- AIR FILTER
- SS HDPE — PIPE MATERIAL TRANSFER
- THREADED CAP
- BLIND FLANGE
- CONTINUED PIPE
- CONCENTRIC FLANGE MOUNTED DIAPHRAGM SEAL
- THREADED DIAPHRAGM SEAL
- OPEN EQUIPMENT DRAIN
- DIFFUSER
- BASKET STRAINER
- FILTER
- PULSATION DAMPNER
- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- DOUBLE WALLED PIPE
- DWG NO. / TO/FROM LOCATION — DRAWING CONTINUATION

GATE SYMBOLS

- SLUICE GATE (SLG)
- SLIDE GATE (SG)
- WEIR SLIDE GATE (WSG)
- BUTTERFLY GATE
- BULK HEAD GATE/STOP LOG (BHG)

VALVE SYMBOLS

- GATE VALVE (GV)
- PLUG VALVE (PV)
- BUTTERFLY VALVE (BFV)
- BALL VALVE (BV)
- BACK FLOW PREVENTER VALVE (BFPV)
- GLOBE VALVE (GLV)
- PINCH VALVE (PCHV)
- DIAPHRAGM VALVE (DV)
- SWING CHECK VALVE (CHV)
- BALL CHECK VALVE (BCV)
- S — SOLENOID VALVE (SV)
- TELESCOPIC VALVE (TV)
- NEEDLE VALVE (NV)
- KNIFE VALVE (KNV)
- MUD VALVE (MV)
- PRESSURE REGULATING VALVE (PREGV)
- BACK PRESSURE REGULATING VALVE (BPV)
- DIFFERENTIAL PRESSURE REGULATING VALVE W/ EXTERIOR TAPS
- SELF-CONTAINED DIFFERENTIAL PRESSURE REGULATING VALVE
- AIR RELEASE VALVE (ARV)
- PRESSURE RELIEF VALVE (PRV)
- VACUUM RELIEF VALVE (VRV)
- AIR-VACUUM RELEASE VALVE (AVRV)

TYPICAL PIPE TAG NUMBERS & DESIGNATION

6"-RW-DI-L04W15

- 6" — FLOW DIRECTION
- RW — LINE NO.
- DI — SPEC
- L04 — SERVICE
- W15 — SIZE

VALVE ACTUATORS

- T — HAND (MANUALLY) OPERATED
- DIAPHRAGM, SPRING OPPOSED
- DIAPHRAGM, PRESSURE-BALANCED
- M — ROTARY MOTOR. (SHOWN TYPICALLY WITH ELECTRIC SIGNAL. MAY BE HYDRAULIC OR PNEUMATIC)
- S — SOLENOID
- E/H — ELECTROHYDRAULIC
- CYLINDER, SINGLE-ACTING, SPRING OPPOSED WITHOUT POSITIONER OR PILOT.

TYPICAL EQUIPMENT TAG NUMBERS & DESIGNATION

P-3620

- P — EQUIPMENT IDENTIFICATION
- 3620 — EQUIPMENT TYPE

PROCESS EQUIPMENT SYMBOLS

PARTIAL LIST
ADDITIONAL SYMBOLS MAY BE SHOWN ON THE FLOW DIAGRAMS

- CENTRIFUGAL PUMP
- DIAPHRAGM METERING PUMP
- CALIBRATION COLUMN
- SUBMERSIBLE PUMP
- EMERGENCY EYEWASH SHOWER
- LEVEL SIGHT GAUGE

MISCELLANEOUS SYMBOLS

- M — MOTOR
- M — VARIABLE SPEED MOTOR
- MCC — INDICATES INTERLOCK OR LOGIC IN A MOTOR CONTROL CENTER
- I — INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK
- MS — MOTOR STARTER
- VFD — VARIABLE FREQUENCY DRIVE WITH KEYPAD

SYSTEM ARCHITECTURE SYMBOLS

- OIT — OPERATOR INTERFACE TERMINAL
- MANAGED ETHERNET SWITCH
- PROGRAMMABLE LOGIC CONTROLLER
- FOPP — FIBER OPTIC PATCH PANEL
- UNINTERRUPTIBLE POWER SUPPLY
- MC — MEDIA CONVERTER

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

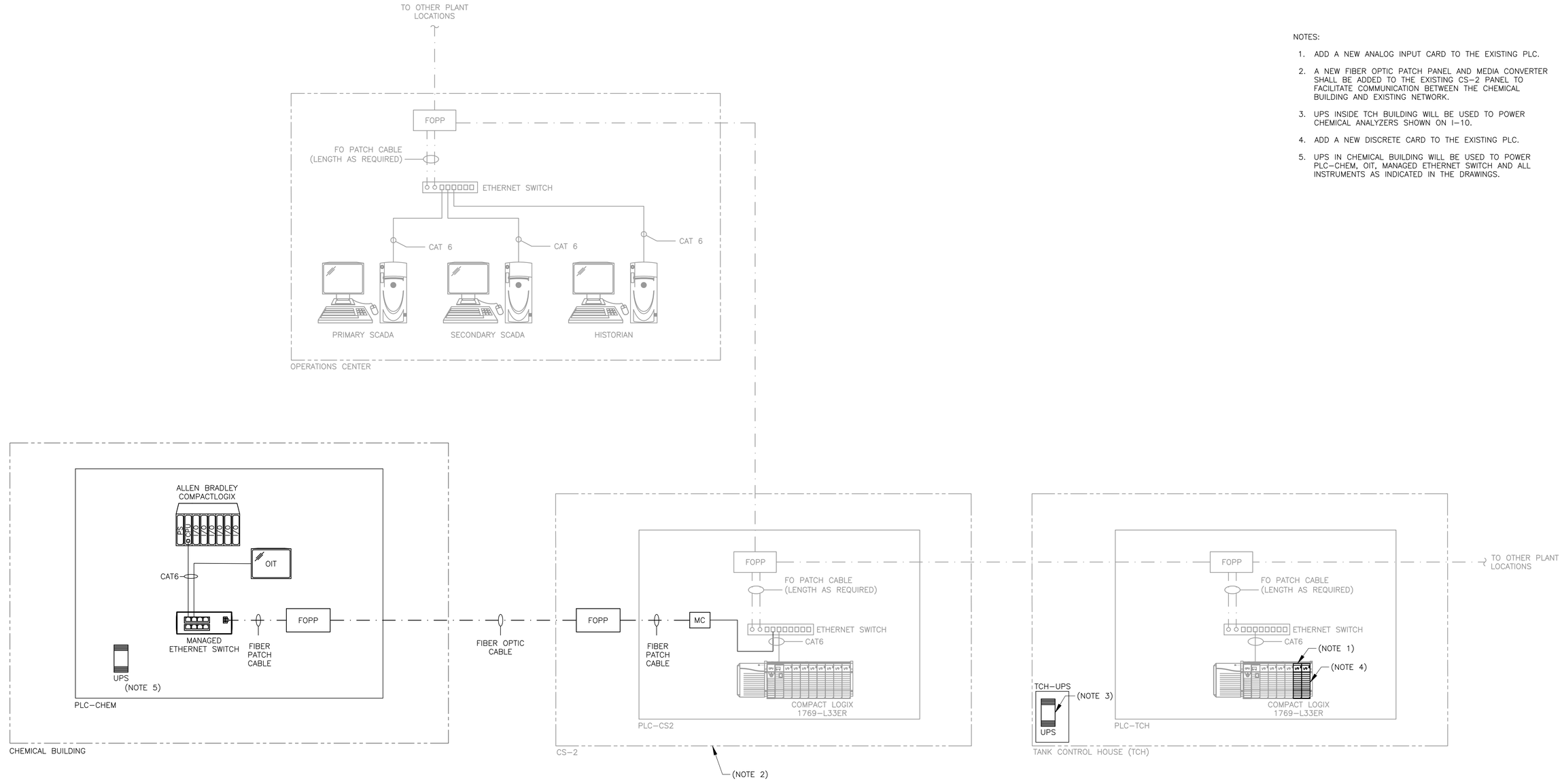
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

INSTRUMENTATION LEGEND II

PROJECT NO. 255128-234374
FILE NAME: I002SYMB.DWG
SHEET NO. I-2

BID SET



NOTES:

1. ADD A NEW ANALOG INPUT CARD TO THE EXISTING PLC.
2. A NEW FIBER OPTIC PATCH PANEL AND MEDIA CONVERTER SHALL BE ADDED TO THE EXISTING CS-2 PANEL TO FACILITATE COMMUNICATION BETWEEN THE CHEMICAL BUILDING AND EXISTING NETWORK.
3. UPS INSIDE TCH BUILDING WILL BE USED TO POWER CHEMICAL ANALYZERS SHOWN ON I-10.
4. ADD A NEW DISCRETE CARD TO THE EXISTING PLC.
5. UPS IN CHEMICAL BUILDING WILL BE USED TO POWER PLC-CHEM, OIT, MANAGED ETHERNET SWITCH AND ALL INSTRUMENTS AS INDICATED IN THE DRAWINGS.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

SYSTEM ARCHITECTURE

PROJECT NO. 255128-234374
FILE NAME: I003PISA.DWG
SHEET NO. I-3

BID SET

XREFs: [CDMS_2234] Images: []
Last saved by: PRAGADHEESHWARANT Time: 9/23/2019 6:07:00 AM
O:\AutoCAD Plant Vault\PW_PL1\255128_234374\PID DWG\I-4.dwg

PLC–CHEM

LOOP NO. 1310 — HIGH LEVEL
LOOP NO. 1300 — FAULT, RUNNING
LOOP NO. 1270 — ALARM, TROUBLE
LOOP NO. 1275 — UPS ON BATTERY, UPS FAULT, UPS LOW BATTERY, UPS ON MAINT. BYPASS
LOOP NO. 1305 — GENARAL HVAC ALARM
LOOP NOS. 1125 & 1225 — PANEL INTRUSION
LOOP NOS. 1015 & 1025 — OPENED, CLOSED
TYP. OF LOOP NOS. 1103 & 1203 — AUTO, OPENED, CLOSED, OPEN, CLOSE
TYP. OF LOOP NOS. 1110 & 1120 — LEVEL, HIGH HIGH LEVEL, LOW LOW LEVEL
LOOP NO. 1710 — OPEN/CLOSE
TYP. OF LOOP NOS. 1210 & 1220 — FAULT, RUNNING
LOOP NO. 1500 — DAY TANK LEVEL (CALCULATED), DAY TANK LOW–LOW LEVEL
LOOP NO. 1105 — RAPID DROP IN LEVEL
LOOP NO. 1125 — BOTH TANKS OFFLINE
LOOP NO. 1325 — PANEL INTRUSION — CR 1325
LOOP NO. 1020 — FLOW ACTIVATED
LOOP NO. 0100 — ALARM LIGHT — XA 0100 40 — ES — (OUTDOOR BEACON)

UPS

FACP (DIV.26)

ATC–1 (DIV.23)

FSCP–1100
SODIUM HYPOCHLORITE (NaOCl) FILL STATION

ES

TANK 1 HIGH HIGH LEVEL — LAHH 1110A
TANK 2 HIGH HIGH LEVEL — LAHH 1120A
TANK 1 HIGH LEVEL — LAH 1110A
TANK 2 HIGH LEVEL — LAH 1120A
TANK 1 FILL VALVE OPENED — ZLO 1015A
TANK 2 FILL VALVE OPENED — ZLO 1025A
TANK 1 LEVEL — LI 1110A
TANK 2 LEVEL — LI 1120A
SILENCE — HS 1100
RESET — HS 1100
PANEL INTRUSION — CR 1125
HORN/STROBE

(OUTSIDE) (DIV. 40) (NOTE 2)

LCP–1200
SODIUM HYPOCHLORITE LOCAL CONTROL PANEL
(NOTE 2)

TANK 1 LOW LOW LEVEL — LALL 1110
TANK 1 LOW LEVEL — LAL 1110
TANK 1 HIGH LEVEL — LAH 1110B
TANK 1 HIGH HIGH LEVEL — LAHH 1110B
TANK 1 LEVEL — LI 1110B
TANK 1 FILL VALVE O/C — HS 1015C
TANK 1 FILL VALVE CLOSED — ZLC 1015A
TANK 1 FILL VALVE OPENED — ZLO 1015B
TANK 1 DISCH. VALVE OCA — HS 1103C
TANK 1 DISCH. VALVE CLOSED — ZLC 1103A
TANK 1 DISCH. VALVE OPENED — ZLO 1103A
PUMP 1 S/S — HS 1210B
PUMP 1 RUNNING — RL 1210
PUMP 1 FAULT — YL 1210
PUMP 1 IN REMOTE — YCI 1210
DAY TANK LEVEL — LI 1500A
DAY TANK HIGH HIGH LEVEL — LAHH 1500
RAPID DROP IN LEVEL — RDL 1105

PANEL INTRUSION — CR 1225
TANK 2 LOW LOW LEVEL — LALL 1120
TANK 2 LOW LEVEL — LAL 1120
TANK 2 HIGH LEVEL — LAH 1120B
TANK 2 HIGH HIGH LEVEL — LAHH 1120B
TANK 2 LEVEL — LI 1120B
TANK 2 FILL VALVE O/C — HS 1025C
TANK 2 FILL VALVE CLOSED — ZLC 1025A
TANK 2 FILL VALVE OPENED — ZLO 1025B
TANK 2 DISCH. VALVE OCA — HS 1203C
TANK 2 DISCH. VALVE CLOSED — ZLC 1203A
TANK 2 DISCH. VALVE OPENED — ZLO 1203A
PUMP 2 S/S — HS 1220B
PUMP 2 RUNNING — RL 1220
PUMP 2 FAULT — YL 1220
PUMP 2 IN REMOTE — YCI 1220
SOLENOID VALVE OCA — HS 1710
DAY TANK LOW LOW LEVEL — LALL 1500
BOTH TANKS OFFLINE — XL 1125

ES

RP–1500 — HIGH–HIGH LEVEL SHUTDOWN — LSHH–1500 — I–5 — FROM SODIUM HYPOCHLORITE DAY TANK
(DIV.40) (DIV.26)
OPEN WATER VALVE — I–5 — TO SOLENOID VALVE SV–1710

3/4"–SHC–PVC(SCH 80)–L04W02

LI 1110 40 — UPS — VENT
LT 1110 40 — UPS
LE 1110 40
LSHH 1110 40 — UPS
LSLL 1110 40 — UPS
6"–SHC–PVC

LOR OSC ES OPENED CLOSED
HS 1015A HS 1015B M ZLO 1015 ZLC 1015
46 46 46 46

PRV–1001
BV–1015
BV–1014
3/4"–SHC–PVC(SCH 80)
3/4"–SHC–PVC(SCH 80)–L04W05
4"–SHC–PVC(SCH 80)–L04W04
P–TRAP
2"–SHC–PVC(SCH 80)–L04W03

T–1110
SODIUM HYPOCHLORITE BULK STORAGE TANK NO. 1

LOR OSC ES OPENED CLOSED
HS 1103A HS 1103B M ZLO 1103 ZLC 1103
46 46 46 46

3"x1 1/2"
BFV–1102
BV–1107
TO DRAIN
2"–DR–PVC(SCH 80)–L04W07
BV–1103
1 1/2"–SHC–PVC(SCH 80)–L04W08
3/4"–SHC–PVC(SCH 80)–L04W20
PRV–1110B
BV–1104
BV–1109
3/4"–SHC–PVC

MCC
HOR HS 1210A MS
(DIV. 26)

PI 1105 40
BV–1108
1 1/2"x1"
P–1210
SODIUM HYPOCHLORITE TRANSFER PUMP NO. 1
1"–SHC–PVC(SCH 80)–L04W06
BCV–1105
BV–1106
PRV–1110F
3/4"–SHC–PVC(SCH 80)–L04W24

SILENCE HS 1020 — ES — (DIV. 22)
FSH 1020 22
POTABLE WATER FROM PLUMBING
BV–1020

ESEW–1020
EMERGENCY SHOWER AND EYEWASH UNIT (CONTAINMENT AREA)

TANK FILL CONNECTION
BV–1001 BCV–1001
3/4"–SHC–PVC(SCH 80)
BV–1002
3/4"–SHC–PVC(SCH 80)
BV–1024

LI 1120 40 — UPS — VENT
LT 1120 40 — UPS
LE 1120 40
LSHH 1120 40 — UPS
LSLL 1120 40 — UPS
6"–SHC–PVC

LOR OSC ES OPENED CLOSED
HS 1025A HS 1025B M ZLO 1025 ZLC 1025
46 46 46 46

BV–1025

T–1120
SODIUM HYPOCHLORITE BULK STORAGE TANK NO. 2

LOR OSC ES OPENED CLOSED
HS 1203A HS 1203B M ZLO 1203 ZLC 1203
46 46 46 46

3"x1 1/2"
BFV–1202
BV–1207
TO DRAIN
2"–DR–PVC(SCH 80)–L04W09
BV–1203
1 1/2"–SHC–PVC(SCH 80)–L04W15
1 1/2"–SHC–PVC(SCH 80)–L04W13
BV–1300
3/4"–SHC–PVC(SCH 80)–L04W31
PRV–1220B
BV–1204
BV–1209
3/4"–SHC–PVC
4"–SHC–PVC(SCH 80)–L04W12
P–TRAP

MCC
HOR HS 1220A MS
(DIV. 26)

PI 1205 40
BV–1208
1 1/2"x1"
P–1220
SODIUM HYPOCHLORITE TRANSFER PUMP NO. 2
1"–SHC–PVC(SCH 80)–L04W17
BCV–1205
BV–1206
PRV–1220F
3/4"–SHC–PVC(SCH 80)–L04W35
3/4"–SHC–PVC
BV–1310

1"–SHC–PVC(SCH 80)–L0405 — SODIUM HYPOCHLORITE — I–5 — TO SODIUM HYPOCHLORITE DAY TANK

NOTES:
1. ALL SODIUM HYPOCHLORITE BALL VALVES TO BE VENTED CAVITY BALL VALVES INSTALLED WITH THE DRILLED HOLE FACING UPSTREAM.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

LCP–1300
SUMP PUMP CONTROL PANEL
ES — MS — S/S HS 1300
(DIV.46)

LSH 1310 40
LSL 1310 40

BV–1300B 1 1/2"–DR–PVC(SCH 80)–L04W27 — TO SANITARY SEWER
BV–1300C
3/4"–DR–PVC(SCH 80)–L04W25
BV–1300A
GLV–1300
TANKER TRUCK
BCV–1300

P–1300
SUMP PUMP

SODIUM HYPOCHLORITE CONTAINMENT SUMP

CONTINUED TO I–5

JOHN M. ROBINSON ENGINEER No. 6201069387 LICENSED PROFESSIONAL ENGINEER STATE OF MICHIGAN
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM SODIUM HYPOCHLORITE SYSTEM (1 OF 2)

PROJECT NO. 255128–234374
FILE NAME: I004PIDI.DWG
SHEET NO. I-4

BID SET

LOOP NO. 1500 — WEIGHT

LOOP NO. 1500 — HIGH HIGH LEVEL

TYP. OF LOOP NOS. 1610 & 1620 — LEAK, AUTO, RUNNING, START/STOP, SPEED SETPOINT, SPEED FEEDBACK, VFD FAULT, HIGH PRESSURE

LOOP NO. 1651 — LOW FLOW

PLC–CHEM

LSHH–1500
I–4
TO RELAY PANEL RP–1500

LCP–1610
SODIUM HYPOCHLORITE METERING PUMP LOCAL CONTROL PANEL

ES

	HOA	RESET	SPEED FEEDBACK	SPEED CONTROL	HIGH PRESSURE	VFD FAULT	LEAK
	HS 1610A	HS 1610B	SI 1610	SC 1610	PAH 1610	XA 1610A	XA 1610B
VFD VFD	HS 1620A	HS 1620B	SI 1620	SC 1620	PAH 1620	XA 1620A	XA 1620B

(DIV.46)

VENT

3"–SHC–PVC(SCH 80)–L05W01

3/4"–SHC–PVC(SCH 80)–L05W11

3/4"–SHC–PVC(SCH 80)–L05W24

3/4"–SHC–PVC(SCH 80)–L05W23

1"–SHC–PVC(SCH 80)–L0405

1"x1/2"

1/2"x1"

I–4
FROM SODIUM HYPOCHLORITE TRANSFER PUMPS

BPV–1500

UPS

LSHH 1500 40

2"–SHC–PVC(SCH 80)–L05W02

T–1500
SODIUM HYPOCHLORITE DAY TANK

P–TRAP

1"–DR–PVC(SCH 80)–L05W03

BV–1500A

UPS — WIT 1500 40 — WE 1500 40

PRV–1615

BV–1500C

1"–SHC–PVC–L05W04

BV–1615

1"x3/4"

3/4"–SHC–PVC(SCH 80)

BV–1610B

BV–1610

BV–1610A

3/4"–SHC–PVC(SCH 80)–L05W06

3/4"–SHC–PVC(SCH 80)–L05W09

P–1610
SODIUM HYPOCHLORITE METERING PUMP NO. 1

BV–1610C

BV–1610D

PRV–1610C

PI 1612 46

PSH 1610 46

BV–1612

BPV–1200

BV–1610E

1/2"–SHC–PVC(SCH 80)–L05W14

3/4"–SHC–PVC(SCH 80)–L05W10

3/4"–SHC–PVC(SCH 80)

BV–1620B

BV–1620

BV–1620A

3/4"–SHC–PVC(SCH 80)–L05W07

P–1620
SODIUM HYPOCHLORITE METERING PUMP NO. 2

BV–1620C

BV–1620D

PRV–1620C

PI 1622 46

PSH 1620 46

BV–1622

BPV–1620

BV–1620E

1/2"–SHC–PVC(SCH 80)–L05W08

VENDOR PACKAGE (DIV. 46)

SHC CHEMICAL CONTAINMENT | CS CHEMICAL CONTAINMENT | CI CHEMICAL CONTAINMENT

1/2"x3/4"

3/4"(3")–SHC–PVC(PVC)–L0510

I–10
TO APPLICATION POINT

BV–1650A

3/4"–SHC–PVC

BV–1650C

BV–1708

BCV–1707

NV–1706

FE 1705

BV–1651

FSL 1651 40

BV–1703

BV–1704

SV–1710

OPEN WATER VALVE

OPEN/ CLOSE COMMAND
I–4
FROM LCP–1210

BV–1702

BV–1701

2"–TW–PVC(SCH 80)–L05W20

2"x3/4"

3/4"–TW–PVC(SCH 80)–L05W20

FROM CONTROL STATION NO. 2

CONTINUED FROM I–4

SODIUM HYPOCHLORITE CONTAINMENT AREA

NOTES:

1. ALL SODIUM HYPOCHLORITE BALL VALVES TO BE VENTED CAVITY BALL VALVES INSTALLED WITH THE DRILLED HOLE FACING UPSTREAM.

STATE OF MICHIGAN — LICENSED PROFESSIONAL ENGINEER — JOHN M. ROBINSON ENGINEER No. 6201069387 — 10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM SODIUM HYPOCHLORITE SYSTEM (2 OF 2)

PROJECT NO. 255128–234374
FILE NAME: I005PIDI.DWG

SHEET NO.
I-5

BID SET

XREFs: [CDMS_2234] Images: []
Last saved by: PRAGADHEESHWARANT Time: 9/30/2019 6:17:40 AM
O:\AutoCAD Plant Vault\PW_PLT\255128_234374\PID DWG\I-6.dwg

LOOP NO. 2310 — HIGH LEVEL
LOOP NO. 2300 — FAULT, RUNNING
LOOP NO. 2710 — OPEN/CLOSE
LOOPS NOS. 2125 & 2225 — PANEL INTRUSION
LOOP NO. 2105 — RAPID DROP IN LEVEL
LOOP NO. 2100 — LEVEL, LOW LOW LEVEL, HIGH HIGH LEVEL
TYP. OF LOOP NOS. 2210 & 2220 — FAULT, RUNNING
LOOP NO. 2500 — DAY TANK LEVEL (CALCULATED), DAY TANK LOW-LOW LEVEL
LOOP NO. 2020 — FLOW ACTIVATED

PLC-CHEM

FSCP-2100
CAUSTIC SODA (NaOH)
FILL STATION CONTROL PANEL
(NOTE 1)
PANEL INTRUSION CR 2125
LEVEL LI 2100A
HIGH HIGH LEVEL LAHH 2100A
HORN/STROBE
SILENCE HS 2100A
RESET HS 2100B
HIGH LEVEL LAH 2100A
ES
(OUTSIDE)
(DIV.40)

LCP-2200
CAUSTIC SODA
LOCAL CONTROL PANEL
(NOTE 1)
ES
TANK LEVEL LI 2100B
TANK LOW LOW LEVEL LALL 2100
TANK HIGH HIGH LEVEL LAHH 2100B
PUMP 1 S/S HS 2210B
PUMP 1 RUNNING RL 2210
PUMP 1 FAULT YL 2210
PUMP 1 IN REMOTE YCL 2210
DAY TANK LEVEL LI 2500
DAY TANK HIGH HIGH LEVEL LAHH 2500
RAPID DROP IN LEVEL RDL 2105
PANEL INTRUSION CR 2225
TANK LOW LEVEL LAL 2100
TANK HIGH LEVEL LAH 2100B
PUMP 2 S/S HS 2220B
PUMP 2 RUNNING RL 2220
PUMP 2 FAULT YL 2220
PUMP 2 IN REMOTE YCL 2220
SOLENOID VALVE OCA HS 2710
DAY TANK LOW LOW LEVEL LALL 2500
(DIV.40)

SILENCE HS 2020 — ES — (DIV. 22)
FSH 2020 — 22
POTABLE WATER FROM PLUMBING
BV-2020
ESEW-2020
EMERGENCY SHOWER AND EYEWASH UNIT
(CONTAINMENT AREA)

OPEN WATER VALVE → I-7 TO SOLENOID VALVE SV-2710

VENT
UPS
LI 2100 40
LT 2100 40
LE 2100 40
LSHH 2100 40
LSLL 2100 40
6"-CS-PVC-L06W01

TANK FILL CONNECTION
BV-2100A BCV-2100
2"-CS-PVC(SCH 80)-L06W03
3/4"-CS-PVC
BV-2100E

LOW-LOW LEVEL SHUTDOWN
RP-2100 (DIV.26)
MCC HOR HS 2210A MS (DIV. 26)
RP-2500 (DIV.26)
HIGH-HIGH LEVEL SHUTDOWN
LSHH-2500 I-7 FROM CAUSTIC SODA DAY TANK

PI 2210 40
BV-2210C
M
1 1/2"-CS-CSTL-L06W06
BV-2210A
1 1/2"x1"
1"-CS-CSTL-L06W10
BCV-2210 BV-2210D
3/4"-CS-CSTL BV-2210B
P-2210
CAUSTIC SODA
TRANSFER PUMP NO. 1

T-2100
CAUSTIC SODA
BULK STORAGE TANK
4"-CS-PVC-L06W02
3"x1 1/2"
1 1/2"-CS-CSTL-L06W05
BFV-2100B
BV-2100F
2"-DR-CSTL-L06W17
BV-2100C
3/4"-CS-CSTL BV-2100D

MCC HOR HS 2220A MS (DIV. 26)
PI 2220 40
BV-2220C
M
1 1/2"-CS-CSTL-L06W07
BV-2220A
1 1/2"x1"
1"-CS-CSTL-L06W11
BCV-2220 BV-2220D
3/4"-CS-CSTL BV-2220B
P-2220
CAUSTIC SODA
TRANSFER PUMP NO. 2

1"-CS-CSTL-L0607 → I-7 TO CAUSTIC SODA DAY TANK
BV-2231

LCP-2300
SUMP PUMP
CONTROL PANEL
ES — MS — S/S HS 2300
(DIV.46)

LSH 2310 40
LSL 2310 40
1 1/2"-SFM-PVC(SCH 80)-L06W16
BV-2300D
TO SANITARY SEWER
3/4"-CS-PVC(SCH 80)-L06W15
BV-2300A
TANKER TRUCK
GLV-2300
BV-2300C
M
BCV-2300
P-2300
SUMP PUMP
CAUSTIC SODA CONTAINMENT SUMP

CONTINUED TO I-7

NOTES:

1. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM CAUSTIC SODA (1 OF 2)

PROJECT NO. 255128-234374
FILE NAME: I006PIDI.DWG
SHEET NO. I-6

BID SET

LOOP NO. 2500 — WEIGHT

LOOP NO. 2500 — HIGH HIGH LEVEL

TYP. OF LOOP NOS. 2610 & 2620 — LEAK, AUTO, RUNNING, START/STOP, SPEED SETPOINT, SPEED FEEDBACK, VFD FAULT, HIGH PRESSURE

LOOP NO. 2651 — LOW FLOW

PLC–CHEM

LSHH–2500
I–6
TO RELAY CONTROL PANEL RP–2500

LCP–2610
CAUSTIC SODA METERING PUMP LOCAL CONTROL PANEL

ES

	HOA	RESET	SPEED FEEDBACK	SPEED CONTROL	HIGH PRESSURE	VFD FAULT	LEAK
VFD	HS 2610A	HS 2610B	SI 2610	SC 2610	PAH 2610	XA 2610A	XA 2610B
VFD	HS 2620A	HS 2620B	SI 2620	SC 2620	PAH 2620	XA 2620A	XA 2620B

(DIV.46)

VENT

UPS

3"–CS–PVC–L07W01

3/4"–CS–CSTL–L07W21

3/4"–CS–PVC–L07W22

I–6
FROM CAUSTIC SODA TRANSFER PUMPS

1"–CS–CSTL–L0607

1"x1/2"

1/2"x1"

BPV–2500

LSHH 2500 40

CSTL PVC

T–2500
CAUSTIC SODA DAY TANK

2"–CS–PVC–L07W02

1"–DR–CSTL–L07W05

BV–2500A

UPS — WIT 2500 40 — WE 2500 40

3/4"–DR–CSTL–L07W07

BV–2500D

BV–2500C 1"x3/4"

1"–CS–CSTL–L07W04

BV–2610C

BV–2610A

3/4"–CS–PVC

BV–2610B

3/4"–CS–PVC(SCH 80)–L07W08

P–2610
CAUSTIC SODA METERING PUMP NO. 1

3/4"–CS–PVC

BV–2610D

1/2"–CS–PVC(SCH 80)–L07W08

BV–2610

PRV–2613

PI 2612 46

PSH 2610 46

BV–2611A

BPV–2610

BV–2610E

3/4"–CS–PVC–L07W24

BV–2620C

BV–2620A

3/4"–CS–PVC

BV–2620B

3/4"–CS–PVC(SCH 80)–L07W13

P–2620
CAUSTIC SODA METERING PUMP NO. 2

3/4"–CS–PVC

BV–2620D

1/2"–CS–PVC(SCH 80)–L07W13

BV–2620

PRV–2623

PI 2622 46

PSH 2620 46

BV–2621A

BPV–2620

BV–2620E

VENDOR PACKAGE (DIV. 46)

CS CHEMICAL CONTAINMENT

CI CHEMICAL CONTAINMENT

1/2"x3/4"

BV–2650A

I–10
TO APPLICATION POINT

3/4"(3")–CS–PVC(PVC)–L0710

BV–2708

BV–2650C

3/4"–CS–PVC–L07W35

BCV–2707

NV–2706

FE 2705

BV–2651

FSL 2651 40

BV–2703

BV–2704

SV–2710

OPEN WATER VALVE

OPEN/CLOSE COMMAND
I–6
FROM LCP–2200

BV–2702

BV–2701

HIGH PRESSURE POTABLE WATER
FROM CONTROL STATION NO. 2

2"–TW–PVC(SCH 80)–L07W28

2"x3/4"

3/4"–TW–PVC(SCH 80)–L07W28

CONTINUED FROM I–6

CAUSTIC SODA CONTAINMENT AREA

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM CAUSTIC SODA (2 OF 2)

PROJECT NO. 255128–234374
FILE NAME: I007PIDI.DWG

SHEET NO.
I-7

BID SET

LOOP NO. 3005 — FLOW SWITCH ACTIVATED
LOOP NO. 3310 — HIGH LEVEL
LOOP NO. 3300 — FAULT, RUNNING
LOOP NO. 3105 — RAPID DROP IN LEVEL
LOOP NOS. 3125 & 3225 — PANEL INTRUSION
LOOP NO. 3100 — LEVEL, LOW LOW LEVEL, HIGH HIGH LEVEL
TYP. OF LOOP NOS. 3210 & 3220 — FAULT, RUNNING
LOOP NO. 3500 — DAY TANK LEVEL (CALCULATED), DAY TANK LOW-LOW LEVEL
LOOP NO. 3710 — OPEN/CLOSE
LOOP NO. 3010 — FLOW ACTIVATED

PLC-CHEM

ES — SILENCE HS 3005 (DIV. 22) — FSH 3005 22
POTABLE WATER FROM PLUMBING — BV-3005
ESEW-3005 EMERGENCY SHOWER AND EYEWASH UNIT (TANK FILL AREA)

ES — SILENCE HS 3010 (DIV. 22) — FSH 3010 22
POTABLE WATER FROM PLUMBING — BV-3010
ESEW-3010 EMERGENCY SHOWER AND EYEWASH UNIT (CONTAINMENT AREA)

FSCP-3100 CORROSION INHIBITOR (P043-) FILL STATION CONTROL PANEL (NOTE 1) (OUTSIDE)
- LEVEL LI 3100A
- PANEL INTRUSION CR 3125
- HIGH HIGH LEVEL LAHH 3100A
- HORN/STROBE
- SILENCE HS 3100A
- RESET HS 3100B
- HIGH LEVEL LAH 3100A

ES — **LCP-3200** CORROSION INHIBITOR LOCAL CONTROL PANEL (NOTE 1) (DIV.40)
- TANK LEVEL LI 3100B
- TANK LOW LOW LEVEL LALL 3100
- TANK HIGH HIGH LEVEL LAHH 3100B
- PUMP 1 S/S HS 3210B
- PUMP 1 RUNNING RL 3210
- PUMP 1 IN REMOTE YL 3210
- PUMP 1 FAULT YL 3210
- DAY TANK LEVEL LI 3500
- DAY TANK HIGH HIGH LEVEL LAHH 3500
- RAPID DROP IN LEVEL RDL 3105
- PANEL INTRUSION CR 3225
- TANK LOW LEVEL LAL 3100
- TANK HIGH LEVEL LAH 3100B
- PUMP 2 S/S HS 3220B
- PUMP 2 RUNNING RL 3220
- PUMP 2 IN REMOTE YL 3220
- PUMP 2 FAULT YL 3220
- SOLENOID VALVE OCA HS 3710
- DAY TANK LOW LOW LEVEL LALL 3500

OPEN WATER VALVE → I-9 TO SOLENOID VALVE SV-3710

TANK FILL CONNECTION — BV-3100A — BCV-3100 — 2"-CI-PVC(SCH 80)-L08W03
VENT — 6"-CI-PVC
LI 3100 40 (DIV.40) UPS
LT 3100 40 — LE 3100 40
LSHH 3100 40 UPS — LSLL 3100 40 UPS
LOW-LOW LEVEL SHUTDOWN

RP-3100 I (DIV.26)
MCC — HOR HS 3210A MS (DIV. 26)
RP-3500 I (DIV.26)
HIGH-HIGH LEVEL SHUTDOWN
LSHH-3500 I-9 FROM CORROSION INHIBITOR DAY TANK

PI 3210 40 — BV-3210C

T-3100 CORROSION INHIBITOR BULK STORAGE TANK
- 3/4"-CI-PVC(SCH 80)-L08W02 — BV-3100F
- 4"-CI-PVC(SCH 80)-L08W02

3"x1 1/2" — 1 1/2"-CI-PVC(SCH 80)-L08W05 — BV-3100C
BFV-3100B — BV-3100E — TO DRAIN — 2"-DR-PVC(SCH 80)-L08W17
3/4"-CI-PVC(SCH 80) — BV-3100D

1 1/2"-CI-PVC(SCH 80)-L08W06 — BV-3210A — 3/4"-CI-PVC(SCH 80) — BV-3210B
1 1/2"x1" — **P-3210** CORROSION INHIBITOR TRANSFER PUMP NO. 1
1"-CI-PVC(SCH 80)-L08W10 — BCV-3210 BV-3210D
1"-CI-PVC(SCH 80)-L0809 → I-9 TO CORROSION INHIBITOR DAY TANK

MCC — HOR HS 3220A MS (DIV. 26)
PI 3220 40 — BV-3220C

1 1/2"-CI-PVC(SCH 80)-L08W07 — BV-3220A — 3/4"-CI-PVC(SCH 80) — BV-3220B
1 1/2"x1" — **P-3220** CORROSION INHIBITOR TRANSFER PUMP NO. 2
1"-CI-PVC(SCH 80)-L08W11 — BCV-3220 BV-3220D
BV-3231

ES — **LCP-3300** SUMP PUMP CONTROL PANEL — MS — S/S HS 3300 (DIV.46)
- LSH 3310 40
- LSL 3310 40

1 1/2"-SFM-PVC(SCH 80)-L08W16 — BV-3300D → TO SANITARY SEWER
3/4"-CI-PVC(SCH 80)-L08W15 — BV-3300A — GLV-3300 — TANKER TRUCK
BV-3300C — BCV-3300
P-3300 SUMP PUMP

CONTINUED TO I-9

CORROSION INHIBITOR CONTAINMENT SUMP

NOTES:
1. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

STATE OF MICHIGAN — JOHN M. ROBINSON ENGINEER No. 6201069387 — LICENSED PROFESSIONAL ENGINEER — 10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM CORROSION INHIBITOR SYSTEM (1 OF 2)

PROJECT NO. 255128-234374
FILE NAME: I008PIDI.DWG
SHEET NO. I-8

BID SET

LOOP NO. 3500 — WEIGHT

LOOP NO. 3500 — HIGH HIGH LEVEL

TYP. OF LOOP NOS. 3610 & 3620 — LEAK, AUTO, RUNNING, START/STOP, SPEED SETPOINT, SPEED FEEDBACK, VFD FAULT, HIGH PRESSURE

LOOP NO. 3651 — LOW FLOW

PLC–CHEM

LSHH–3500
I–8
TO RELAY PANEL RP–3500

LCP–3610
CORROSION INHIBITOR METERING PUMP LOCAL CONTROL PANEL

ES –

	HOA	RESET	SPEED FEEDBACK	SPEED CONTROL	HIGH PRESSURE	VFD FAULT	LEAK
VFD	HS 3610A	HS 3610B	SI 3610	SC 3610	PAH 3610	XA 3610A	XA 3610B
VFD	HS 3620A	HS 3620B	SI 3620	SC 3620	PAH 3620	XA 3620A	XA 3620B

(DIV.46)

VENT

UPS

1"–CIW–PVC(SCH 80)–L0809

I–8
FROM CORROSION INHIBITOR TRANSFER PUMPS

1"x1/2"

1/2"x1"

BPV–3500

LSHH 3500 40

3"–CI–PVC(SCH 80)–L09W01

3/4"–CI–PVC(SCH 80)–L09W18

2"–CI–PVC(SCH 80)–L09W02

T–3500
CORROSION INHIBITOR DAY TANK

3/4"–DR–PVC(SCH 80)

BV–3500D

1"x3/4"

BV–3500C

1"–CI–PVC(SCH 80)–L09W04

1"–CI–PVC(SCH 80)–L09W05

BV–3500A

UPS — WIT 3500 40 — WE 3500 40

3/4"–CI–PVC(SCH 80)–L09W22

BV–3610C

BV–3610A

3/4"–CI–PVC(SCH 80)

BV–3610B

3/4"–CI–PVC(SCH 80)–L09W08

P–3610
CORROSION INHIBITOR METERING PUMP NO. 1

3/4"–CI–PVC(SCH 80)

BV–3610D

BV–3610

PRV–3613

PI 3612 46

PSH 3610 46

BV–3611A

1/2"–CI–PVC(SCH 80)–L09W08

BPV–3610

BV–3610E

3/4"–CI–PVC(SCH 80)–L09W21

BV–3620C

BV–3620A

3/4"–CI–PVC(SCH 80)

BV–3620B

3/4"–CI–PVC(SCH 80)–L09W13

P–3620
CORROSION INHIBITOR METERING PUMP NO. 2

3/4"–CI–PVC(SCH 80)

BV–3620D

BV–3620

PRV–3623

PI 3622 46

PSH 3620 46

BV–3621A

1/2"–CI–PVC(SCH 80)–L09W13

BPV–3620

BV–3620E

VENDOR PACKAGE (DIV. 46)

INSIDE CHEMICAL CONTAINMENT | OUTSIDE CHEMICAL CONTAINMENT

1/2"x3/4"

BV–3650A

I–10
TO APPLICATION POINT

3/4"(3")–CI–PVC(PVC)–L0910

BV–3650C

3/4"–CI–PVC(SCH 80)–L09W35

BV–3708

BCV–3707

NV–3706

FE 3703

BV–3651

FSL 3651 40

BV–3703

BV–3704

SV–3710

OPEN WATER VALVE

OPEN/CLOSE COMMAND
I–8
FROM LCP–3200

BV–3702

BV–3701

HIGH PRESSURE POTABLE WATER
FROM CONTROL STATION NO. 2

2"–TW–PVC(SCH 80)–L09W40

2"x3/4"

3/4"–TW–PVC(SCH 80)–L09W40

CONTINUED FROM I–8

CORROSION INHIBITOR CONTAINMENT AREA

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM CORROSION INHIBITOR SYSTEM (2 OF 2)

PROJECT NO. 255128–234374
FILE NAME: I009PIDI.DWG

SHEET NO.
I-9

BID SET

XREFS: [CDMS_2234] Images: []
Last saved by: PRAGADHEESHWARANT Time: 9/30/2019 6:18:02 AM
O:\AutoCAD Plant Vault\PW_PLT\255128_234374\PID DWG\I–9.dwg

LOOP NO. 0301 — FLOW
LOOP NO. 0300 — FLOW
LOOP NO. 0305 — FLOW
LOOP NO. 0330 — LEAK (NOTE 5)
PLC–CS2

LOOP NO. 0105 — UPS ON BATTERY; UPS FAULT; UPS LOW BATTERY; UPS ON MAINT. BYPASS (NOTE 4)
PLC–TCH

LOOP NO. 0101 — CHLORINE (NOTE 3)
LOOP NO. 0102 — pH (NOTE 3)
LOOP NO. 0103 — PHOSPHATE (NOTE 3)

LOOP NO. 0302 — FLOW
PLC–CHEM

LDP–330 LEAK DETECTION PANEL — O/O HS 0330A; POWER JL 0330; ALARM RESET HS 0330B ← ES
(DIV.46)

TCH–UPS — UPS
(DIV.40)

TREATED WATER FROM GLWA

GV–0300
GV–0301
FIT 0300
FE 0300
FIT 0301
FE 0301
(BY OTHERS)
(NOTE 1)
CS–2

TREATED WATER B/L FROM GCDC
36"–TW–DIP–L10W05

GV–1600
48"–TW–HDPE–L10W02
48"x36"
4"–TW–DIP–L10W08

AIT 0102 — UPS — 40 — V — AE 0101 — CL2 — 40 — BV–0201
AE 0102 — pH — 40 — BV–0102A; BV–0102C
AIT 0103 — UPS — 40 — AE 0103 — PO43– — 40 — BV–0103
BV–0102B — 3/4"–SAM–PVC(SCH 80)–L10W04 — GV–0204
GLV–0200
DRAIN; DRAIN; DRAIN
3"–SAN–PVC(SCH 80)
DRAIN TO SUMP PUMP IN BASEMENT
TANK CONTROL HOUSE (TCH) BUILDING

48"–TW–DIP–L10W08 (BY OTHERS)

TREATED WATER TO DORT RESERVOIR
FIT 0302 — 22 — V — FE 0302 — 22 — BV–0303 — WATER METER
BFPV–0305 — PRV–0306 — DOMESTIC WATER
BFPV–0307 — PRV–0308 — PROTECTED WATER
CARRIER WATER — PRV–0309 — TO CHEMICAL SYSTEM
FIRE SPRINKLER RISER
NEW CHEMICAL BUILDING

TREATED WATER TO DISTRIBUTION
48"

INJECTION POINTS
BCV–3662 / BV–3661
BCV–1662 / BV–1661
BCV–2661 / BV–2661
INJECTION QUILL ASSEMBLY (TYP.)
FIT 0305
FE 0305
(BY OTHERS)

CORROSION INHIBITOR I–9 FROM CHEMICAL FEED BUILDING
3/4"(3")–CI–PVC(PVC)–L0910
LSH 3630 — 46
BPV–3650
BV–3640
3/4"–CI–PVC(SCH 80)

SODIUM HYPOCHLORITE I–5 FROM CHEMICAL FEED BUILDING
3/4"(3")–SHC–PVC(PVC)–L0510
LSH 1630 — 46
BPV–1650
BV–1640
3/4"–SHC–PVC(SCH 80)

CAUSTIC SODA I–7 FROM CHEMICAL FEED BUILDING
3/4"(3")–CS–PVC(PVC)–L0710
LSH 2630 — 46
BPV–2650
BV–2640
3/4"–CS–CSTL

GCDC VAULT (BY OTHERS)

NOTES:

1. NOT ALL EXISTING INSTRUMENTS SHOWN.
2. ALL SODIUM HYPOCHLORITE BALL VALVES TO BE VENTED CAVITY BALL VALVES INSTALLED WITH THE DRILLED HOLE FACING UPSTREAM.
3. ANALOG SIGNALS WILL BE WIRED TO NEW AI MODULES AT THE EXISTING ELEVATED TANK CONTROL HOUSE BY CONTRACTOR.
4. UPS SIGNALS WILL BE WIRED TO NEW DI MODULES AT THE EXISTING ELEVATED TANK CONTROL HOUSE BY CONTRACTOR.
5. THE LEAK INPUT WILL BE WIRED TO SPARE DI IN CS–2 PLC.

STATE OF MICHIGAN — JOHN M. ROBINSON ENGINEER No. 6201069387 — LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. PROK
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

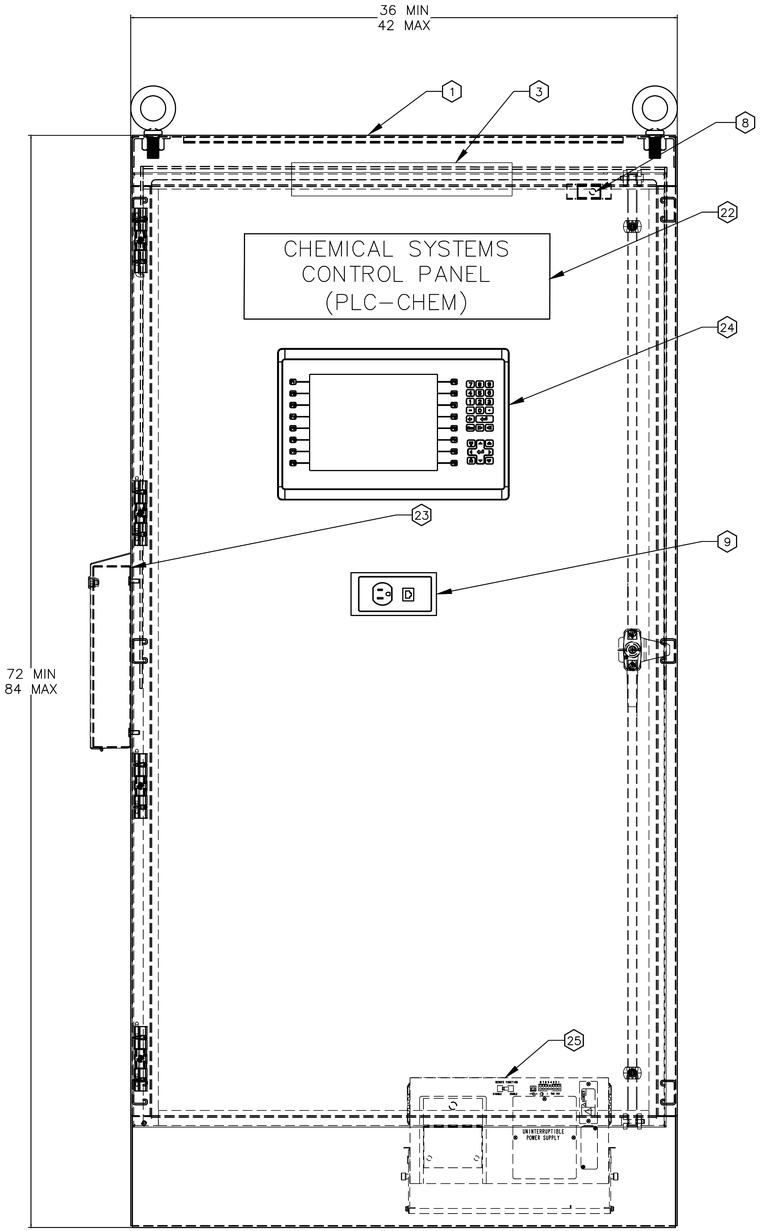
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

PROCESS & INSTRUMENTATION DIAGRAM CHEMICAL FEED LOCATIONS

PROJECT NO. 255128–234374
FILE NAME: I010PIDI.DWG
SHEET NO. I-10

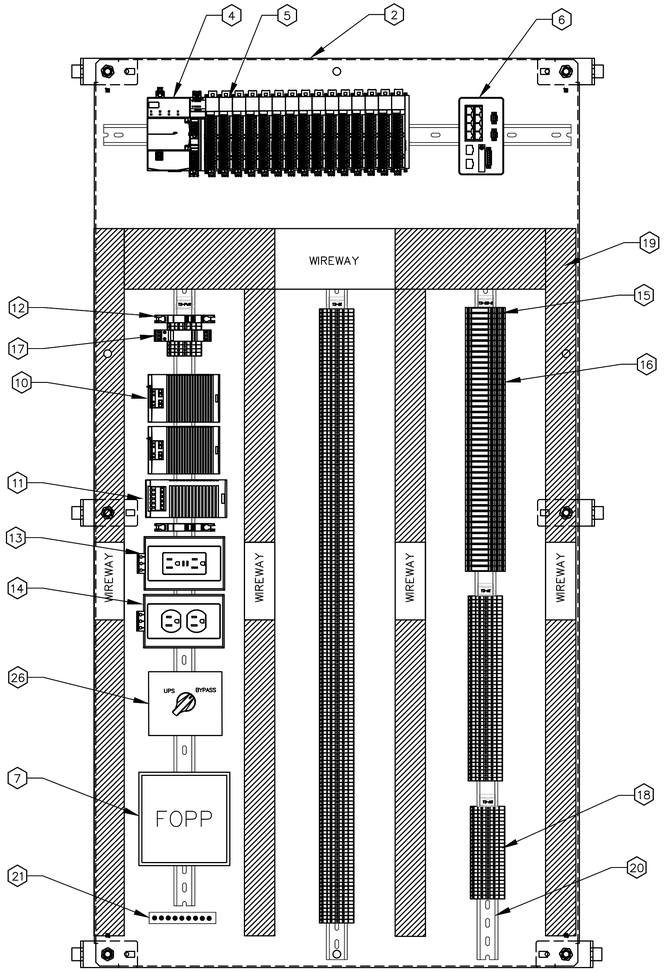
BID SET



FRONT ELEVATION

DETAIL A

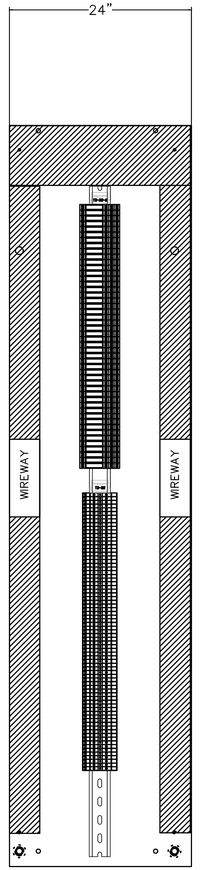
NTS



BACKPANEL ELEVATION

DETAIL B

NTS



SUBPANEL ELEVATION

DETAIL C

NTS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	–
3	1	LED LIGHT	406733
4	1	COMPACTLOGIX 5380 PROCESSOR	406343
5	AS REQ.	COMPACTLOGIX 5069 I/O MODULES	406343
6	1	MANAGED ETHERNET SWITCH	406613
7	1	FIBER OPTIC PATCH PANEL	271523
8	1	INTRUSION SWITCH	406733
9	1	CONVENIENCE RECEPTACLE & ETHERNET PORT	406733
10	2	24V REDUNDANT DC POWER SUPPLY	407859
11	1	24V DC POWER SUPPLY REDUNDANT MODULE	407859
12	AS REQ.	CIRCUIT BREAKERS	406733
13	1	120 VAC DUPLEX GFCI RECEPTACLE	406733
14	1	120 VAC DUPLEX CONVENIENCE RECEPTACLE	406733
15	AS REQ.	120 VAC RELAY SPDT	407853
16	AS REQ.	24 VDC RELAY SPDT	407853
17	AS REQ.	SURGE PROTECTOR	407856
18	AS REQ.	TERMINAL BLOCKS	406733
19	AS REQ.	WIRE WAY	406733
20	AS REQ.	DIN RAIL EQUIPMENT MOUNTING RACK	–
21	AS REQ.	GROUND BUSBAR	406733
22	1	NAMEPLATE	406717
23	1	METALLIC DATA POCKET	406717
24	1	PANELVIEW PLUS 12" OIT	406263
25	1	1.5 KVA UPS	406763
26	1	UPS MAINTAINENCE BYPASS SWITCH (MAKE BEFORE BREAK TYPE)	406763

NOTES

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: A. PRABHAKARAN
SHEET CHK'D BY: S. REILLY
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

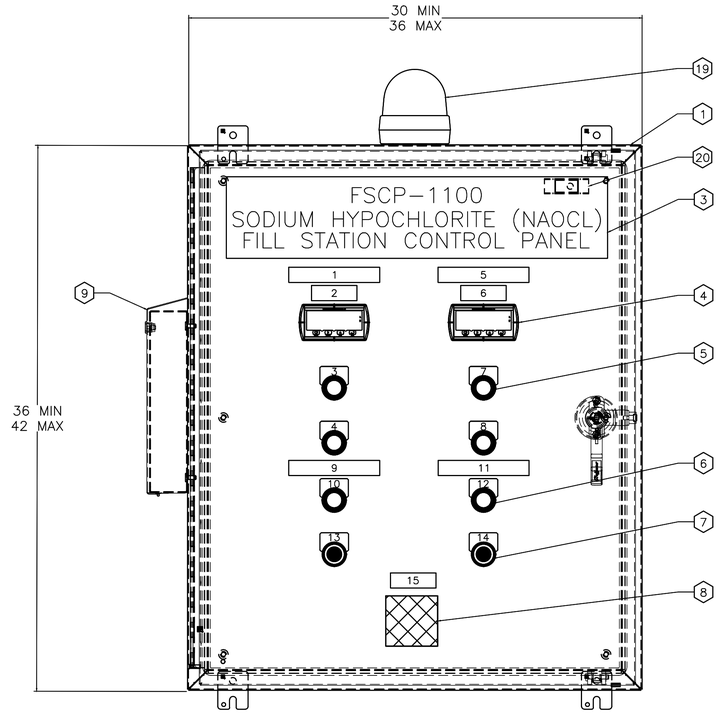
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

CHEMICAL SYSTEMS
(PLC-CHEM)
CONTROL PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I011DETL.DWG
SHEET NO.
I-11

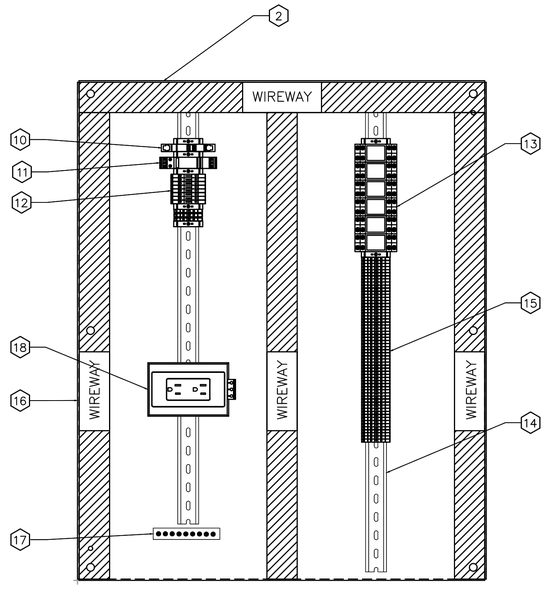
BID SET



FRONT ELEVATION

DETAIL A

NTS



BACKPANEL ELEVATION

DETAIL B

NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	2	DIGITAL PANEL METER	407813
5	4	PILOT LIGHT (WITH AMBER LENS)	407816
6	2	PILOT LIGHT (WITH GREEN LENS)	407816
7	2	PUSH BUTTON	407819
8	1	ALARM HORN	407833
9	1	METALLIC DATA POCKET	406717
10	AS REQ.	CIRCUIT BREAKER	406733
11	AS REQ.	SURGE PROTECTOR	407856
12	AS REQ.	FUSED TERMINAL BLOCKS	406733
13	AS REQ.	CONTROL RELAY	407853
14	AS REQ.	DIN RAIL	406733
15	AS REQ.	TERMINAL BLOCKS	406733
16	AS REQ.	WIRE WAY	406733
17	AS REQ.	GROUND BUSBAR	406733
18	AS REQ.	GFCI RECEPTACLE	406733
19	1	BEACON	407833
20	1	INTRUSION SWITCH	406733

NAMEPLATE SCHEDULE

NO.	QTY	DESIGNATIONS	DESCRIPTION
1	1	BULK TANK 1	NAMEPLATE
2	1		LEVEL
3	1		HIGH-HIGH LEVEL
4	1		HIGH LEVEL
5	1	BULK TANK 2	NAMEPLATE
6	1		LEVEL
7	1		HIGH-HIGH LEVEL
8	1		HIGH LEVEL
9	1	BULK TANK 1 FILL VALVE	NAMEPLATE
10	1		OPENED
11	1	BULK TANK 2 FILL VALVE	NAMEPLATE
12	1		OPENED
13	1	–	SILENCE
14	1	–	RESET
15	1	–	HORN

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.
3. PANEL LOCATED OUTSIDE AT FILL CONNECTION.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: A. PRABHAKARAN
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

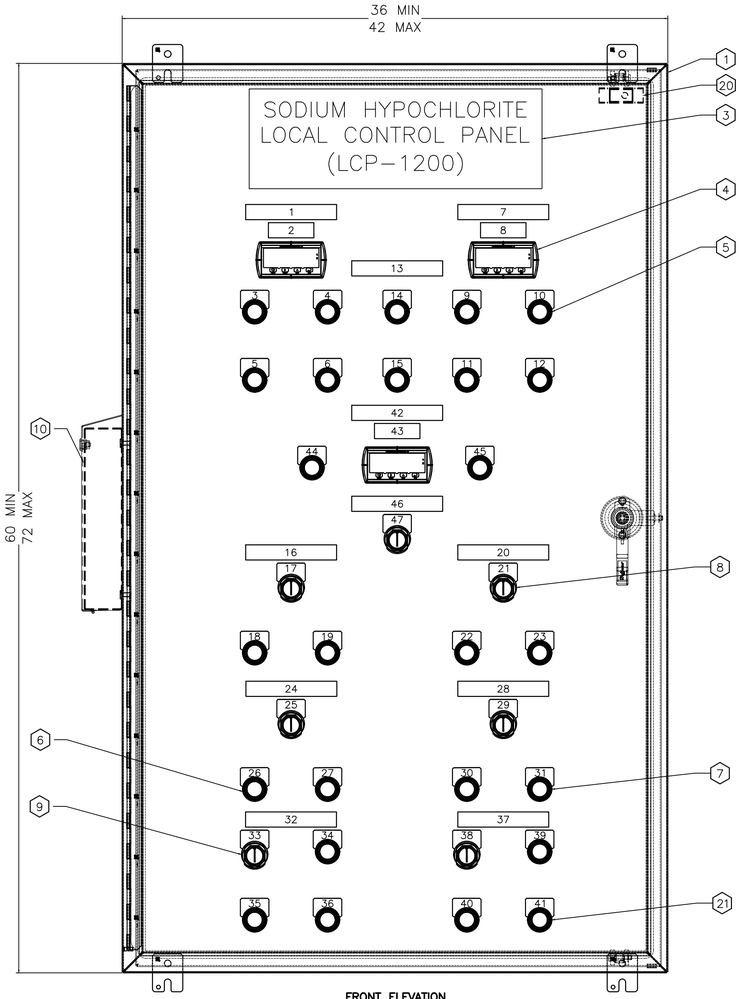
CHEMICAL SYSTEMS FEED BUILDING

SODIUM HYPOCHLORITE FILL STATION (FSCP-1100) CONTROL PANEL DETAIL

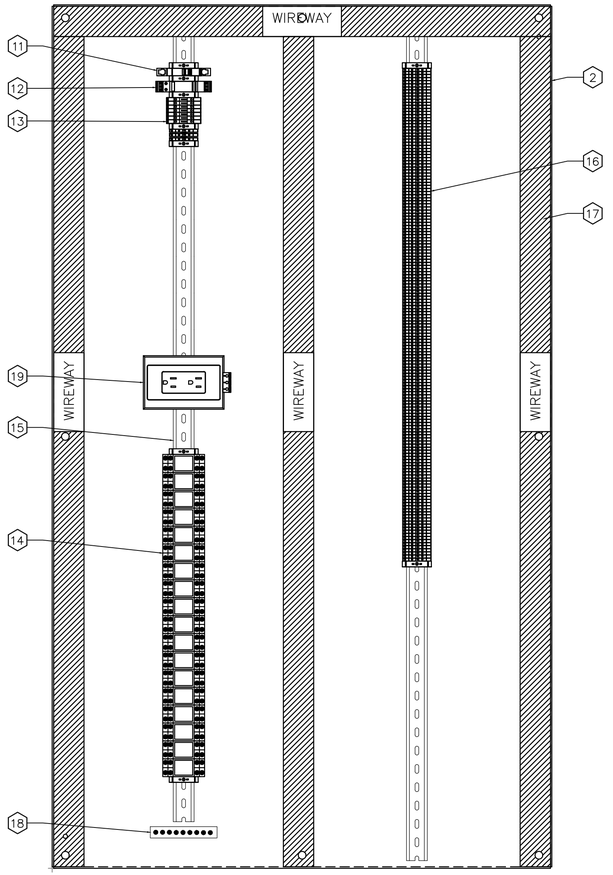
PROJECT NO. 255128-234374
FILE NAME: I012DETL.DWG

SHEET NO.
I-12

BID SET



FRONT ELEVATION
DETAIL A
NTS



BACKPANEL ELEVATION
DETAIL B
NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	3	DIGITAL PANEL METER	407813
5	14	PILOT LIGHT (WITH AMBER LENS)	407816
6	6	PILOT LIGHT (WITH GREEN LENS)	407816
7	4	PILOT LIGHT (WITH RED LENS)	407816
8	5	THREE WAY SELECTOR SWITCH	407819
9	2	TWO WAY SELECTOR SWITCH	407819
10	1	METALLIC DATA POCKET	407819
11	AS REQ.	CIRCUIT BREAKER	406733
12	AS REQ.	SURGE PROTECTOR	407856
13	AS REQ.	FUSED TERMINAL BLOCKS	406733
14	AS REQ.	CONTROL RELAY	407853
15	AS REQ.	DIN RAIL	406733
16	AS REQ.	TERMINAL BLOCKS	406733
17	AS REQ.	WIRE WAY	406733
18	AS REQ.	GROUND BUSBAR	406733
19	AS REQ.	GFCI RECEPTACLE	406733
20	1	INTRUSION SWITCH	406733
21	2	PILOT LIGHT (WITH WHITE LENS)	407816

NAMEPLATE SCHEDULE

NO.	QTY	DESIGNATIONS	DESCRIPTION
1	1	BULK TANK 1	NAMEPLATE
2	1		LEVEL
3	1		HIGH–HIGH LEVEL
4	1		HIGH LEVEL
5	1		LOW LEVEL
6	1		LOW–LOW LEVEL
7	1	BULK TANK 2	NAMEPLATE
8	1		LEVEL
9	1		HIGH–HIGH LEVEL
10	1		HIGH LEVEL
11	1		LOW LEVEL
12	1		LOW–LOW LEVEL
13	1	BULK TANK	NAMEPLATE
14	1		RAPID DROP IN LEVEL
15	1		BOTH TANKS OFFLINE
16	1	BULK TANK 1 FILL VALVE	NAMEPLATE
17	1		OPEN/CLOSE
18	1		OPENED
19	1		CLOSED
20	1	BULK TANK 2 FILL VALVE	NAMEPLATE
21	1		OPEN/CLOSE
22	1		OPENED
23	1		CLOSED
24	1	BULK TANK 1 DISCHARGE VALVE	NAMEPLATE
25	1		OPEN/CLOSE/AUTO
26	1		OPENED
27	1		CLOSED
28	1	BULK TANK 1 DISCHARGE VALVE	NAMEPLATE
29	1		OPEN/CLOSE/AUTO
30	1		OPENED
31	1		CLOSED
32	1	TRANSFER PUMP 1	NAMEPLATE
33	1		START/STOP
34	1		RUNNING
35	1		FAULT
36	1		REMOTE
37	1	TRANSFER PUMP 2	NAMEPLATE
38	1		START/STOP
39	1		RUNNING
40	1		FAULT
41	1		REMOTE
42	1	DAY TANK	NAMEPLATE
43	1		LEVEL
44	1		HIGH–HIGH LEVEL
45	1		LOW–LOW LEVEL
46	1	WATER VALVE	NAMEPLATE
47	1		OPEN/CLOSE/AUTO

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

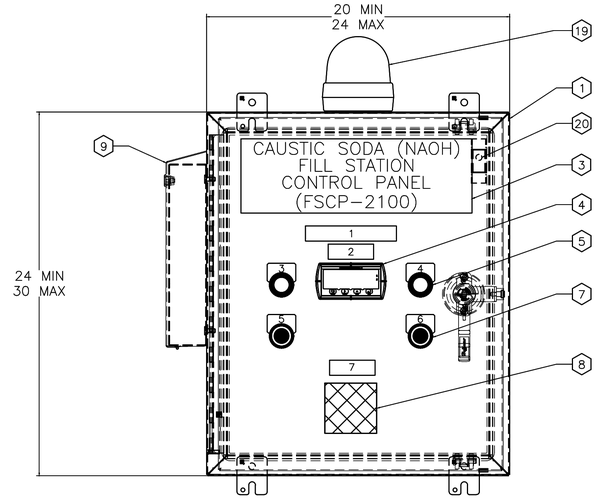
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

SODIUM HYPOCHLORITE (LCP-1200) CONTROL PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I013DETL.DWG
SHEET NO. I-13

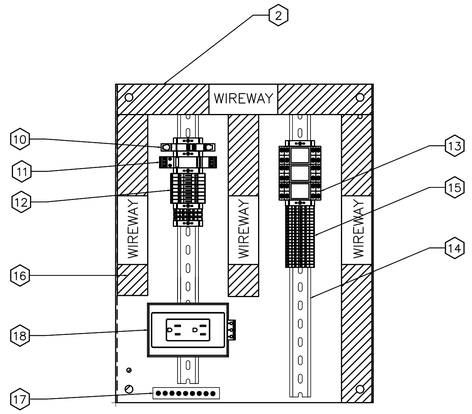
BID SET



FRONT ELEVATION

DETAIL A

NTS –



BACKPANEL ELEVATION

DETAIL B

NTS –

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	1	DIGITAL PANEL METER	407813
5	2	PILOT LIGHT (WITH AMBER LENS)	407816
6	–	NOT USED	–
7	2	PUSH BUTTON	407819
8	1	ALARM HORN	407833
9	1	METALLIC DATA POCKET	406717
10	AS REQ.	CIRCUIT BREAKER	406733
11	AS REQ.	SURGE PROTECTOR	407856
12	AS REQ.	FUSED TERMINAL BLOCKS	406733
13	AS REQ.	CONTROL RELAY	407853
14	AS REQ.	DIN RAIL	406733
15	AS REQ.	TERMINAL BLOCKS	406733
16	AS REQ.	WIRE WAY	406733
17	AS REQ.	GROUND BUSBAR	406733
18	AS REQ.	GFCI RECEPTACLE	406733
19	1	BEACON	407833
20	1	INTRUSION SWITCH	406733

NAMEPLATE SCHEDULE			
NO.	QTY	DESIGNATIONS	DESCRIPTION
1	1	BULK TANK	NAMEPLATE
2	1		LEVEL
3	1		HIGH–HIGH LEVEL
4	1		HIGH LEVEL
5	1	–	SILENCE
6	1	–	RESET
7	1	–	HORN

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.
3. PANEL LOCATED OUTSIDE AT FILL CONTAINER.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: A. PRABHAKARAN
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

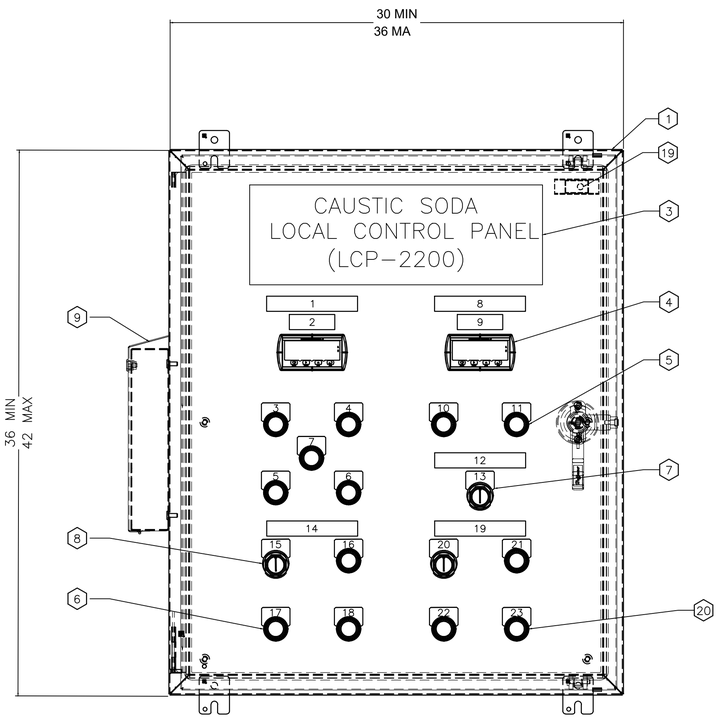
CHEMICAL SYSTEMS FEED BUILDING

CAUSTIC SODA FILL STATION (FSCP-2100) CONTROL PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I014DETL.DWG

SHEET NO.
I-14

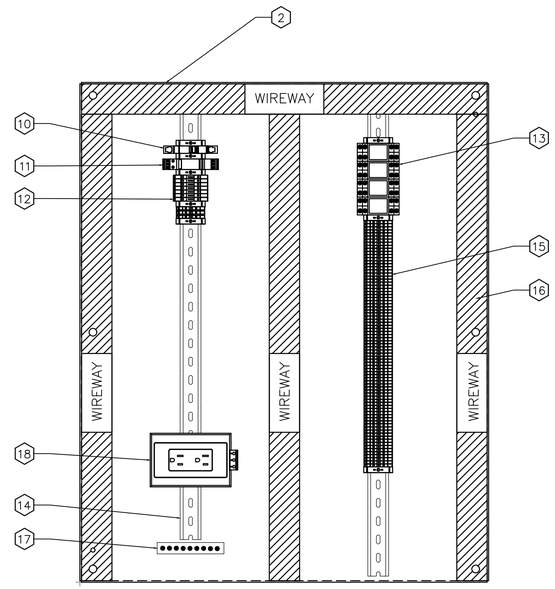
BID SET



FRONT ELEVATION

DETAIL A

NTS



BACKPANEL ELEVATION

DETAIL B

NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	2	DIGITAL PANEL METER	407813
5	9	PILOT LIGHT (WITH AMBER LENS)	407816
6	2	PILOT LIGHT (WITH GREEN LENS)	407816
7	1	THREE WAY SELECTOR SWITCH	407819
8	2	TWO WAY SELECTOR SWITCH	407819
9	1	METALLIC DATA POCKET	406717
10	AS REQ.	CIRCUIT BREAKER	407833
11	AS REQ.	SURGE PROTECTOR	407856
12	AS REQ.	FUSED TERMINAL BLOCKS	406733
13	AS REQ.	CONTROL RELAY	407853
14	AS REQ.	DIN RAIL	406733
15	AS REQ.	TERMINAL BLOCKS	406733
16	AS REQ.	WIRE WAY	406733
17	AS REQ.	GROUND BUSBAR	406733
18	AS REQ.	GFCI RECEPTACLE	406733
19	1	INTRUSION SWITCH	406733
20	2	PILOT LIGHT (WITH WHITE LENS)	406733

NAMEPLATE SCHEDULE

NO.	QTY	DESIGNATION	DESCRIPTION
1	1	BULK TANK	NAMEPLATE
2	1		LEVEL
3	1		HIGH-HIGH LEVEL
4	1		HIGH LEVEL
5	1		LOW LEVEL
6	1		LOW-LOW LEVEL
7	1		RAPID DROP IN LEVEL
8	1	DAY TANK	NAMEPLATE
9	1		LEVEL
10	1		HIGH-HIGH LEVEL
11	1		LOW-LOW LEVEL
12	1	WATER VALVE	NAMEPLATE
13	1		OPEN/CLOSE/AUTO
14	1	TRANSFER PUMP 1	NAMEPLATE
15	1		START/STOP
16	1		RUNNING
17	1		FAULT
18	1		REMOTE
19	1	TRANSFER PUMP 2	NAMEPLATE
20	1		START/STOP
21	1		RUNNING
22	1		FAULT
23	1		REMOTE

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

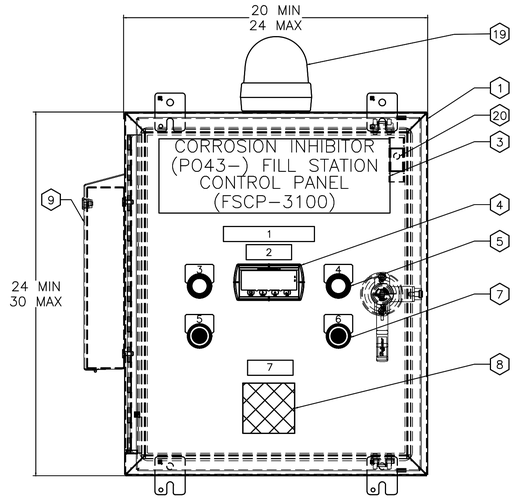
CHEMICAL SYSTEMS FEED BUILDING

CAUSTIC SODA
(LCP-2200)
CONTROL PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I015DETL.DWG

SHEET NO.
I-15

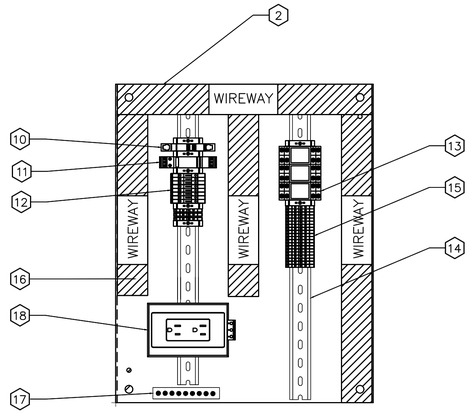
BID SET



FRONT ELEVATION

DETAIL A

NTS



BACKPANEL ELEVATION

DETAIL B

NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	1	DIGITAL PANEL METER	407813
5	2	PILOT LIGHT (WITH AMBER LENS)	407816
6	–	NOT USED	–
7	2	PUSH BUTTON	407819
8	1	ALARM HORN	407833
9	1	METALLIC DATA POCKET	406717
10	AS REQ.	CIRCUIT BREAKER	406733
11	AS REQ.	SURGE PROTECTOR	407856
12	AS REQ.	FUSED TERMINAL BLOCKS	406733
13	AS REQ.	CONTROL RELAY	407853
14	AS REQ.	DIN RAIL	406733
15	AS REQ.	TERMINAL BLOCKS	406733
16	AS REQ.	WIRE WAY	406733
17	AS REQ.	GROUND BUSBAR	406733
18	AS REQ.	GFCI RECEPTACLE	406733
19	1	BEACON	406733
20	1	INTRUSION SWITCH	406733

NAMEPLATE SCHEDULE

NO.	QTY	DESIGNATION	DESCRIPTION
1	1	BULK TANK	NAMEPLATE
2	1		LEVEL
3	1		HIGH–HIGH LEVEL
4	1		HIGH LEVEL
5	1	–	SILENCE
6	1	–	RESET
7	1	–	HORN

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.
3. PANEL LOCATED OUTSIDE AT FILL CONNECTION.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: A. PRABHAKARAN
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

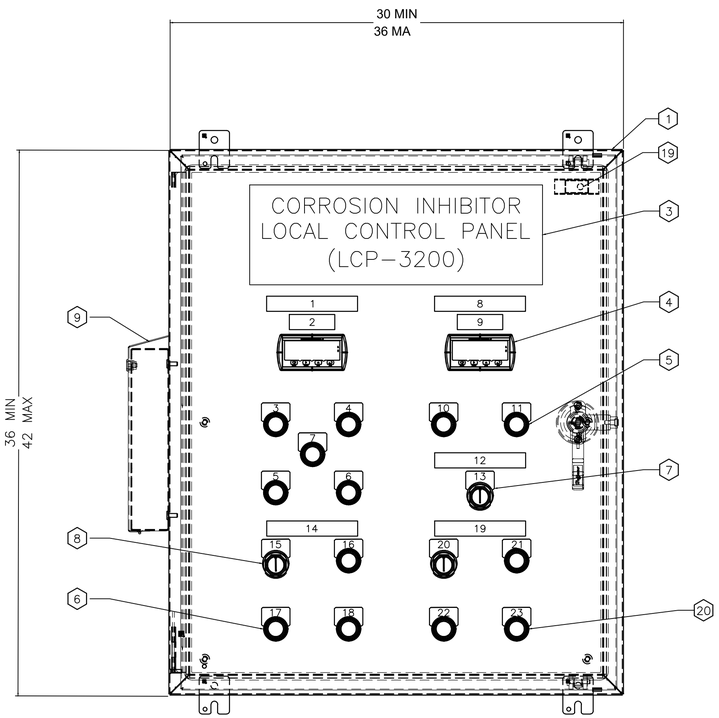
CHEMICAL SYSTEMS FEED BUILDING

CORROSION INHIBITOR FILL STATION (FSCP-3100) CONTROL PANEL DETAIL

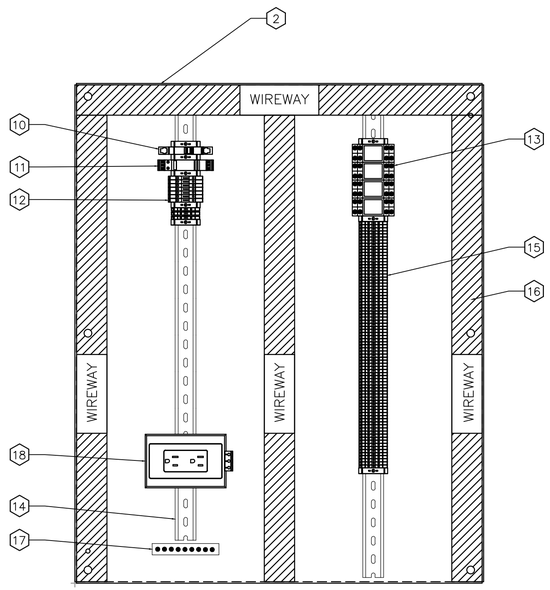
PROJECT NO. 255128–234374
FILE NAME: I016DETL.DWG

SHEET NO.
I-16

BID SET



FRONT ELEVATION
DETAIL A
NTS



BACKPANEL ELEVATION
DETAIL B
NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	2	DIGITAL PANEL METER	407813
5	9	PILOT LIGHT (WITH AMBER LENS)	407816
6	2	PILOT LIGHT (WITH GREEN LENS)	407816
7	1	THREE WAY SELECTOR SWITCH	407819
8	2	TWO WAY SELECTOR SWITCH	407819
9	1	METALLIC DATA POCKET	406717
10	AS REQ.	CIRCUIT BREAKER	407833
11	AS REQ.	SURGE PROTECTOR	407856
12	AS REQ.	FUSED TERMINAL BLOCKS	406733
13	AS REQ.	CONTROL RELAY	407853
14	AS REQ.	DIN RAIL	406733
15	AS REQ.	TERMINAL BLOCKS	406733
16	AS REQ.	WIRE WAY	406733
17	AS REQ.	GROUND BUSBAR	406733
18	AS REQ.	GFCI RECEPTACLE	406733
19	1	INTRUSION SWITCH	406733
20	2	PILOT LIGHT (WITH WHITE LENS)	406733

NAMEPLATE SCHEDULE

NO.	QTY	DESIGNATION	DESCRIPTION
1	1	BULK TANK	NAMEPLATE
2	1		LEVEL
3	1		HIGH-HIGH LEVEL
4	1		HIGH LEVEL
5	1		LOW LEVEL
6	1		LOW-LOW LEVEL
7	1		RAPID DROP IN LEVEL
8	1	DAY TANK	NAMEPLATE
9	1		LEVEL
10	1		HIGH-HIGH LEVEL
11	1		LOW-LOW LEVEL
12	1	WATER VALVE	NAMEPLATE
13	1		OPEN/CLOSE/AUTO
14	1	TRANSFER PUMP 1	NAMEPLATE
15	1		START/STOP
16	1		RUNNING
17	1		FAULT
18	1		REMOTE
19	1	TRANSFER PUMP 2	NAMEPLATE
20	1		START/STOP
21	1		RUNNING
22	1		FAULT
23	1		REMOTE

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.
2. HIGH AND LOW LEVEL SIGNALS ARE TO BE PROGRAMMED FROM THE LEVEL DISPLAY PANEL METER DIGITAL OUTPUTS.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

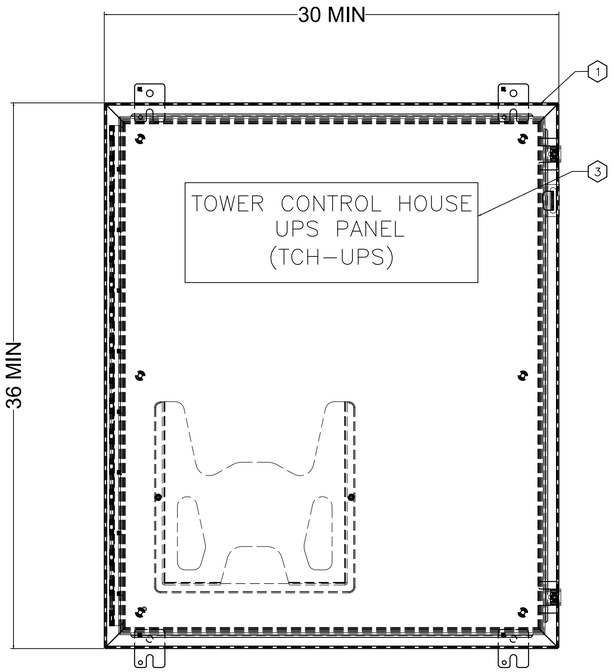
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

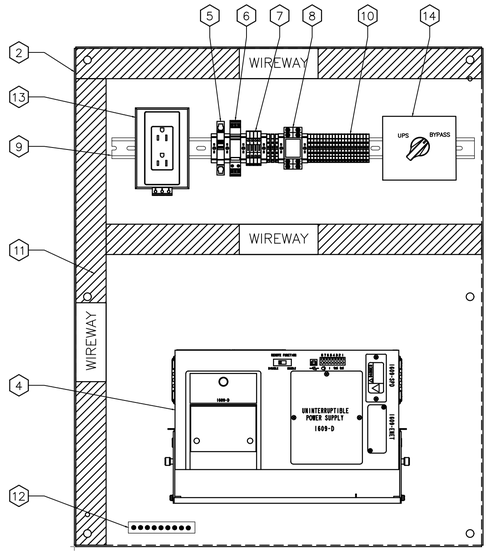
CORROSION INHIBITOR (LCP-3200) CONTROL PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I017DETL.DWG
SHEET NO.
I-17

BID SET



FRONT ELEVATION
DETAIL A
NTS



BACKPANEL ELEVATION
DETAIL B
NTS

MAJOR PANEL EQUIPMENT – BILL OF MATERIALS

⬡	QTY.	DESCRIPTION	SPECIFICATION
1	1	PANEL ENCLOSURE	406717
2	1	BACK PANEL	406717
3	1	NAMEPLATE	406717
4	1	1.5 KVA UPS	406763
5	AS REQ.	CIRCUIT BREAKER	406733
6	AS REQ.	SURGE PROTECTOR	407856
7	AS REQ.	FUSED TERMINAL BLOCKS	406733
8	AS REQ.	CONTROL RELAY	407853
9	AS REQ.	DIN RAIL	406733
10	AS REQ.	TERMINAL BLOCKS	406733
11	AS REQ.	WIRE WAY	406733
12	AS REQ.	GROUND BUSBAR	406733
13	AS REQ.	GFCI RECEPTACLE	406733
14	1	UPS MAINTENANCE BYPASS SWITCH (MAKE BEFORE BREAK TYPE)	406763

NOTES:

1. GENERAL PANEL LAYOUT SHOWN. REFER TO SPECIFICATION FOR DETAILED REQUIREMENT.

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

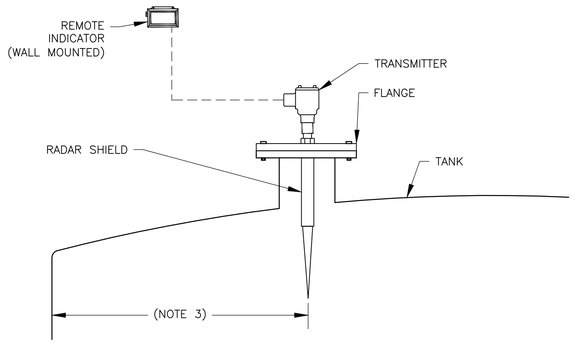
CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

TOWER CONTROL HOUSE - UPS (TCH-UPS) PANEL DETAIL

PROJECT NO. 255128-234374
FILE NAME: I018DETL.DWG
SHEET NO. I-18

BID SET

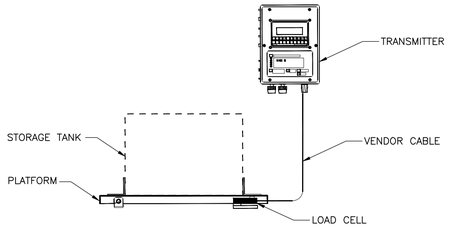


NOTES:

1. A MINIMUM OF 0.4" OF THE SENSOR RADAR SHIELD SHALL PROTRUDE FROM THE LIP OF INSERTION TO AVOID FALSE ECHOES BEING REFLECTED OFF THE FLANGE.
2. KEEP CONDUCTIVE OBJECTS (e.g. LADDERS, PIPES, ETC.) AWAY FROM PROBE TO AVOID ECHOING INTERFERENCE WITH SENSOR.
3. TO AVOID INTERFERENCE, THE SENSOR SHALL BE PLACED 1 FOOT AWAY FROM THE TANK WALL FOR EVERY 10 FEET OF VESSEL HEIGHT. (e.g. 40 FT. TANK = 4 FT. AWAY FROM TANK WALL)

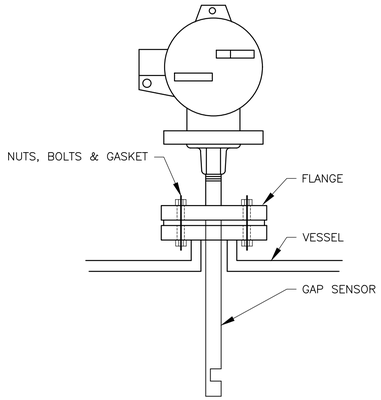
RADAR LEVEL (WITH REMOTE INDICATOR)

DETAIL A – NTS



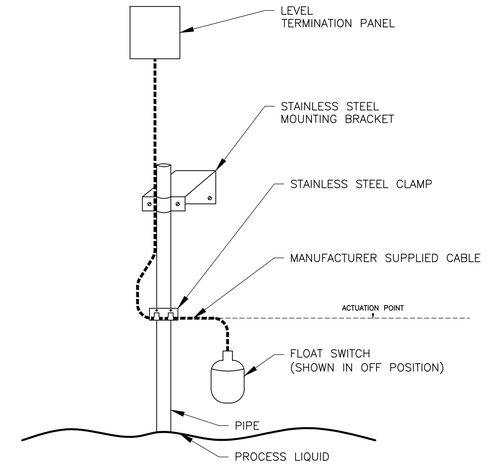
WEIGHT SENSING MODULE AND TRANSMITTER

DETAIL B – NTS



ULTRASONIC GAP SWITCH

DETAIL C – NTS

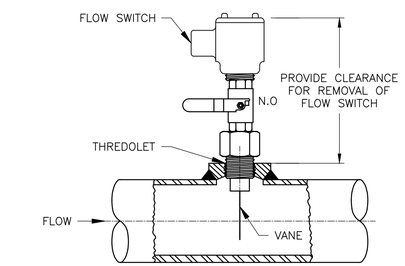


NOTES:

1. PROVIDE 15" X 15" MINIMUM SIZED FLOAT TERMINATION PANEL. PROVIDE J-HOOK INSIDE PANEL TO COIL EXTRA CABLE. PROVIDE TERMINATION BLOCKS. ALL CABLES AND WIRES SHALL BE LABELED.

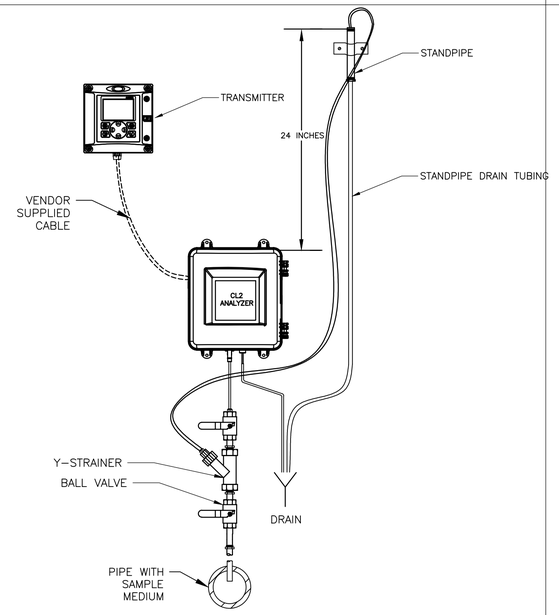
FLOAT SWITCH (POLE MOUNTED)

DETAIL D – NTS



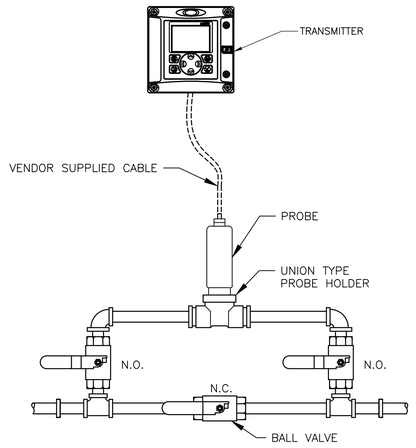
VANE FLOW SWITCH

DETAIL E – NTS



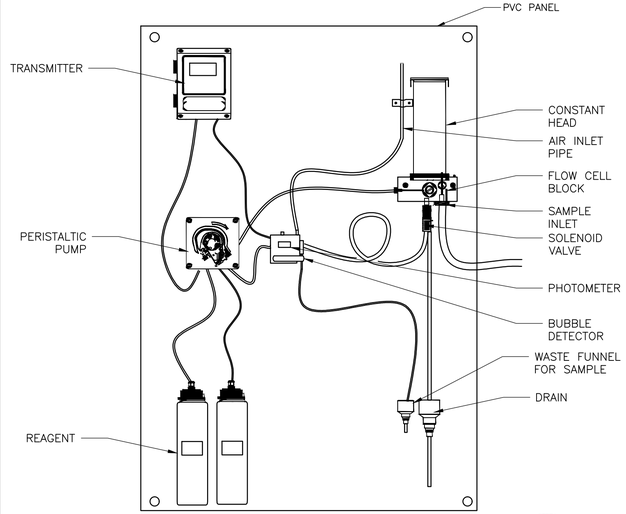
CHLORINE ANALYZER

DETAIL F – NTS



pH ANALYZER (FLOW-THROUGH)

DETAIL G – NTS



PHOSPHATE ANALYZER

DETAIL H – NTS

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

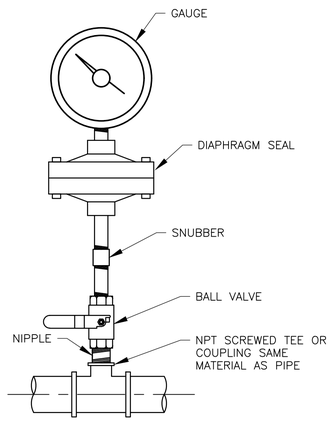
CHEMICAL SYSTEMS FEED BUILDING

INSTALLATION DETAIL - I

PROJECT NO. 255128-234374
FILE NAME: I019DETL.DWG

SHEET NO.
I-19

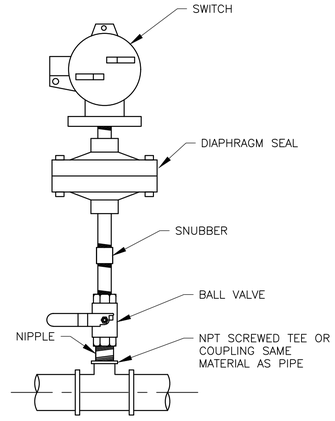
BID SET



PRESSURE GAUGE (WITH DIAPHRAGM SEAL)

DETAIL I

NTS



PRESSURE SWITCH (WITH DIAPHRAGM SEAL)

DETAIL J

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. REILLY
DRAWN BY: T. PRAGADHEESH
SHEET CHK'D BY: A. PRABHAKARAN
CROSS CHK'D BY: S. HUSSAIN
APPROVED BY: J. ROBINSON
DATE: OCTOBER 2019

CDM Smith
CDM Smith Michigan Inc.
645 Griswold Street, Suite 3770
Detroit, MI 48226
Tel: (313) 963-1313

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
1101 SAGINAW STREET #105, FLINT, MI 48502

CHEMICAL SYSTEMS FEED BUILDING

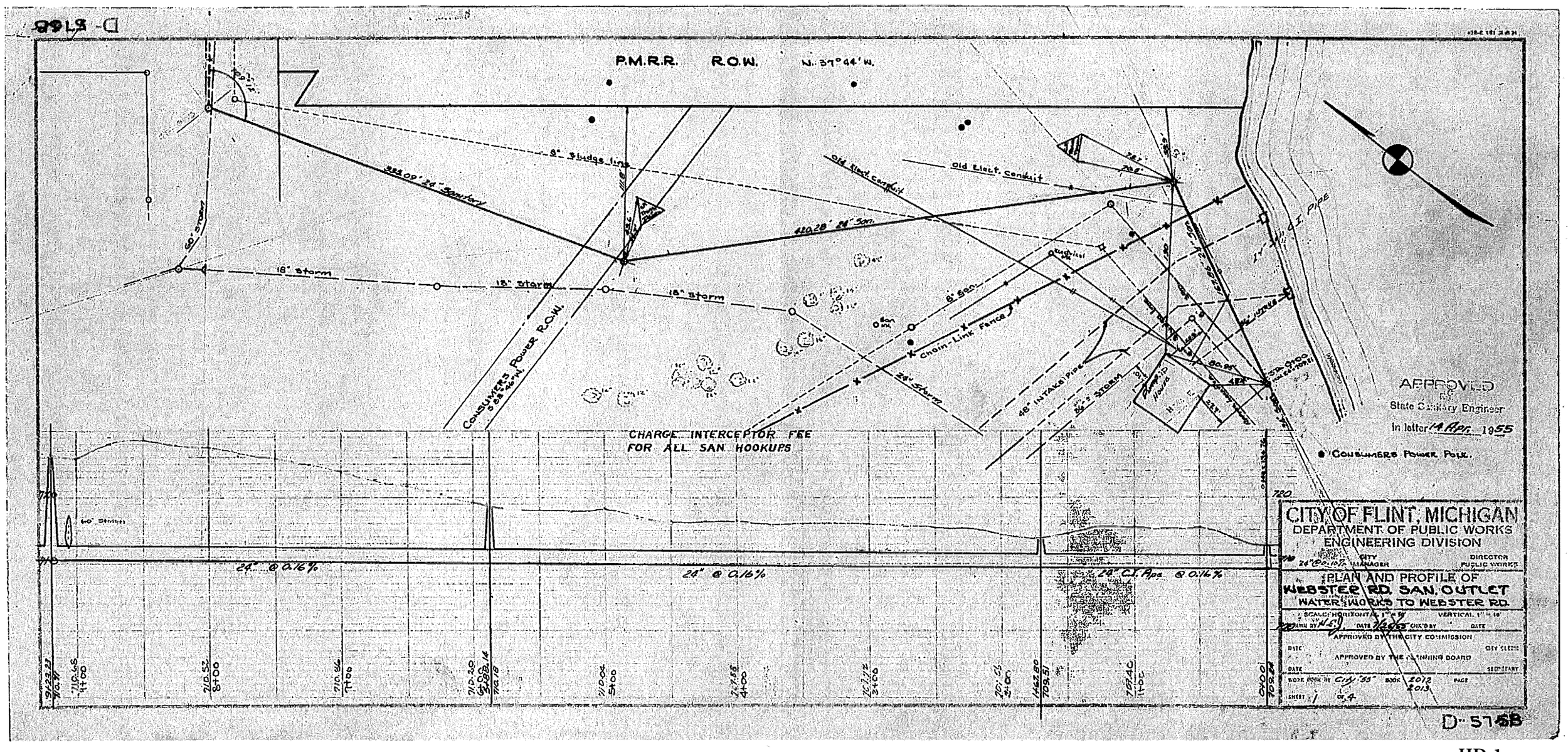
INSTALLATION DETAIL - II

PROJECT NO. 255128-234374
FILE NAME: I020DETL.DWG

SHEET NO.
I-20

STATE OF MICHIGAN
JOHN M. ROBINSON
ENGINEER
No. 6201069387
LICENSED PROFESSIONAL ENGINEER
10-9-19

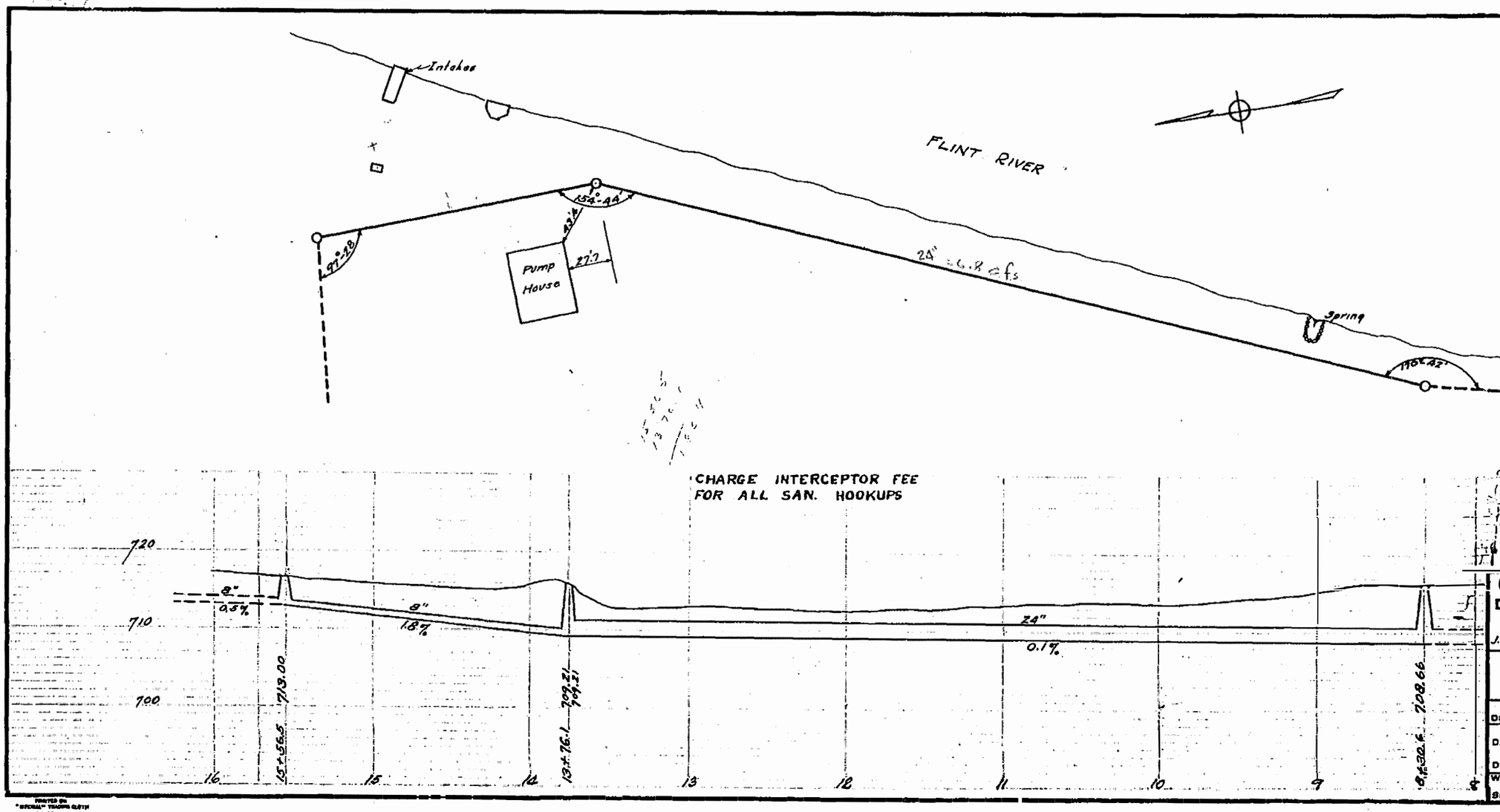
BID SET



HD-1

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQIORED TO EXECUTE THE WORK"

D-4178



APPROVED BY STATE SANITARY ENGINEER
IN LETTER DATED _____ 19__

QUANTITIES

SIZE - INS.	LENGTH - EST.	ACTUAL	SYSTEM	EXCAVATION	CU. YDS. - EST.	ACTUAL	SYSTEM	MANHOLES - EST.	ACTUAL	SYSTEM
42										
36										
30										
24	/			16-18						
20				14-16						
18				12-14						
15				10-12						
12				8-10						
10				6-8						
8				0-6						

APPROVED
State Sanitary Engineer
In letter of Apr. 1955

CITY OF FLINT, MICHIGAN
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

J.M. Barringer CITY MANAGER — J.R. Pollock DIRECTOR PUBLIC WORKS

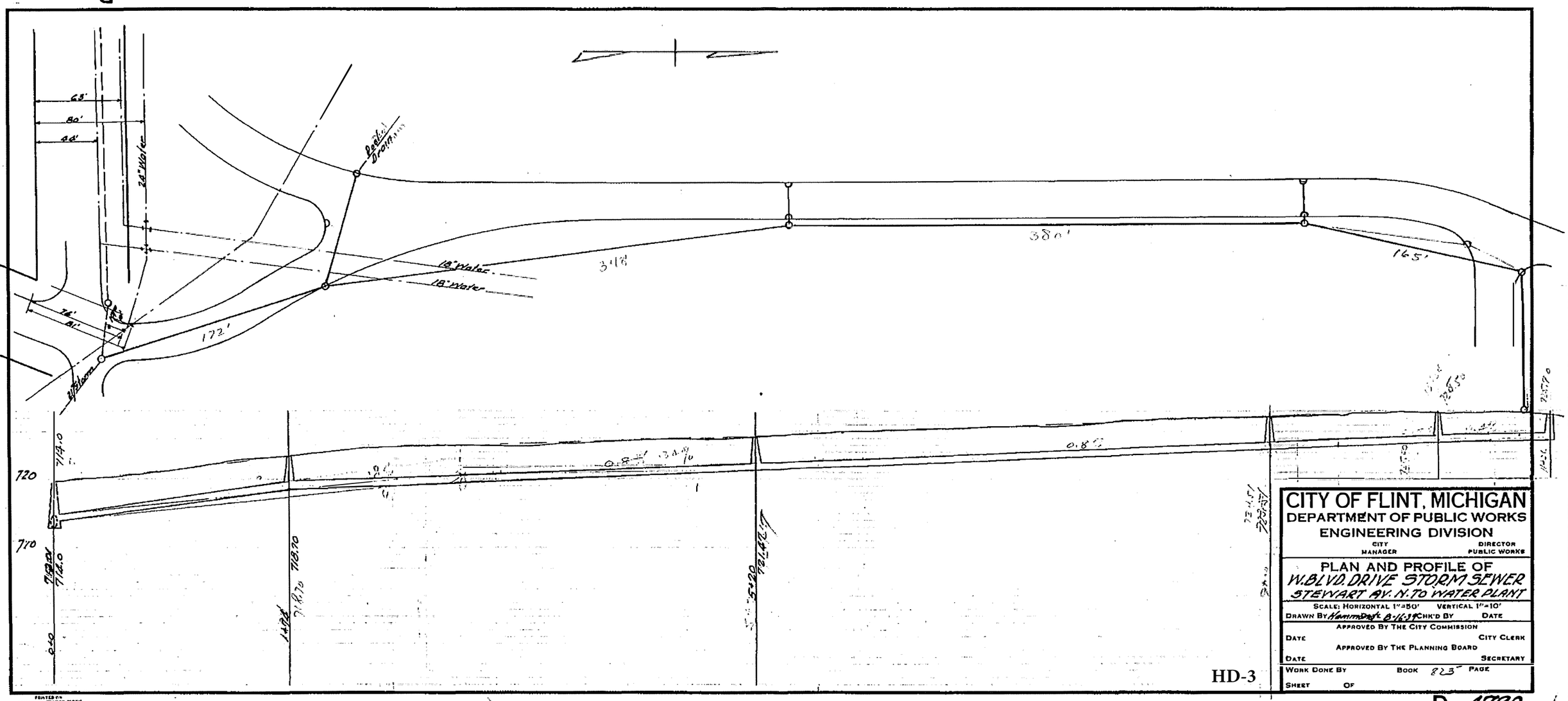
PLAN AND PROFILE OF
NORTHERN EXTENSION OF THE EAST SIDE INTERCEPTER

SCALE: HORIZONTAL 1"=50' VERTICAL 1"=10'
DRAWN BY [illegible] DATE 1-26-32 CHK'D BY SHH. DATE 1-16-32
APPROVED BY THE CITY COMMISSION
DATE _____ CITY CLERK
APPROVED BY THE PLANNING BOARD
DATE _____ SECRETARY
WORK DONE BY _____ BOOK 418 250 PAGE 14.
SHEET 2 OF 3

HD-2 D- 4178

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

D-



CITY OF FLINT, MICHIGAN
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

CITY MANAGER — DIRECTOR PUBLIC WORKS

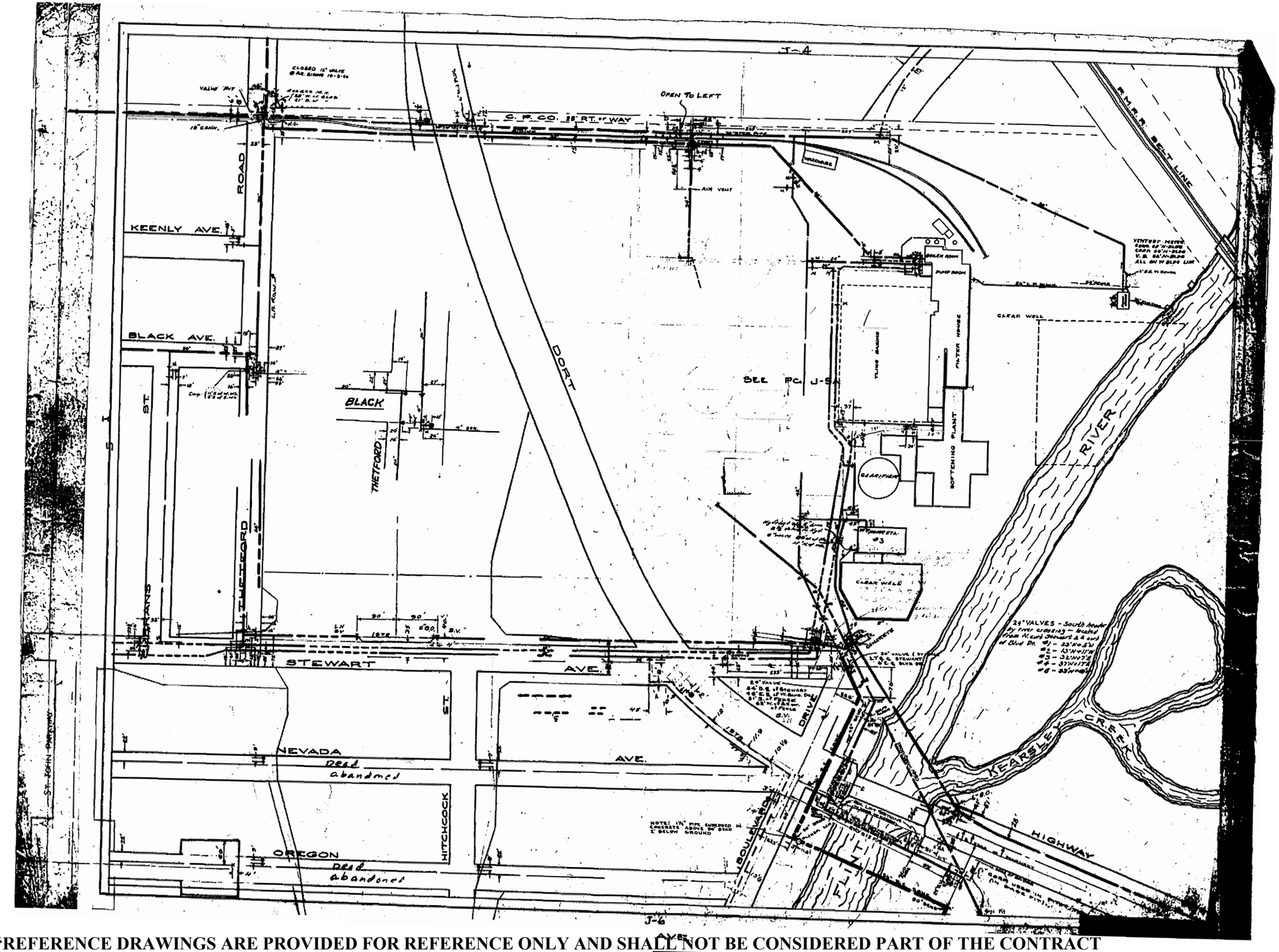
PLAN AND PROFILE OF
W. BLVD. DRIVE STORM SEWER
STEWART AV. N. TO WATER PLANT

SCALE: HORIZONTAL 1"=50' VERTICAL 1"=10'
DRAWN BY Hammond 8/6/57 CHK'D BY DATE
APPROVED BY THE CITY COMMISSION
DATE CITY CLERK
APPROVED BY THE PLANNING BOARD
DATE SECRETARY
WORK DONE BY BOOK 823 PAGE
SHEET OF

D- 4790

PRINTED ON "IMPERIAL" TRACING CLOTH K & E CO., N.Y.

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

J-4

72" DETROIT - FLINT WATER

WEST BLVD.

FLINT BELT LINE R.R.

25' CONSUMER POWER CO. EASMNT

WATER STORAGE

PRIMARY CLARIFIER Nº 1

SECONDARY Nº 2

CLARIF. Nº 3

SETTLING BASIN

FILTER HOUSE

CLEAR WELL

SOFTENING PLANT

PUMPING STA. Nº 3

CLEAR WELL

CITY OF FLINT WATER WORKS

ST. JOHN PKWY.

NORTH BUICK FREEWAY

DORT HWY.

I-475

STEWART AVENUE

OREGON

EAST BLVD. DRIVE

W. BLVD.

FLINT RIVER

KEARSLEY CREEK

For Details on Water Mains see Pg. J-5A

Leak off at Valve

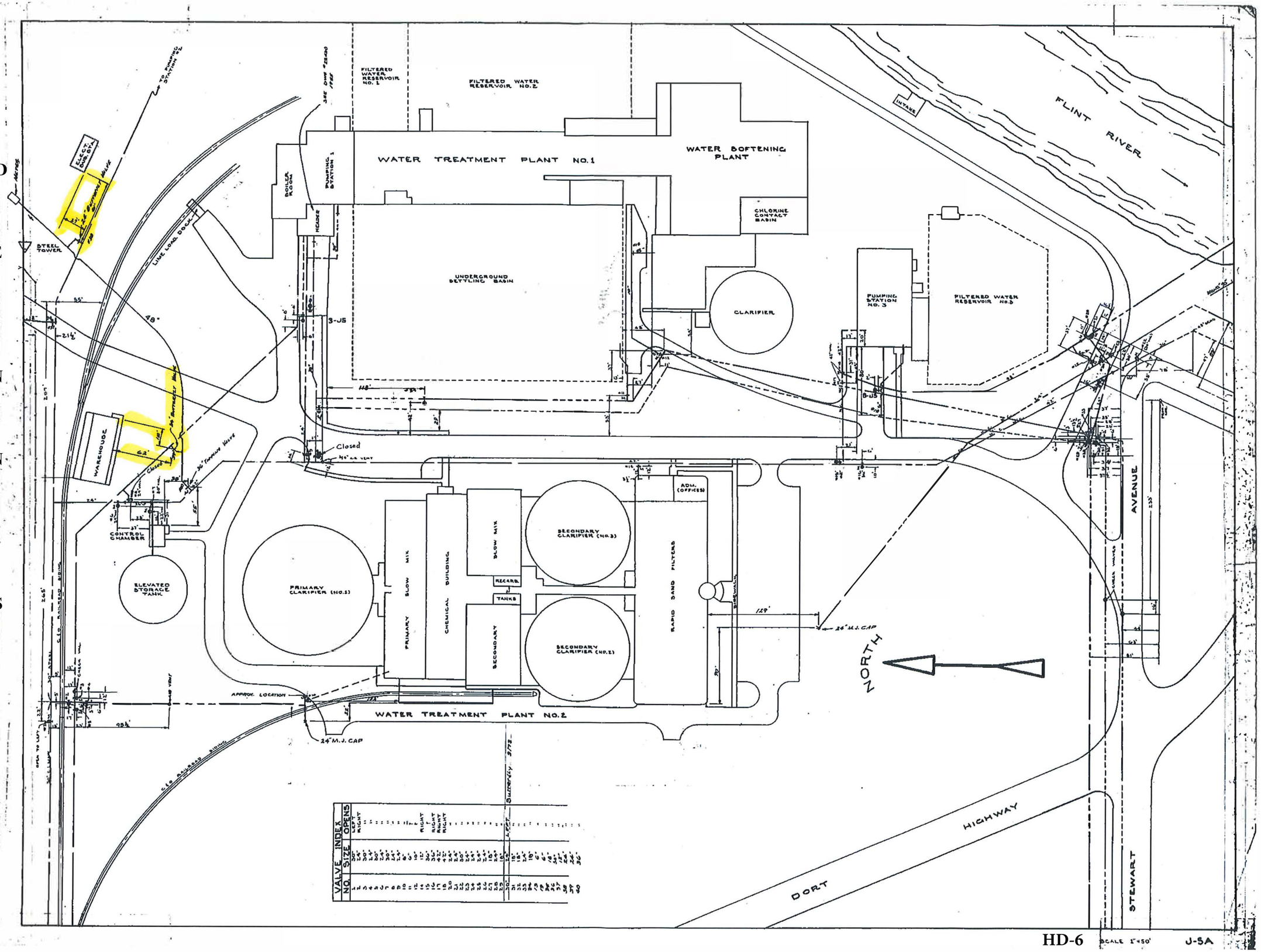
24" VALVES - SOUTH HEADER BY RIVER CROSSING - LOCATED FROM N. CURB OF STEWART & E. CURB W. BLVD DR.

HD-5 J-5

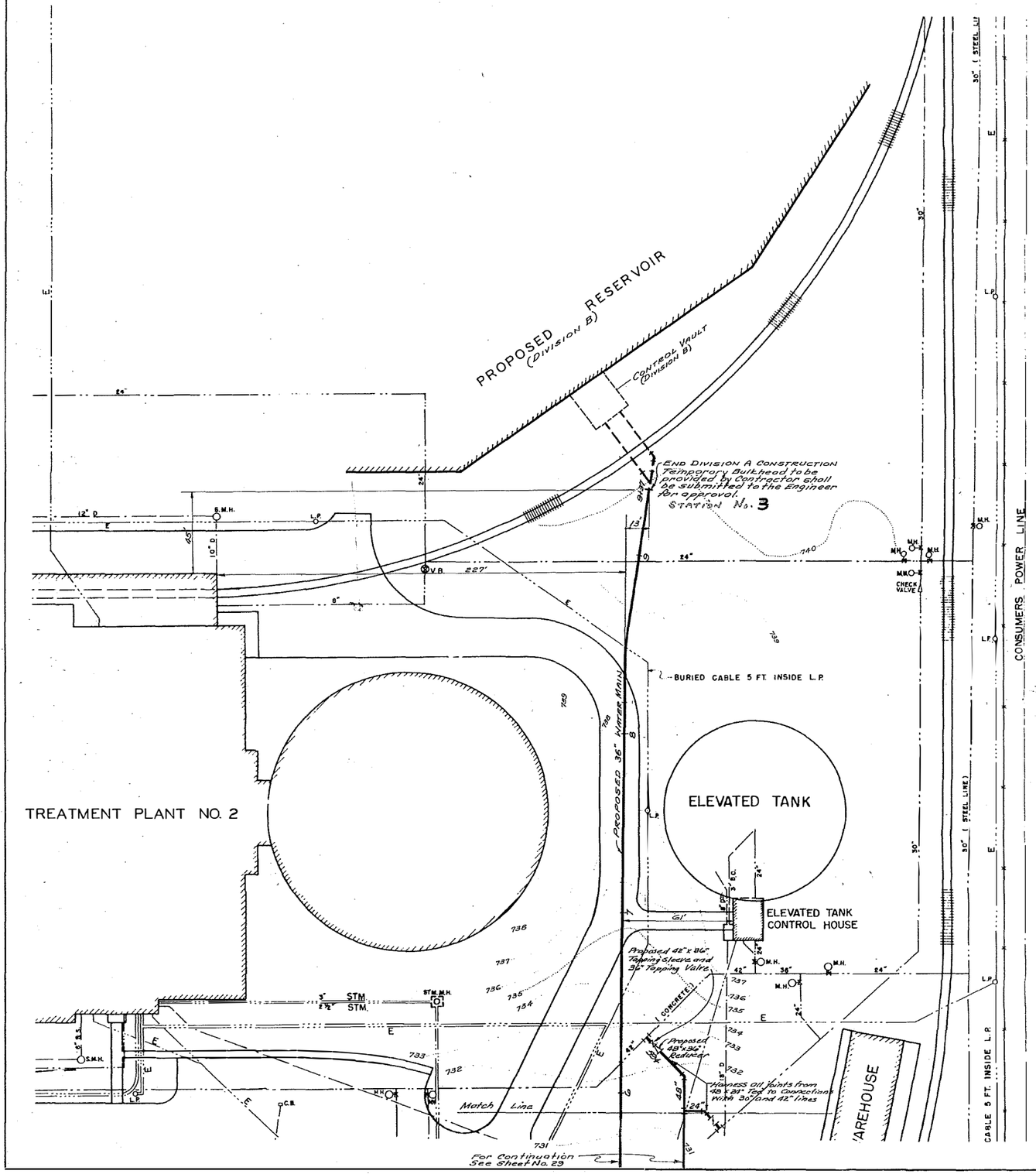
K-5

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



HD-6



NORTH

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

Note:
See Sheets No. 31 For Profile of the Proposed Water Main Construction

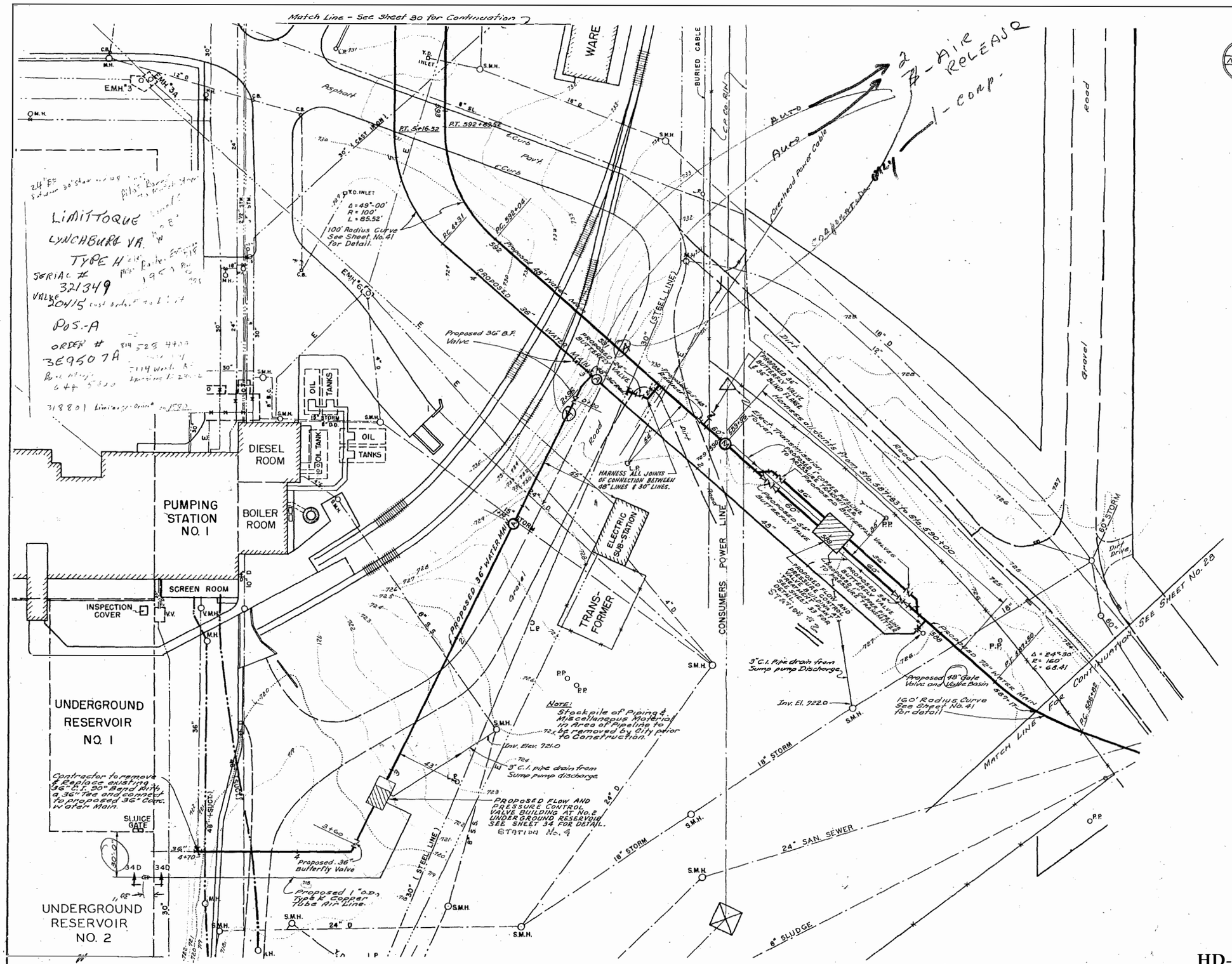
CITY OF FLINT, MICHIGAN

FLINT-DETROIT WATER SUPPLY PROJECT

SITE PLAN
AT EXISTING WATER TREATMENT PLANT

DRAWN BY K.N.	CONSOER, TOWNSEND & ASSOCIATES IN MICHIGAN CONSULTING ENGINEERS	SCALE 1"=30'-0"
DATE JAN. 1966		REVISED
CHECKED BY A.G.W.		SHEET NO. 30 OF 43 SHEETS
APPROVED BY Jos. F. Ribar		

HD-7



"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

Note:
See Sheet No. 31 For Profile of the Proposed Water Main Construction

Elevations shown on this Sheet are based on City Datum Elev. 711.87 at N.E. corner of the existing South Intake Headwall in Flint River near the Water Treatment Plant. To convert to elevations shown on Pipeline Plan and Profile Sheet No. 3 thru 28 inclusive, deduct 1.25 Feet.

All utilities within Plant Site to be verified by Contractor in the field.

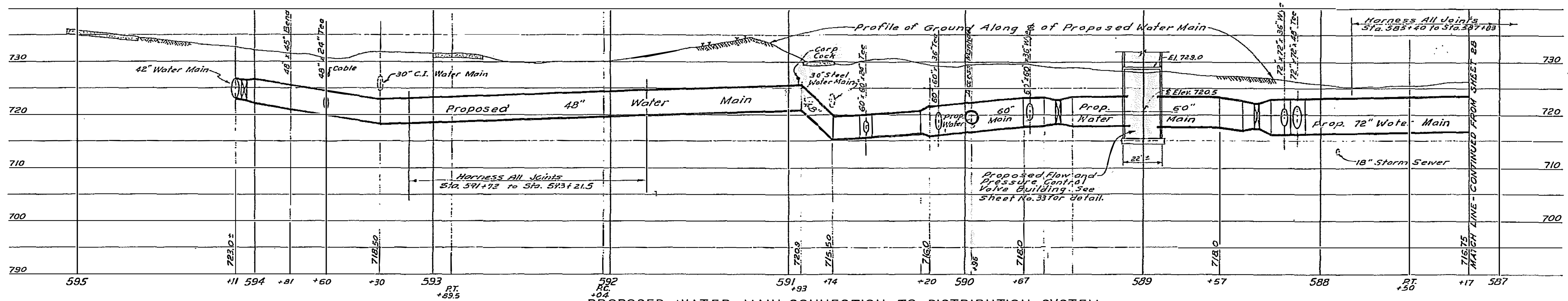
CITY OF FLINT, MICHIGAN
FLINT DETROIT WATER SUPPLY PROJECT
SITE PLAN
AT EXISTING WATER TREATMENT PLANT

DRAWN BY K.N
DATE Nov. 1966
CHECKED BY A.G.W.
APPROVED BY Lee F. Kelly

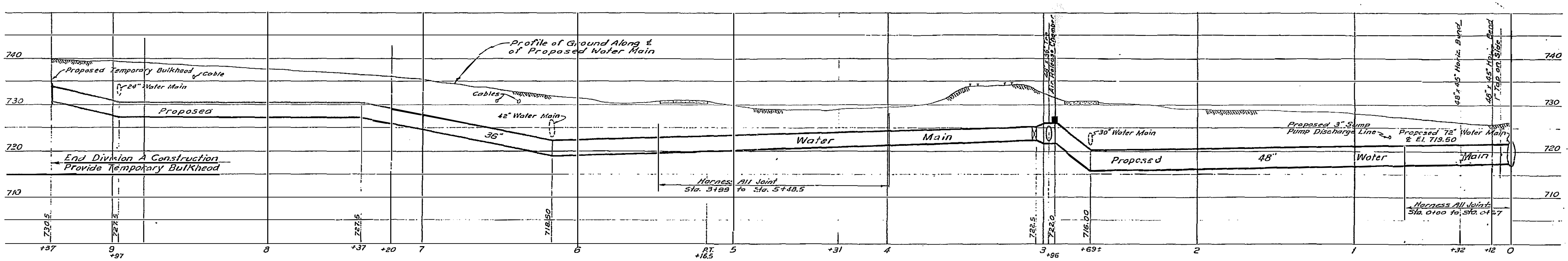
CONSOER, TOWNSEND & ASSOCIATES
IN MICHIGAN
CONSULTING ENGINEERS

SCALE 1"=30'-0"
REVISED
SHEET NO 29
OF 43 SHEETS

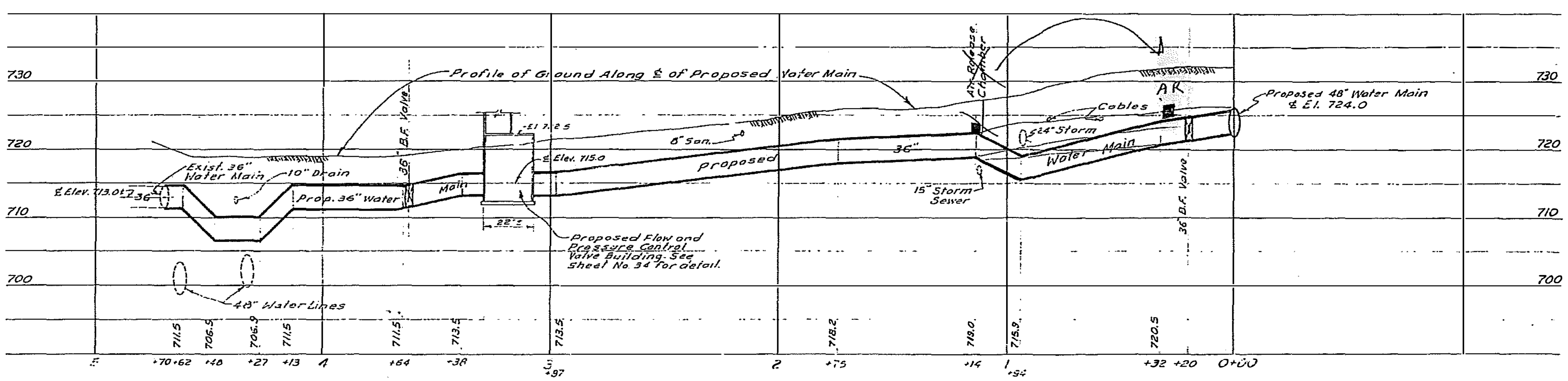
HD-8



PROPOSED WATER MAIN CONNECTION TO DISTRIBUTION SYSTEM



PROPOSED WATER MAIN CONNECTION TO DORT RESERVOIR



PROPOSED WATER MAIN TO EXISTING UNDERGROUND RESERVOIR NO.2

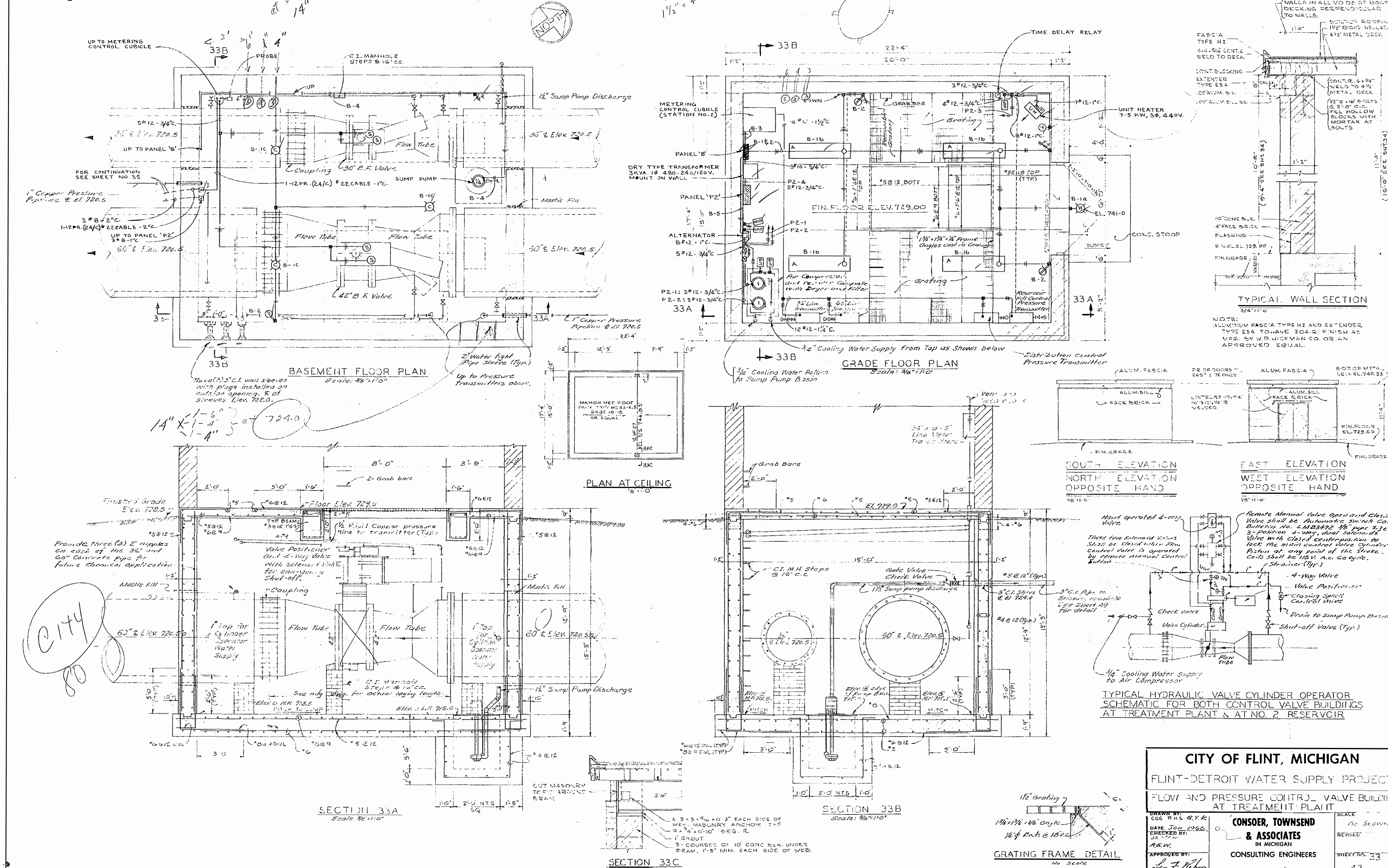
NOTE:
Elevations shown on this Sheet are based on City Datum Elev. 711.87 at N.E. corner of the existing South Intake Headwall in Flint River near the Water Treatment Plant.
To Convert to elevations shown on Pipe Line Plan and Profile Sheet No. 3 thru 28 inclusive, deduct 1.25 Feet.

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

CITY OF FLINT, MICHIGAN
FLINT-DETROIT WATER SUPPLY PROJECT
PROFILE AT EXISTING WATER TREATMENT PLANT
CONSOER, TOWNSEND

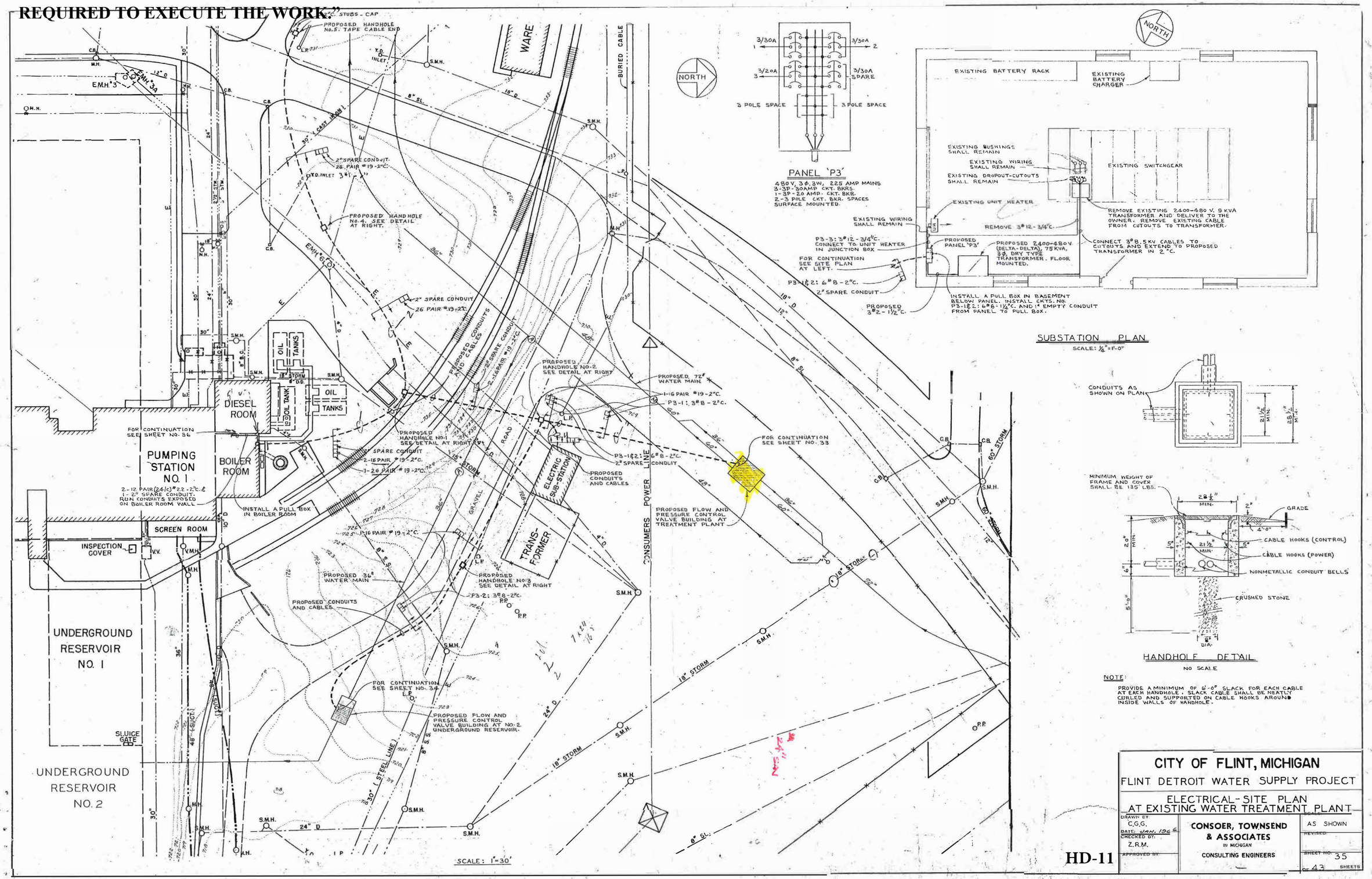
HD-9

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



HD-10 DIVISION A 64-117

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



CITY OF FLINT, MICHIGAN

FLINT DETROIT WATER SUPPLY PROJECT

ELECTRICAL - SITE PLAN AT EXISTING WATER TREATMENT PLANT

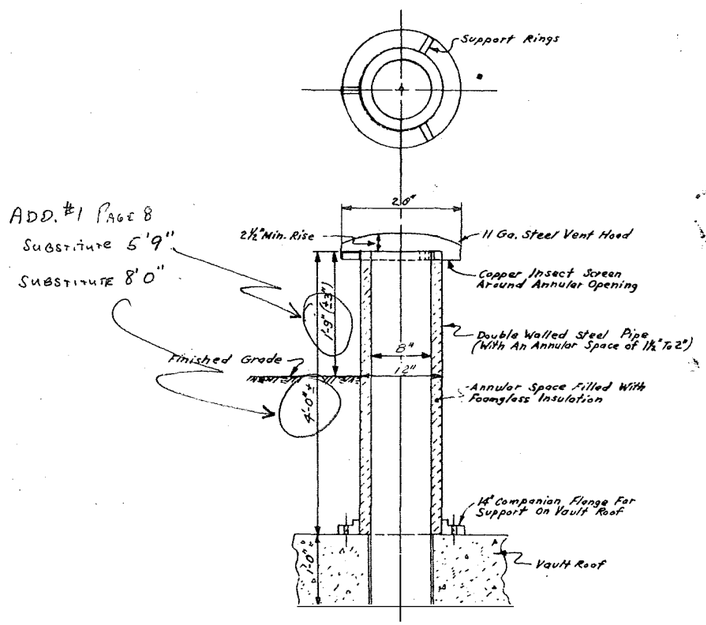
DRAWN BY: C.G.G.	CONSOER, TOWNSEND & ASSOCIATES IN MICHIGAN CONSULTING ENGINEERS	AS SHOWN
DATE: JAN. 1966		REVISED
CHECKED BY: Z.R.M.		SHEET NO. 35 OF 43 SHEETS
APPROVED BY:		

HD-11

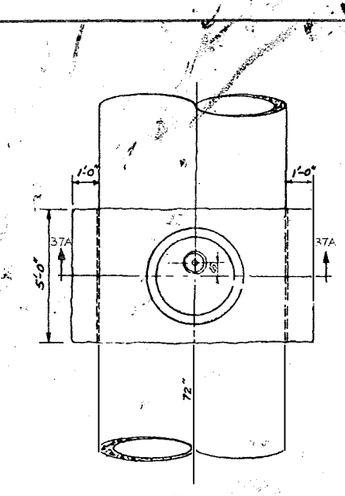
DIVISION A — 64-117

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

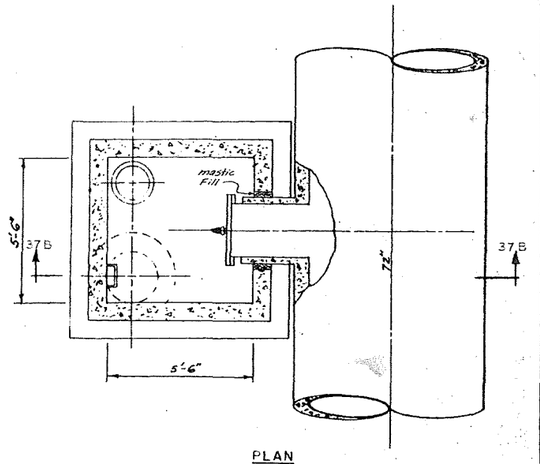
ADD. #1 PAGE 8
SUBSTITUTE 5'9"
SUBSTITUTE 8'0"



VENT PIPE DETAIL
Scale: 1"=1'-0"

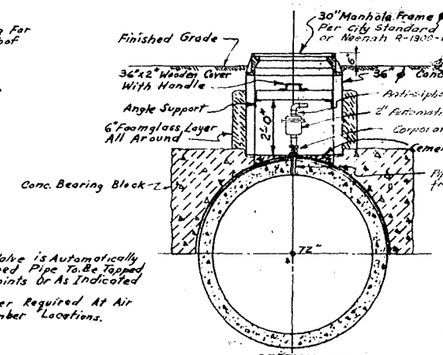


PLAN



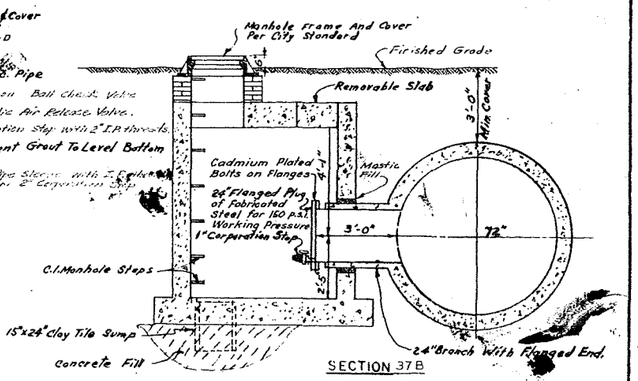
PLAN

NOTES:
1. Air Release Valve is Automatically Operated. Bleed Pipe To Be Tapped At Summit Points or As Indicated
2. 4 Ft. Min Cover Required At Air Release Chamber Locations.



SECTION 37A

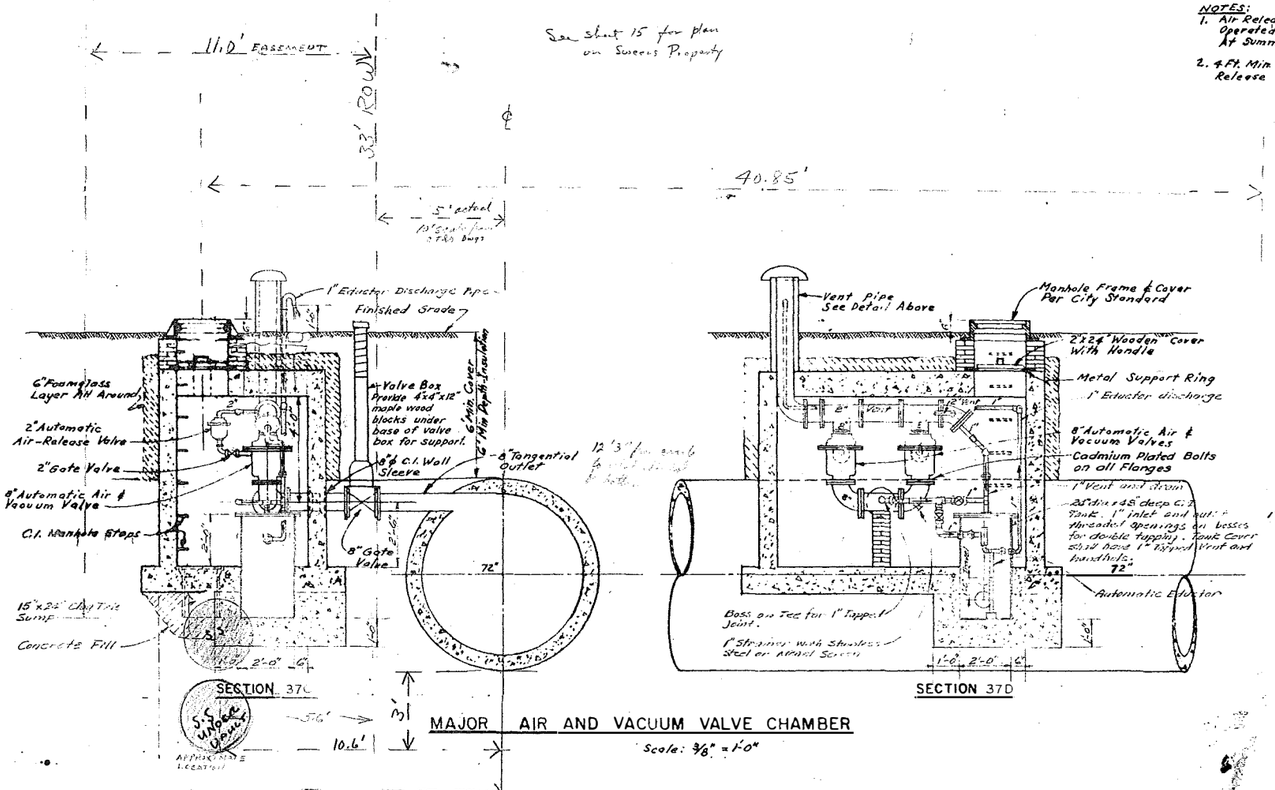
AIR RELEASE CHAMBER
Scale: ⅜" = 1'-0"



SECTION 37B

ACCESS MANHOLE CHAMBER
Scale: ⅜" = 1'-0"

NOTES:
1. Exact Location of All Structures With Respect To The Pipeline Are To Be Determined From Plan Sheets Or As Directed By The Resident Engineer.
2. All reinforcing details not shown here are shown on Sheet No. 39



MAJOR AIR AND VACUUM VALVE CHAMBER
Scale: ⅜" = 1'-0"

CITY OF FLINT, MICHIGAN
FLINT-DETROIT WATER SUPPLY PROJECT
PIPELINE DETAILS

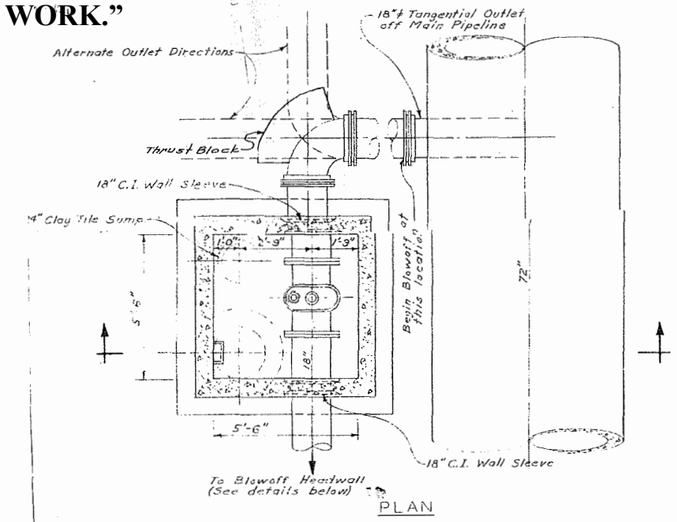
DRAWN BY: P.N. R.F.B.
DATE Jan 1966
CHECKED BY: G.Y.K. A.G.W.
APPROVED BY: Jas. F. Pollock

CONSOER, TOWNSEND & ASSOCIATES
MICHIGAN
CONSULTING ENGINEERS

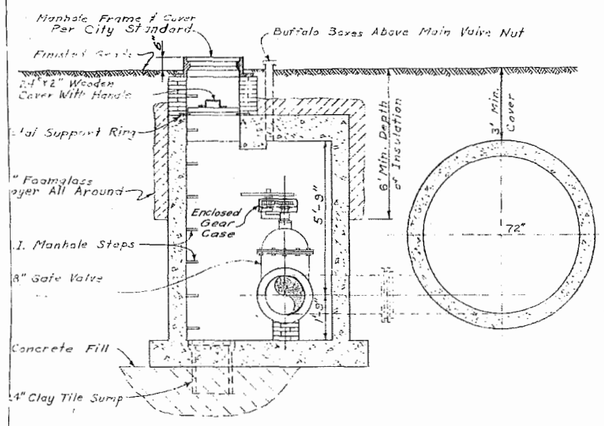
SCALE: As Shown
REVISED:
SHEET NO. 37 OF 43 SHEETS

HD-12

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



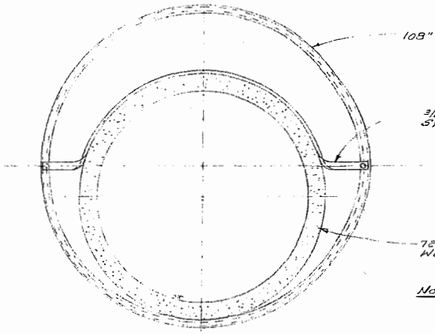
PLAN



SECTION

18" BLOWOFF VALVE CHAMBER

Scale: 3/8"=1'-0"



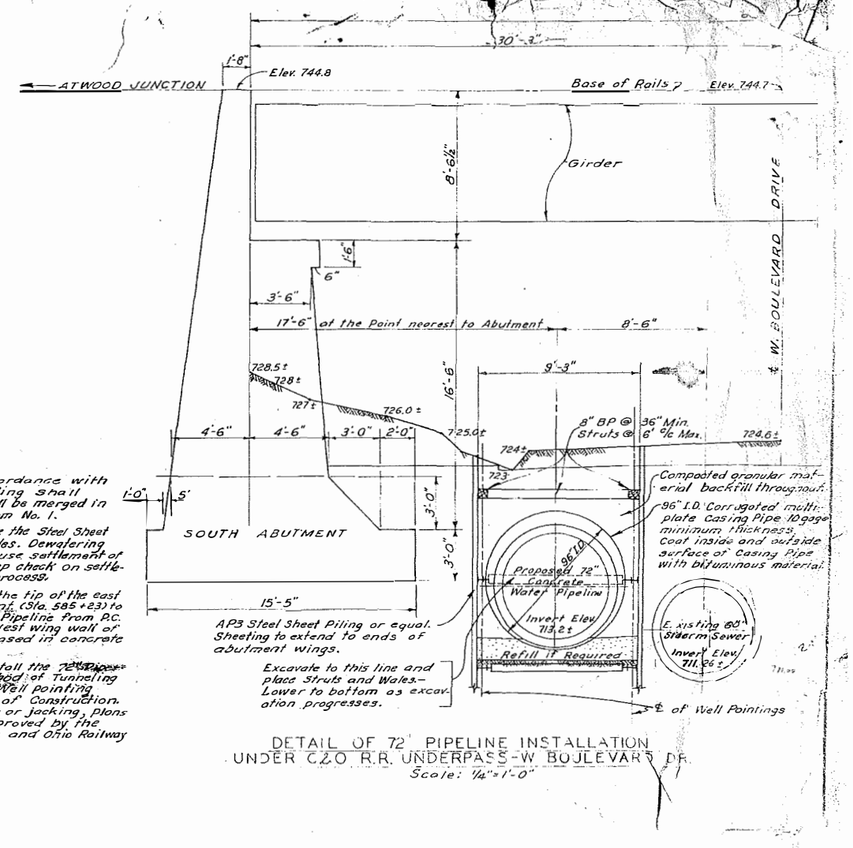
Note:
Ends of Tunnel Liner Plate to be Bricked up as per Specifications.

TYPICAL SECTION OF WATER MAIN IN TUNNEL

Scale: 1/2"=1'-0"

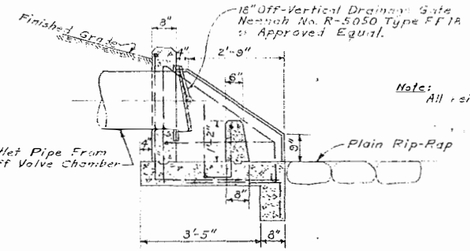
NOTES

1. 72" Pipeline to be installed in accordance with details shown. Steel sheet piling shall be left in place. All costs shall be merged in the Contract Unit Price for Item No. 1.
2. Well pointing to be installed inside the Steel Sheet Piling and between ends of wales. Dewatering shall proceed at a rate not to cause settlement of the abutment. Contractor to keep check on settlement during entire dewatering process.
3. 96" Casing Pipe shall extend from the tip of the east wing wall of the south abutment (Sta. 585+23) to P.C. of the pipeline (Sta. 585+74). Pipeline from P.C. (Sta. 585+74) to the tip of the west wing wall of the south abutment shall be encased in concrete of 10" minimum thickness.
4. Contractor has the option to install the 72" pipeline in 96" casing pipe by method of Tunneling or Jacking without sheeting. Well pointing shall be used for any method of Construction. If pipe is installed by tunneling or jacking, plans are to be submitted to and approved by the Chief Engineer of Chesapeake and Ohio Railway Co. before starting work.

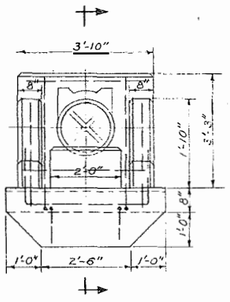


DETAIL OF 72" PIPELINE INSTALLATION UNDER C&O R.R. UNDERPASS-W. BOULEVARD DR.

Scale: 1/4"=1'-0"



SECTION



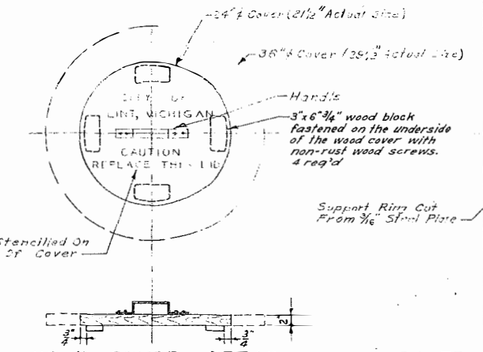
ELEVATION

Note:
All reinforcing bars #4

BLOWOFF HEADWALL

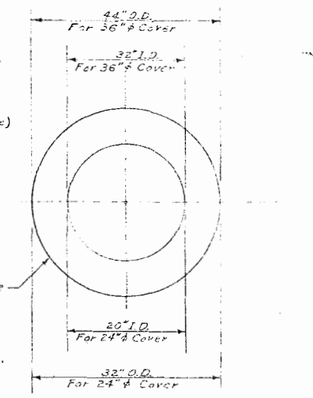
Scale: 1/2"=1'-0"

Notes:
1. Exact location of all structures with respect to the Pipeline are to be determined from the Drawings or as directed by the Resident Engineer.
2. Reinforcing details are shown on Sheet No. 39



WOOD COVER DETAIL

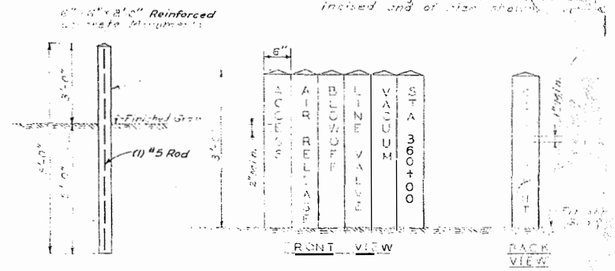
Scale: 1"=1'-0"



COVER SUPPORT RING DETAIL

Not To Scale

All Monuments are to be located near the Structures or at the particular station and approximately 6 Feet from the Right of Way line. Station Monuments are to be placed every 10 Stations (every 1000 Feet). All lettering on Monuments to be inscribed and of size shown.



CONCRETE MONUMENT DETAILS

Not To Scale

CITY OF FLINT, MICHIGAN

FLINT-DETROIT WATER SUPPLY PROJECT

PIPELINE DETAILS

DRAWN BY:
DATE: Jan. 1966
CHECKED BY: GYE, AGW
APPROVED BY: Lee J. Nelson

CONSOER, TOWNSEND & ASSOCIATES IN MICHIGAN
CONSULTING ENGINEERS

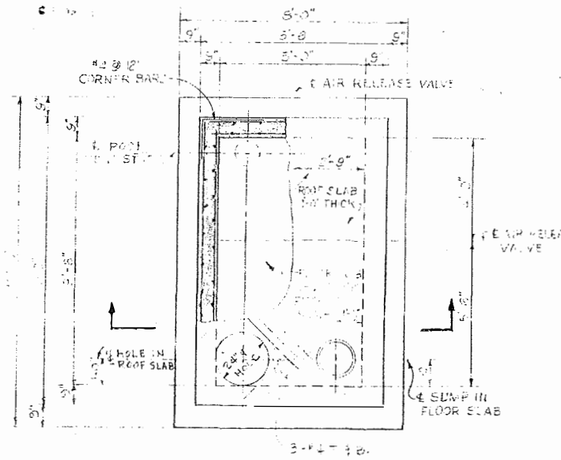
DEPT. As Sh
SHEET
OF

HD-13

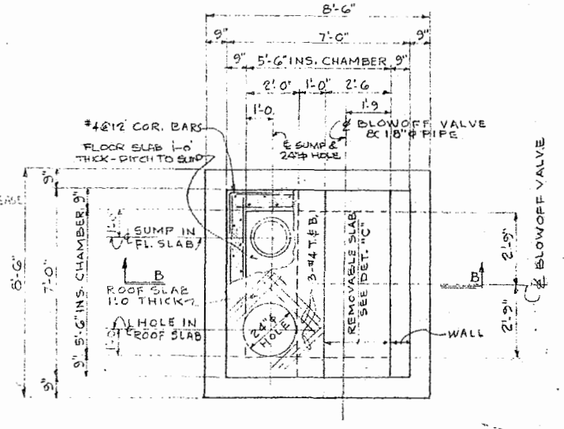
38

ADDENDUM NO. 1 - SHEET REVISION

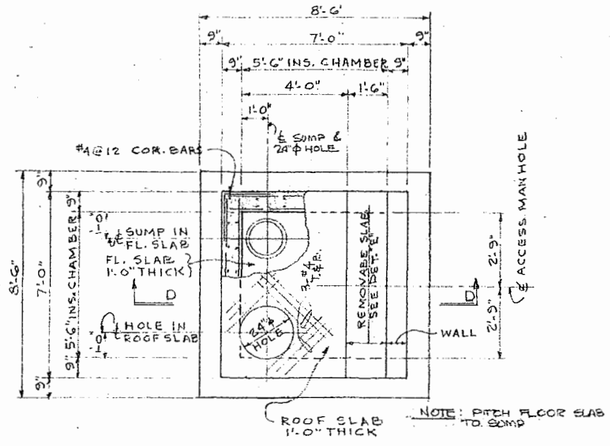
DIVISION A



PLAN - AIR RELEASE-VACUUM CHAMBER

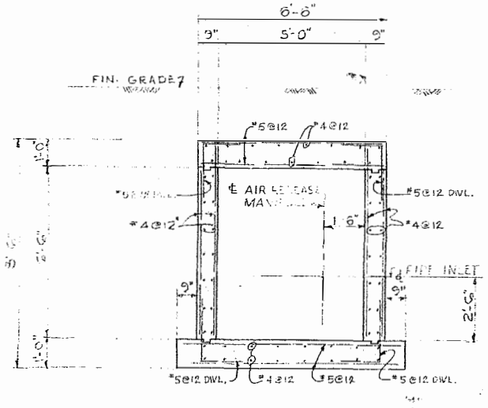


PLAN - BLOWOFF VALVE CHAMBER

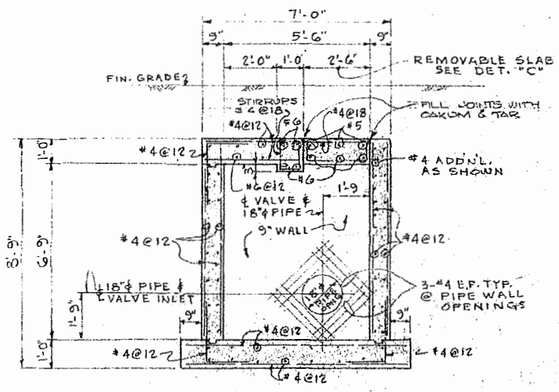


NOTE: PITCH FLOOR SLAB TO SUMP

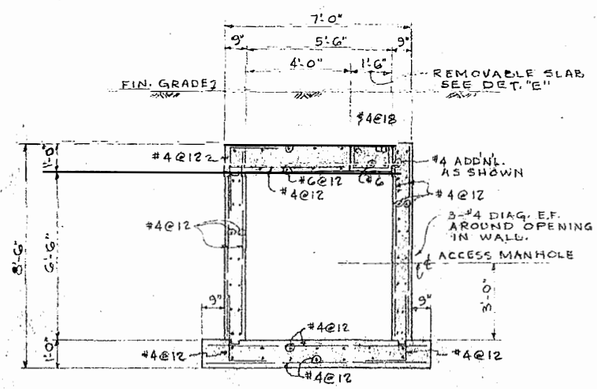
PLAN - ACCESS MANHOLE CHAMBER



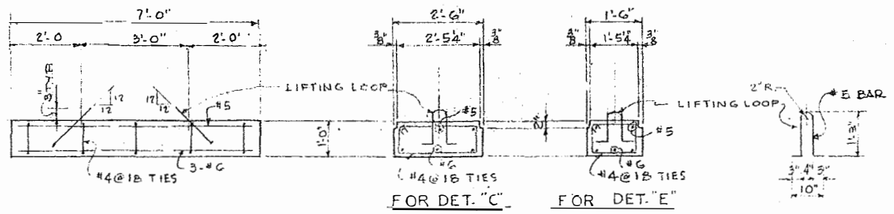
SECTION A



SECTION B



SECTION D



REMOVABLE SLAB — DET. "C" & DET. "E"
½" = 1'-0"

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

HD-14

CITY OF FLINT, MICHIGAN

FLINT-DETROIT WATER SUPPLY PROJECT

AIR RELEASE, BLOWOFF VALVE & ACCESS MANHOLE CHAMBERS

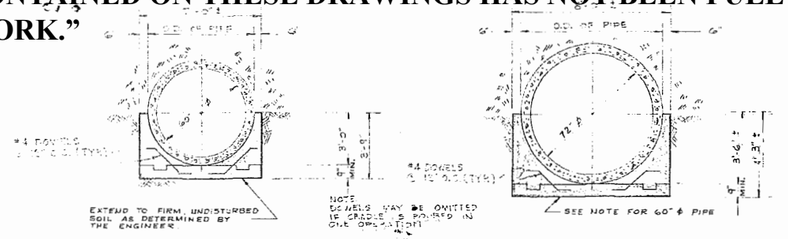
DRAWN BY: WEP
DATE: Jan. 1966
CHECKED BY: EEL, AWL
APPROVED BY: LFR

CONSOER, TOWNSEND & ASSOCIATES
IN MICHIGAN
CONSULTING ENGINEERS

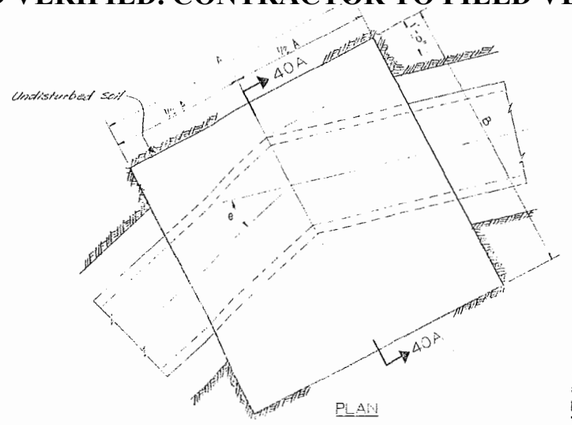
SCALE: 3/8" = 1'-0" UNLESS NOTED
SHEET NO. 33
NO. 13

DIVISION A

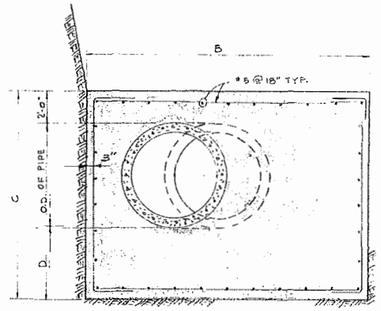
"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



CRADLE FOR 60" & 72" DIA. PIPE



PLAN



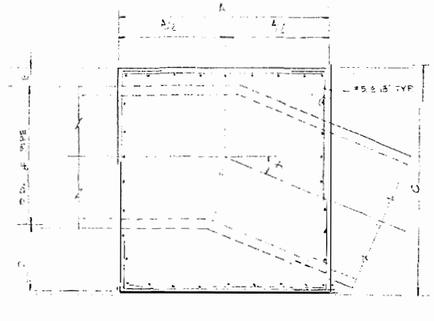
SECTION 40A

THRUST BLOCK FOR HORIZONTAL BENDS

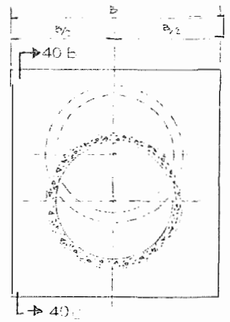
THRUST BLOCKS

PIPE DIA.	θ MIN.	θ MAX	A	B	C	D
72" OR 60"	10°	15°	8'-0	10'-0	10'-6	1'-6
	7°	8°	5'-0	10'-0	10'-6	1'-6
36"	30°	45°	6'-0	8'-0	7'-0	1'-0
24"	30°	45°	6'-0	7'-0	5'-6	1'-0

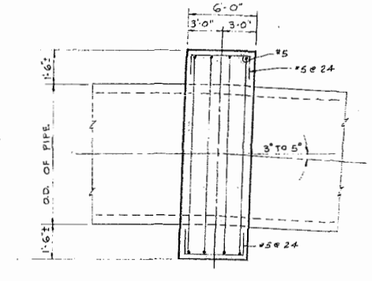
NOTE:
1 72" ϕ PIPE, θ = 10° TO 15°, ANCHOR BLOCKS NOT REQD. IF 9'-0 MIN. CLEAR EARTH COVER IS MAINTAINED.
2 72" & 60" ϕ PIPE, θ = 7° TO 8°, ANCHOR BLOCKS NOT REQD. IF 5'-0 MIN. CLEAR EARTH COVER IS MAINTAINED



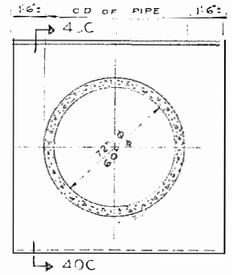
SECTION 40B



ELEVATION



SECTION 40C

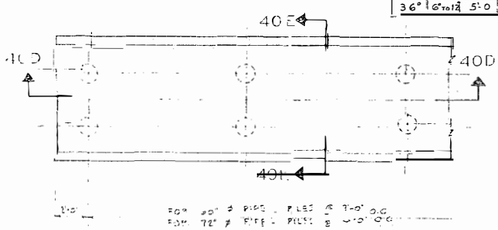


ELEVATION

THRUST BLOCK FOR VERTICAL BENDS

THRUST BLOCKS

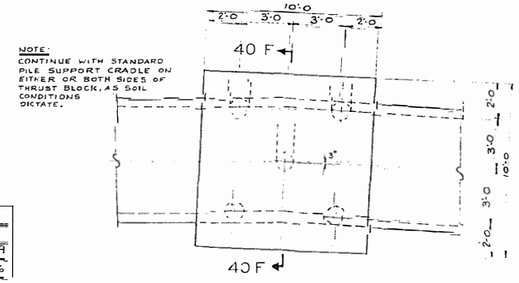
PIPE DIA.	α	A	B	C	D	E
72"	11°TO15	12'-0	10'-0	11'-0	2'-6	1'-6
	7°TO10	9'-0	10'-0	10'-0	2'-0	1'-0
	5°TO6	6'-0	10'-0	9'-0	1'-0	1'-0
60"	10°TO15	9'-0	10'-0	10'-0	2'-0	2'-0
	6°TO8	6'-0	10'-0	10'-0	2'-0	2'-0
36"	6°TO12	5'-0	6'-0	6'-6	1'-6	1'-0



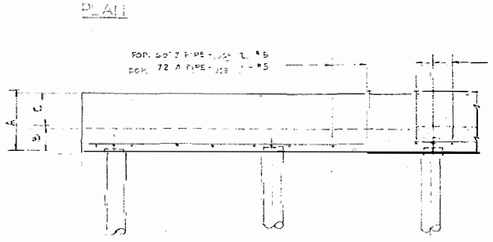
PLAN

PILE SUPPORTED CRADLES

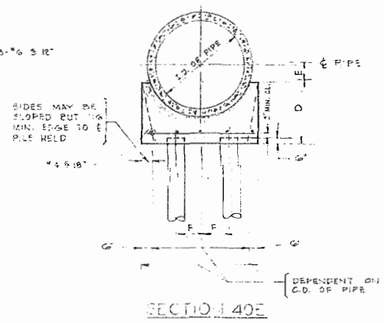
PIPE DIA.	A	B	C	D	E	F
72"	4'-6	2'-3	2'-3	4'-6	1'-3	1'-6
60"	3'-6	1'-6"	2'-0"	3'-6	1'-0	1'-6



PILE SUPPORTED THRUST BLOCK FOR 3° HORIZ. BEND

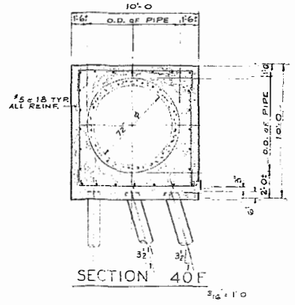


SECTION 40D

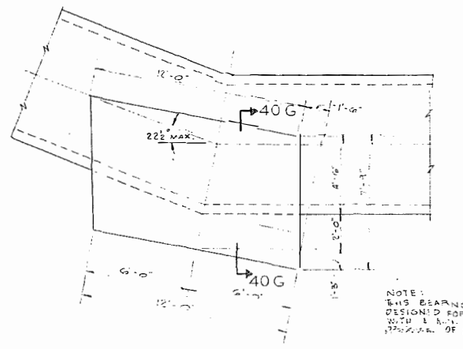


PILE SUPPORTED CRADLE

SECTION 40E

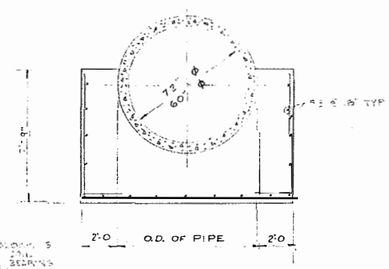


SECTION 40F



BEARING BLOCK

NOTE:
BEARING BLOCK IS DESIGNED FOR ℄ PIPE WITH 2 TON/SQ. FT. SOIL BEARING STRESS MAX. OF 2.6 Ft/sq.in.



SECTION 40G

NOTE:
1. BACKFILL AT ALL PIPE LINE BENDS, WHETHER OR NOT THERE IS AN ANCHOR BLOCK, SHALL BE OF WELL COMPACTED GRANULAR MATERIAL.
2. NO INFERIOR MATERIAL, SUCH AS PEAT OR SIMILAR SOIL, IS TO CARRY ANY PIPE THRUST.

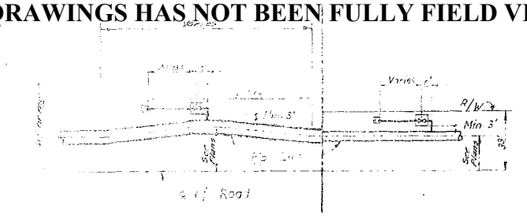
CITY OF FLINT, MICHIGAN
FLINT DETROIT WATER SUPPLY PROJECT
PIPE CRADLE & THRUST BLOCKS

DRAWN BY: W.S.R.
DATE:
CHECKED BY:
APPROVED BY:

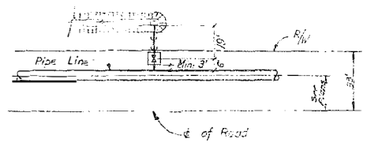
CONSOER, TOWNSEND & ASSOCIATES
IN MICHIGAN
CONSULTING ENGINEERS

SCALE: 1"=1'-0"
REVISED
SHEET NO. 42 OF 42 SHEETS

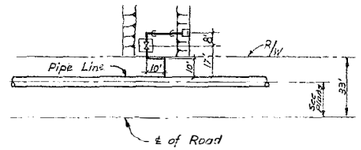
"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



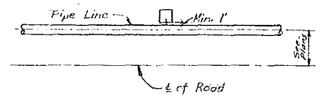
PLAN



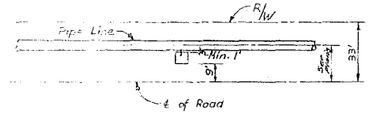
PLAN



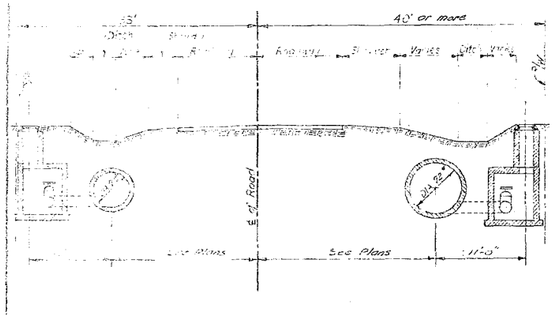
PLAN



PLAN

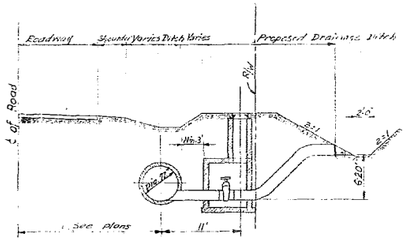


PLAN



SECTION

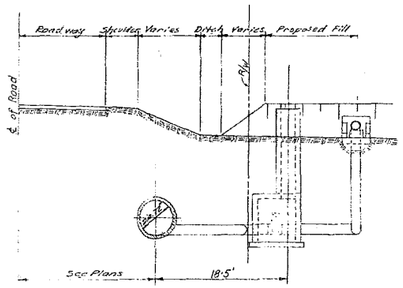
SCHEME "A"



SECTION

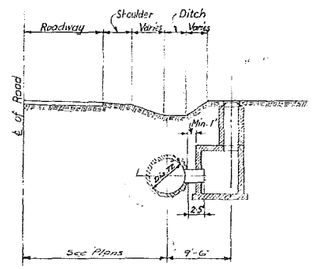
SCHEME "B"

BLOWOFF VALVE CHAMBER



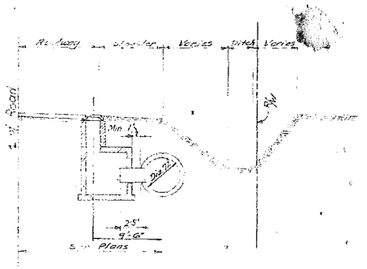
SECTION

SCHEME "C"



SECTION

SCHEME "D"

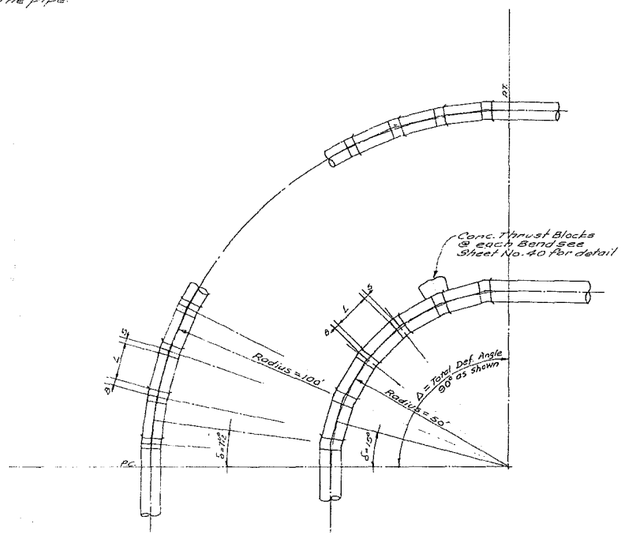


SECTION

SCHEME "E"

ACCESS MANHOLE CHAMBER

Thrust Blocks shall be provided by the Contractor for all 30° Radius Bends if pipe is installed at depth shown on the Profile. See Details of Thrust Blocks on Sheet No. 40. In lieu of the furnishing and installation of Thrust Blocks for such 30° Radius Bends, the Contractor will have the option of lowering the entire pipe bend to a depth to provide a minimum of 9'-0" of earth cover over the top of the pipe.



DETAIL OF PIPELINE CURVES

1"=20'-0"

DATA FOR 50 FT. RADIUS CURVE:

MAXIMUM PERMISSIBLE DEFLECTION ANGLE (δ) = 15°
CORD LENGTH = 2 x R TAN. $\delta/2$ = 2 x 50 x 0.1317 = 13.17 FT.

PIPE DIAMETER	72"	60"
LAID LENGTH FOR 15° BEND (S)	0.99 FT.	0.88 FT.
(B)	1.27	1.14
TOTAL LAID LENGTH OF BEND	2.26	2.02
STRAIGHT PIPE LAID LENGTH (L)	10.91	11.15

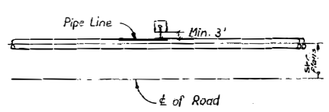
DATA FOR 100 FT. RADIUS CURVE:

MAXIMUM PERMISSIBLE DEFLECTION ANGLE (δ) = 7 1/2°
CORD LENGTH = 2 x R TAN. $\delta/2$ = 2 x 100 x 0.0655 = 13.10 FT.

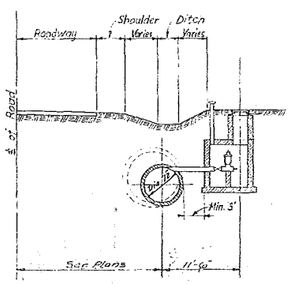
PIPE DIAMETER	72"	60"
LAID LENGTH FOR 7 1/2° BEND (S)	0.59 FT.	0.55 FT.
(B)	0.87	0.81
TOTAL LAID LENGTH OF BEND	1.46	1.36
STRAIGHT PIPE LAID LENGTH (L)	11.64	11.74

DATA FOR CURVE RADIUS GREATER THAN 100 FT.:

MAXIMUM PERMISSIBLE DEFLECTION ANGLE (δ) = 7 1/2°
CORD LENGTH = 2 x R TAN. $\delta/2$ = 0.131 R
STRAIGHT PIPE LAID LENGTH = 0.131 R - (S + B)
IF STRAIGHT PIPE LAID LENGTH IS GREATER THAN 16'-0", THE STANDARD PIPE LENGTH, A SMALLER DEFLECTION ANGLE (δ) SHOULD BE USED.



PLAN



SECTION

SCHEME "F"

AIR-VACUUM VALVE CHAMBER

	SCHEME	LOCATION
BLOWOFF VALVE CHAMBER	A	Typical Layout
	B	
	C	
ACCESS MANHOLE	D	Typical Layout
	E	Sta. 286+27
AIR-VACUUM VALVE CHAMBER	F	Typical Layout

HD-16

CITY OF FLINT, MICHIGAN

FLINT DETROIT WATER SUPPLY PROJECT

LAYOUT DETAILS OF APPURTENANCES

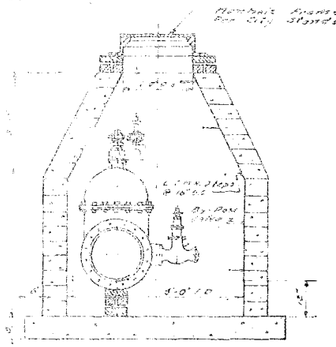
DRAWN BY: G.J.S.
DATE: Jan. 1966
CHECKED BY: G.Y.E. A.G.W.
APPROVED BY: L.P.R.

CONSOER, TOWNSEND & ASSOCIATES
IN MICHIGAN
CONSULTING ENGINEERS

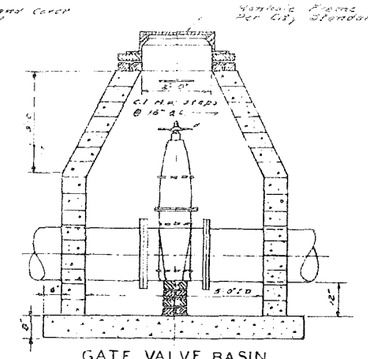
SCALE: NOT TO SCALE
REVISED
SHEET NO. 43

DIVISION A

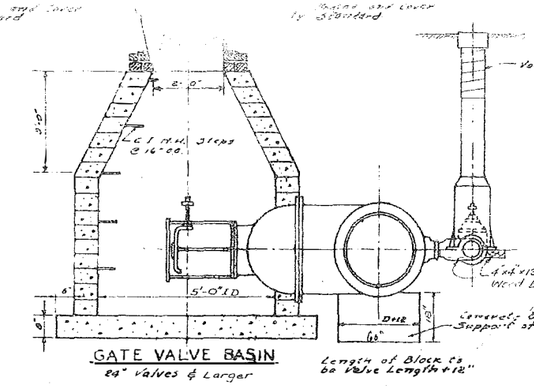
"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



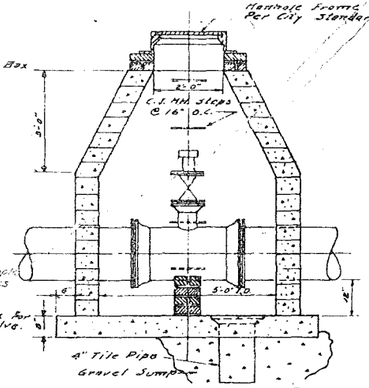
SECTION



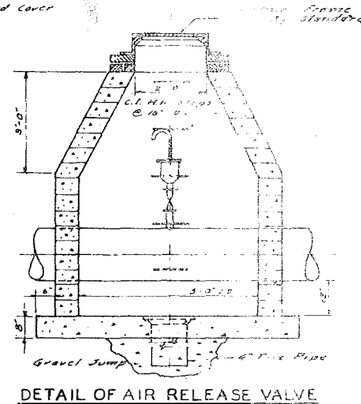
GATE VALVE BASIN
12" Valves & Smaller



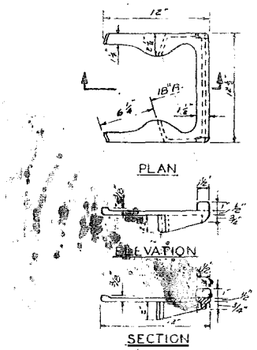
GATE VALVE BASIN
24" Valves & Larger



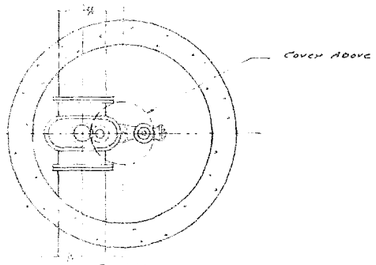
DETAIL OF DRAIN VALVE



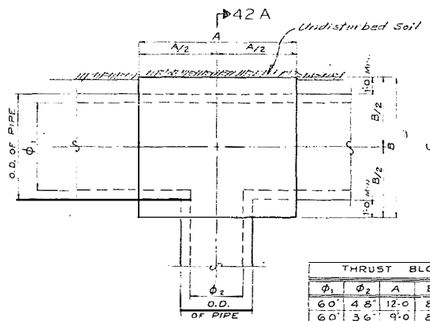
DETAIL OF AIR RELEASE VALVE



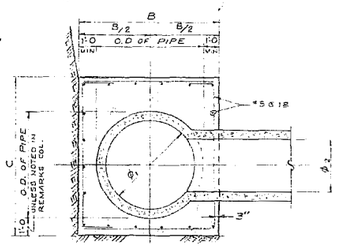
MANHOLE STEP DETAIL



PLAN
GATE VALVE BASIN
8"-16"& 20" Valves



PLAN

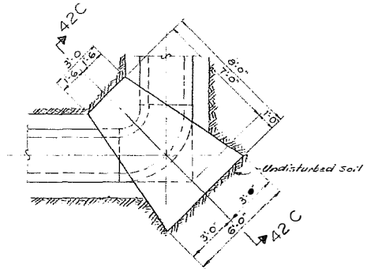


SECTION 42A

THRUST BLOCK

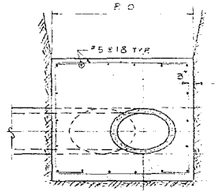
ϕ_1	ϕ_2	A	B	C	REMARKS
60°	48"	12-0	8-0	9-0	
60°	36"	9-0	8-0	9-0	
60°	24"	5-0	8-0	8-0	
45°	36"	10-0	6-6	9-0	EXTEND THRUST BLOCK 1'-6" BELOW BOTT. OF PIPE
30°	24"	6-0	6-0	7-0	
24"	24"	6-0	6-0	7-0	EXTEND THRUST BLOCK 1'-0" BELOW BOTT. OF PIPE

THRUST BLOCK FOR HORIZONTAL TEE

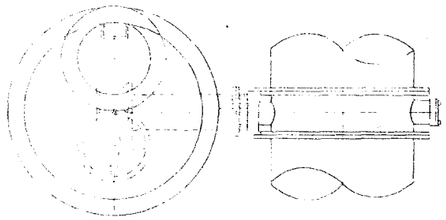


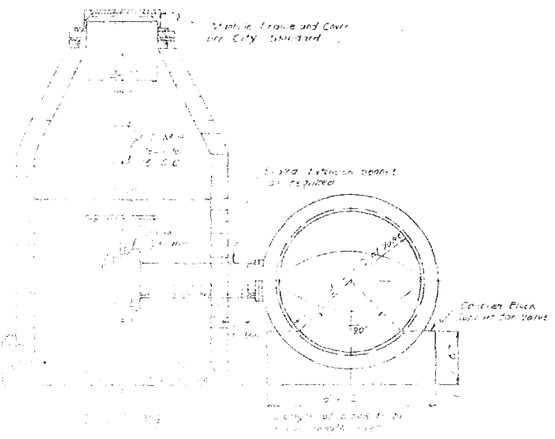
PLAN

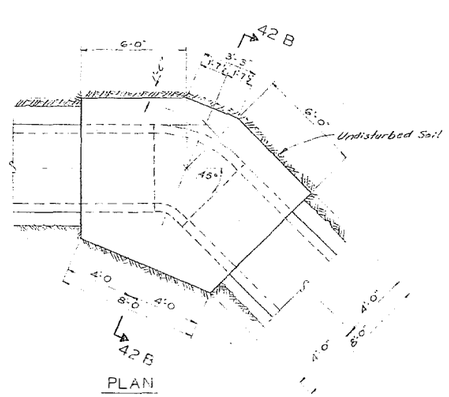
THRUST BLOCK FOR 90° HORIZONTAL BEND 24 ϕ PIPE



SECTION 42C

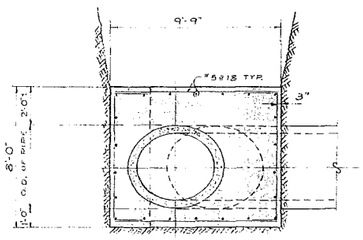

PLAN



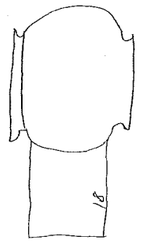


PLAN

THRUST BLOCK FOR 45° HORIZONTAL BEND 48 ϕ PIPE



SECTION 42B



This Contract Includes Items Checked in the Following Table

- [x] Gate Valve ... (12" Valves & Smaller)
- [x] Gate ... (16", 18" & 20" Valves)
- [x] Gat... (24" Valves & Larger)
- [ ] Ve... Butterfly Valve
- [ ] ... Valve
- [ ] ... Tees
- [ ] ... Vertical Bends
- [ ] ... Special Bend

CITY OF FLINT, MICHIGAN

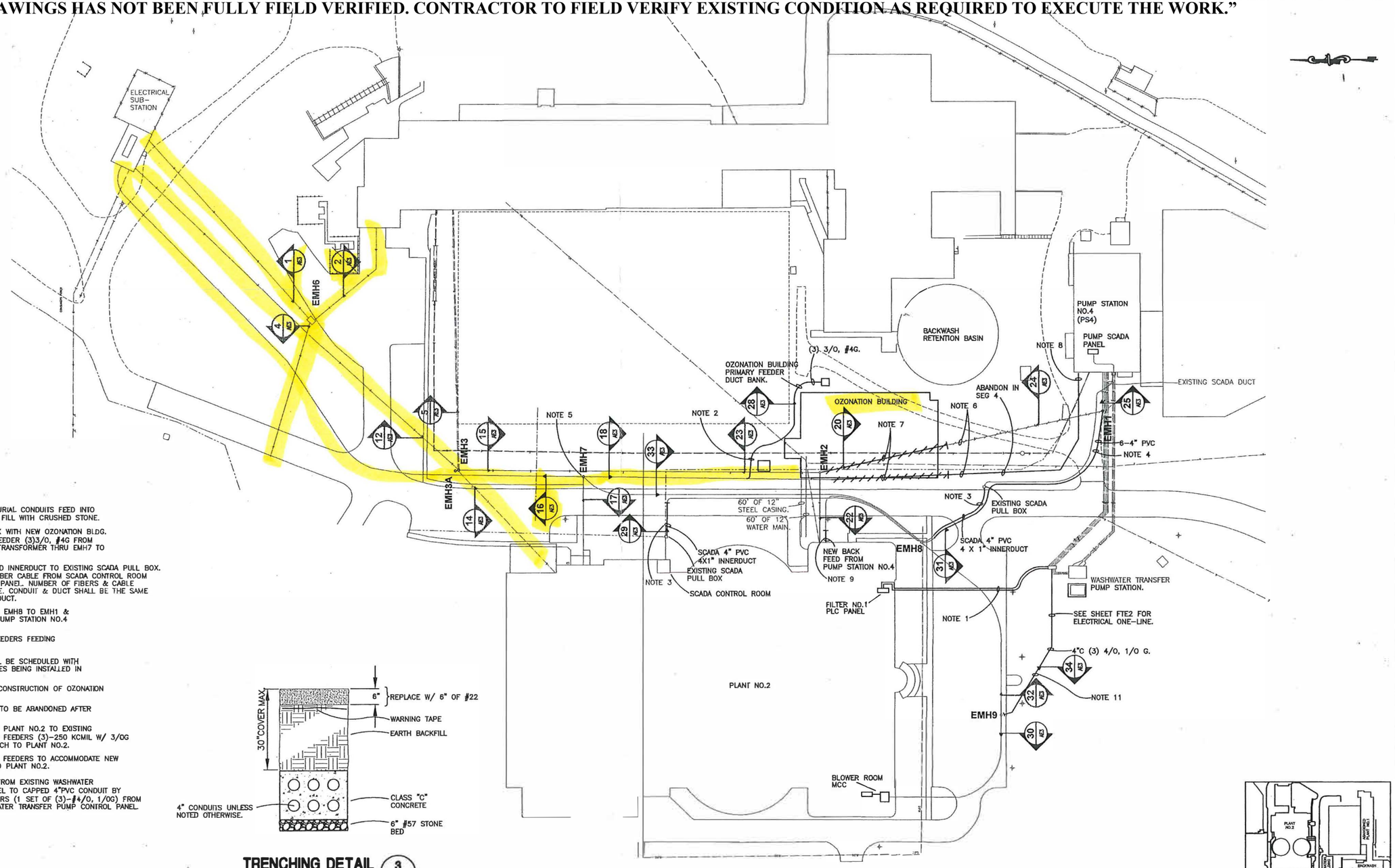
FLINT DETROIT WATER SUPPLY PROJECT

MISCELLANEOUS DETAILS

DRAWN BY: M.E.
DATE: Jan. 1966
CHECKED BY: G.V.E. A.S.W.
APPROVED BY: C. T. Nelson

CONSOER, TOWNSEND & ASSOCIATES IN MICHIGAN
CONSULTING ENGINEERS

"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."



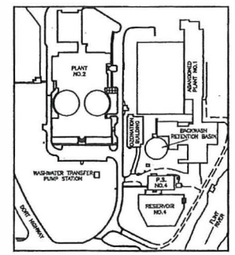
NOTES:

1. (2) 2" PVC CONDUIT DIRECT BURIAL CONDUITS FEED INTO FILTER #1 PLC PANEL & BACK FILL WITH CRUSHED STONE.
2. INTERCEPT EXISTING DUCT BANK WITH NEW OZONATION BLDG. DUCT BANK FEED. PULL NEW FEEDER (3)3/0, #4G FROM OZONATION BLDG. PAD MOUNT TRANSFORMER THRU EMH7 TO SUB STATION SWITCH NO.1.
3. TIE IN 4" PVC 4x1" MULTIGUARD INNERDUCT TO EXISTING SCADA PULL BOX. RUN NEW MULTI-CONDUCTOR FIBER CABLE FROM SCADA CONTROL ROOM TO PUMP STATION NO.4 SCADA PANEL. NUMBER OF FIBERS & CABLE TO BE SAME AS EXISTING CABLE. CONDUIT & DUCT SHALL BE THE SAME AS EXISTING MUMTIGUARD INNERDUCT.
4. INSTALL NEW DUCT BANK FROM EMH8 TO EMH1 & PULL NEW FEEDERS BETWEEN PUMP STATION NO.4 & EMH7.
5. CUT & SPLICE TO TWO NEW FEEDERS FEEDING PS4 THROUGH EMH8 & EMH1.
6. DUCT BANK INSTALLATION SHALL BE SCHEDULED WITH OTHER CONTRACTORS & SERVICES BEING INSTALLED IN THE LOCALITY.
7. DEMO AS REQUIRED FOR NEW CONSTRUCTION OF OZONATION BUILDING.
8. EXISTING DUCT BANK/FEEDERS TO BE ABANDONED AFTER CUT-OVER TO NEW FEEDERS.
9. INSTALL NEW DUCT BANK FROM PLANT NO.2 TO EXISTING CAPPED DUCT BANK. PULL NEW FEEDERS (3)-250 KCMIL W/ 3/0G FROM PUMP STATION NO.4 SWITCH TO PLANT NO.2.
10. REMOVE EXISTING (ABANDONED) FEEDERS TO ACCOMMODATE NEW FEEDERS FROM EMH-8, AND TO PLANT NO.2.
11. INSTALL (1)-4" PVC CONDUIT FROM EXISTING WASHWATER TRANSFER PUMP CONTROL PANEL TO CAPPED 4"PVC CONDUIT BY EMH-9. PULL NEW 480V FEEDERS (1 SET OF (3)-#4/0, 1/0G) FROM BLOWER ROOM MCC TO WASHWATER TRANSFER PUMP CONTROL PANEL.

TRENCHING DETAIL 3 AE2

SCALE: NTS (TYPICAL)

NOTE:
TRENCH & BACKFILL FOR INSTALLATION OF CONDUITS IS BY ELECTRICAL CONTRACTOR.



KEY PLAN
NTS

ALL NEW WORK SHOWN AS BOLD.

THE DLZ TEAM
ENGINEERS · ARCHITECTS · SURVEYORS · PLANNERS
1425 KEYSTONE AVE., LANSING, MI 48911
TELE. (517) 393-4484 • FAX (517) 393-5580

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

ASSOCIATED ELECTRICAL
DUCT BANK & ELECTRICAL MAN HOLE LOCATIONS

DRAWN	DJD
CHK'D.	ANG
APPRV'D	MEJ
DATE	JUNE, 2002
PROJECT NUMBER	7019-04

NO.	REVISION	BY	DATE

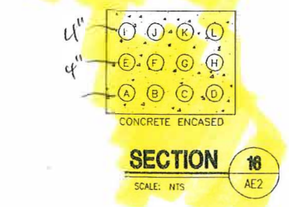
STATE OF MICHIGAN
DAVID W. DMYTRYKA
ENGINEER
No. 31515
PROFESSIONAL ENGINEER

HD-18

SHEET
OF
DRAWING NUMBER
AE2

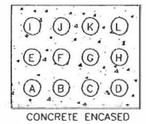
"REFERENCE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE INFORMATION CONTAINED ON THESE DRAWINGS HAS NOT BEEN FULLY FIELD VERIFIED. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION AS REQUIRED TO EXECUTE THE WORK."

A: NO DUCT
B: NO DUCT
C: NO DUCT
D: NO DUCT
E: 4"PVC W/-PL2-F2-3PH
F: 4"PVC W/-PL2-F1-3PH
G: 4"PVC W/-PS4-F1-3PH
H: 4"PVC W/-PS4-F2-3PH
I: 4"PVC W/-P2F-3PH
J: 4"PVC W/-OB-3PH
K: 4"PVC W/-
L: 4"PVC W/-



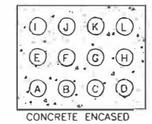
SECTION 16 AE2
SCALE: NTS

A: 4"PVC W/-PL2
B: 4"PVC W/-PL2
C: NO DUCT
D: NO DUCT
E: 4"PVC W/-SPARE
F: 4"PVC W/-SPARE
G:
H:
I:
J:
K:
L:
} NO DUCT



SECTION 17 AE2
SCALE: NTS

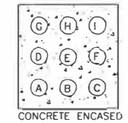
A: NO DUCT
B: NO DUCT
C:
D: 4"PVC W/-PS4-P1
J:
K: 4"PVC W/-OB-3PH
L: 4"PVC W/-SPARE
G: 4"PVC W/-SPARE
H: 4"PVC W/-PS4-F2
I:



SECTION 18 AE2
SCALE: NTS

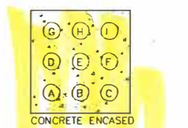
A: 4"PVC W/-PS4 -C2
B: 4"PVC W/-PL2W
C: 4"PVC W/-PS4 C1
D: 4"PVC W/-PS4 -B2
E: 4"PVC W/-PS4C
F: 4"PVC W/-PS4-B1
G: 4"PVC W/-PS4 -A2
H: 4"PVC W/-
I: 4"PVC W/-PS4 -A1

ABANDON UNDER OZONE BLDG.



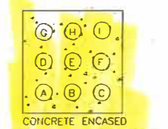
SECTION 20 AE2
SCALE: NTS

A: 4"PVC W/-PL1-A
B: 4"PVC W/-PL1-B
C: 4"PVC W/-PL1-C
D: 4"PVC W/-SPARE
E: 4"PVC W/-SPARE
F: 4"PVC W/--
G: 4"PVC W/-SPARE
H: 4"PVC W/-EMF 3PH.
I: 4"PVC W/-SPARE



SECTION 1 AE2
SCALE: NTS

A: 4"PVC W/-CPL1-PL1-C
B: 4"PVC W/-BPL1-PL1-B
C: 4"PVC W/-APL1-PL1-A
D: 4"PVC W/-
E: 4"PVC W/-SPARE
F: 4"PVC W/-SPARE
G: 4"PVC W/-SPARE
H: 4"PVC W/-SPARE
I: 4"PVC W/-SPARE

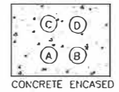


SECTION 2 AE2
SCALE: NTS

A: 4"PVC W/-EMF 3PH.

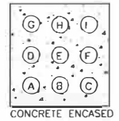
SECTION 4 AE2
SCALE: NTS

A: 4"PVC W/-PL2W
B: 4"PVC W/-SPARE
C: 4"PVC W/-SPARE
D: 4"PVC W/-SPARE



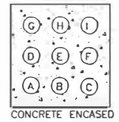
SECTION 22 AE2
SCALE: NTS

A: 4"PVC W/-PS4-C1
B: 4"PVC W/-SPARE
C: 4"PVC W/-PS4-C2
D: 4"PVC W/-PS4-B1
E: 4"PVC W/-PS4C
F: 4"PVC W/-PS4-B2
G: 4"PVC W/-PS4-A1
H: 4"PVC W/-
I: 4"PVC W/-PS4-A2



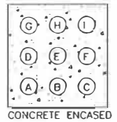
SECTION 23 AE2
SCALE: NTS

A: 4"PVC W/-PS4-C1
B: 4"PVC W/-PL2W
C: 4"PVC W/-PS4-C2
D: 4"PVC W/-PS4-B1
E: 4"PVC W/-
F: 4"PVC W/-PS4-B2
G: 4"PVC W/-PS4-A1
H: 4"PVC W/-
I: 4"PVC W/-PS4-A2



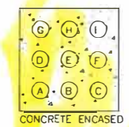
SECTION 24 AE2
SCALE: NTS

A: 4"PVC W/-PS4-F1-3PH
B: 4"PVC W/-PS4-F2-3PH
C: 4"PVC W/-PL2W
D: 4"PVC W/-PS4-B2
E: 4"PVC W/-
F: 4"PVC W/-PS4-B1
G: 4"PVC W/-PS4-A2
H: 4"PVC W/-
I: 4"PVC W/-PS4-A1



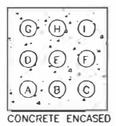
SECTION 25 AE2
SCALE: NTS

A: 4"PVC W/-PS4-Z1
B: 4"PVC W/-SPARE
C: 4"PVC W/-PS4-C2
D: 4"PVC W/-PS4-B1
E: 4"PVC W/-PS4C
F: 4"PVC W/-PS4-B2
G: 4"PVC W/-PS4-A2
H: 4"PVC W/-SPARE
I: 4"PVC W/-PS4-A1



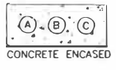
SECTION 12 AE2
SCALE: NTS

A: 4"PVC W/-PS4-C2
B: 4"PVC W/-
C: 4"PVC W/-PS4-C1
D: 4"PVC W/-PS4-B2
E: 4"PVC W/-PS4C
F: 4"PVC W/-PS4-B1
G: 4"PVC W/-PS4-A2
H: 4"PVC W/-
I: 4"PVC W/-PS4-A1



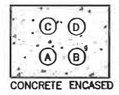
SECTION 15 AE2
SCALE: NTS

A: 4"PVC W/-
B: 4"PVC W/-
C: 4"PVC W/-



SECTION 14 AE2
SCALE: NTS

A: 4"PVC W/-OB-F1-3PH
B: 4"PVC W/-SPARE
C: 4"PVC W/-SPARE
D: 4"PVC W/-SPARE

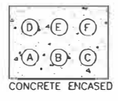


SECTION 28 AE2
SCALE: NTS

A: 4"PVC W/-4X1" INNERDUCT

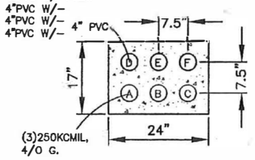
SECTION 29 AE2
SCALE: NTS

A: 4"PVC W/-P2F-3PH
B: 4"PVC W/-BWXF-3PH
C: 4"PVC W/-
D: 4"PVC W/-
E: 4"PVC W/-
F: 4"PVC W/-



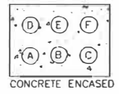
SECTION 30 AE2
SCALE: NTS

A: 4"PVC W/-PS4-F1-3PH
B: 4"PVC W/-PS4-F2-3PH
C: 4"PVC W/-PL2W
D: 4"PVC W/-
E: 4"PVC W/- 4" PVC
F: 4"PVC W/-



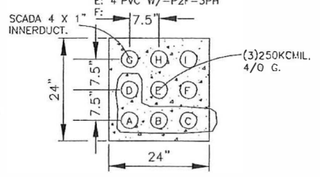
SECTION 31 AE2
SCALE: NTS

A: 4"PVC W/-P2F-3PH
B: 4"PVC W/-
C: 4"PVC W/-
D: 4"PVC W/-
E 4"PVC W/-
F: 4"PVC W/-



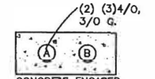
SECTION 32 AE2
SCALE: NTS

A: 4"PVC W/-PL2-F2-3PH
B: 4"PVC W/-PL2-F1-3PH
C: 4"PVC W/-PS4-F1-3PH
D: 4"PVC W/-PS4-F2-3PH
E: 4"PVC W/-P2F-3PH
F:

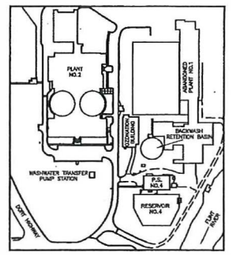


SECTION 33 AE2
SCALE: NTS

A: 4"PVC W/-BWXF-3PH
B: 4"PVC W/-SPARE



SECTION 34 AE2
SCALE: NTS



KEY PLAN
NTS

ABBREVIATION KEY:
EMF – ENGINEERING MANTAINENCE FACILITY
OB – OZONE BLDG.
PL1 – PLANT 1
PL2 – PLANT 2
PL2W – PLANT WASH PUMP TRANSFORMER 3–1/0
PS4 – PUMP STATION 4
PS2 – PUMP STATION 2
P2F – PLANT 2 FILTER
PS4C – PUMP STATION CONTROL BUNDLE
BWXF – BACKWASH TRANSFER PUMP FEEDER (480 VOLT)
W/ – WITH
–F1 – FEEDER 1
–F2 – FEEDER 2

NOTES:
1. ALL CONDUCTORS IN DUCT BANK ARE PRIMARY 2400V FEEDS UNLESS OTHER WISE NOTED.

ALL NEW WORK SHOWN IN BOLD.

THE DLZ TEAM
ENGINEERS · ARCHITECTS · SCIENTISTS · PLANNERS · SURVEYORS
1425 KEYSTONE AVE., LANSING, MI 48911
TELE (517) 393-4483 · FAX (517) 393-5794

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

ASSOCIATED ELECTRICAL
DUCT BANK SECTIONS

DRAWN	DJD
CHK'D.	ANG
APPRV'D	MEJ
DATE	JUNE, 2002
PROJECT NUMBER	7019–04

NO.	REVISION	BY	DATE

STATE OF MICHIGAN
DAVID W. DMYTRYKA
ENGINEER
No. 51515
PROFESSIONAL ENGINEER

HD-19

SHEET
OF
DRAWING NUMBER
AE3