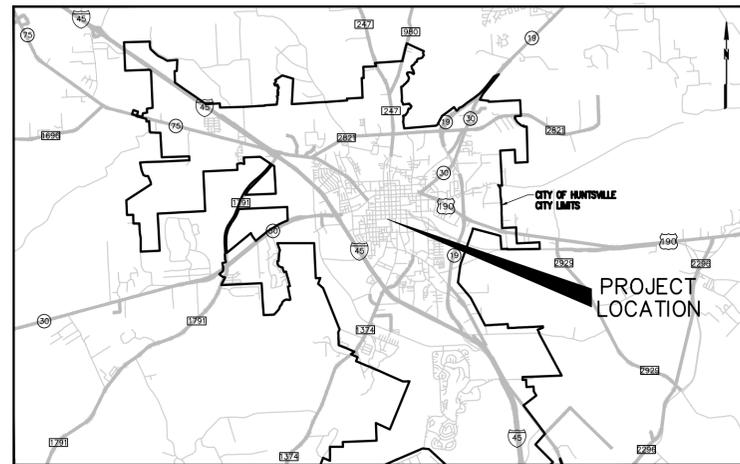


CONSTRUCTION PLANS FOR: 17TH STREET STORM SEWER IMPROVEMENTS CITY PROJECT ID # 22-10-14

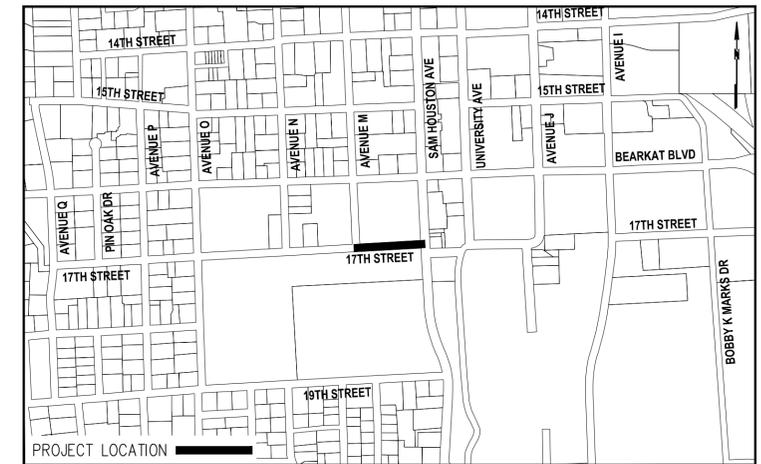
BID SET

LJA PROJECT No. E243-0020
FEBRUARY 2023

PREPARED FOR



VICINITY MAP
SCALE: N.T.S.



LOCATION MAP
SCALE: N.T.S.



DRAWING INDEX

1. COVER SHEET
2. GENERAL NOTES
3. PROJECT LAYOUT - HORIZONTAL & VERTICAL CONTROL
- 3A. SURVEY CONTROL SHEET
4. PLAN & PROFILE - 17TH STREET - BEGINNING TO END (BL "A")
5. STORM SEWER DETAILS
6. CITY OF HUNTSVILLE - STANDARD STORM SEWER DETAILS
7. CITY OF HUNTSVILLE - STANDARD WATER DETAILS - SHEET 1 OF 2
8. CITY OF HUNTSVILLE - STANDARD WATER DETAILS - SHEET 2 OF 2
9. STORM WATER POLLUTION PREVENTION - PLAN
10. STORM WATER POLLUTION PREVENTION - DETAILS
11. TRAFFIC CONTROL PLAN
12. STANDARD BARRICADE DETAILS

MAYOR
ANDY BRAUNINGER

CITY COUNCIL

MAYOR PRO TEM/WARD 2	RUSSELL HUMPHREY
WARD 1	VACANT
WARD 3	DELORIS MASSEY
WARD 4	JON STRONG
AT LARGE POSITION 1	BERT LYLE
AT LARGE POSITION 2	KAREN DENMAN
AT LARGE POSITION 3	VICKI MCKENZIE
AT LARGE POSITION 4	PAT GRAHAM

CITY MANAGER
ARON KULHAVY, AICP

CITY ENGINEER
DR. KATHLIE S. JENG-BULLOCH, P.E., D. WRE, CFM



CITY OF HUNTSVILLE

Kathlie S. Jeng-Bulloch 03/08/2023
CITY ENGINEER DATE
DR. KATHLIE S. JENG-BULLOCH, P.E., D. WRE, CFM

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GENERAL CONSTRUCTION NOTES
(ISSUE DATE: 06-19-18)
(THESE NOTES ARE CONSIDERED SUPPLEMENTAL TO THE WATER, SANITARY SEWER, AND STORM SEWER CONSTRUCTION NOTES)

LOCATES AND PERMITTING

- THE LOCATION OF AT&T (COMMUNICATIONS), CENTERPOINT ENERGY (GAS), ENTERGY (AKA GULF STATE UTILITIES - ELECTRIC), MID-SOUTH SYNERGY (ELECTRIC), WALLER COUNTY CABLEVISION, SUDDEN LINK CABLE, PHELPS WATER, WALKER COUNTY SUD, AND OTHER UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL REQUEST THE EXACT LOCATION OF THESE FACILITIES BY CALLING THE UTILITY COORDINATING COMMITTEE AT PHONE NUMBER 800-545-6005 OR 811, AT LEAST 48-HOURS BEFORE COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH OCCUR DUE TO HIS FAILURE TO REQUEST THE LOCATION AND PRESERVATION OF THESE UNDERGROUND FACILITIES.
- CONTRACTOR SHALL CONTACT THE CITY OF HUNTSVILLE UTILITIES AT 936-294-5733 AND ENGINEERING DEPARTMENT AT 936-294-5789 A MINIMUM OF 48-HOURS PRIOR TO BEGINNING ANY WORK. WHEN APPLICABLE, CONTRACTOR SHALL NOTIFY TEXAS DEPARTMENT OF TRANSPORTATION AREA ENGINEER 48-HOURS PRIOR TO CONSTRUCTION IN THE STATES RIGHTS-OF-WAY AT 936-295-3462.
- CONTRACTOR TO BE RESPONSIBLE TO OBTAIN ALL REQUIRED CONSTRUCTION PERMITS INCLUDING WALKER COUNTY, TXDOT AND CITY OF HUNTSVILLE.

ENERGIZED OVERHEAD POWER LINE

- CHAPTER 752 OF THE TEXAS HEALTH AND SAFETY CODE PROHIBITS ALL ACTIVITIES IN WHICH IT IS POSSIBLE FOR PERSONS, EQUIPMENT, OR MATERIALS TO COME WITHIN SIX FEET OF AN ENERGIZED OVERHEAD POWER LINE. FEDERAL REGULATION, TITLE 29, PART 1910.194(L) AND PART 1926.460(A)(15), ALSO CONTAIN MINIMUM CLEARANCE REQUIREMENTS FROM ANY ENERGIZED POWER LINE. INDIVIDUALS ARE RESPONSIBLE FOR THEIR OWN SAFETY AND CONTRACTORS AND OWNERS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF THEIR WORKERS UNDER THESE LAWS. IF YOU OR YOUR COMPANY MUST WORK NEAR OVERHEAD POWER LINES, CALL 1-800-ENTERGY TO BEGIN THE PROCESS OF DE-ENERGIZING OR RELOCATING THE POWER LINES AT YOUR EXPENSE. FAILURE TO DO SO COULD LEAD TO THE DEATH OR SERIOUS INJURY TO YOU OR SOMEONE ELSE AS WELL AS BE A VIOLATION OF THE ABOVE LAWS POTENTIALLY SUBJECTING YOU TO CRIMINAL AND CIVIL PENALTIES.

SURVEYING AND DIMENSIONAL CONTROL

- ALL SURVEY CONTROL POINTS AND BENCHMARKS ARE REPORTED AS FOLLOWS: HORIZONTAL COORDINATES (EXPRESSED IN U. S. SURVEY FEET UNITS) AND BEARINGS HEREON ARE REFERRING TO THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE AND BASED ON THE POSITION OF THE NATIONAL GEODETIC SURVEY (NGS) PRIMARY AIRPORT CONTROL STATION 737 AT HAVING PUBLISHED NAD 83 (1993) COORDINATES OF N=3,128,437.762 METERS AND E=1,154,289.433 METERS. LINEAR DIMENSIONS (EXPRESSED IN U. S. SURVEY FEET) ARE "NAD83 GRID" UNIT AND MAY BE CONVERTED TO "GEODETIC HORIZONTAL" UNITS BY DIVIDING BY A COMBINED SCALE FACTOR OF 0.9998. ELEVATIONS ARE EXPRESSED IN U.S. SURVEY FEET AND REFERRED TO THE (NGS) NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE POTENTIAL CONFLICTS AND VERIFY THAT THE BORING OPERATION AND PIPE INSTALLATION CAN BE ACCOMPLISHED WITHOUT CONFLICTING WITH EXISTING UTILITIES.
- CONTRACTOR IS RESPONSIBLE FOR HIS OWN HORIZONTAL AND VERTICAL CONTROL. REFERENCE POINTS AND CONSTRUCTION STAKING IS INCIDENTAL TO THE PROJECT.
- ALIGNMENT, CENTERLINE CURVE DATA, AND STATIONING TO BE DETERMINED FROM APPROVED AND/OR RECORDED SUBDIVISION OR ROAD RIGHT-OF-WAY PLAT.
- PUBLIC EASEMENTS DENOTED ON THIS PLAN ARE HEREBY DEDICATED TO THE PUBLIC FOREVER. ANY PUBLIC UTILITY, INCLUDING THE CITY OF HUNTSVILLE, SHALL HAVE THE RIGHT AT ALL TIMES, OF INGRESS AND EGRESS TO AND FROM AND UPON SAID EASEMENTS FOR THE PURPOSE OF CONSTRUCTION, RECONSTRUCTION, INSPECTION, PATROLLING, MAINTAINING AND ADDING TO OR REMOVING ALL OR PART OF ITS RESPECTIVE SYSTEMS WITHOUT THE NECESSITY OF ANY TIME OF PROHIBITING THE PERMISSION OF THE PROPERTY OWNER. ANY PUBLIC UTILITY, INCLUDING THE CITY OF HUNTSVILLE, SHALL HAVE THE RIGHT TO MOVE AND KEEP MOVED ALL OR PART OF ANY BUILDING, FENCES, TREES, SHRUBS, OTHER GROWTHS OR IMPROVEMENTS THAT IN ANY WAY ENDANGER OR INTERFERE WITH THE CONSTRUCTION, MAINTENANCE OR EFFICIENCY OF ITS RESPECTIVE SYSTEMS ON ANY OF THE EASEMENTS SHOWN ON THIS PLAT. NEITHER THE CITY OF HUNTSVILLE OR ANY PUBLIC UTILITY SHALL BE RESPONSIBLE FOR THE REPLACING OR REIMBURSING THE PROPERTY OWNER DUE TO REMOVAL OR RELOCATION OF ANY OBSTRUCTION ON THE PUBLIC EASEMENTS.
- ALL DIMENSIONS SHOWN ARE APPROXIMATE AND NEED TO BE FIELD VERIFIED BY THE CONTRACTOR. HORIZONTAL AND VERTICAL ALIGNMENT CHANGES ARE TO BE APPROVED BY THE CITY.
- ALL EXISTING UNDERGROUND UTILITIES ARE NOT GUARANTEED TO BE COMPLETED OR DEFINITE, BUT WERE OBTAINED FROM THE BEST INFORMATION AVAILABLE. CONTRACTOR HAS SOLE RESPONSIBILITY FOR FIELD VERIFICATION OF ALL EXISTING UTILITIES SHOWN ON DRAWINGS. CONTRACTOR SHALL COORDINATE ALL CONFLICTS WITH THE APPROPRIATE GOVERNING AGENCY.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	 City Service Center 448 State Highway 75 Huntsville, TX 77320	CITY OF HUNTSVILLE STANDARD DETAILS CONSTRUCTION NOTES	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV#</th> <th>ISSUER</th> <th>DATE</th> <th>APPROVER</th> <th>SHEET</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>MAM</td> <td>07/10/2018</td> <td></td> <td>1 OF 3</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">GF-01</td> </tr> </tbody> </table>	REV#	ISSUER	DATE	APPROVER	SHEET	0	MAM	07/10/2018		1 OF 3					GF-01
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NAME: CONSTRUCTION NOTES
CATEGORY: GENERAL FACILITY
DRAWN DATE: 11/22/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

GENERAL CONSTRUCTION NOTES
(CONTINUED)

OSHA - TRENCH SAFETY

- CONTRACTOR SHALL IMPLEMENT THE TRENCH SAFETY SYSTEM REQUIREMENTS OF THE FEDERAL, STATE, AND LOCAL SAFETY AND HEALTH REGULATIONS AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), 29 CFR, PART 1926 SUBPART P, EXCAVATION AND THE TEXAS HEALTH AND SAFETY CODE, CHAPTER 756 - MISCELLANEOUS HAZARDOUS CONDITIONS.
- NO EXCAVATIONS SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT FOR THE INSTALLATION OF MANHOLES, SANITARY SEWER LINES, AND OTHER UTILITIES SHALL BE COVERED WITH STEEL SHEETING, WHEN IN PAVED AREAS, 3/4" PLYWOOD, WOOD PLANKING OR SOME OTHER MATERIAL APPROVED BY THE CITY IN OTHER AREAS. THE EXCAVATION AREA MUST BE WELL PROTECTED WITH TRAFFIC BARRICADES EQUIPPED WITH FLASHING YELLOW LIGHTS.
- ALL EXCAVATION AREAS MUST BE COMPLETELY CORDONED OFF WITH A MINIMUM OF TWO STRANDS OF YELLOW PLASTIC CONSTRUCTION TAPE, ACCEPTABLE TO THE CITY. THE TAPE SHALL BE SUPPORTED WITH ENOUGH INTERMEDIATE SUPPORTS TO AVOID EXCESSIVE SAGGING. THE TAPE MAY BE TIED TO TRAFFIC BARRICADES WITH FLASHING YELLOW LIGHTS AND WOODEN LATH FOR SUPPORT. WHERE EXCAVATIONS EXTEND BEYOND THE EXISTING BACK OF CURB OR EDGE OF PAVEMENT, ADEQUATE BARRICADES WITH FLASHING YELLOW LIGHTS SHALL BE INSTALLED TO PROTECT PEDESTRIAN TRAFFIC.

STREETS, TRAFFIC CONTROL

- WHEN ANY STREET OR ANY SECTION OF A STREET IS CLOSED, THE CONTRACTOR SHALL FURNISH AND MAINTAIN ADEQUATE BARRICADES, WARNING AND DIRECTING SIGNS, RED FLAGS AND LIGHTS AT THE END OF EACH STREET AND AT ALL INTERSECTIONS ALONG THE STREET WITHIN THE LIMIT OF THE WORK AREA. ALL EXPENSE INCURRED FOR THE ABOVE REQUIREMENTS SHALL BE BORNE BY THE CONTRACTOR. ALL WARNING SIGNS AND BARRICADES SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. CONTRACTOR TO NOTIFY PROPER AUTHORITIES PRIOR TO ANY STREET OR PARTIAL STREET CLOSING.
- CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS.
- OFF-DUTY UNIFORMED POLICE OFFICER(S) ARE REQUIRED TO DIRECT TRAFFIC WHERE TRAFFIC LANES ARE BLOCKED.
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES AFFECTED BY THIS CONSTRUCTION BY MEANS OF ANCHORED STEEL PLATES, BY BACKFILLING IMMEDIATELY AFTER CONSTRUCTION, AND/OR BY PLACING SHELL OR LIMESTONE SURFACES FOR TEMPORARY DRIVEWAY PURPOSES. CONTRACTOR'S ATTENTION IS DIRECTED TO HS-20 LOAD RATED ACCESS REQUIREMENTS FOR ALL SUCH AREA.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING BARRICADES, FLAGMEN, ETC. TO CONFORM TO SAFETY REQUIREMENTS FOR THE CITY OF HUNTSVILLE AND TEXAS DEPARTMENT OF TRANSPORTATION.

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GENERAL CONSTRUCTION NOTES
(CONTINUED)

CONTRACTOR ADDITIONAL RESPONSIBILITIES

- EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO THE ORIGINAL OR BETTER CONDITIONS.
- CONTRACTOR IS RESPONSIBLE FOR EXAMINING ALL EXISTING FENCES AND REPAIRING THEM EQUAL TO OR BETTER THAN THEIR EXISTING CONDITION. THE COST FOR REPAIRING OR RESETTING EXISTING FENCES AND FENCE POST SHALL BE INCLUDED IN THE OTHER ITEMS OF WORK IN THE PROJECT.
- CONTRACTOR SHALL CLEAN AND DRESS UP EACH DAY'S WORK AREA PRIOR TO PROCEEDING WITH THE NEXT DAY'S WORK. ADEQUATE POSITIVE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
- CONTRACTOR SHALL ADEQUATELY PROTECT EXISTING STRUCTURES, UTILITIES, TREES, SHRUBS AND OTHER PERMANENT OBJECTS.
- TREES WITHIN THE STREET RIGHT-OF-WAY SHALL NOT BE REMOVED OR DISTURBED, EXCEPT WHERE CALLED OUT TO BE REMOVED. WHERE TREE ROOTS MUST BE CUT, FOLLOW THE REPAIR METHODS DESCRIBED IN THE SPECIFICATIONS AND/OR DETAILED ON PLAN SHEETS.
- THE CONTRACTOR SHALL CONDUCT THEIR OPERATIONS IN A MANNER SUCH THAT TRUCKS AND OTHER VEHICLES DO NOT CREATE A DIRT NUISANCE OR SAFETY HAZARD IN ANY STREETS, PUBLIC OR PRIVATE. CLEAN UP OF STREETS SHALL BE PERFORMED DAILY.
- ANY AREA OF GRASS, WHICH IS DISTURBED OR DUG UP DURING THE CONSTRUCTION, SHALL BE REPLACED WITH ST. AUGUSTINE SOD OR GRASS THAT MATCHES THE GRASS REMOVED, REFERENCE SPECIFICATIONS AND/OR PLANS.
- EXISTING PAVEMENTS, CURBS, SIDEWALKS, DRIVEWAYS AND LANDSCAPING DAMAGED OR REMOVED DURING CONSTRUCTION BY THE CONTRACTOR SHALL BE REPLACED BY THE CONTRACTOR AT THEIR EXPENSE.
- ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE SWP DEVELOPED FOR THE SITE AND IN COMPLIANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS.
- EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO THE ORIGINAL OR BETTER CONDITIONS.
- CONDITION OF THE FACILITIES, UPON COMPLETION OF JOB, SHALL BE AS GOOD OR BETTER THAN THE CONDITION PRIOR TO STARTING WORK. THE CONTRACTOR SHALL RESTORE ALL GRADES AND LANDSCAPING TO PRECONSTRUCTION CONDITIONS AND RE-ESTABLISH TURF AREAS DAMAGED BY THE CONSTRUCTION ACTIVITIES.
- ALL EXCESS DIRT FROM EXCAVATION SHALL BE DISPOSED OF OFFSITE BY CONTRACTOR AT NO EXTRA PAY.
- CONTRACTOR SHALL REMOVE ALL TRASH, EXCESS MATERIAL, DEBRIS, ETC. FROM THE SITE UPON COMPLETION OF THE PROJECT PRIOR TO INSPECTION AND APPROVAL BY THE APPROVING AGENCIES.
- CONTRACTOR SHALL PROVIDE THE CITY OF HUNTSVILLE ONE SET OF (RECORD) DRAWINGS.

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DRAWN DATE: 11/22/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

WATERLINE CONSTRUCTION NOTES

- ALL WATERLINE CONSTRUCTION TO BE ACCOMPLISHED IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS AS CODIFIED UNDER TITLE 30 TEXAS ADMINISTRATIVE CODE (30 TAC), CHAPTER 290.
- ALL WATERLINES TO BE LOCATED INSIDE PUBLIC ROAD RIGHTS-OF-WAYS AND PUBLIC EASEMENTS. CITY REPRESENTATIVE TO INSPECT & APPROVE PRIOR TO BACKFILL.
- ALL WATER MAINS 4" TO 16" SHALL BE C-909 (DR-18) AND ALL WATER MAINS 20" TO 24" SHALL BE C-900 (DR-18).
- TWELVE (12) INCH OR SMALLER WATERMANS TO HAVE A MINIMUM COVER OF FOUR (4) FEET. VARY FLOW LINE UNIFORMLY FROM DEPTH AND LOCATION SHOWN IN PLANS.
- WATERLINE FITTINGS TO BE CAST OR DUCTILE IRON WITH POLYETHYLENE WRAP AS SPECIFIED UNLESS OTHERWISE NOTED.
- MAINTAIN 12-INCH MINIMUM CLEARANCE AT CROSSINGS BETWEEN ALL WATERLINES AND ALL UTILITIES INCLUDING STORM SEWERS AND CLEVERTS UNLESS OTHERWISE NOTED.
- WATERLINES SHALL BE BEDDED AS SHOWN IN THE CITY OF HUNTSVILLE DETAILS. ALL WATER LINES TO BE INSPECTED BY CITY OF HUNTSVILLE PRIOR TO BACKFILL.
- WATERLINE TRENCHES UNDER OR WITHIN THREE (3) FEET OF PROPOSED OR FUTURE PAVEMENT SHALL BE BACKFILLED PER THE CITY OF HUNTSVILLE DETAILS.
- ALL 2" THRU 12" GATE VALVES FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH AWWA C509 AND BE MANUFACTURED BY MUELLER, AMERICAN-DARLING, OR APPROVED EQUAL RESILIENT SEAT GATE VALVES AND SHALL OPEN IN A COUNTER CLOCKWISE DIRECTION ONLY. VALVES ON ALL TAPPING SLEEVES ARE TO BE OF THE SAME TYPE.
- VALVES TO BE LOCATED OPPOSITE PROPERTY CORNER WHERE APPROPRIATE.
- ALL VALVE BOXES SHALL BE ADJUSTED TO FINISHED GRADE AFTER PAVING IS COMPLETE.
- ALL FIRE HYDRANTS SHALL BE MANUFACTURED BY MUELLER OR AMERICAN-DARLING. EQUIP EACH FIRE HYDRANT WITH TWO (2) TWO AND ONE-HALF (2 1/2) INCH NOMINAL INSIDE DIAMETER HOSE NOZZLES AND ONE (1) FOUR AND ONE-HALF (4 1/2) INCH NOMINAL INSIDE DIAMETER PUMPER NOZZLE WITH NATIONAL STANDARD THREADS ON EACH NOZZLE.
- CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING TO WITHSTAND TEST PRESSURES SPECIFIED BY THE TCEQ AND THE CITY OF HUNTSVILLE STANDARD DETAILS.
- ALL WATERLINE TESTING SHALL BE WITNESSED AND APPROVED BY THE CITY OF HUNTSVILLE.
- 12-GAUGE LOCATOR WIRE TO BE INSTALLED ON ALL WATER LINES & FORCE MAINS, TO BE ACCESSIBLE AT VALVE STACKS.
- ALL TS&VS SHALL BE FULL BODY - STAINLESS STEEL.
- 1 WATER SAMPLE PER 1000 FEET SHALL BE SUBMITTED TO A TEXAS DEPARTMENT OF HEALTH APPROVED LABORATORY AND SHALL BE FREE OF ANY CONTAMINATES, PRIOR TO BEING PUT IN SERVICE.
- DISINFECTION OF NEW AND REPAIRED WATER MAINS SHALL BE IN CONFORMANCE WITH AWWA C651. ALL NEW WATER MAINS SHALL BE DISINFECTED BEFORE THEY ARE PLACED IN SERVICE. ALL WATER MAINS TAKEN OUT OF SERVICE FOR INSPECTING, REPAIRING OR OTHER ACTIVITY, WHICH MIGHT LEAD TO CONTAMINATION OF WATER, SHALL BE DISINFECTED BEFORE THEY ARE RETURNED TO SERVICE. (NO SEPARATE PAY)
- CONTRACTOR TO INSTALL RAY-O-LITE OR EQUAL 4" X 4" BLUE REFLECTORIZED PAVEMENT MARKERS 6" OFF CENTER OF ROADWAY ON FIRE HYDRANT SIDE OF STREET.
- WATERLINE 8" OR GREATER SHALL BE CONSTRUCTED SUCH THAT ALL CROSSINGS WITH SANITARY SEWER OR SANITARY SEWER LEADS SHALL CENTER ONE FULL SECTION OF WATERLINE AT THE SANITARY SEWER CROSSING. WATERLINE SHALL BE AT LEAST 2 FEET ABOVE SANITARY LINE. WHERE WATERLINE CROSSES UNDER SANITARY SEWER LINES, WATERLINE SEGMENT SHALL BE ENCASED IN PIPE AT LEAST TWO NOMINAL PIPE DIAMETERS LARGER THAN WATERLINE AND MAINTAIN 1-FOOT VERTICAL CLEARANCE FROM SANITARY LINE.
- WHERE WATERLINE CROSSES UNDER SANITARY SEWER LINE, BOTH SEGMENTS MUST PASS A PRESSURE AND LEAKAGE TEST AS SPECIFIED BY TCEQ UNDER 30 TAC, CHAPTER 290 AND IN AWWA C600 STANDARDS.
- ALL VALVE BOXES SHALL BE ERECTED PLUMBED & BE FREE OF DEBRIS.

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NAME: WL CONSTRUCTION NOTES
CATEGORY: WATER
DRAWN DATE: 10/26/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

STORM SEWER NOTES
(ISSUE DATE: 04-20-18)
(THESE NOTES ARE CONSIDERED SUPPLEMENTAL TO THE GENERAL CONSTRUCTION NOTES)

- STORM SEWER CONSTRUCTION SHALL CONFORM TO THE CITY OF HUNTSVILLE SPECIFICATIONS FOR STORM SEWER CONSTRUCTION.
- ALL STORM SEWER TO BE ASTM C-76, CLASS III REINFORCED CONCRETE PIPE WITH RUBBER GASKETED JOINTS CONFORMING TO ASTM C443. CLASS IV RCP REQUIRED UNDER PAVEMENT WITH LESS THEN 2' OF COVER.
- ALL STORM SEWER INLETS SHALL BE BACKFILLED WITH CEMENT STABILIZED SAND (1.5 SACKS PER TON). ALL BEDDING SHALL BE CLASS "AA". ALL STORM SEWERS TO BE INSPECTED BY THE CITY PRIOR TO BACKFILL.
- ALL STORM SEWER TRENCHES UNDER PROPOSED AND FUTURE PAVEMENT OR WITHIN THREE-FOOT (3') FROM BACK OF CURB TO BE BACKFILLED WITH CEMENT STABILIZED SAND (1.5 SACKS PER TON) TO A POINT OF ONE FOOT (1') BELOW PAVEMENT SURGRADE. THE REMAINING BACKFILL TO BE MADE WITH COMPACTED SELECT MATERIAL. COST OF BACKFILL AND BEDDING TO BE INCLUDED IN UNIT PRICE PER LINEAR FOOT OF PIPE.
- HIGH DENSITY POLYETHYLENE PIPE MAY BE SUBSTITUTED ON PRIVATE PROPERTY AND ON PUBLIC ROAD (ON A CASE-BY-CASE BASIS), APPROVED BY THE CITY ENGINEER, FOR REINFORCED CONCRETE PIPE SUBJECT TO THE FOLLOWING:
 - FOR PIPES 36" AND SMALLER - CEMENT STABILIZED SAND PLACED BEFORE PIPE IS LAID, TO 7" MIN. BEDDING DEPTH. FOR SEWERS 42"-60" CEMENT STABILIZED SAND PLACED BEFORE PIPE IS LAID, TO 10" MIN. BEDDING DEPTH. THE SIDES SHALL BE 12" MIN. FROM EDGE OF TRENCH TO SPRINGLINE.
 - CEMENT STABILIZED SAND SHALL BE THOROUGHLY RODDED, PLACED AND COMPACTED TO 95% STANDARD PROCTOR DENSITY 1'0" ABOVE THE TOP OF PIPE, AFTER PIPE IS LAID.
 - PIPE AND FITTINGS: THE TYPES OF PIPE WILL BE INDICATED ON THE DRAWINGS BY THE FOLLOWING DESCRIPTION CONFORMING TO AASHTO M 252, AASHTO M 294, AND/OR AASHTO M66-95, LATEST EDITION. PIPE DESCRIPTION: CP (CORRUGATED POLYETHYLENE PIPE).
 - TYPE S (THIS PIPE SHALL HAVE A FULL CIRCULAR CROSS-SECTION, WITH AN OUTER CORRUGATED PIPE WALL AND A SMOOTH INNER LINE).

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	 City Service Center 448 State Highway 75 Huntsville, TX 77320	CITY OF HUNTSVILLE STANDARD DETAILS CONSTRUCTION NOTES	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV#</th> <th>ISSUER</th> <th>DATE</th> <th>APPROVER</th> <th>SHEET</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>MAM</td> <td>07/10/2018</td> <td></td> <td>1 OF 1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">SD-01</td> </tr> </tbody> </table>	REV#	ISSUER	DATE	APPROVER	SHEET	0	MAM	07/10/2018		1 OF 1					SD-01
REV#	ISSUER	DATE	APPROVER	SHEET														
0	MAM	07/10/2018		1 OF 1														
				SD-01														

NAME: CONSTRUCTION NOTES
CATEGORY: STORM DRAINAGE
DRAWN DATE: 11/22/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

UTILITY NOTES

CAUTION - UNDERGROUND GAS FACILITIES
THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

CAUTION - UNDERGROUND CABLE FACILITIES
TELEPHONE AND TELEVISION CABLE EXISTS UNDERGROUND THROUGHOUT THE PROPOSED PROJECT AREA. CONTRACTOR TO CONTACT "DIG-TESS" AT 1-800-344-8377 AT LEAST 48 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION FOR LOCATION AND MARKING OF UNDERGROUND CABLE.

WARNING - OVERHEAD ELECTRIC FACILITIES
OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT (713) 207-2222.

ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY
NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

CAUTION - UNDERGROUND PIPELINES
UNDERGROUND PIPELINES ARE SHOWN ACCORDING TO BEST AVAILABLE INFORMATION. CONTRACTOR TO PROCEED WITH CAUTION DURING EXCAVATION. CONTRACTOR TO COORDINATE WITH PIPELINE OWNER IN CASE OF CONFLICTS OR QUESTIONS.

CAUTION - AT&T TEXAS/SWBT FACILITIES

- THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
- THE CONTRACTOR SHALL CALL 1-800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
- WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
- THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
- PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. ROOSEVELT LEE JR. AT (713) 412-3990 OR EMAIL AT RL7259@att.com, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR AT&T TEXAS/SWBT FACILITIES.

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

NOTICE:

For your safety, you are required by Texas law to call 811 at least 48 hours before you dig so that underground lines can be marked. This Verification does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITIES

Mike Brower DATE **01-25-23**

CenterPoint Energy/Natural Gas Facilities Verifications ONLY
CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.
Signature Valid for six months

Mike Brower DATE **01-25-23**

CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
(This Signature verifies existing underground facilities - not to be used for conflict verification)
Signature Valid for six months

NO SIGNATURE REQUIRED BY FACILITY OWNER DATE N/A

Energy/Electrical Facilities Verifications
(This Signature verifies existing underground facilities - not to be used for conflict verification)
Signature Valid for one year

R. R. R. R. DATE **01/23/23**

AT&T Texas / SWBT Facilities
(Approved for AT&T Texas / SWBT UNDERGROUND Conduit Facilities only)
Signature Valid for one year

Revision By Chk. Appr. Date
CITY OF HUNTSVILLE 17TH STREET STORM SEWER IMPROVEMENTS
GENERAL NOTES

CITY OF HUNTSVILLE
17TH STREET STORM SEWER
IMPROVEMENTS

GENERAL NOTES

LJA Engineering, Inc.

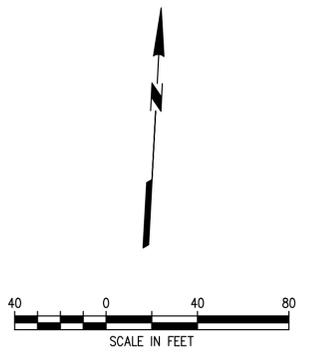
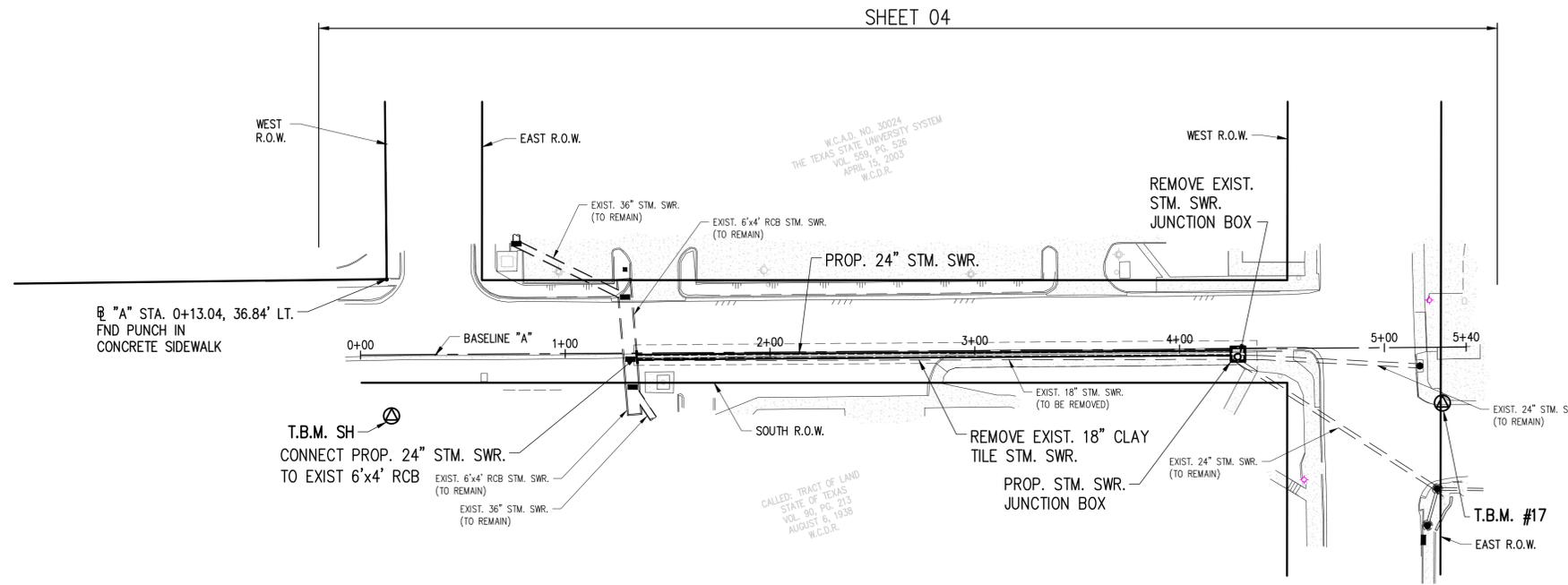
11821 East Freeway Phone 713.450.1300
Suite 360 Fax 713.450.1385
Houston, Texas 77029 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 02 Of 12

BENCHMARK NOTE:
 CITY OF HUNTSVILLE MON.#6023
 MONUMENT IS A 2-1/2" ALUMINUM CAP IN CONCRETE
 MONUMENT. MARK IS LOCATED IN ISLAND AT THE
 INTERSECTION OF HWY 45 AND VETERANS MEMORIAL PKWY.
 NORTHING: 10,260,078.59
 EASTING: 3,790,372.05
 ELEV. 404.28' (NAVD 88)

TBM#17
 CUT "X" IN CONCRETE.
 NORTHING: 10,256,596.23
 EASTING: 3,798,747.24
 ELEVATION: 406.44'

TBM SH
 CUT "X" IN CONCRETE.
 NORTHING: 10,256,563.23
 EASTING: 3,798,235.06
 ELEVATION: 382.86'



Revision	By	Chk.	Appr.	Date

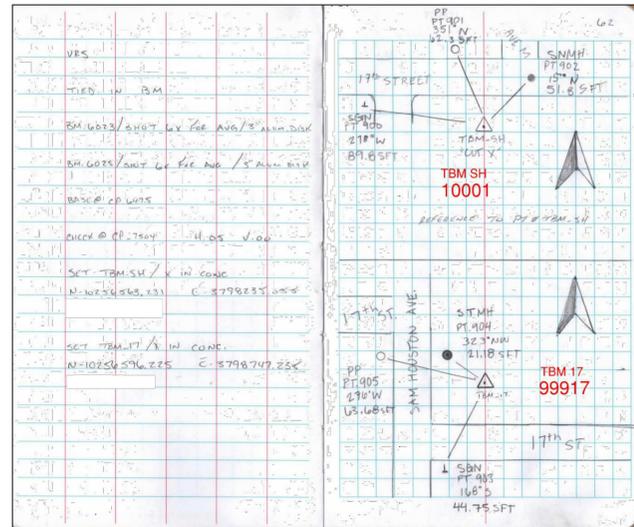
CITY OF HUNTSVILLE
17TH STREET STORM SEWER
IMPROVEMENTS

PROJECT LAYOUT
HORIZONTAL & VERTICAL
CONTROL

LJA Engineering, Inc.
 11821 East Freeway Phone 713.450.1300
 Suite 360 Fax 713.450.1385
 Houston, Texas 77029 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 03 Of 12

S:\Projects\2023\0223104 CONTROL SHEET 17TH ST.dwg 1/27/2023



NAME:	NORTHING:	EASTING:	ELEVATION:	LATITUDE:	LONGITUDE:	ELLIPSOIDAL HEIGHT:	DESCRIPTION
TBM "SH" 10001	10256563.231	3798235.055	382.86	30°42'59.11775" N	95°33'10.56849" W	293.637	"X" IN CONCRETE
TBM #17 99917	10256596.226	3798747.235	406.44	30°42'59.22621" N	95°33'04.68972" W	317.217	"X" IN CONCRETE

* All linear units are expressed in U. S. Survey Feet values.

Coordinate System, Basis of Bearings and Linear Units:

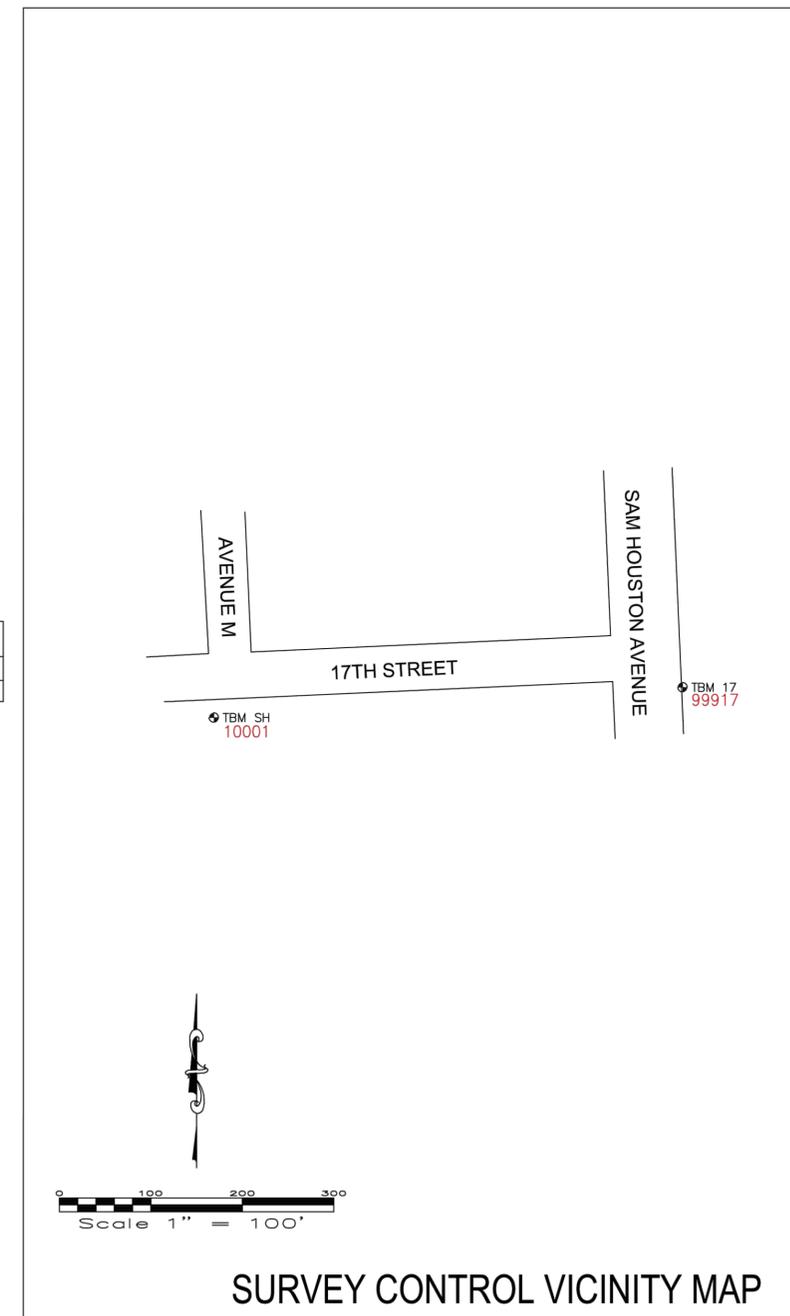
Coordinates and bearings hereon are referred to the Texas Coordinate System of 1983, Central Zone, and based on the position of National Geodetic Survey (formerly known as the U. S. Coast & Geodetic Survey) Primary Airport Control Station (PACS) monument designated "T39 A" having published NAD 83 (1993) coordinates of N= 3,128,437.762 Meters and E= 1,154,289.433 Meters.

Distances shown hereon are U. S. Survey Feet in "GRID" units and may be converted to "Geodetic Horizontal" units by dividing by a combined scale factor of 0.99988.

Survey control points, shown hereon, are associated with the City of Huntsville, Mapping Control Network (MCN)

Surveyor's Technical Report, contains additional information regarding datum and N.G.S. horizontal / vertical control incorporated in the MCN. Report can be found at: www.huntsvilletx.gov/181/Surveying

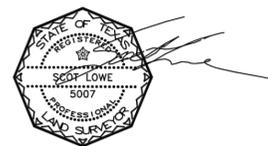
Additional MCN points can be viewed on the City of Huntsville, TX - Public GIS Mapping System at: www.huntsvilletx.gov/438/City_Maps



SURVEY CONTROL VICINITY MAP

SURVEY CONTROL SHEET
 City of Huntsville, Texas
 Storm Sewer project
 No. 22-10-14

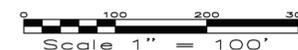
SHEET 1 OF 1



LJA Surveying, Inc.

Surveying
 2743 Smith Ranch Road, Suite 901
 Pearland, Texas 77584

Project No. 22-10-14
 S:\SECTORS\SURVEY\PROJECTS\LJAS001E243(HUNSTVILLE)\0020
 (HUNSTVILLE STORM)\925 TOPO\06 CAD\221014 CONTROL
 SHEET_17TH ST.dwg



Original drawing scale: ONE INCH = 100 FEET
 Original sheet: 18 Inch H by 24 Inch W

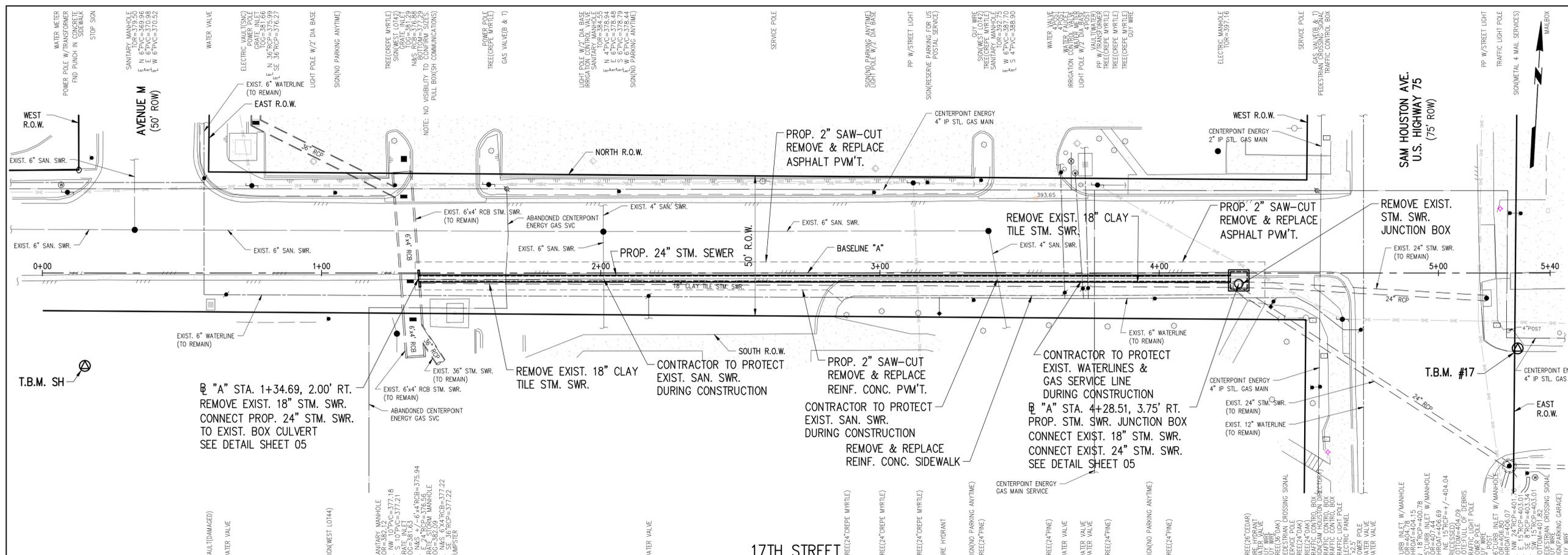
Revision	By	Chk.	Appr.	Date

CITY OF HUNSTVILLE
 17TH STREET STORM SEWER
 IMPROVEMENTS

SURVEY CONTROL SHEET

LJA Engineering, Inc.
 11821 East Freeway Suite 360 Houston, Texas 77029
 Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: 1" = 100'
APPROVED:	SHEET No. 03A Of 12



BENCHMARK NOTE:
 CITY OF HUNTSVILLE MON.#6023
 MONUMENT IS A 2-1/2" ALUMINUM CAP IN CONCRETE
 MONUMENT. MARK IS LOCATED IN ISLAND AT THE
 INTERSECTION OF HWY 45 AND VETERANS MEMORIAL PKWY.
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 CUT "X" IN CONCRETE.
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TBM SH
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TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED,
 CALL CENTERPOINT AT 713-207-2222
NOTICE:
 For your safety, you are required by Texas law to call 811 at least
 48 hours before you dig so that underground lines can be marked.
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VERIFICATION OF PRIVATE UTILITIES
 Mike Browne DATE 01-25-23

CenterPoint Energy/Natural Gas Facilities Verifications ONLY
 CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature
 not to be used for conflict verification.
 Signature Valid for six months
 Mike Browne DATE 01-25-23

CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
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 Signature Valid for six months

NO SIGNATURE REQUIRED BY FACILITY OWNER DATE N/A

Energy/Electrical Facilities Verifications
 (This Signature verifies existing underground facilities - not to be used for conflict verification)
 Signature Valid for one year
 R. R. R. DATE 01/23/23

AT&T Texas / SWBT Facilities
 (Approved for AT&T Texas / SWBT UNDERGROUND Conduit Facilities only)
 Signature Valid for one year



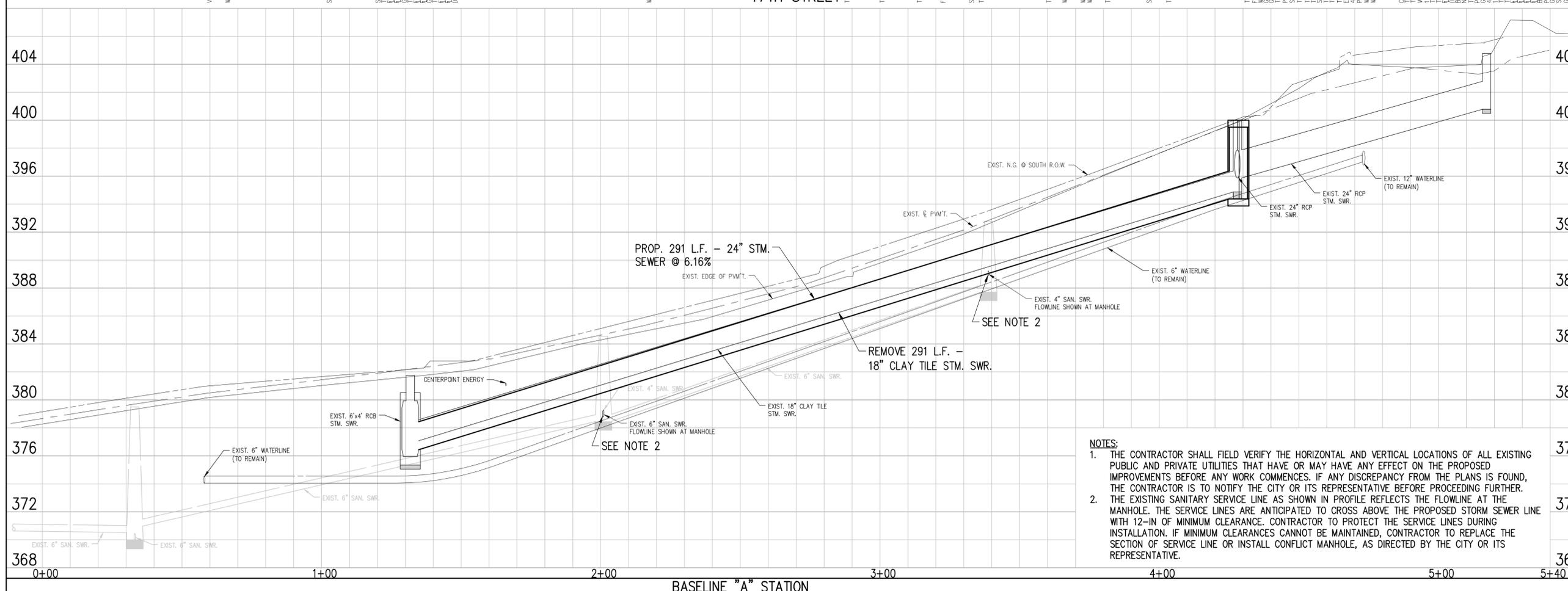
Revision	By	Chk.	Appr.	Date

CITY OF HUNTSVILLE
17TH STREET STORM SEWER
IMPROVEMENTS

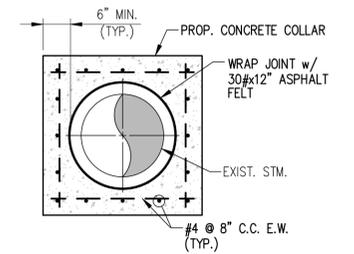
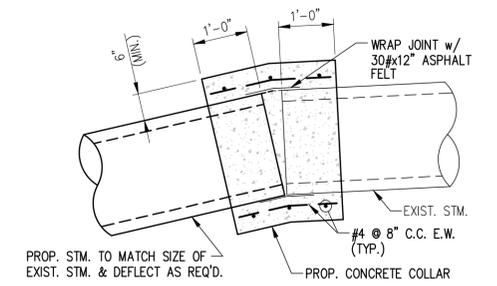
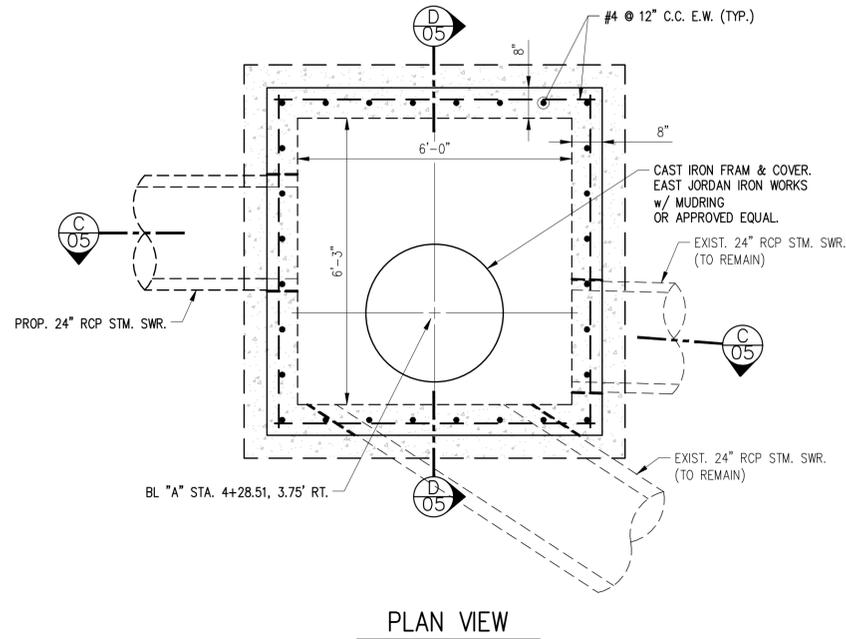
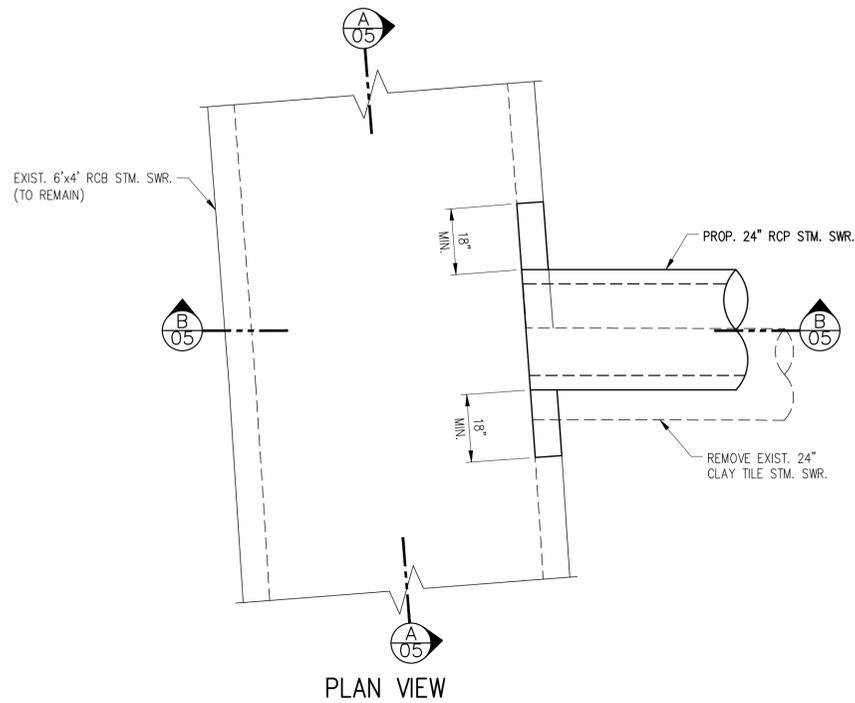
17TH STREET
PLAN & PROFILE
BEGINNING TO END (BL "A")

LJA Engineering, Inc.
 11821 East Freeway Phone 713.450.1300
 Suite 360 Fax 713.450.1385
 Houston, Texas 77029 FRN - F-1386

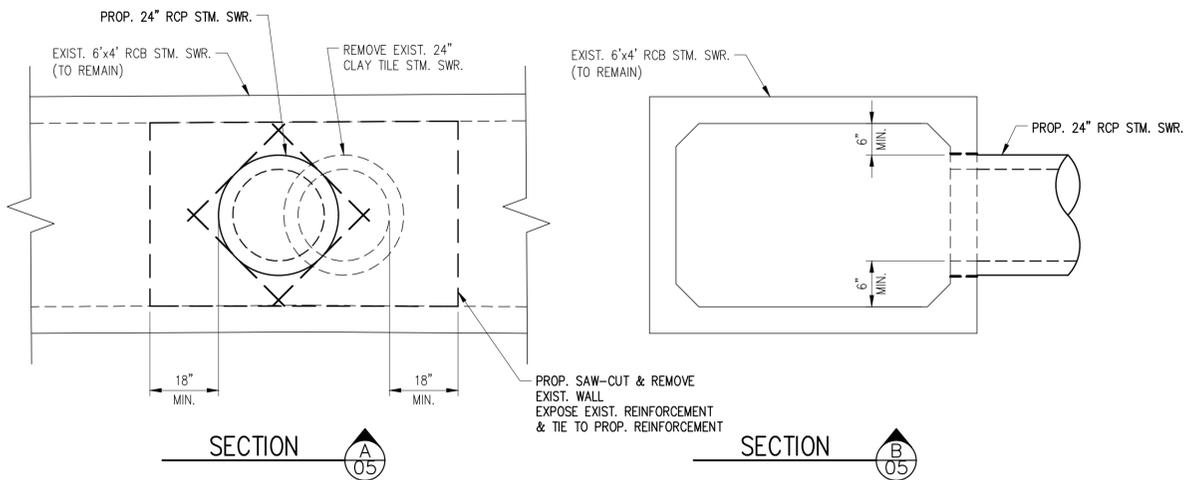
DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=4' VER.
APPROVED:	SHEET No. 04 Of 12



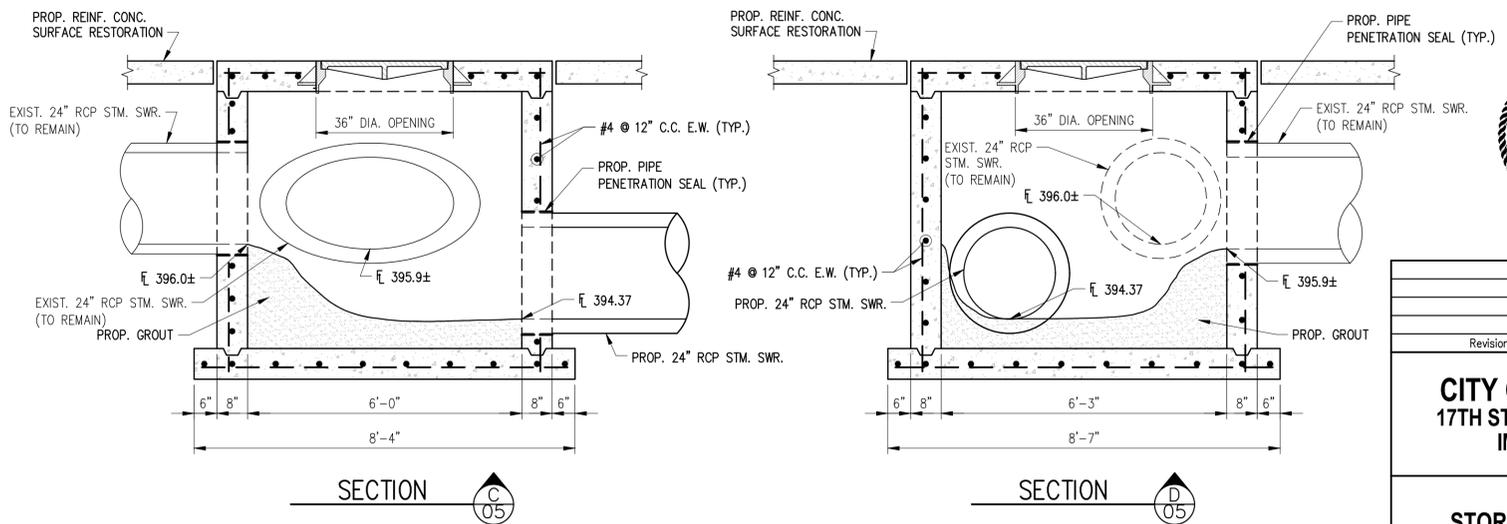
- NOTES:**
1. THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES THAT HAVE OR MAY HAVE ANY EFFECT ON THE PROPOSED IMPROVEMENTS BEFORE ANY WORK COMMENCES. IF ANY DISCREPANCY FROM THE PLANS IS FOUND, THE CONTRACTOR IS TO NOTIFY THE CITY OR ITS REPRESENTATIVE BEFORE PROCEEDING FURTHER.
 2. THE EXISTING SANITARY SERVICE LINE AS SHOWN IN PROFILE REFLECTS THE FLOWLINE AT THE MANHOLE. THE SERVICE LINES ARE ANTICIPATED TO CROSS ABOVE THE PROPOSED STORM SEWER LINE WITH 12-IN OF MINIMUM CLEARANCE. CONTRACTOR TO PROTECT THE SERVICE LINES DURING INSTALLATION. IF MINIMUM CLEARANCES CANNOT BE MAINTAINED, CONTRACTOR TO REPLACE THE SECTION OF SERVICE LINE OR INSTALL CONFLICT MANHOLE, AS DIRECTED BY THE CITY OR ITS REPRESENTATIVE.



SECTION
TYPICAL CONCRETE
COLLAR DETAIL
N.T.S.



BOX CULVERT CONNECTION DETAIL
SCALE: 1/2" = 1'-0"



PROP. JUNCTION BOX DETAIL
SCALE: 1/2" = 1'-0"



Revision	By	Chk.	Appr.	Date

CITY OF HUNSTVILLE
17TH STREET STORM SEWER
IMPROVEMENTS

STORM SEWER DETAILS

LJA Engineering, Inc.
11821 East Freeway Suite 360 Houston, Texas 77029
Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 05 Of 12

CROSS-SECTION OF CRUSHED STONE FOUNDATION

LONGITUDINAL SECTION ALONG PIPE @ AT FOUNDATION TRENCH DAM

NOTES:

- ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
- THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, OR OTHER CLASS II EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
- PLACE TRENCH DAMS IN CLASS I EMBEDMENT AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS STORM CRUSHED STONE FOUNDATION FOR WET STABLE TRENCH	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: STM CRUSHED STONE FDN CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-03		

HALF SECTION UNDER PAVEMENT

HALF SECTION UNDER NATURAL GROUND

NOTES:

- WHERE WET SAND IS ENCOUNTERED, REINFORCED CONCRETE PIPE SEWERS SHALL BE CONSTRUCTED USING APPROVED SPECIAL DESIGN AS SHOWN ON DRAWINGS.
- MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE 'A' FOR THE NOMINAL PIPE SIZE:
NOMINAL PIPE SIZE "A"
18" TO 30" COVER 30"
36" COVER 36"
- MAX TRENCH WIDTH SHALL NOT BE GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
- NOTE DETAIL SD-01 HDPE USE BACKFILL AND BEDDING REQUIREMENTS.

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS STORM BEDDING & BACKFILL FOR DRY STABLE TRENCH	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: ST BEDDING & BACKFILL CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-04		

HALF SECTION 32" MANHOLE COVER WITH FRAME

NOTES:

- ALL LETTERS SHALL BE 3" HIGH AND SHALL BE RAISED 1/8" LINE WIDTH FOR LETTERS SHALL BE 1/4" WIDE.
- 1/2" x 2 1/2" RECESS (SEE SECTION OF COVER THRU RECESS)
- GROOVES 3/4" DIA x 3/4" DEEP APPROX 3/4" TO 1" SPACES
- 3/4" HOLES
- WORD "SEWER" OR "STORM SEWER"
- MACHINE BEARING SURFACE
- 32" MANHOLE FRAME & COVER FRAME: VULCAN MODEL V-1425 OR EQUAL COVER: VULCAN MODEL V-1419

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS STORM SEWER MANHOLE FRAME & COVER	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: ST SW MH FRAME & COVER CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-08		

SECTION B-B

PLAN OF TYPE "C"

NOTES:

- BRICK WALLS 12"-0" BELOW TOP OF CASTING TO BE 12" THICK. STD. FRAME & COVER SHALL BE PER COH STANDARD MH COVER
- ADJUSTMENT RINGS AS REQUIRED
- CONCENTRIC CONE
- O-RING JOINTS
- PRECAST SECTIONS PER ASTM C-478 OR 8" BRICK WALLS
- 5" THK WALL (MIN.)
- 48" INSIDE DIA. (MIN.)
- 1 1/2 -SACK CEMENT PER CUBIC SAND 1/4" STABILIZED BACKFILL AROUND MANHOLE COMPACTED IN 8" LIFTS (MAX.)
- 32" STANDARD MANHOLE FRAME AND COVER (COVER NOT SHOWN)
- 6"-0" (MIN.) CONC. SLAB 6"-8" (MAX.)
- 5" O.C.E.W.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS TYPE "C" STORM SEWER MANHOLE FOR 42" PIPE AND SMALLER	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: TYPE C STSW MANHOLE CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-09		

PRECAST CONCRETE MANHOLE

DIMENSIONS AND WEIGHTS				
LS. DIA.	HT.	W.	H.	WEIGHT (LBS.)
48	5	6	6	868
60	6	8	1300	
72	7	8	1811	
96	9	8	3090	

NOTES:

- LIFTING INSERTS AS REQUIRED.
- ALL JOINTS SHALL BE SEALED WITH APPROVED RUBBER GASKET
- STRUCTURE TO BE PLACED ON 12" STABILIZED BASE
- C.S.S. SHALL BE BROUGHT TO WITHIN 2'-0" OF TOP OF MANHOLE.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS PRECAST CONCRETE MANHOLE	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: PRECAST CONC. MANHOLE CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-12		

PLAN VIEW

SECTION A-A

NOTES:

- DETAIL TO BE USED WHERE STORM SEWER SIZE IS 24" DIAMETER OR LESS.
- FOR PIPE SEWERS GREATER THAN 24", USE TYPE "C" MANHOLE

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS STORM SEWER JUNCTION BOX FOR MAX 24" DIAMETER PIPE	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: STSW JUNCTION BOX CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-13		

MANHOLE BLOCKOUT (STORM SEWER) IN PAVEMENT

NOTES:

- MH BLOCKOUT FOR ST SWR CATEGORY: STORM DRAINAGE
- DRAWN DATE: 11/22/2016
- DRAWN BY: WLS/III
- SCALE: N.T.S.
- APPROVED BY: YSR

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS MANHOLE BLOCKOUT FOR STORM SEWER IN PAVEMENT	REV# 0 ISSUER MAM DATE 07/10/2018 APPROVER	SHEET 1 OF 1
NAME: MH BLOCKOUT FOR ST SWR CATEGORY: STORM DRAINAGE DRAWN DATE: 11/22/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	SD-15		



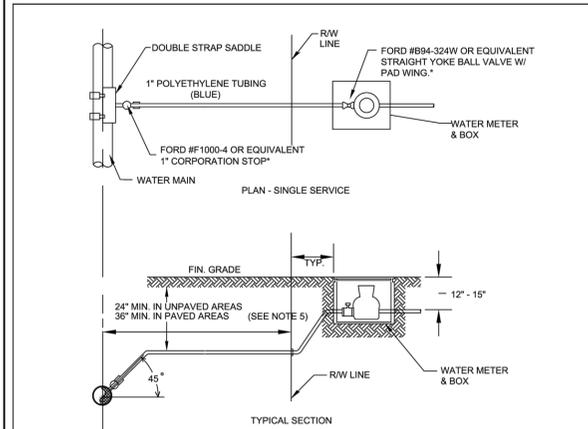
Revision	By	Chk.	Appr.	Date

**CITY OF HUNTSVILLE
17TH STREET STORM SEWER
IMPROVEMENTS**

**CITY OF HUNTSVILLE
STANDARD STORM SEWER DETAILS**

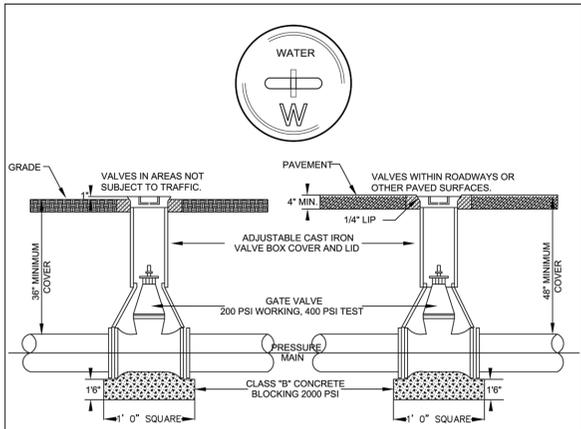
LJA Engineering, Inc.
11821 East Freeway Phone 713.450.1300
Suite 360 Fax 713.450.1385
Houston, Texas 77029 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 06 Of 12



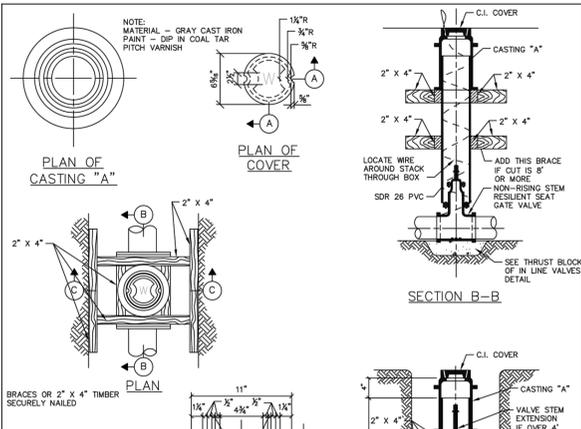
- NOTES:
- CUSTOMER POINT OF SERVICE IS TYPICALLY AT THE LOCATION WHERE CUSTOMER PLUMBING IS ATTACHED TO THE YOKE NUT.
 - COPPER TUBING FOR 1/2\"/>

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS WATER SERVICE CONNECTION 5/8\", 3/4\", 1-1/2\", AND 2\"/>
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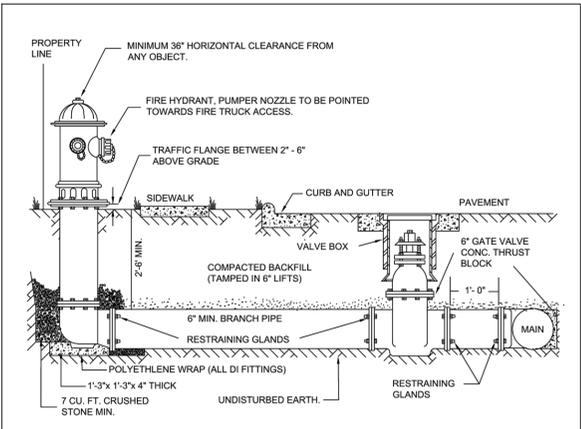
- NOTES:
- All water systems must be designed and constructed in accordance with the City's Standards, Specifications, and Design Criteria and applicable design criteria of the Texas Commission on Environmental Quality.
 - Block Gate Valves with Compression Joint Fittings on 8\"/>

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS GATE VALVE AND VAULT INSTALLATION 14 INCH AND SMALLER
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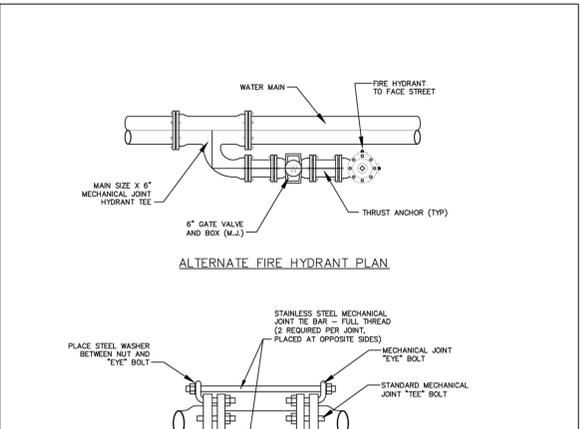
- NOTES:
- Developer shall install fire hydrants as part of water distribution system. The developer shall locate a fire hydrant within 500 feet of all portions of building sites, based upon a clear path of travel. Fire hydrants shall be served by supply lines of at least 6 inches in size.
 - Branch pipe shall be ductile iron ANWA C150-98.
 - 6\"/>

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS VALVE BOX DETAIL
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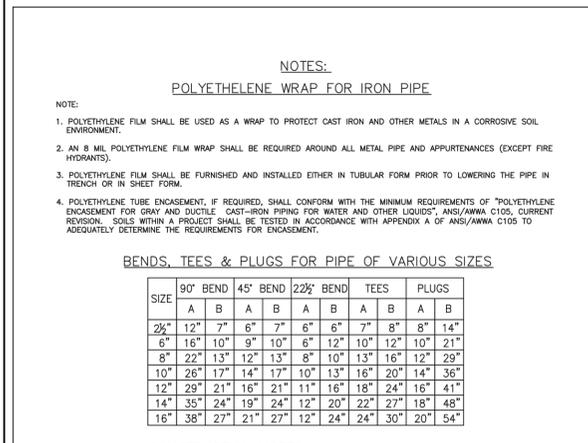
- NOTES:
- Developer shall install fire hydrants as part of water distribution system. The developer shall locate a fire hydrant within 500 feet of all portions of building sites, based upon a clear path of travel. Fire hydrants shall be served by supply lines of at least 6 inches in size.
 - Branch pipe shall be ductile iron ANWA C150-98.
 - 6\"/>

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS FIRE HYDRANT INSTALLATION
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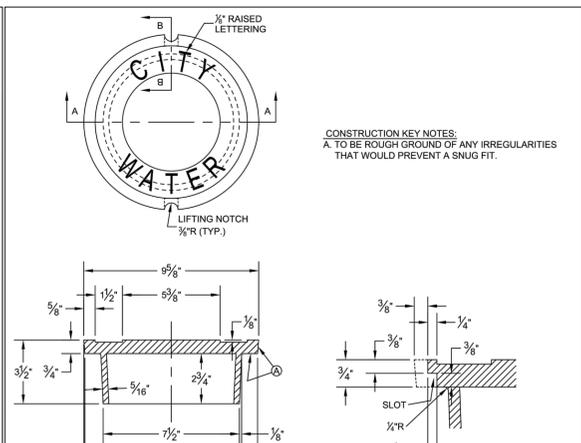
- NOTES:
- Developer shall install fire hydrants as part of water distribution system. The developer shall locate a fire hydrant within 500 feet of all portions of building sites, based upon a clear path of travel. Fire hydrants shall be served by supply lines of at least 6 inches in size.
 - Branch pipe shall be ductile iron ANWA C150-98.
 - 6\"/>

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS ALTERNATE HYDRANT PLAN
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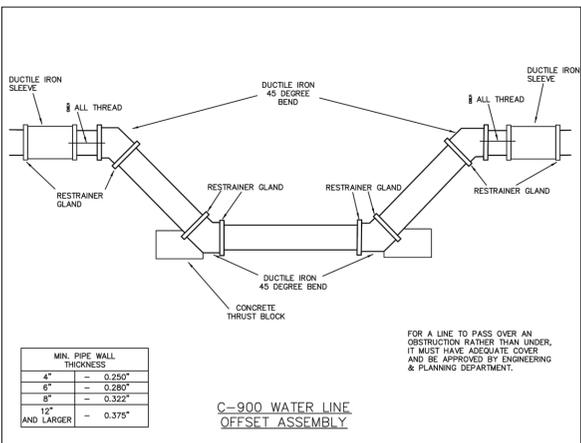
- CONSTRUCTION NOTES:
- ALL WATER MAIN LINES 4" TO 16" SHALL BE C-909 (DR-13). ALL WATER MAIN LINES 20" THROUGH 24" SHALL BE C-900 (DR-18).
 - ALL FLUSHING VALVES AND GATE VALVES TO BE AMERICAN WATER WORKS ASSOC. (AWWA) STANDARD COUNTERCLOCKWISE OPENING WITH NON-RISING STEM DESIGN.
 - THE MAXIMUM ALLOWABLE SIZE OF A TAPPING SLEEVE AND VALVE ON AN EXISTING PIPE IS ONE SIZE SMALLER THAN THE PIPE DIAMETER OF THE MAIN TO BE TAPPED.
 - ALL DUCTILE IRON PIPE SHALL BE CLASS 50 MORTAR LINED. NO A.C. PIPE WILL BE ALLOWED AND ALL DUCTILE IRON FITTINGS SHALL BE MORTAR LINED PUSH ON OR MECHANICAL JOINTS.
 - ALL BACKFILL WITHIN THE R.O.W. SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS POLYETHYLENE WRAP DETAIL & TABLE FOR BENDS, TEES, AND PLUGS
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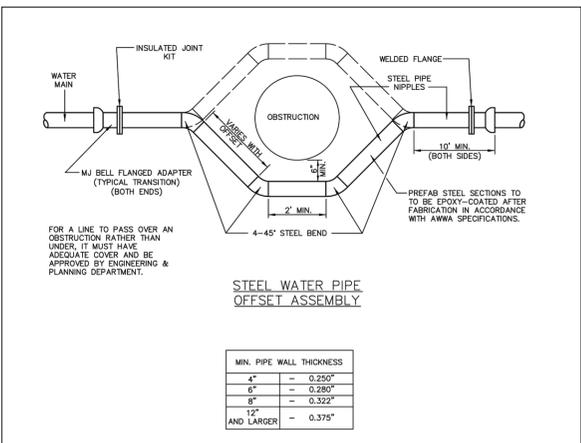
- NOTES:
- CASTINGS TO SMOOTH AND VOID OF AIR HOLES.
 - WEIGHT OF COVER IS 18 POUNDS.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS BONNET BOX COVER FLIP RESISTANT
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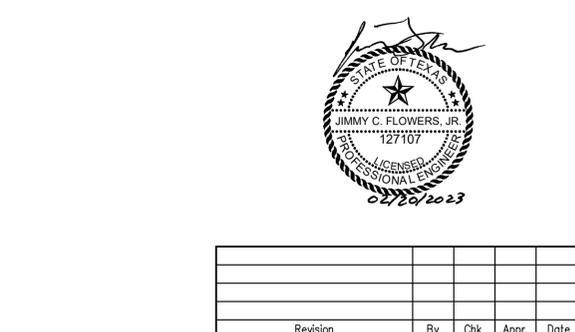
- NOTES:
- ALL MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH ENGINEERING & PLANNING DEPARTMENT SPECIFICATIONS.
 - OFFSET SECTIONS SHALL BE THRUST-BLOCKED IN ACCORDANCE WITH DWG NO COT-WA-07, IF NECESSARY ALL THREE RODS SHALL BE USED TO RESTRAIN THE JOINTS.
 - ALL WATER MAINS LESS THAN OR EQUAL TO 12" DIAMETER SHALL BE PVC C-900 (DR-18). ALL PROPOSED WATER MAINS GREATER THAN OR EQUAL TO 14" DIAMETER SHALL BE PVC C-905 (DR-18).
 - DUCTILE IRON FITTING SHALL BE FULL BODY PER ANWA C110.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS PVC WATER LINE OFFSET ASSEMBLY
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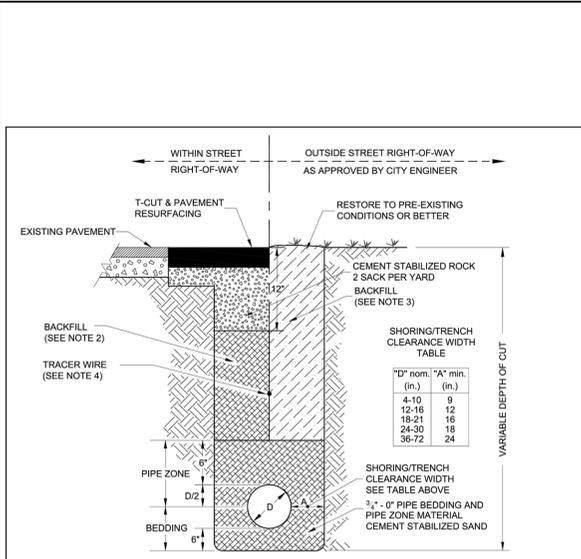


- NOTES:
- ALL MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH DEPARTMENT OF ENGINEERING & PLANNING SPECIFICATIONS.
 - INSULATED JOINT TO BE MADE UP USING INSULATING GASKETS, PLASTIC BOLT SLEEVES AND WASHERS OF INSULATING GASKET MATERIAL BACKED WITH ZINC-PLATED WASHERS, OR OTHER METHODS APPROVED SPECIFICALLY BY THE ENGINEERING & PLANNING DEPARTMENT.
 - NO FIELD FABRICATION OR INTERIOR COATING OF STEEL WATER PIPE OFFSETS ALLOWED.
 - OFFSET SECTIONS SHALL BE THRUST-BLOCKED IN ACCORDANCE WITH DWG NO COT-WA-07, IF NECESSARY ALL THREE RODS SHALL BE USED TO RESTRAIN THE JOINTS.
 - PROPOSED WATER LINE CROSSING OF WASTEWATER MAINS AND LATERALS SHALL BE PER NOTE 21 OF THE WATER LINE CONSTRUCTION NOTES.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS	CITY OF HUNTSVILLE STANDARD DETAILS STEEL WATER LINE OFFSET ASSEMBLY
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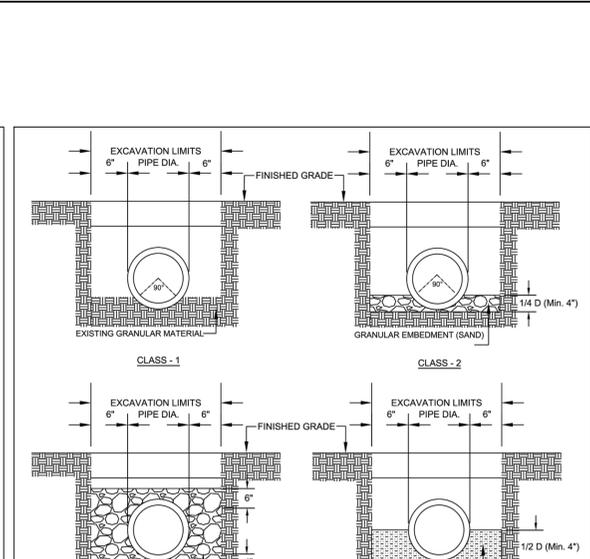


Revision					By	Chk.	Appr.	Date
CITY OF HUNTSVILLE 17TH STREET STORM SEWER IMPROVEMENTS CITY OF HUNTSVILLE STANDARD WATER DETAILS SHEET 1 OF 2								
LJA Engineering, Inc. 11821 East Freeway Suite 360 Houston, Texas 77029 Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386								
DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.							
DRAWN: P.R.	DATE: FEBRUARY 2023							
CHECKED:	SCALE: N.T.S.							
APPROVED:	SHEET No. 07 Of 12							



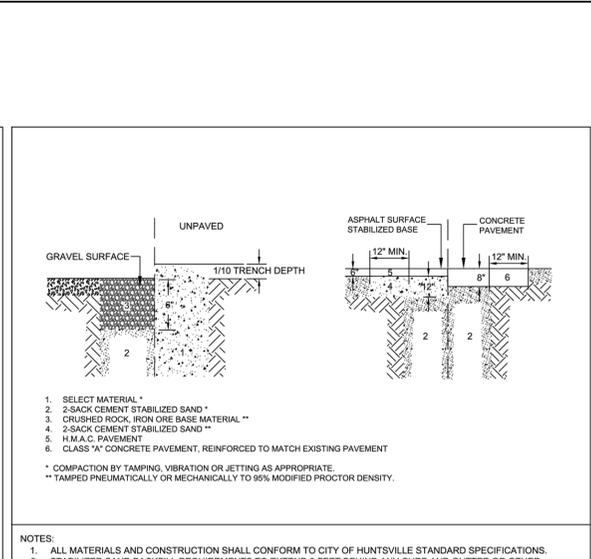
- NOTES:
1. THESE TRENCH BACKFILL REQUIREMENTS APPLY TO ALL PUBLIC UTILITY PIPES.
 2. FOR TRENCHES 12" WIDE OR LESS IN STREETS WITH CLASSIFICATIONS HIGHER THAN RESIDENTIAL, USE SELECT FILL. FOR ALL OTHER TRENCHES, USE 3/4" - 0" AGGREGATE COMPACTED TO 95% OF MAX DENSITY.
 3. USE SELECT BACKFILL COMPACTED TO 90% OF MAX DENSITY.
 4. TRACER WIRE SHALL BE PLACED ABOVE NON-METALLIC PIPE AND 2 FEET BELOW FINISHED GRADE.
 5. RESTORE TO ORIGINAL CONDITIONS OR BETTER.

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS PIPE TRENCH BACKFILL
NAME: PIPE TRENCH BACKFILL CATEGORY: WATER DRAWN DATE: 10/28/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 1 1 MAM 10/16/2019 RAM W-54



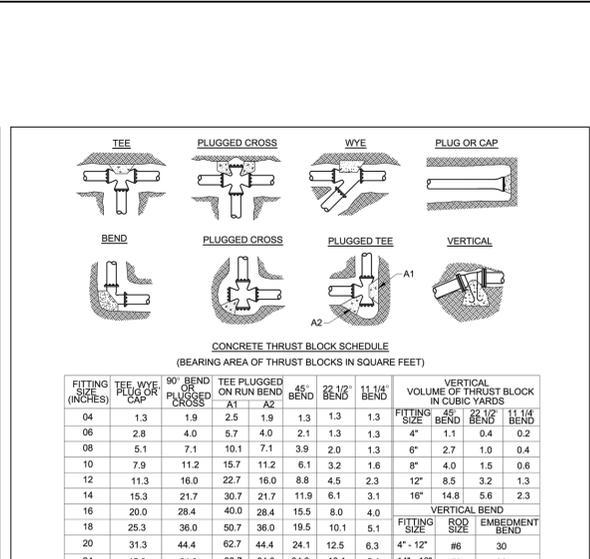
- NOTES:
1. CLASS OF BEDDING REQUIRED SHALL BE BASED ON THE TYPE OF SOIL ENCOUNTERED IN EXCAVATION.
 2. MINIMUM TRENCH WIDTH SHALL BE PIPE OUTSIDE DIAMETER (O.D.) + 12 INCHES.
 3. BACKFILL ABOVE THE BEDDING SHALL CONFORM TO "UTILITY TRENCH REPAIR" STANDARD DRAWING, SHEET 2 OF 2.
 4. REFER TO STANDARD SPECIFICATION ITEMS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS.
 5. ALL TRENCHES WITHIN 3 FEET OF EXISTING CURB MUST BE BACKFILLED WITH 2 SACK PER CUBIC YARD CEMENT STABILIZED SAND.

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS PIPE BEDDING CLASSES 1 - IV
NAME: PIPE BEDDING CATEGORY: UTILITIES-WATER/SEWER DRAWN DATE: 10/16/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 2 1 MAM 10/21/2019 RAM W-55



- NOTES:
1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO CITY OF HUNTSVILLE STANDARD SPECIFICATIONS.
 2. STABILIZED SAND BACKFILL REQUIREMENTS TO EXTEND 3 FEET BEHIND ANY CURB OR GUTTER OR OTHER CONCRETE STRUCTURE AND TO DITCH FLOW LINE ON NON-CURB AND GUTTER STREETS.
 3. WHERE 50% OR MORE OF THE SURFACE ARE OF PAVEMENT HAS BEEN REMOVED OR DAMAGED, CALCULATED AT INTERVALS OF ONE BLOCK OR 350 LINEAR FEET (WHICH EVER IS LESS), FULL WIDTH RESTORATION SHALL BE REQUIRED. ANY STRIP OF REMAINING PAVEMENT LESS THAN 2 FEET IN WIDTH ALONG CURB AND GUTTER OR PAVEMENT EDGE, SHALL BE REMOVED AND REPLACED.
 4. UTILITY CROSSINGS OF CITY STREETS MUST BE BORED, UNLESS PERMISSION FOR A STREET CUT HAS BEEN GIVEN IN WRITING BY THE CITY ENGINEER. STREET CUTS PARALLEL TO CENTERLINE MUST BE APPROVED BY THE CITY ENGINEER AND WILL REQUIRE RESURFACING BY A PAVING MACHINE.
 5. STREET SURFACING SHALL BE TRIMMED TO NEAT STRAIGHT LINE WITH EDGES FREE OF DUST, MOISTURE OR LOOSE MATERIAL.
 6. ALL COLD JOINT SURFACES SHALL BE TACKED WITH EMULSION WHICH SHALL HAVE "BROKEN" PRIOR TO PATCHING.
 7. COMPLETED PATCH SHALL NOT DEVIATE FROM EXISTING SURFACE MORE THAN .03 FEET/10 FEET IN PROFILE OR .05 FEET/10 FEET IN CROSS SECTION WHEN MEASURED WITH A 10 FEET STRAIGHT EDGE.
 8. COMPLETE PATCH SHALL NOT POND WATER IN EXCESS OF .01 FOOT.
 9. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF STREET REPAIR FOR ONE YEAR AFTER INSTALLATION.
 10. ALL TRENCHES 4 FEET DEEP OR DEEPER MUST BE SHORED.

ENGINEERING DEPARTMENT CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS UTILITY TRENCH REPAIR
NAME: UTILITY TRENCH REPAIR CATEGORY: UTILITIES-WATER/SEWER DRAWN DATE: 10/16/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 2 OF 2 1 MAM 10/21/2019 RAM W-56

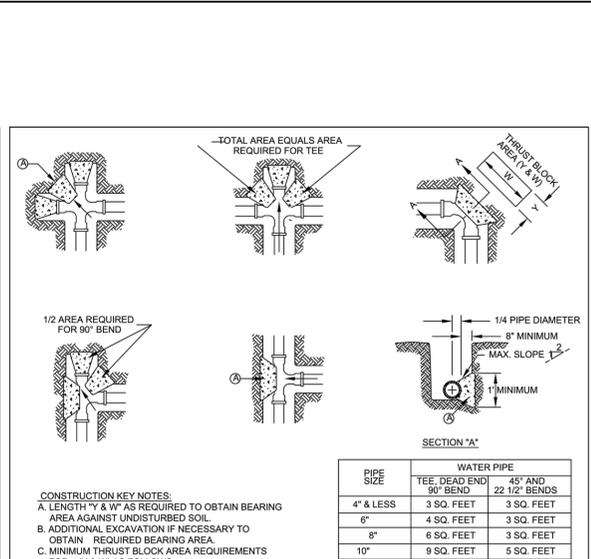


CONCRETE THRUST BLOCK SCHEDULE
(BEARING AREA OF THRUST BLOCKS IN SQUARE FEET)

FITTING SIZE (INCHES)	TEE, WYE OR PLUG OR CAP	90° BEND OR PLUGGED CROSS	TEE PLUGGED ON RUN BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	VOLUME OF THRUST BLOCK IN CUBIC YARDS	FITTING SIZE	22 1/2° BEND	11 1/4° BEND	
04	1.3	1.9	2.5	1.9	1.3	1.3	1.1	4"	1.1	0.4	0.2
06	2.8	4.0	5.7	4.0	2.1	1.3	1.3	4"	1.1	0.4	0.2
08	5.1	7.1	10.1	7.1	3.9	2.0	1.3	6"	2.7	1.0	0.4
10	7.9	11.2	15.7	11.2	6.1	3.2	1.6	8"	4.0	1.5	0.6
12	11.3	16.0	22.7	16.0	8.8	4.5	2.3	12"	8.5	3.2	1.3
14	15.3	21.7	30.7	21.7	11.9	6.1	3.1	16"	14.8	5.6	2.3
16	20.0	28.4	40.0	28.4	15.5	8.0	4.0	16"	14.8	5.6	2.3
18	25.3	36.0	50.7	36.0	19.5	10.1	5.1	16"	14.8	5.6	2.3
20	31.3	44.4	62.7	44.4	24.1	12.5	6.3	4" - 12"	#6	30	
24	45.3	64.0	90.7	64.0	34.9	18.1	9.1	14" - 16"	#8	36	

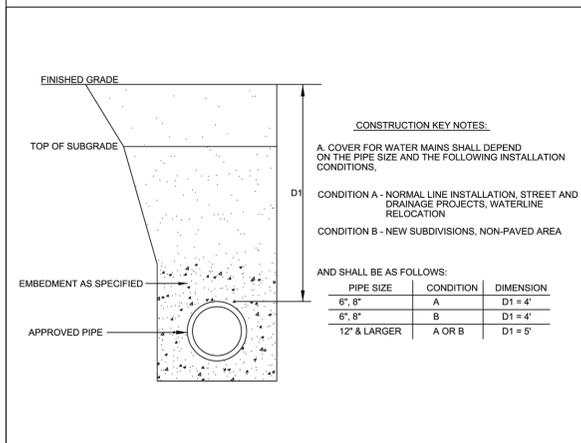
BEARING AREA = (TEST PRESSURE / 150) x (1,500 / SOIL BEARING STRESS) x (TABLE VALUE)

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS HORIZONTAL BLOCKING CONCRETE CRADLE VERTICAL BENDS
NAME: HORIZONTAL/VERT. BLOCKING CATEGORY: WATER DRAWN DATE: 10/25/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 3 W-57



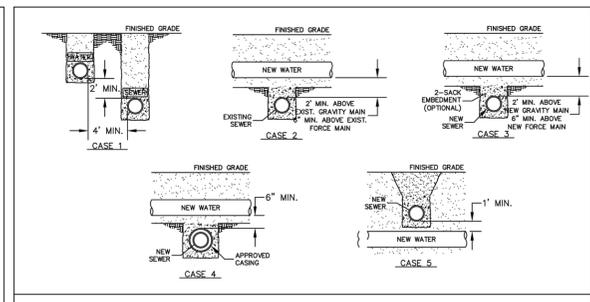
- CONSTRUCTION KEY NOTES:
- A. LENGTH "Y" & "W" AS REQUIRED TO OBTAIN BEARING AREA AGAINST UNDISTURBED SOIL.
 - B. ADDITIONAL EXCAVATION IF NECESSARY TO OBTAIN REQUIRED BEARING AREA.
 - C. MINIMUM THRUST BLOCK AREA REQUIREMENTS FOR (Y & W) AS FOLLOWS:
- | PIPE SIZE | TEE, DEAD END 90° BEND | WATER PIPE 45° AND 22 1/2° BENDS |
|-----------|------------------------|----------------------------------|
| 4" & LESS | 3 SQ. FEET | 3 SQ. FEET |
| 6" | 4 SQ. FEET | 3 SQ. FEET |
| 8" | 6 SQ. FEET | 3 SQ. FEET |
| 10" | 9 SQ. FEET | 5 SQ. FEET |
| 12" | 13 SQ. FEET | 7 SQ. FEET |
| 16" | 23 SQ. FEET | 12 SQ. FEET |
| 18" | 29 SQ. FEET | 15 SQ. FEET |

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS CONCRETE THRUST BLOCKING
NAME: CONCRETE THRUST BLOCKING CATEGORY: WATER DRAWN DATE: 10/21/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 1 W-59



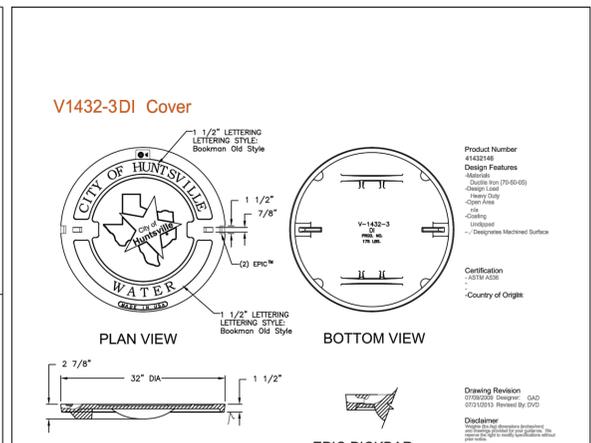
- CONSTRUCTION KEY NOTES:
- A. COVER FOR WATER MAINS SHALL DEPEND ON THE PIPE SIZE AND THE FOLLOWING INSTALLATION CONDITIONS.
 - CONDITION A - NORMAL LINE INSTALLATION, STREET AND DRAINAGE PROJECTS, WATERLINE RELOCATION
 - CONDITION B - NEW SUBDIVISIONS, NON-PAVED AREA
- AND SHALL BE AS FOLLOWS:
- | PIPE SIZE | CONDITION | DIMENSION |
|--------------|-----------|-----------|
| 6", 8" | A | D1 = 4" |
| 6", 8" | B | D1 = 4" |
| 12" & LARGER | A OR B | D1 = 6" |

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS COVER FOR WATER MAINS
NAME: COVER FOR WATER MAINS CATEGORY: WATER DRAWN DATE: 10/16/2016 DRAWN BY: WLS/III SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 1 W-60



- GENERAL NOTES:
1. NEW OR EXISTING POTABLE WATER AND SANITARY SEWER MAINS.
 2. SEPARATION DISTANCES SHALL FOLLOW TEXAS COMMISSION ON ENVIRONMENTAL QUALITY STANDARD REQUIREMENTS.
- CONSTRUCTION KEY NOTES:
- WHEN STANDARD NINE (9) FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, SEPARATION SHALL BE DETERMINED ACCORDING TO THE FOLLOWING CONDITIONS:
 - CASE 1. GRAVITY SANITARY SEWER MAIN OR FORCE MAIN PARALLEL TO POTABLE WATER MAIN (PER TCEQ 5200.440(A)(9)(A)) AND 5200.440(A)(9)(B)).
 - SEWER MATERIALS: EXISTING GRAVITY MAIN (PVC SDR35 OR CLAY) OR FORCE MAIN TO REMAIN IF NOT LEAKING. IF LEAKING, REPLACE ONE PIPE SEGMENT PER CASE 3 REQUIREMENTS.
 - SEPARATE TRENCHES SHALL BE USED.
 - CENTER ONE SEGMENT OF WATER PIPE OVER SEWER MAIN OR FORCE MAIN.
 - MINIMUM PIPE SEGMENT LENGTH FOR WATER PIPE SHALL BE 18 FEET LONG.
 - CASE 2. NEW POTABLE WATER MAIN CROSSING EXISTING GRAVITY SANITARY SEWER MAIN OR EXISTING FORCE MAIN (PER TCEQ 5200.440(A)(9)(A)) AND 5200.440(A)(9)(B)).
 - LOCATION: WATER ABOVE SEWER OR FORCE MAIN.
 - SEWER MATERIALS: EXISTING GRAVITY MAIN (PVC SDR35 OR CLAY) OR FORCE MAIN TO REMAIN IF NOT LEAKING. IF LEAKING, REPLACE ONE PIPE SEGMENT PER CASE 3 REQUIREMENTS.
 - CENTER ONE SEGMENT OF WATER PIPE OVER SEWER MAIN OR FORCE MAIN.
 - MINIMUM PIPE SEGMENT LENGTH FOR WATER PIPE SHALL BE 18 FEET LONG.
 - CASE 3. NEW POTABLE WATER MAIN CROSSING NEW GRAVITY SANITARY SEWER MAIN OR NEW FORCE MAIN (PER TCEQ 5200.440(A)(9)(A)) AND 5200.440(A)(9)(B)).
 - LOCATION: WATER ABOVE SEWER OR FORCE MAIN.
 - SEWER MATERIALS: NEW GRAVITY MAIN - PVC (150 PSI) OR DI REQUIRED, CENTER UNDER WATER MAIN. NEW FORCE MAIN - PVC (150 PSI) OR DI REQUIRED. FORCE MAIN TO BE EMBEDDED IN CEMENT STABILIZED BACKFILL. THE TOTAL LENGTH OF ONE PIPE PLUS 12" BEYOND THE JOINT AT EACH END.
 - CENTER ONE SEGMENT OF WATER PIPE OVER SEWER PIPE OR FORCE MAIN.
 - MINIMUM PIPE SEGMENT LENGTH FOR WATER AND SEWER SHALL BE 18 FEET LONG.
 - FOR NEW GRAVITY SEWER ONLY, IN LIEU OF PVC (150PSI) OR DI, INSTALL ONE PIPE SEGMENT OF SD355 SEWER MAIN MUST BE EMBEDDED IN CEMENT STABILIZED BACKFILL THE TOTAL LENGTH OF ONE PIPE PLUS 12" BEYOND THE JOINT AT EACH END.
 - CASE 4. NEW POTABLE WATER MAIN CROSSING NEW GRAVITY SANITARY SEWER MAIN OR NEW FORCE MAIN (PER TCEQ 5200.440(A)(9)(A)) AND 5200.440(A)(9)(B)).
 - LOCATION: WATER ABOVE SEWER OR FORCE MAIN.
 - SEWER MATERIALS: NEW GRAVITY MAIN - SD355 ACCEPTABLE NEW FORCE MAIN - PVC (150PSI) OR DI REQUIRED. IN ADDITION, SEWER MAIN OR FORCE MAIN MUST BE ENCASED IN DI OR STEEL. TWO NOMINAL SIZES LARGER THAN MAIN AND AT LEAST 18 FEET LONG.
 - CENTER CASING PIPE ON WATER MAIN.
 - CASE 5. NEW GRAVITY SANITARY SEWER MAIN OR NEW FORCE MAIN CROSSING NEW POTABLE WATER MAIN (PER TCEQ 5200.440(A)(9)(A)) AND 5200.440(A)(9)(B)).
 - LOCATION: SEWER OR FORCE MAIN ABOVE WATER.
 - NEW GRAVITY MAIN OR FORCE MAIN REQUIRES ONE PIPE SEGMENT OF PVC (150 PSI) OR DI. IN ADDITION, WATER MUST BE DI OR STEEL OR ENCASED IN DI OR STEEL. TWO NOMINAL SIZES LARGER THAN MAIN AND AT LEAST 18 FEET LONG.
 - CENTER ONE SEGMENT OF SEWER PIPE ON WATER MAIN.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS SEPARATION DISTANCE SANITARY SEWER AND POTABLE WATER
NAME: SEPARATION DISTANCE CATEGORY: WATER DRAWN DATE: 09/09/2018 DRAWN BY: DAC SCALE: N.T.S. APPROVED BY: MMC	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 07/31/2018 RAM 1 OF 1 W-61



- GENERAL NOTES:
1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO CITY OF HUNTSVILLE STANDARD SPECIFICATIONS.
 2. STABILIZED SAND BACKFILL REQUIREMENTS TO EXTEND 3 FEET BEHIND ANY CURB OR GUTTER OR OTHER CONCRETE STRUCTURE AND TO DITCH FLOW LINE ON NON-CURB AND GUTTER STREETS.
 3. WHERE 50% OR MORE OF THE SURFACE ARE OF PAVEMENT HAS BEEN REMOVED OR DAMAGED, CALCULATED AT INTERVALS OF ONE BLOCK OR 350 LINEAR FEET (WHICH EVER IS LESS), FULL WIDTH RESTORATION SHALL BE REQUIRED. ANY STRIP OF REMAINING PAVEMENT LESS THAN 2 FEET IN WIDTH ALONG CURB AND GUTTER OR PAVEMENT EDGE, SHALL BE REMOVED AND REPLACED.
 4. UTILITY CROSSINGS OF CITY STREETS MUST BE BORED, UNLESS PERMISSION FOR A STREET CUT HAS BEEN GIVEN IN WRITING BY THE CITY ENGINEER. STREET CUTS PARALLEL TO CENTERLINE MUST BE APPROVED BY THE CITY ENGINEER AND WILL REQUIRE RESURFACING BY A PAVING MACHINE.
 5. STREET SURFACING SHALL BE TRIMMED TO NEAT STRAIGHT LINE WITH EDGES FREE OF DUST, MOISTURE OR LOOSE MATERIAL.
 6. ALL COLD JOINT SURFACES SHALL BE TACKED WITH EMULSION WHICH SHALL HAVE "BROKEN" PRIOR TO PATCHING.
 7. COMPLETED PATCH SHALL NOT DEVIATE FROM EXISTING SURFACE MORE THAN .03 FEET/10 FEET IN PROFILE OR .05 FEET/10 FEET IN CROSS SECTION WHEN MEASURED WITH A 10 FEET STRAIGHT EDGE.
 8. COMPLETE PATCH SHALL NOT POND WATER IN EXCESS OF .01 FOOT.
 9. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF STREET REPAIR FOR ONE YEAR AFTER INSTALLATION.
 10. ALL TRENCHES 4 FEET DEEP OR DEEPER MUST BE SHORED.

DEPARTMENT OF ENGINEERING & MAPPING/ENGINEERING DIVISION CITY OF HUNTSVILLE, TEXAS		CITY OF HUNTSVILLE STANDARD DETAILS AIR RELEASE MANHOLE COVER
NAME: WL CONSTRUCTION NOTES CATEGORY: WATER DRAWN DATE: DRAWN BY: SCALE: N.T.S. APPROVED BY: YSR	City Service Center 448 State Highway 75 Huntsville, TX 77320	REV# ISSUER DATE APPROVER SHEET 0 MAM 04/21/2020 RAM 1 OF 1 W-64



Revision	By	Chk.	Appr.	Date

**CITY OF HUNTSVILLE
17TH STREET STORM SEWER
IMPROVEMENTS**

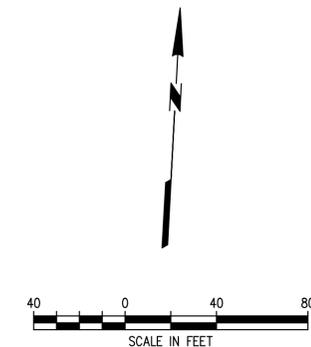
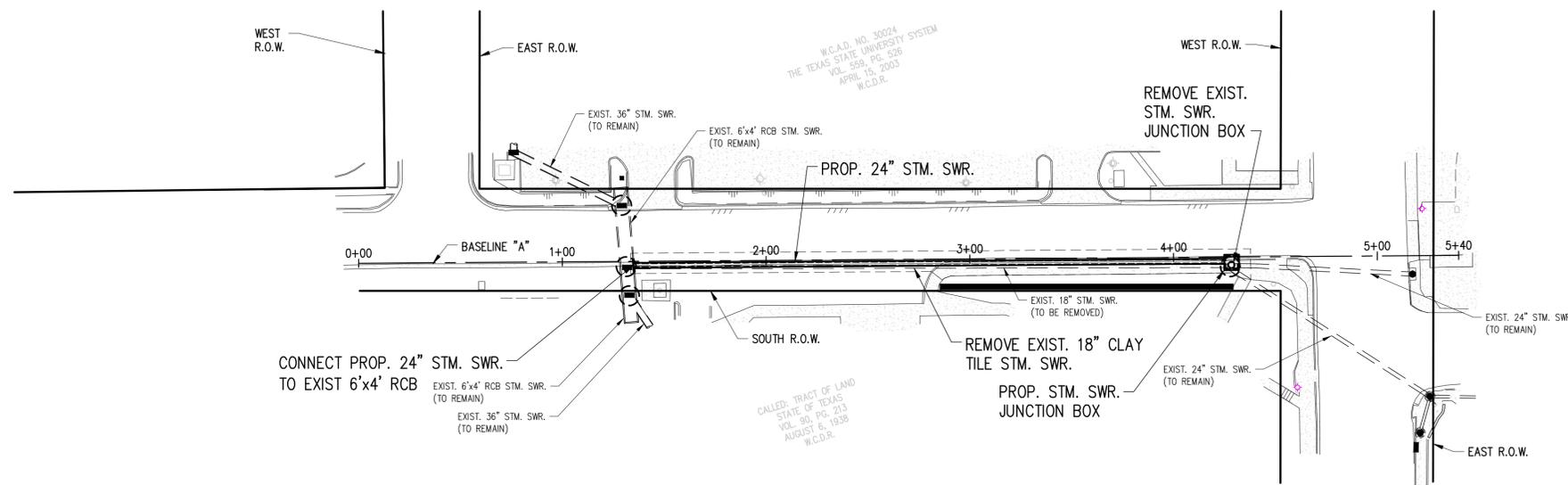
**CITY OF HUNTSVILLE
STANDARD WATER DETAILS
SHEET 2 OF 2**

LJA Engineering, Inc.
11821 East Freeway Suite 360 Houston, Texas 77029
Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 08 Of 12

LEGEND

-  INLET PROTECTION BARRIER
-  REINFORCED FILTER FABRIC BARRIER
-  AREA INLET PROTECTION BARRIER



Revision	By	Chk.	Appr.	Date

**CITY OF HUNSTVILLE
17TH STREET STORM SEWER
IMPROVEMENTS**

**STORM WATER
POLLUTION PREVENTION
PLAN**

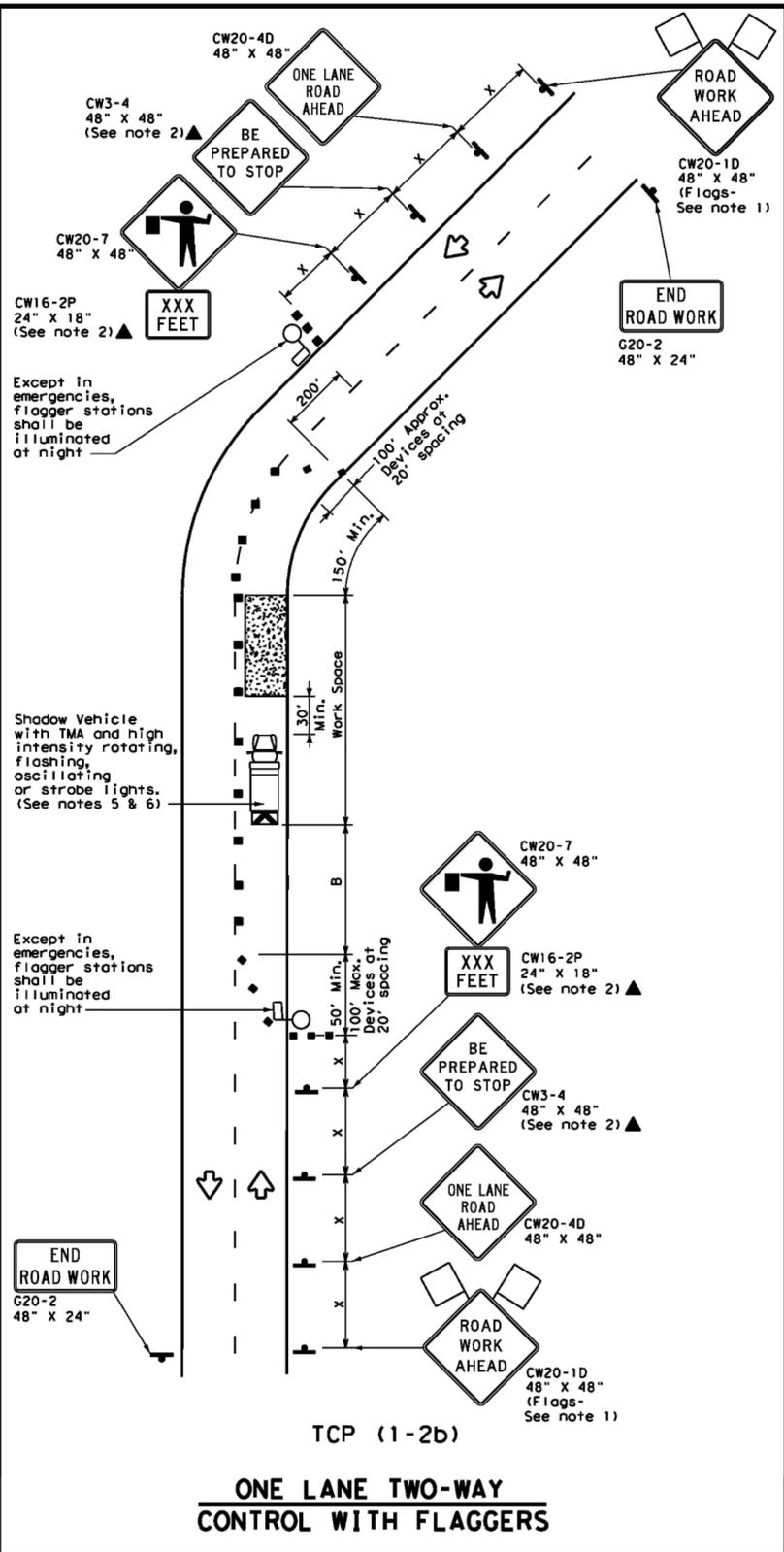
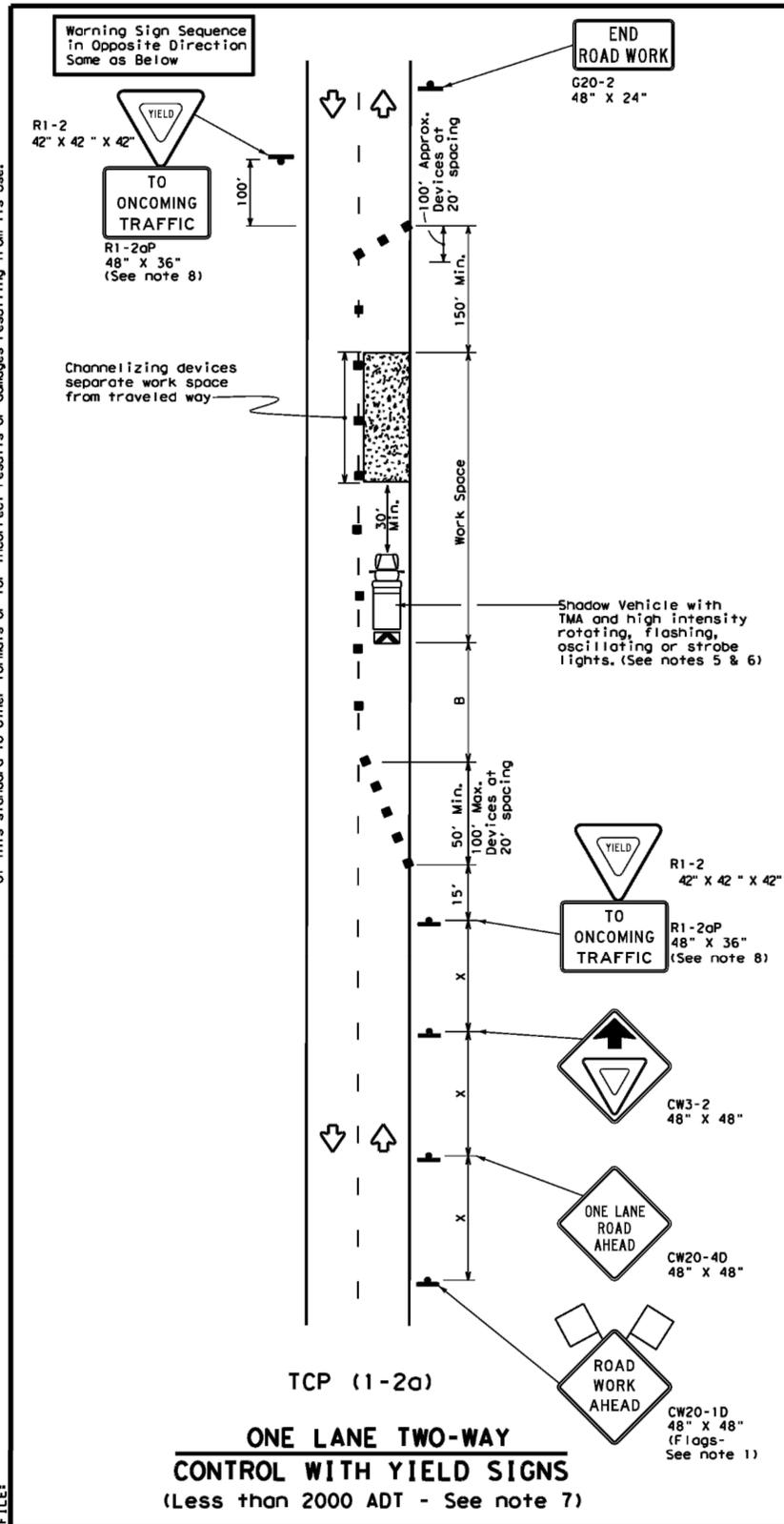
LJA Engineering, Inc. 

11821 East Freeway Phone 713.450.1300
Suite 360 Fax 713.450.1385
Houston, Texas 77029 FRN - F-1386

DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.
DRAWN: P.R.	DATE: FEBRUARY 2023
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APPROVED:	SHEET No. 09 Of 12

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DATE: FILE:



LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed * S	Formula L = WS ² / 60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40	L = WS	265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50	L = WS	500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60	L = WS	600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70	L = WS	700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
- R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
- Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 ONE-LANE TWO-WAY
 TRAFFIC CONTROL
 TCP (1-2) - 18**

FILE: tcp1-2-18.dgn	DN:	EKI	DN:	EKI
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
4-90 4-98	DIST	COUNTY	SHEET NO.	
2-94 2-12				
1-97 2-18				



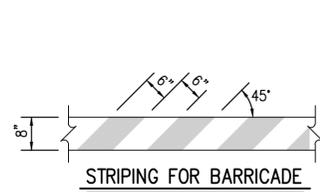
Revision	By	Chk.	Appr.	Date

**CITY OF HUNSTVILLE
 17TH STREET STORM SEWER
 IMPROVEMENTS**

TRAFFIC CONTROL PLAN

LJA Engineering, Inc.
 11821 East Freeway Suite 360 Houston, Texas 77029
 Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386

DESIGN: J.C.F. JOB No. E243-0020 Cont. No.
 DRAWN: P.R. DATE: FEBRUARY 2023
 CHECKED: SCALE: N.T.S.
 APPROVED: SHEET No. 11 Of 12

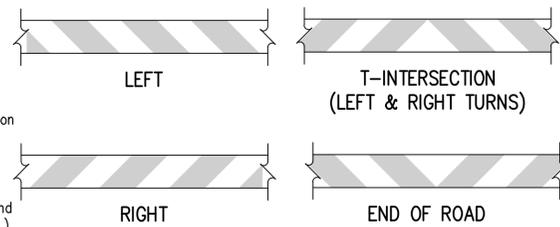


For all types of barricades with rails less than 3'-0" long. Stripes 4" wide shall be used. Identification markings may be shown only on back side of barricade rails.

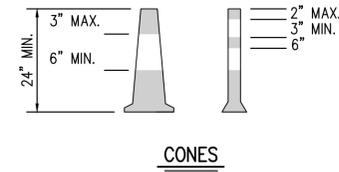
Striping should cover the full width of the rail striping of rails, panels, etc., should slope downward at an angle of 45 degrees in direction traffic is to pass.

Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade.

Barricades with stripes which begin at the upper right side and slope downward to the lower left side are to be designated as "Right" (R) Barricades. Barricades with stripes which begin at the upper left side and slope downward to the lower right side are to be designated as "Left" (L) Barricades.



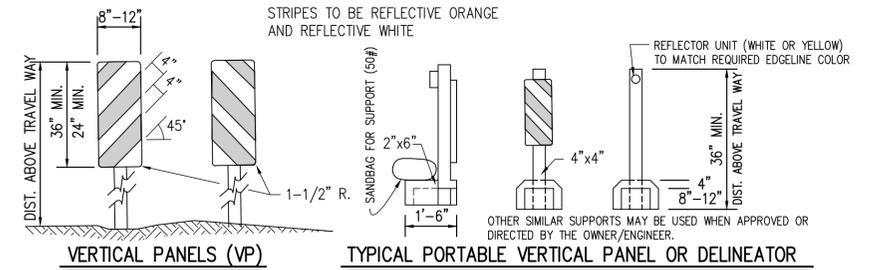
STRIPING DIRECTION DETAILS



Traffic cones and tubular markers shall be a minimum of 24 inches in height with a broadened base and may be made of various materials to withstand impact without damage to themselves or to vehicles. Larger sizes should be used on freeways and other roadways where speeds are relatively high or wherever more conspicuous guidance is needed. Orange shall be the predominant color on cones and tubular markers. They should be kept clean and bright for maximum target value. For nighttime use they shall be reflectorized or equipped with lighting devices for maximum visibility. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night.

Reflectorization of tubular markers shall be a minimum of two three-inch bands placed a maximum of 2" from the top with a maximum of 6" between the bands. Reflectorization of cones shall be provided by a minimum 6" band placed a maximum of 3" from the top.

Cones or tubular markers are only suitable for temporary usage (up to 8 hours) with other channelizing devices such as vertical panels or barricades preferred for longer term usage. Care should be taken to insure that they remain in their proper location and in an upright position.



Vertical Panels are normally used as channelizing devices to indicate tangent or nearly tangent roadway alignment where good target value of a device is needed in daytime as well as the nighttime. In addition, vertical panels should be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive day and night delineation may be required. Vertical Panels should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes should always slope downward toward the traveled way.

CHANNELIZING DEVICES

BARRICADE NOTES

The most recent edition of the TEXAS Manual on Uniform Traffic Control Devices (MUTCD), and its revisions, shall govern the construction and use of all items herein described.

Channelizing devices other than barricades should normally be used for channelization purposes.

Barricades should be placed perpendicular to the traffic flow. Other channelizing devices, such as drums, vertical panels or portable barriers, should be used where needed to separate traffic from the work area. In all cases, the barricades should be located to warn and direct traffic.

Barricades may be designed and constructed from walmalized wood or any other suitable material in a manner approved by the Owner/Engineer. The barricade shown hereon are typical and are suggested details for wood support systems. The details of rail width and striping, number and spacing of rails, minimum length and height (above pavement) of rails must be adhered to, whether or not the alternate designs are used. (See Detail This Sheet).

Barricades are to be constructed in a first-class workmanship manner of clean sound material. All surfaces above ground, which are not striped, shall be white except unpainted galvanized metal or aluminum components. Components made of lumber shall be painted with a minimum of two coats of an approved brand of exterior white paint to secure thorough coverage and a uniform white color.

The reflectorized white and reflectorized orange (reflectorized red) stripes for barricades, drums, and vertical panels shall be constructed of "High intensity sheeting and shall be maintained to meet the appearance, color, and reflectivity requirements set by the MUTCD.

The Contractor shall maintain each barricade in a clean and good condition.

Barricades shall be removed upon completion of the work and/or the elimination of the hazard on any section.

Type I Barricades shall consist of a striped upper horizontal rail mounted on demountable supports at either end and fabricated in such manner that the rail or rails can be assembled or disassembled to or from the supports with ease. The standard Barricade design has a lower rail not required on the alternate design. A Type I Barricade is intended for use where the hazard is relatively small, for minor maintenance and repair work or for the continuous marking of a restricted roadway. Type I rails that are striped on both sides should be striped in opposite directions.

Type II Barricades shall consist of an upper and lower rail fastened to a support. The support should be of an "A" frame configuration, hinged or otherwise fastened at the top to permit convenient folding and stacking for transporting from one work site to another. Since portability is a prime consideration, the materials chosen for the barricades should be as light weight as possible and structurally sound. Sandbags should be used for ballast when required. A Type II Barricade is intended for use where the area is quite confined such as on city streets, or the continuous marking of a restricted roadway, or for temporary daytime use.

Type III Barricades should consist of three striped horizontal rails and assembled as a panel for mounting to posts or skids. Type III Barricades are typically permanent in nature and are required to function in one location for a long time. When the Type III (Moveable) Barricades are constructed on bases or skids instead of posts set in ground, it may be desirable to ballast the bases with sandbags to provide added resistance to overturning due to periods of high winds.

An orange flag may be mounted on Type I, Type II and Type III Barricades for increased daytime emphasis. For night time use, it is desirable to add flashing warning light when barricades are used singly and a steady burn light when barricades are used in a series for channelization.

The Contractor shall maintain each barricade in a clean and good condition.

Barricades shall be removed upon completion of the work and/or the elimination of the hazard on any section.

Type I Barricades shall consist of a striped upper horizontal rail mounted on demountable supports at either end and fabricated in such manner that the rail or rails can be assembled or disassembled to or from the supports with ease. The standard Barricade design has a lower rail not required on the alternate design. A Type I Barricade is intended for use where the hazard is relatively small, for minor maintenance and repair work or for the continuous marking of a restricted roadway. Type I rails that are striped on both sides should be striped in opposite directions.

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An orange flag may be mounted on Type I, Type II and Type III Barricades for increased daytime emphasis. For night time use, it is desirable to add flashing warning light when barricades are used singly and a steady burn light when barricades are used in a series for channelization.

CONSTRUCTION OF BARRICADES

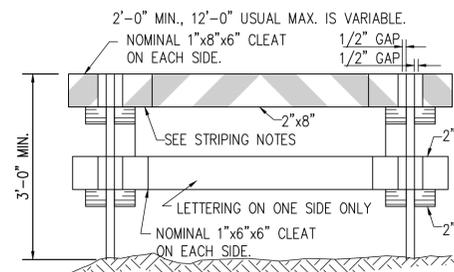
The barricades may be fixed or moveable, depending on the location and application.

Movable barricades are appropriate where the construction or maintenance operations are of short duration, and/or are progressively shifted along a roadway. The design of movable mounting must be such as to resist overturning by ordinary strong winds or by chance contact with vehicles. Fixed barricades are justified only for major construction or reconstruction.

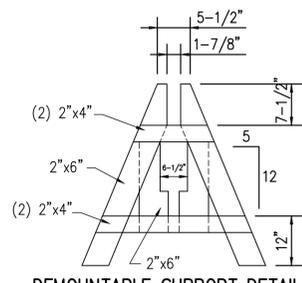
Movable Type III Barricades are generally of heavy construction with a heavy base.

BARRICADE CHARACTERISTICS			
TYPE	I	II	III
WIDTH OF RAIL	8 IN. MIN. - 12 IN. MAX.	8 IN. MIN. - 12 IN. MAX.	8 IN. MIN. - 12 IN. MAX.
LENGTH OF RAIL	2 FT. MIN. - VARIABLE MAX.	2 FT. MIN. - VARIABLE MAX.	2 FT. MIN. - VARIABLE MAX.
WIDTH OF STRIPES	6 IN.	6 IN.	6 IN.
HEIGHT	3 FT. MIN.	3 FT. MIN.	3 FT. MIN.
NUMBER OF REFLECTORIZED RAIL FACES	2 (ONE EACH DIRECTION)	4 (TWO EACH DIRECTION)	3 (IF FACING TRAFFIC IN ONE DIRECTION) OR 6 (IF FACING TRAFFIC IN TWO DIRECTIONS)

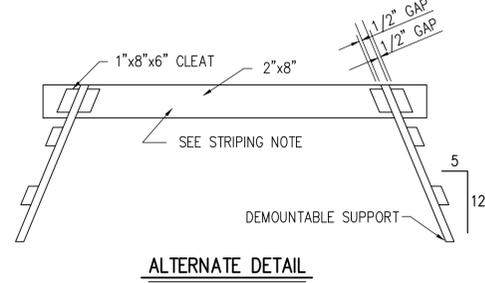
FOR WOODEN BARRICADES, NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.
 * FOR RAILS LESS THAN 3 FT. LONG, 4 IN. WIDE STRIPES MAY BE USED.



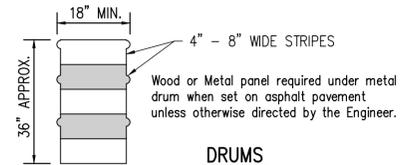
STANDARD DETAIL



TYPE I BARRICADE



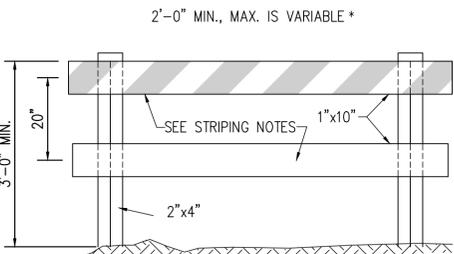
ALTERNATE DETAIL



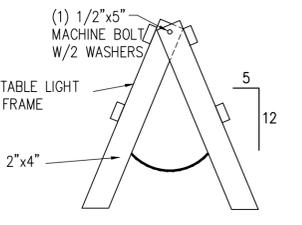
DRUMS

Drums, set on end, and used for traffic warning or channelization shall be approximately 35" in height and minimum of 18" in diameter. The contractor, at his option, may use drums made from steel barrels or black polyethylene plastic drum liners weighing approximately eight pounds each. The markings on drums shall be horizontal, circumferential, reflectorized orange and reflectorized white stripes, 4 to 8 inches wide. The first reflectorized stripe should start within two (2) inches of the top of the drum. There shall be at least two orange and two white stripes on each drum. If there are non-reflectORIZED spaces between the horizontal orange and white stripes, they shall be no more than 2 inches wide. Metal drums shall be painted black or orange before reflectORIZED stripes are added. All drums on a project will be the same color. When drums are placed in the roadway, appropriate warning signs should be used. During hours of darkness, a flashing warning light should be placed on drums used singly as a warning device. Steady burn electric lights of channelization should be placed on drums used in series for traffic channelization. Drums shall be weighted with sand.

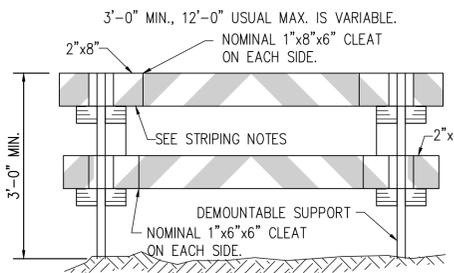
CW-8 CHEVRON signs, CW-6A ARROW signs or VP-1 Vertical Panels mounted above drums may be used as supplements to drum delineation. (Vertical Panels w/ post shall be bolted to Barrel w/3-1/2"x8" machine bolts w/2 washers on 9" spacing.



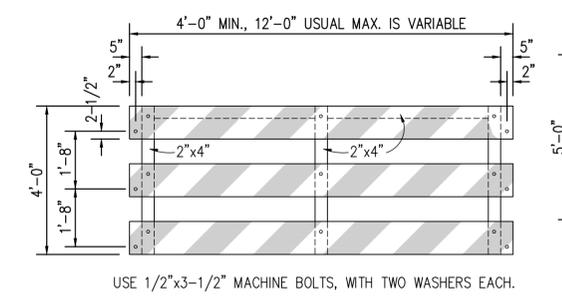
STANDARD DETAIL



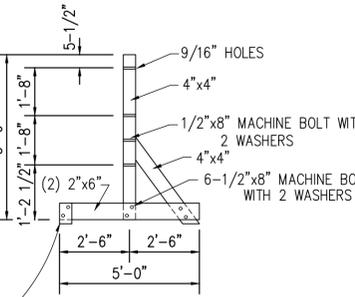
A FRAME SUPPORT DETAIL



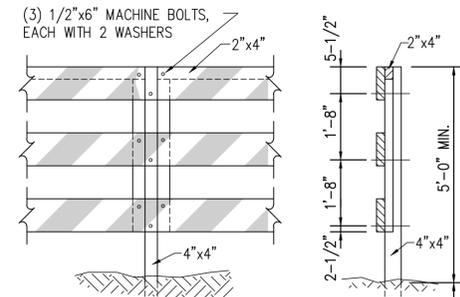
ALTERNATE DETAIL



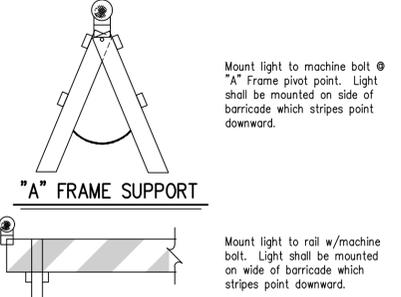
PANEL DETAIL



STAND DETAIL



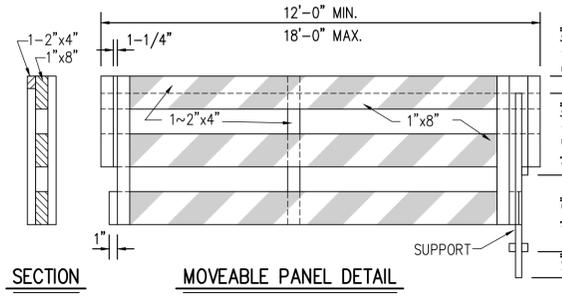
POST DETAIL



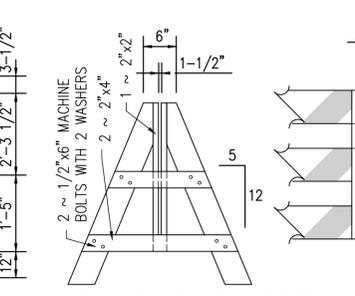
A FRAME SUPPORT

OTHER SUPPORT

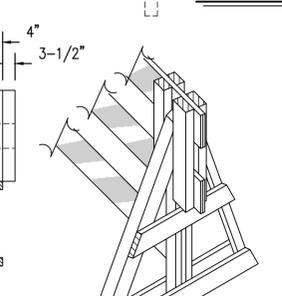
BARRICADE W/LIGHT DETAIL



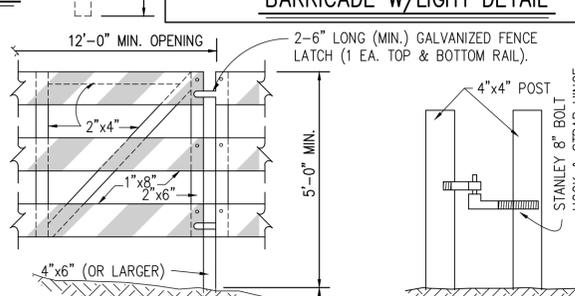
MOVEABLE PANEL DETAIL



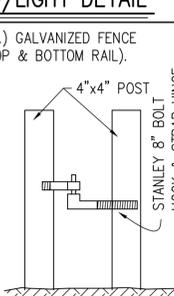
DEMOUNTABLE SUPPORT DETAIL



ASSEMBLY DETAIL



GATE DETAIL



GATE HINGE DETAIL



Revision	By	Chk.	Appr.	Date
CITY OF HUNSTVILLE				
17TH STREET STORM SEWER IMPROVEMENTS				
STANDARD BARRICADE DETAILS				
LJA Engineering, Inc.				
11821 East Freeway		Phone 713.450.1300		
Suite 360		Fax 713.450.1385		
Houston, Texas 77029		FRN - F-1386		
DESIGN: J.C.F.	JOB No. E243-0020 Cont. No.			
DRAWN: P.R.	DATE: FEBRUARY 2023			
CHECKED:	SCALE: N.T.S.			
APPROVED:	SHEET No. 12 Of 12			