

# City of Largo

## ENGINEERING DESIGN AND CONSTRUCTION STANDARDS

2008 Edition  
(Updated July 2020)



**COMMISSION APPROVED**

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Department



# City of Largo

## Engineering Design and Construction Standards

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General Notes

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## DUST CONTROL NOTES

### DEFINITION:

REDUCING SURFACE AND AIR MOVEMENT OF DUST DURING LAND DISTURBING, DEMOLITION AND CONSTRUCTION ACTIVITIES.

### PROPOSE:

TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES AND REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE, OR SAFETY, OR TO ANIMAL OR PLANT LIFE.

### CONDITIONS WERE PRACTICE APPLIES:

IN AREA SUBJECT TO SURFACE AND AIR MOVEMENT OF DUST WHERE ON -SITE AND OFF- SITE DAMAGE IS LIKELY TO OCCUR IF PREVENTIVE MEASURES ARE NOT TAKEN.

### PLANNING CONSTRUCTIONS:

CONSTRUCTION ACTIVITIES INEVITABLY RESULT IN THE EXPOSURE AND DISTURBANCE OF SOIL. FUGITIVE DUST IS EMITTED BOTH DURING THE ACTIVITIES (I.E., EXCAVATION, DEMOLITION, VEHICLE TRAFFIC, HUMAN ACTIVITY) AND AS A RESULT OF WIND EROSION OVER THE EXPOSED EARTH SURFACES. LARGE QUANTITIES OF DUST ARE TYPICALLY GENERATED IN "HEAVY" CONSTRUCTION ACTIVITIES, SUCH AS ROAD AND STREET CONSTRUCTION AND SUBDIVISION, COMMERCIAL AND INDUSTRIAL DEVELOPMENT, WHICH INVOLVE DISTURBANCE OF SIGNIFICANT AREAS OF SOIL SURFACE. RESEARCH AT CONSTRUCTION SITES HAS ESTABLISHED AN AVERAGE DUST EMISSION RATE OF 1.2 TONS/ACRE/MONTH FOR ACTIVE CONSTRUCTION. EARTH- MOVING ACTIVITIES COMPRISE THE MAJOR SORES OF CONSTRUCTION DUST EMISSIONS, BUT TRAFFIC AND GENERAL DISTURBANCE OF THE SOIL ALSO GENERATE SIGNIFICANT DUST EMISSION. IN PLANNING FOR DUST CONTROL, IT SHOULD BE OBVIOUS THAT THE LESS SOIL IS EXPOSED AT ANY ONE TIME, THE LESS POTENTIAL THERE WILL BE FOR DUST GENERATION. PHASING A PROJECT AND UTILIZING TEMPORARY STABILIZATION PRACTICES UPON THE COMPLETION OF GRADING CAN SIGNIFICANTLY REDUCE DUST EMISSION.

### TEMPORARY MEASURES:

1. MULCHES- A NATURAL OR ARTIFICIAL LAYER OF PLANT MATERIALS OR OTHER MATERIALS THAT WILL NOT FLOAT OR WASH AWAY.
2. VEGETATIVE- TEMPORARY SEEDING OR GROUND COVERS.
3. TILLAGE- THIS PRACTICE IS DESIGNED TO ROUGHEN AND BRING CLODS TO THE SURFACE. IT IS AN EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE WIND EROSION STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL -TYPE PLOWS (WITH 12-INCH SPACING), SPRING -TOOTHED HARROWS, AND SIMILAR PLOWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.
4. IRRIGATION- THIS IS GENERALLY DONE AS AN EMERGENCY TREATMENT. SITE IS SPRINKLED WITH WATER UNTIL THE SURFACE IS WET. REPEAT AS NEEDED. TO PREVENT CARRYOUT OF MUD ONTO STREETS, REFER TO TEMPORARY GRAVEL CONSTRUCTION ENTRANCE.
5. BARRIERS- SOLID BOARD FENCE, BUR LAY FENCE, CREATE WALLS, BALES OF HAY AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND AT INTERVALS OF ABOUT 15 TIMES THE BARRIER HEIGHT ARE EFFECTIVE IN CONTROLLING WIND EROSION.
6. PERMANENT VEGETATION- PERMANENT SEEDING AND PERMANENT STABILIZATION WITH SOD.
7. TOP SOILING- THIS ENTAILS COVERING THE SURFACE WITH LESS EROSIIVE SOIL MATERIAL.
8. STONE- COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.



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TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

Dust Control Notes

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PUBLICATION DATE:  
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SE-01

CITY ENGINEER:  
LELAND E. DICUS, P.E.

DRAWING SCALE:  
NOT TO SCALE

**SEDIMENT AND EROSION CONTROL MEASURES NOTES PAGE 1 OF 2**

1. SEDIMENT AND EROSION AND TURBIDITY CONTROL MEASURES ARE PART OF THE CITY OF LARGO'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT ISSUED BY THE US ENVIRONMENTAL PROTECTION AGENCY (EPA), THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE FLORIDA WATER MANAGEMENT DISTRICT. PERMITS SHALL BE STRICTLY ENFORCED BY THE CITY AND THESE AGENCIES.
2. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE BREAKING GROUND PROCESS AND PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES INCLUDING DEMOLITION ACTIVITIES.
3. SILT FENCE MUST WRAP ENTIRE AREA OF CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE CITY ENGINEER. FINAL LOCATIONS OF TURBIDITY CONTROL DEVICES MAY BE ADJUSTED AS DIRECTED BY THE CITY ENGINEER OR REPRESENTATIVES OF THE PERMITTING AGENCIES WITHOUT ADDITIONAL COMPENSATION.
4. UNTIL COMPLETION OF INSTALLATION OF THE TURBIDITY AND SEDIMENT CONTROL DEVICE, THE CONTRACTOR CANNOT "BREAK GROUND " OR PERFORM ANY LAND CLEARING ACTIVITIES INCLUDING, BUT NOT LIMITED TO, TREE REMOVAL, DEMOLITION, SCALPING, DIGGING, OR STOCKPILING OF DIRT UNTIL EROSION CONTROL DEVICE ARE APPROVED AND SIGNED OFF BY THE INSPECTOR.
5. INSPECTION AND MAINTENANCE OF SEDIMENT AND EROSION, AND TURBIDITY CONTROL MEASURES SHALL BE A CONTINUING FUNCTION OF THE CONTRACTOR WITHOUT ADDITIONAL COMPENSATION FOR THE DURATION OF THE PROJECT AND UNTIL A CERTIFICATE OF OCCUPANCY IS ISSUED. REMOVAL OF ALL SEDIMENT, EROSION AND TURBIDITY CONTROL DEVICES PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY MUST BE APPROVED BY THE CITY OF LARGO. MAINTAINCE OF THESE DEVICES SHALL BE AS DIRECTED BY THE CITY ENGINEER.
6. THE LIFE CYCLE OF SILT SCREEN AND HAY BALES IS LIMITED. SILT FENCES HAVE A MAXIMUM USABLE LIFE OF 6 MONTHS AND THE USABLE LIFE OF HAY BALES IS 3 MONTHS. SILT SCREENS AND HAY BALES SHALL BE REPLACED AT THE END OF THEIR USABLE LIFE. THE CITY ENGINEER MAY REQUIRE REPLACEMENT PRIOR TO THE USABLE LIFE BASED UPON FIELD CONDITIONS. ADDITIONAL TURBIDITY AND/OR SEDIMENT CONTROL DEVICES MAY REQUIRED AS DIRECTED BY THE ENGINEER.
7. PROTECTION OF EXISTING AND PROPOSED STORM SEWER SYSTEM: DURING CONSTRUCTION, ALL STORM SEWER INLETS IN THE VICINITY OF THE PROJECT SHALL BE PROTECTED BY APPROVED TURBIDITY CONTROL MEASURES AND SEDIMENT TRAPS SUCH AS SECURED HAY BALES, SILT FENCES, SOD, STONE, ECT. THESE DEVICES SHALL BE MAINTAINED, CLEANED, MODIFIED AND REPAIRED BY THE CONTRACTOR AS REQUIRED BY CONSTRUCTION PROGRESS OR AS DIRECTED BY THE ENGINEER (SEE FOOT INDEX NO. 102).
8. SEDIMENT TRAPPING MEASURES: SEDIMENT BASINS AND TRAPS, PERIMETER BEERS, FILTER FENCE, BERMS, SEDIMENT BARRIERS, VEGETATIVE BUFFERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT AND/OR PREVENT THE TRANSPORT OF SEDIMENT ONTO ADJACENT PROPERTIES, OR INTO EXISTING WATER BODIES, MUST BE INSTALLED, CONSTRUCTED OR, IN THE CASE OF VEGETATIVE BUFFER, PROTECTED FROM DISTURBANCE AS THE FIRST STEP IN THE LAND ALTERATION PROCESS.
9. ALL EROSION CONTROL DEVICES SHALL BE CHECKED DAILY, ESPECIALLY AFTER EACH RAINFALL EVENT AND SHALL BE CLEANED OUT AND/OR REPAIRED AS REQUIRED. ALL VIOLATIONS MUST BE REPORTED TO THE CITY ENGINEER WITHIN 24 HOURS. COPIES OF THE STANDARD OPERATOR PROCEDURE FOR VIOLATION NOTICES ARE AVAILABLE FOR THE ENGINEERING DIVISION.
10. FULL SOD STABILIZATION SHALL OCCUR WITHIN 72 HOURS OF OBTAINING FINAL GRADE.
11. THE CONTRACTOR SHALL PROVIDE TURBIDITY BARRIERS AS DIRECTED BY THE CITY ENGINEER TO CONTROL EROSION AND SEDIMENTATION FROM TAKING PLACE OUTSIDE THE LIMITS OF THE PROJECT. THE TURBIDITY BARRIERS SHALL BE PLACED IN ACCORDANCE WITH REQUIREMENTS OF THE CITY LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS, MOST RECENT EDITION.
12. FAILURE TO COMPLY WITH EROSION CONTROL MEASURES WILL RESULT IN A NOTICE OF VIOLATION BEING ISSUED. THE NOTICE WILL STIPULATE THE TIME FRAME ALLOWED FOR COMPLIANCE. IF THE PROJECT IS NOT IN COMPLIANCE WITHIN THE TIME FRAME GIVEN, A STOP WORK ORDER WILL BE ISSUED.
13. DEMOLITION AND TYPICAL CONSTRUCTION PROJECTS USUALLY GENERATE LARGE AMOUNT OF DUST WITH SIGNIFICANT CONCENTRATIONS OF HEAVY METALS AND OTHER TOXIC POLLUTANTS. DUST CONTROL TECHNIQUES SHALL BE USED TO CONTROL DUST. SEDIMENT SHALL BE RETAINED ON SITE AND NOT BE ALLOWED TO RUN DIRECTLY INTO WATER COURSES OR STORM WATER CONVEYANCE SYSTEM. USE OF CALCIUM CHLORIDE, OIL OR OTHER CHEMICAL DUST AGENTS IS PROHIBITED, UNLESS APPROVED BY CITY ENGINEER.
14. FOR PROJECTS OVER 1 ACRE THE PROJECT SHALL ADHERE TO THE REQUIREMENTS OF THE EPA AND FDEP NOTICE OF INTENT (NOI) TO USE THE NPDES GENERAL PERMIT AND STORM WATER POLLUTION PREVENTION PLAN (SWP3)



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Sediment and Erosion Control Measures Notes	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SE-02	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS, P.E.	NOT TO SCALE		

**SEDIMENT AND EROSION CONTROL MEASURES NOTES**  
**PAGE 2 OF 2**

14. FOR PROJECTS OVER 1 ACRE THE PROJECT SHALL ADHERE TO THE REQUIREMENTS OF THE EPA AND FDEP NOTICE OF INTENT (NOI) TO USE THE NPDES GENERAL PERMIT AND STORM WATER POLLUTION PREVENTION PLAN (SWP3)
15. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND THE STATE OF FLORIDA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT (NPDES PERMIT) AND BECOME FAMILIAR WITH THEIR CONTENTS.
16. ALL WASH WATER (CONCRETE TRUCKS, VEHICLE CLEANING , EQUIPMENT CLEANING, ETC.) SHALL BE DISPOSED OF IN A MANNER THAT PREVENTS TRANSPORT OF THESE MATERIALS INTO STORM WATER CONVEYANCE SYSTEM.
17. NO RUBBISH, TRASH, GARBAGE, OR OTHER SUCH MATERIALS SHALL BE DISCHARGED IN DRAINAGE DITCH OR WATER OF THE STATE.
18. DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITY IS PLANNED TO BE STOPPED FOR AT LEAST 21 DAYS, SHALL BE TEMPORARILY SEEDED AND MULCHED. THESE AREAS SHALL BE SEEDED AND MULCHED NO LATER THAN 3 DAYS FROM THE LAST CONSTRUCTION ACTIVITY OCCURRING IN THESE AREAS.
19. DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS PERMANENTLY STOPPED SHALL BE PERMANENTLY SEEDED, AND MULCHED OR SODDED AS DIRECTED BY THE CITY ENGINEER. THESE AREAS SHALL BE PERMANENTLY SEEDED OR SODDED NO LATER THAN 3 DAYS AFTER THE LAST CONSTRUCTION ACTIVITY OCCURRING IN THESE AREAS.
20. IF THE ACTION OF VEHICLES TRAVELING OVER THE GRAVEL CONSTRUCTION ENTRANCE IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF DIRT OR MUD AS IDENTIFIED BY THE CITY ENGINEER THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLES ENTER A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNERS CONSTRUCTION MANAGER. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING WASH WATER AT THE SITE.
21. ALL MATERIAL SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAIN MUST BE REMOVED IMMEDIATELY. ROADWAYS AND RIGHT-OF-WAYS SHALL BE CLEANED DAILY BY A VACUUM STREET SWEEPER OR AS DIRECTED BY THE CITY ENGINEER.
22. CONTRACTOR OR SUBCONTRACTORS WILL BE RESPONSIBLE FOR REMOVING SEDIMENT IN THE DETENTION POND AFTER THE STABILIZATION OF THE SITE AND ALSO ANY SEDIMENT THAT MAY HAVE COLLECTED IN THE STORM SEWER DRAINAGE SYSTEM.
23. IF SOIL STOCKPILING IS EMPLOYED ON THE SITE, SILT FENCES COVERING WITH PLASTIC TARP AND OTHER MEANS SHALL BE USED TO HELP CONTAIN THE SEDIMENT.
24. SLOPES SHALL BE LEFT IN A ROUGHENED CONDITION DURING THE GRADING PHASE TO REDUCE RUNOFF VELOCITIES AND EROSION OR TEMPORARY SEEDED AND MULCHED.
25. DUE TO THE GRADE CHANGES DURING THE DEVELOPMENT OF THE PROJECT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING THE EROSION CONTROL MEASURES (SILT FENCES, STRAW BALES, ECT.) TO HELP PREVENT EROSION AND STORM WATER POLLUTION.
26. ALL OFF SITE CONSTRUCTION SHALL BE STABILIZED AT EACH END OF EACH WORKING DAY, THIS INCLUDES BACK FILLING OF TRENCHES FOR STORM DRAIN CONSTRUCTION AND PLACEMENT OF GRAVEL OR BITUMINOUS PAVING FOR ROAD CONSTRUCTION.
27. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND STAY IN PLACE UNTIL FINAL STABILIZATION HAS OCCURRED AND UNTIL APPROVED BY THE ENGINEERING INSPECTOR OR CITY ENGINEER.



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## TEMPORARY GRAVEL CONSTRUCTION ENTRANCE AND EXIT NOTES

### DEFINITION:

A STONE STABILIZER PAD LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON A CONSTRUCTION SITE.

### PURPOSE:

TO STABILIZE ENTRANCES TO THE CONSTRUCTION SITE AND REDUCE THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PUBLIC ROADS AND STORM WATER SYSTEMS BY MOTOR VEHICLES OR RUNOFF.

### CONDITIONS WHERE PRACTICE APPLIES:

WHEREVER TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY INTO A PUBLIC ROAD OR OTHER PAVED AREA.

### PLANNING CONSIDERATIONS:

CONSTRUCTION ENTRANCES PROVIDE AN AREA WHERE MUD CAN BE REMOVED FROM CONSTRUCTION VEHICLE TIRES BEFORE THEY ENTER A PUBLIC ROAD. IF THE ACTION OF THE VEHICLE TRAVELING OVER THE GRAVEL PAD IS NOT SUFFICIENT TO REMOVE MOST OF THE MUD, THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLE ENTERS A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF-SITE. CONSTRUCTION ENTRANCE SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY CONSTRUCTION VEHICLES.

### DESIGN CRITERIA

#### AGGREGATE SIZE:

FDOT NO. 1 COARSE AGGREGATE (1.5-3.5 INCH STONE) (4-9 CM) SHOULD BE USED.

#### ENTRANCE DIMENSIONS:

THE AGGREGATE MUST BE AT LEAST 6 INCHES (15 CM) THICK. IT MUST EXTEND THE FULL WIDTH OF THE VEHICULAR INGRESS AND EGRESS AREA, OR A MINIMUM OF 20'. THE LENGTH OF THE ENTRANCE MUST BE AT LEAST 50 FEET (20 M). IF POSSIBLE OR AS DIRECTED BY THE CITY ENGINEER THE ENTRANCE MUST WIDEN AT ITS CONNECTION TO THE ROADWAY IN ORDER TO ACCOMMODATE THE TURNING RADIUS OF LARGE TRUCKS.

#### WASHING:

IF CONDITIONS ON THE SITE AREA IS SUCH THAT MOST OF THE MUD IS NOT REMOVED BY THE VEHICLES TRAVELING OVER THE GRAVEL, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING A PUBLIC ROAD. WASH WATER MUST BE CARRIED AWAY FROM THE ENTRANCE TO THE SETTING AREA TO REMOVE SEDIMENT. A WASH RACK MAY ALSO BE USED TO MAKE WASHING MORE CONVENIENT AND EFFECTIVE.

#### LOCATION:

THE ENTRANCE SHOULD BE LOCATED FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.

#### CONSTRUCTION SPECIFICATIONS:

THE AREA OF THE ENTRANCE SHOULD BE CLEARED OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL. A GEOTEXTILE SHOULD BE LAID DOWN TO IMPROVE STABILITY AND SIMPLIFY MAINTENANCE. THE GRAVEL SHALL THEN BE LACED OVER THE GEOTEXTILE TO THE SPECIFIED DIMENSIONS.

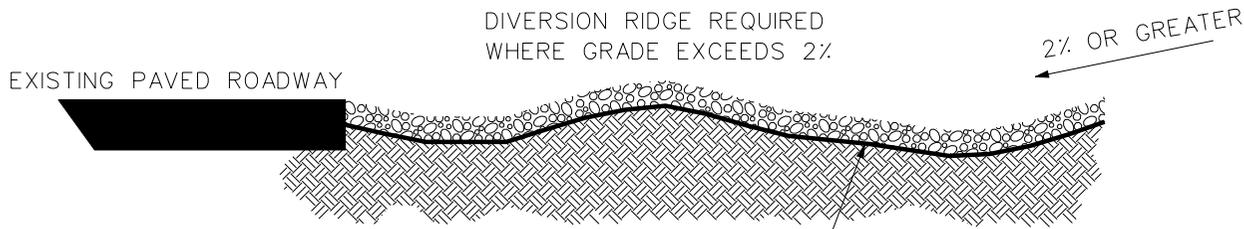
#### MAINTENANCE:

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 2 -INCH (5 CM) STONE, AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEAN OUT OF ANY STRUCTURES USED TO TRAP SEDIMENTS. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY. LOOK FOR SIGNS OF TRUCKS AND TRAIERED EQUIPMENT "CUTTING CORNERS" WHERE GRAVEL MEETS THE ROADWAY. SWEEP THE PAVED ROAD DAILY FOR SEDIMENTS AND STONES.



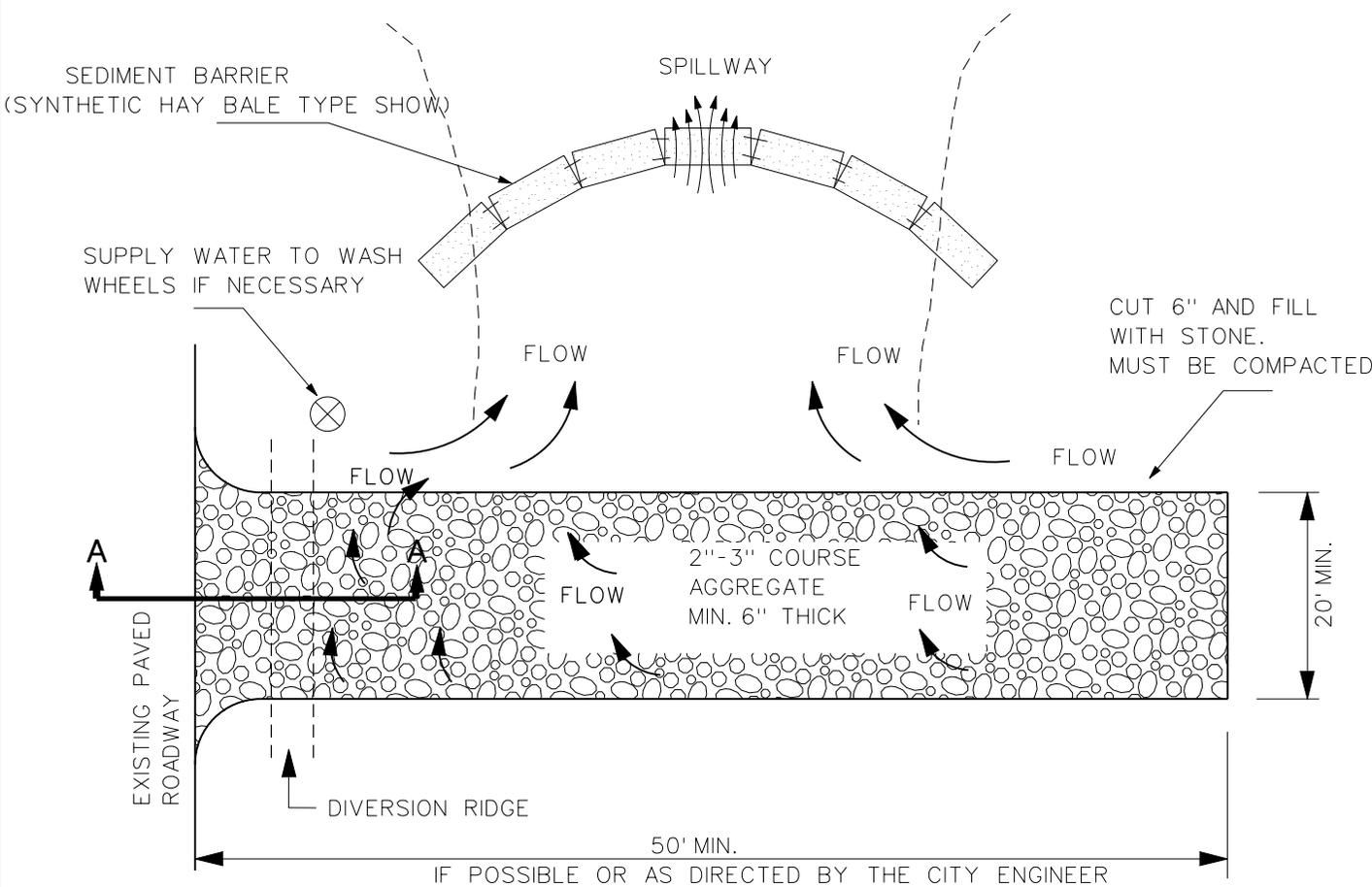
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**SECTION A-A**

NOTE:  
USE SANDBAGS, SYNTHETIC HAY BALES OR OTHER APPROVED METHODS TO CHANNELIZE RUNOFF TO BASIN AS REQUIRED.

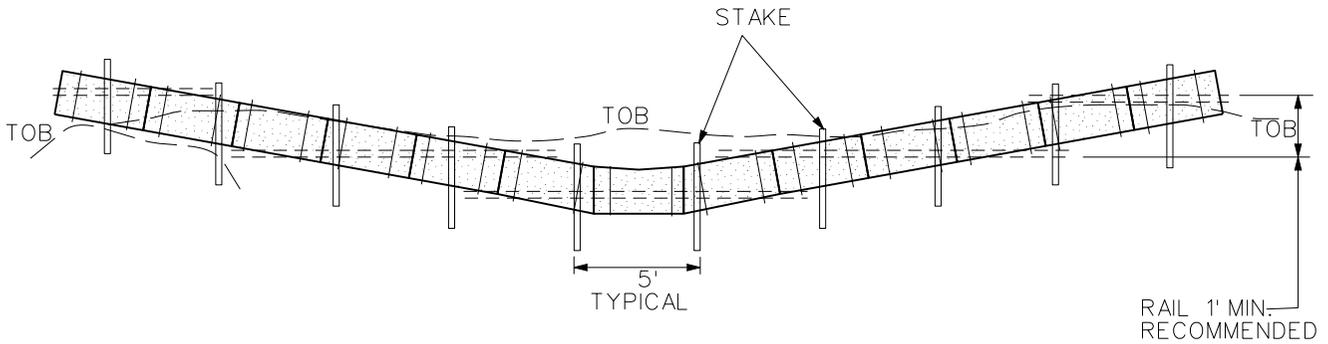


- NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF WAY OR STORM WATER SYSTEMS. THEY MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
  2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE INTO THE PUBLIC RIGHT-OF-WAY.
  3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.



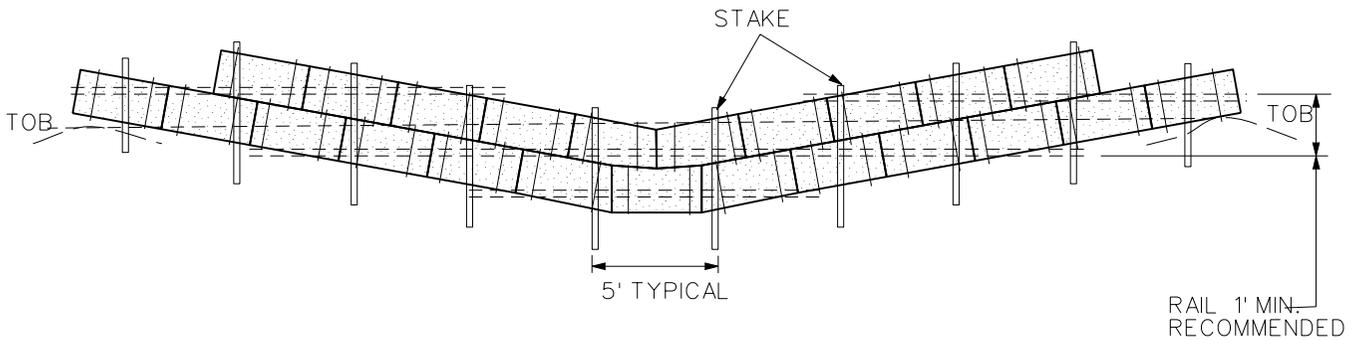
**City of Largo**  
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 Engineering Services Division  
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 TEL: (727) 587-6713 FAX: (727) 586-7413  
 WWW: <http://www.largo.com>

TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Temporary Gravel Construction Entrance with Wheel Wash</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SE-04</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



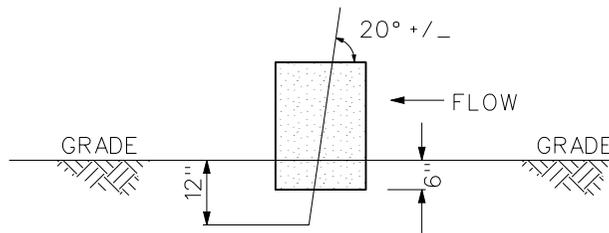
NOTE:  
 SYNTHETIC HAY BALES MUST BE USED  
 ANCHOR BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE.

**TYPE 1**



NOTE:  
 ANCHOR LOWER BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE. #5 OR LARGER REBAR IS ACCEPTABLE.  
 ANCHOR TOP BALES TO LOWER BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE.

**TYPE 2**

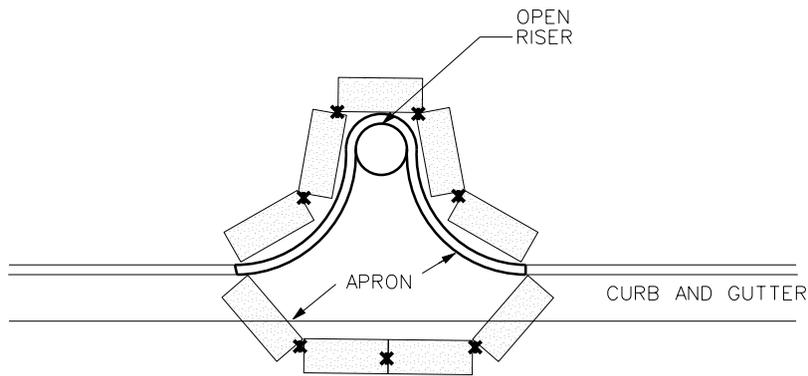


**PROFILE**



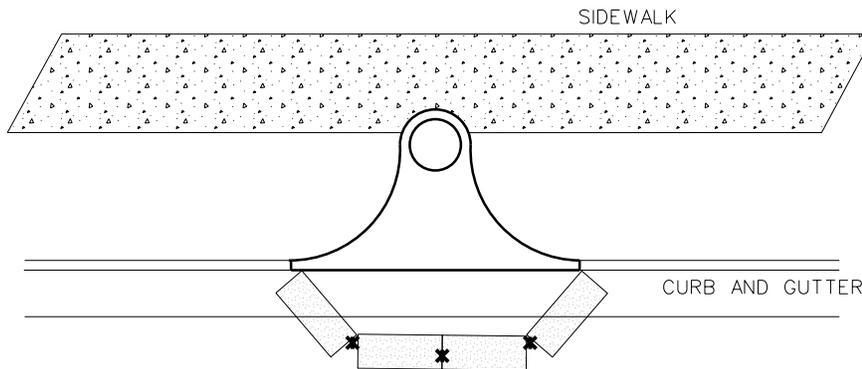
**City of Largo**  
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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Synthetic Haybale Barrier for Unpaved Ditches</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SE-05</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

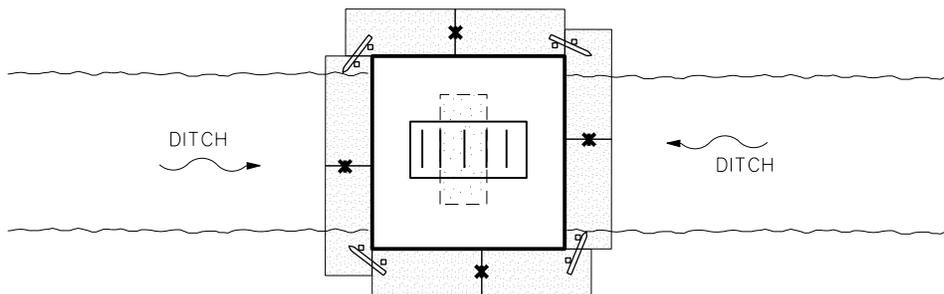


**PARTIAL INLET**

MUST BE STACKED WITH WOOD OR REBAR



**COMPLETED INLET**



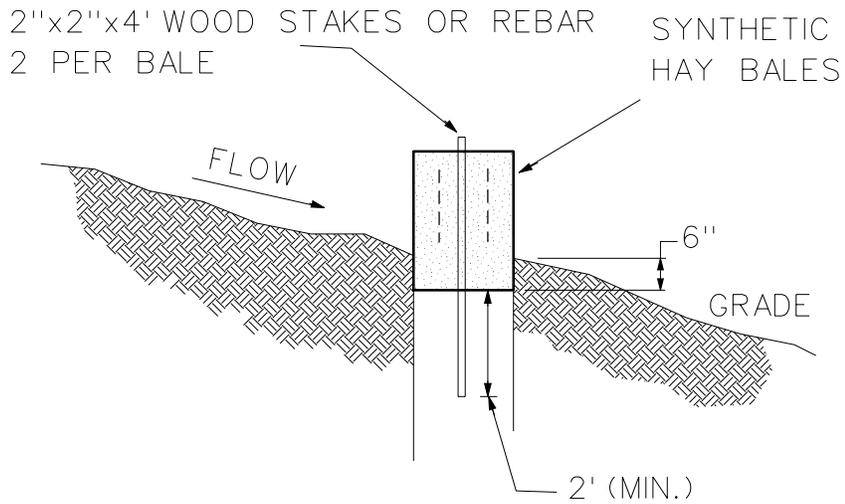
**DITCH BOTTOM INLET**

**NOTE: SYNTHETIC HAY BALES MUST BE USED**

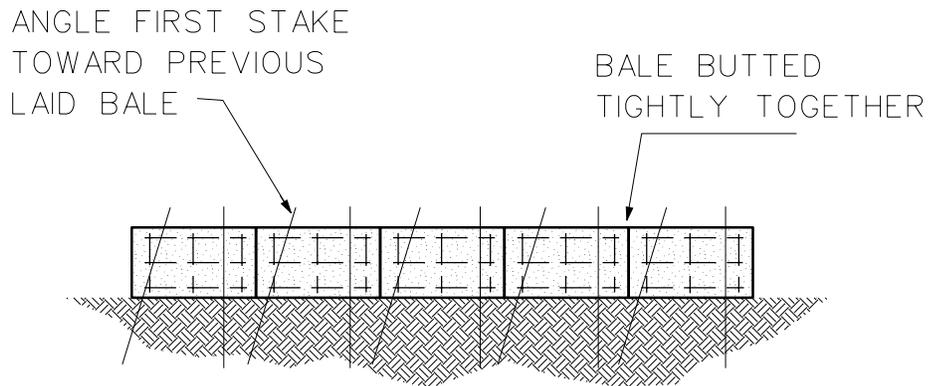


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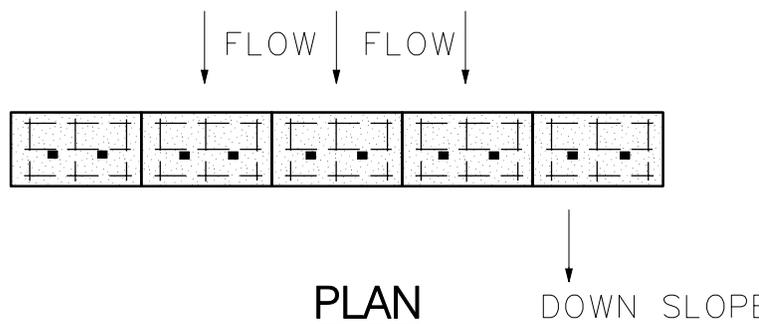
TITLE: Engineering Design and Construction Standards		DESCRIPTION: Synthetic Hay Protection Around Inlets/Structures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-06	
CITY ENGINEER: LELAND E. DICUS	DRAWING SCALE: NOT TO SCALE		



**SECTION**



**ELEVATION**

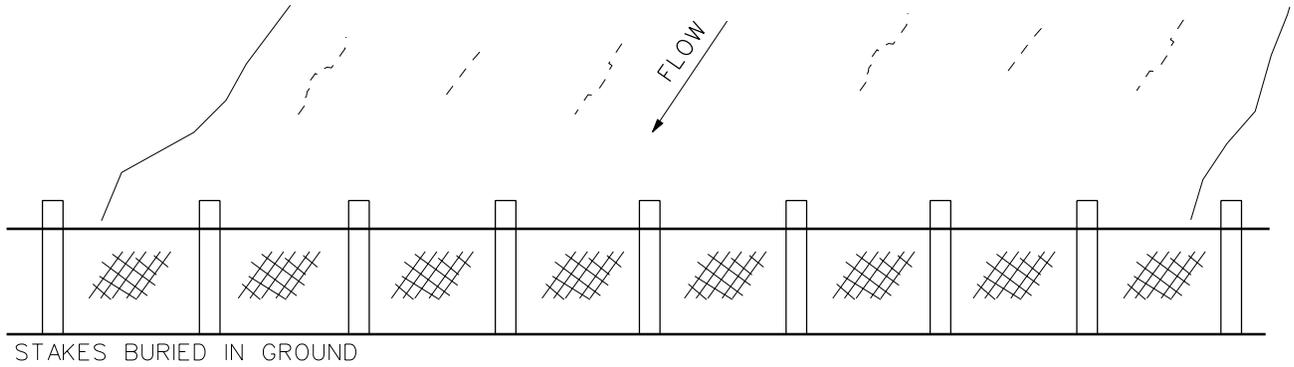


\*IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.

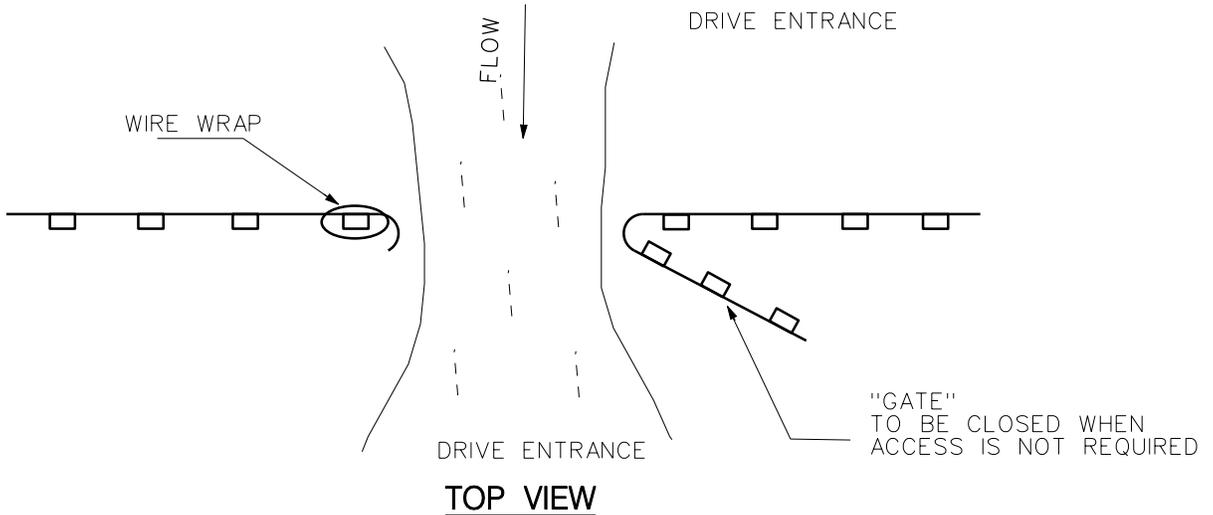
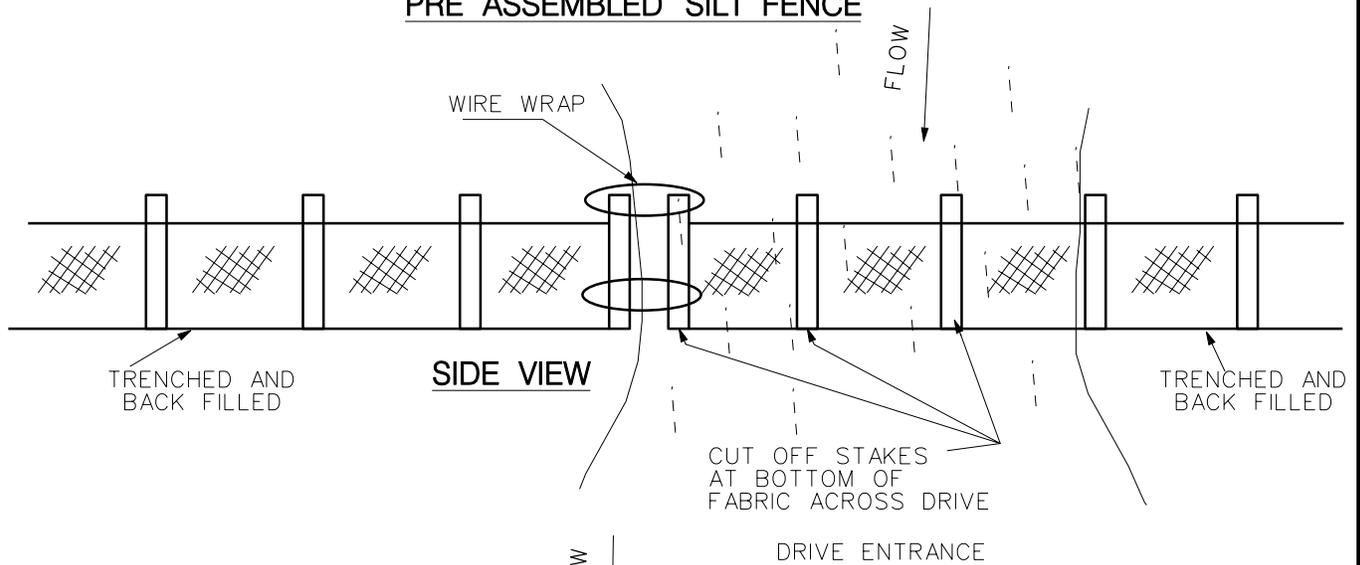


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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Synthetic Bale Barrier</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SE-07</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**PRE ASSEMBLED SILT FENCE**



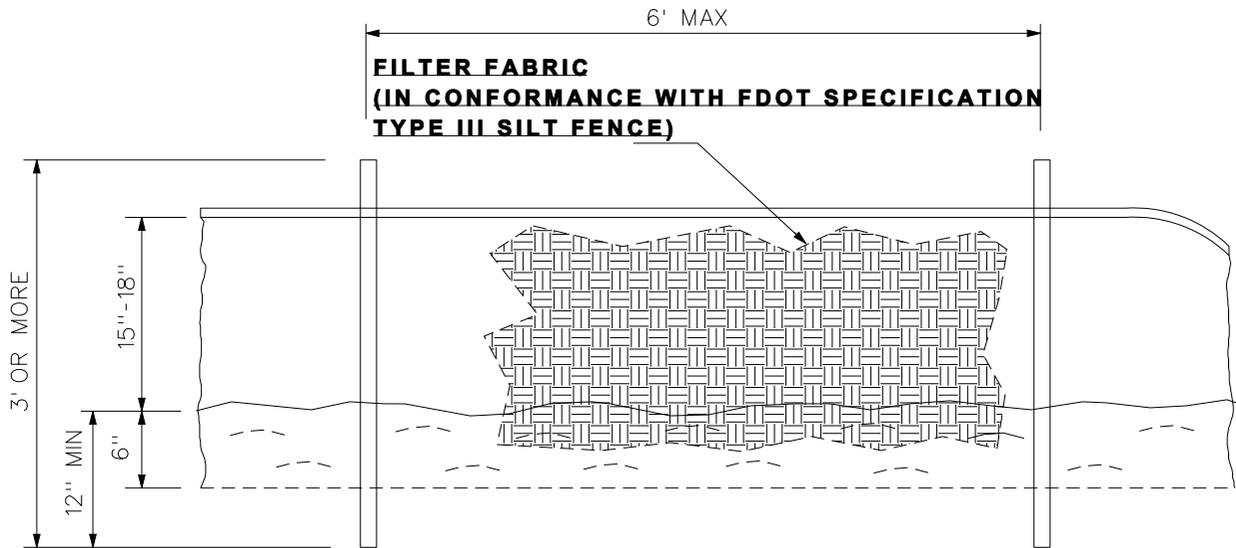
**NOTE:**

1. FOR ENTRY INTO SITE WITH EQUIPMENT YOU MAY LEAVE A SMALL SECTION UN TRENCHED, CUT OFF THE STAKE FLUSH WITH BOTTOM OF FABRIC. THIS MAKES A "GATE" THAT CAN BE OPENED AND CLOSED (WIRE LOOPS WILL HOLD GATE SHUT)

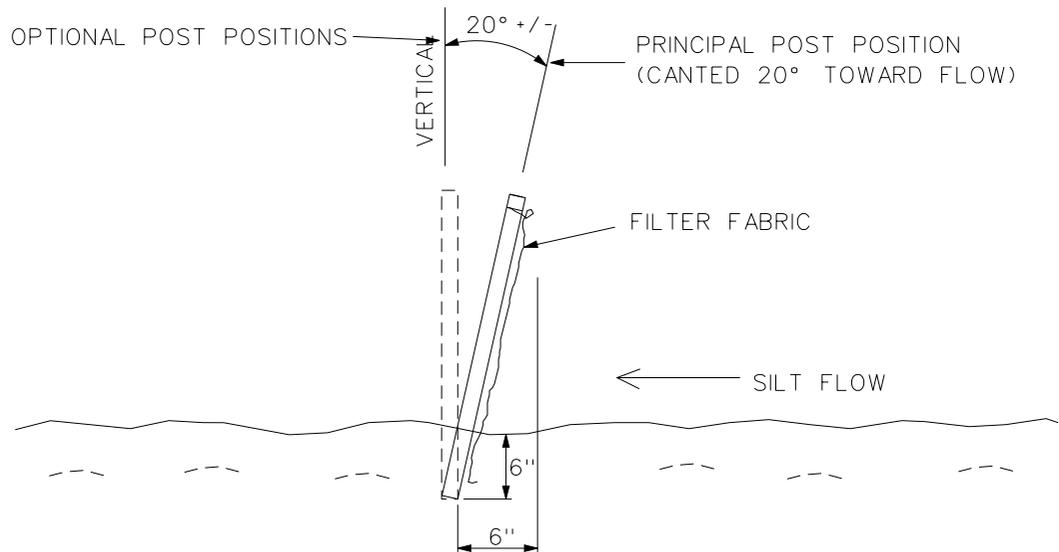


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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Residential Temporary Access Detail</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SE-08</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**ELEVATION**



**SECTION**

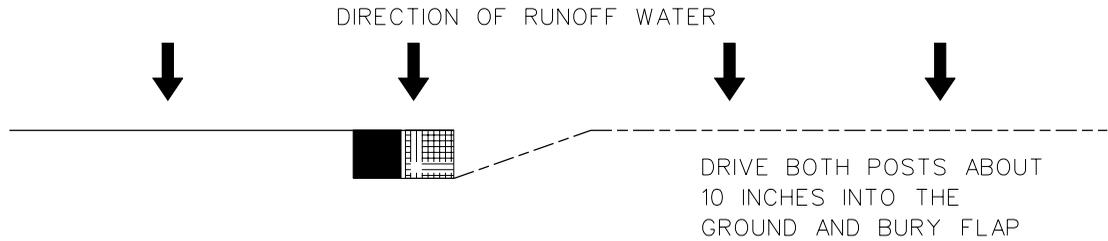
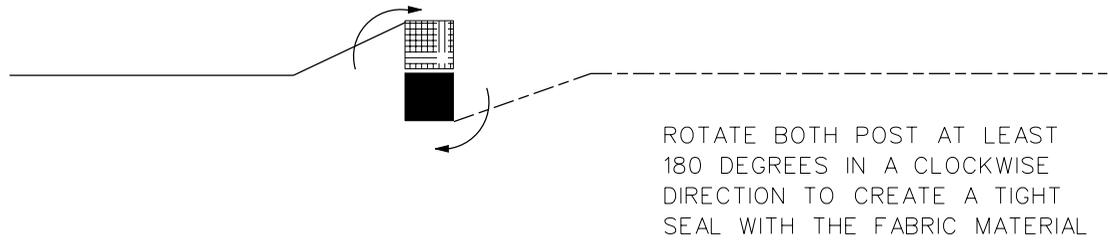
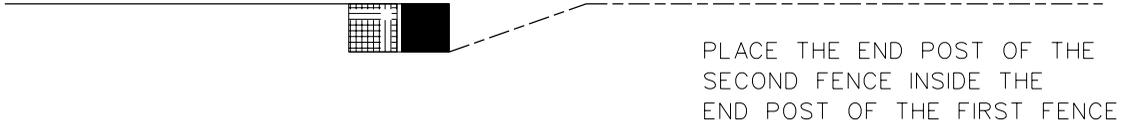
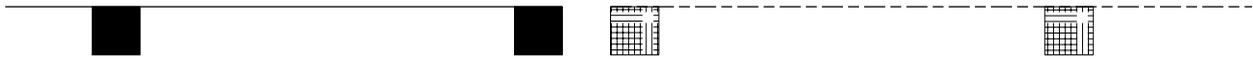
**NOTES:**

1. THE FABRIC SHOULD FACE THE AREA OF CONSTRUCTION WITH THE STAKES ON THE OUTSIDE AWAY FROM CONSTRUCTION.
2. FABRIC MUST BE TRENCHED IN AND BACK FILLED. THIS CAN BE DONE WITH A TRENCHER, FRONT BUCKET, OR HAND.
3. FILTER FABRIC MUST BE TAUT.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Type III Silt Fence	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SE-09	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS, P.E.	NOT TO SCALE		



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TITLE:  
**Engineering Design and Construction Standards**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

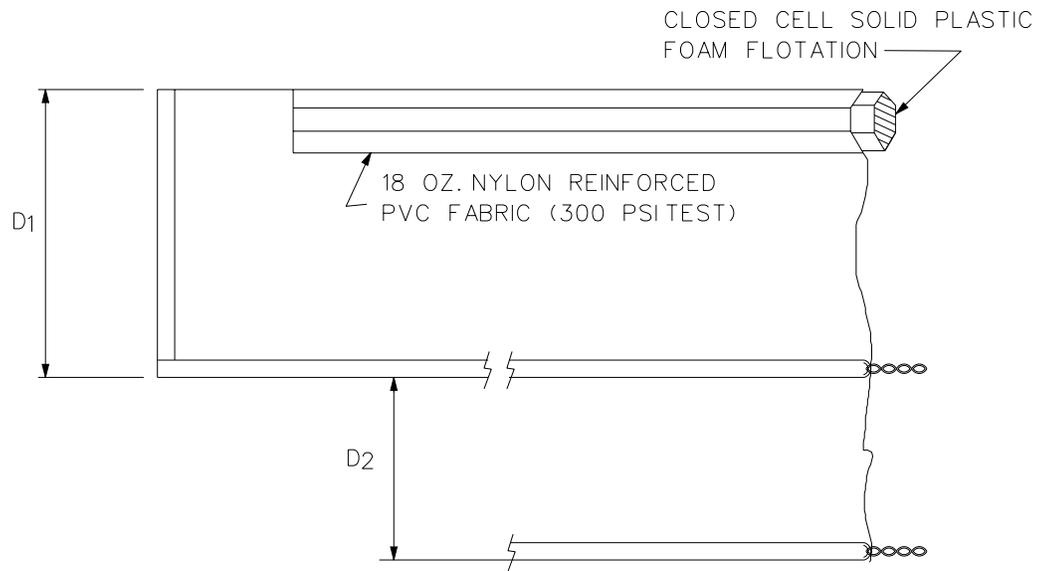
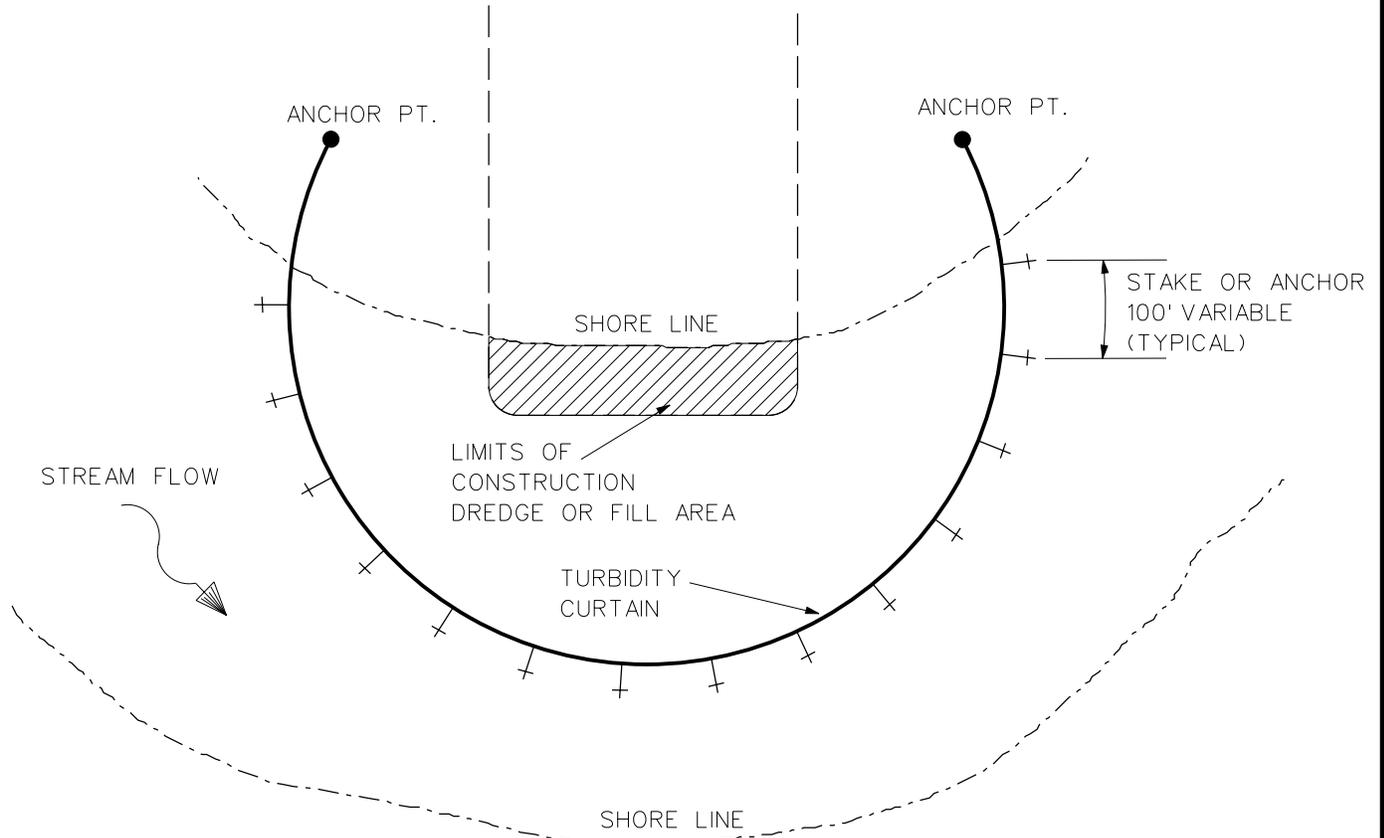
CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

DESCRIPTION:  
**Attaching Two Silt Fences**

PUBLICATION DATE:  
**November 18, 2008**

DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**SE-10**



**NOTES:**

D1 = 5' STD. (SINGLE PANEL FOR DEPTHS 5' OR LESS)  
 D2 = 5' STD. (ADDITIONAL PANEL FOR DEPTH >5')  
 CURTAIN TO REACH BOTTOM. ADDITIONAL PANELS  
 TO BE USED TO REACH BOTTOM IF SINGLE ROW  
 DOES NOT REACH.



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TITLE:  
**Engineering Design and  
 Construction Standards**

DESCRIPTION:  
**Floating Turbidity Barrier**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

PUBLICATION DATE:  
**November 18, 2008**

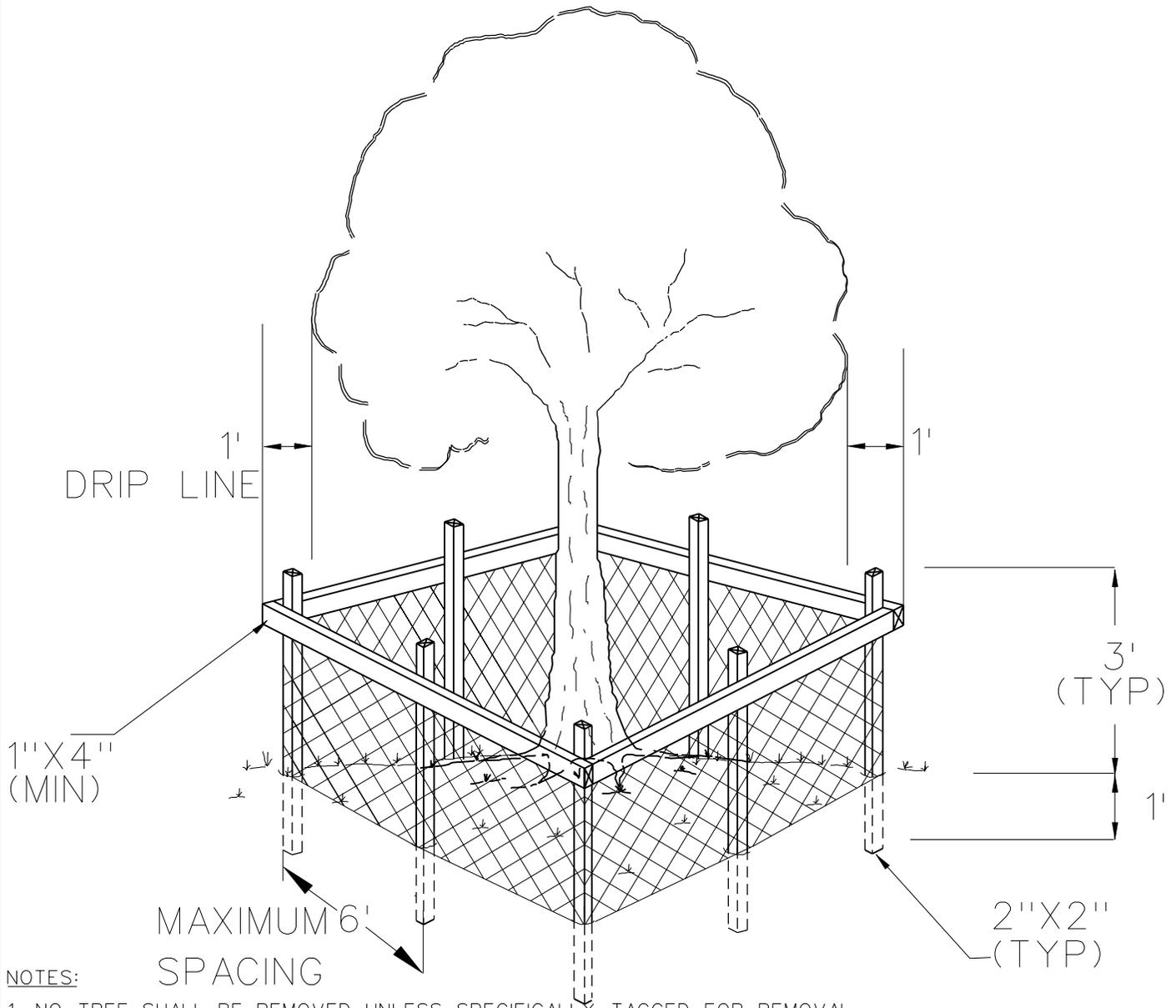
INDEX NUMBER:

**SE-11**

CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

DRAWING SCALE:  
**NOT TO SCALE**

# ANY TREE REMOVABLE REQUIRES A PERMIT



**NOTES:**

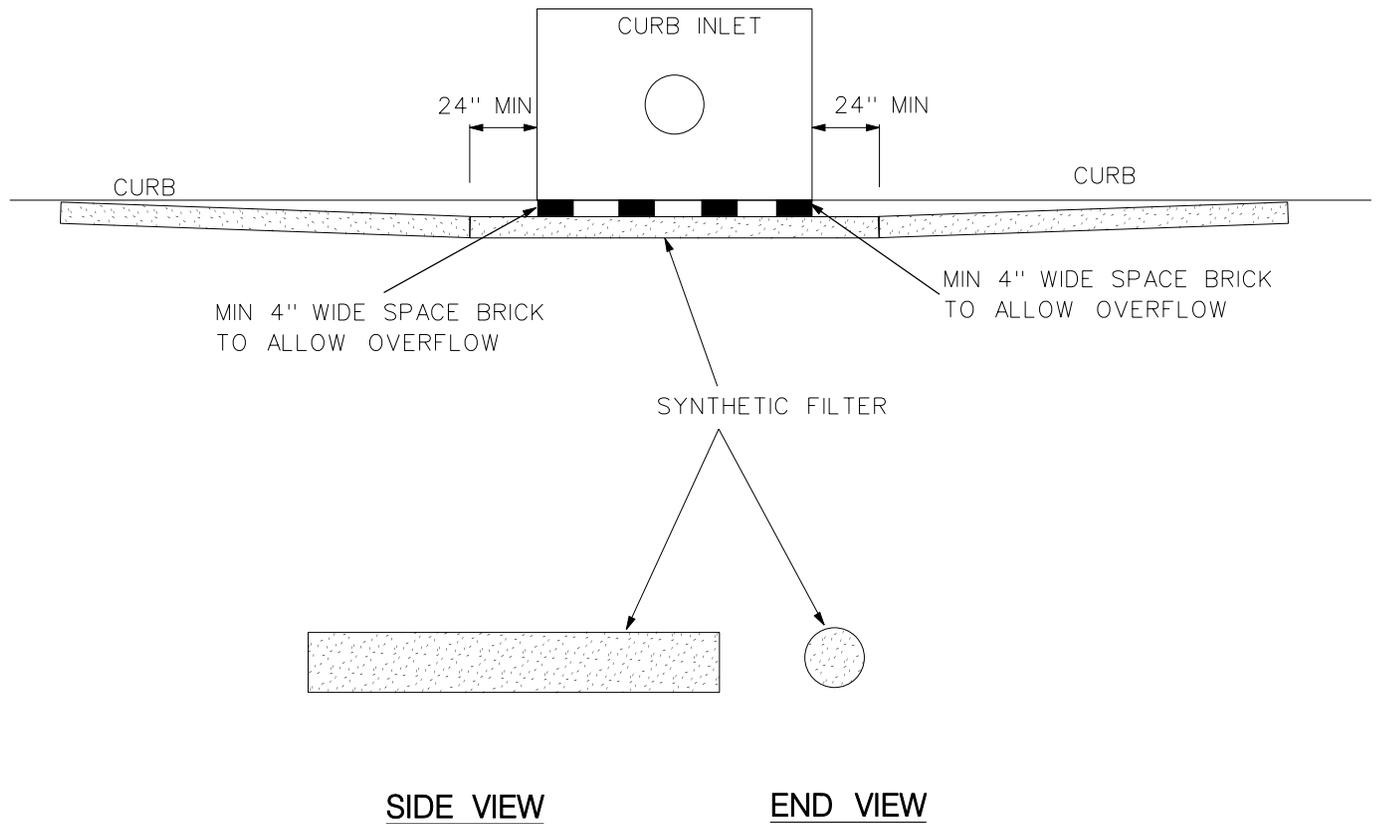
1. NO TREE SHALL BE REMOVED UNLESS SPECIFICALLY TAGGED FOR REMOVAL.
2. A PROTECTIVE BARRIER SHALL BE ERECTED AROUND ALL TREES AND NATIVE VEGETATION THAT ARE TO REMAIN PERMANENTLY ON-SITE.
3. ROOTS GREATER THAN 1" DIAMETER SHALL NOT BE CUT UNLESS OTHERWISE APPROVED.
4. TREE ROOTS ONE FOOT OUTSIDE OF BARRIER MUST COMPLY WITH SECTION 6300 SUBSECTION 6303(B) OF LARGO'S COMPREHENSIVE DEVELOPMENT CODE (CDC).
5. STOCKPILED MATERIALS OR UNNECESSARY VEHICULAR TRAFFIC SHALL NOT BE ALLOWED OVER ANY TREE ROOTS SYSTEM.
6. PROTECTIVE BARRIERS ARE TO BE CONSTRUCTED USING NO LESS THAN 2"X2" LUMBER FOR THE UPRIGHTPOSTS. UPRIGHT POSTS ARE TO BE AT LEAST 4 FEET IN LENGTH WITH A MINIMUM OF ONE FOOT ANCHORED IN THE GROUND AND THREE FEET ABOVE GROUND. UPRIGHT POSTS ARE TO BE PLACED AT A MAXIMUM DISTANCE OF 6 FEET APART. HORIZONTAL RAILS ARE TO BE CONSTRUCTED USING NO LESS THAN 1"X4" LUMBER AND SHALL BE SECURELY ATTACHED TO THE TOP OF THE UPRIGHT POSTS. A PVC- TYPE SAFETY FENCE THE HEIGHT OF THE BARRIER SHALL BE ATTACHED TO THE UPRIGHT POSTS, THE TOP RAIL, AND THE GROUND, WITHFASTENERS A MAXIMUM OF 8 INCHES APART. BARRIERS SHALL EXTEND AT LEAST ONE FOOT BEYOND THE DRIP LINE OF ALL PROTECTED TREES ON THE PROPERTY AND SHALL BE AT LEAST THREE FEET HIGH.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Tree Protection	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-12	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

SYNTHETIC CURB INLET FILTER



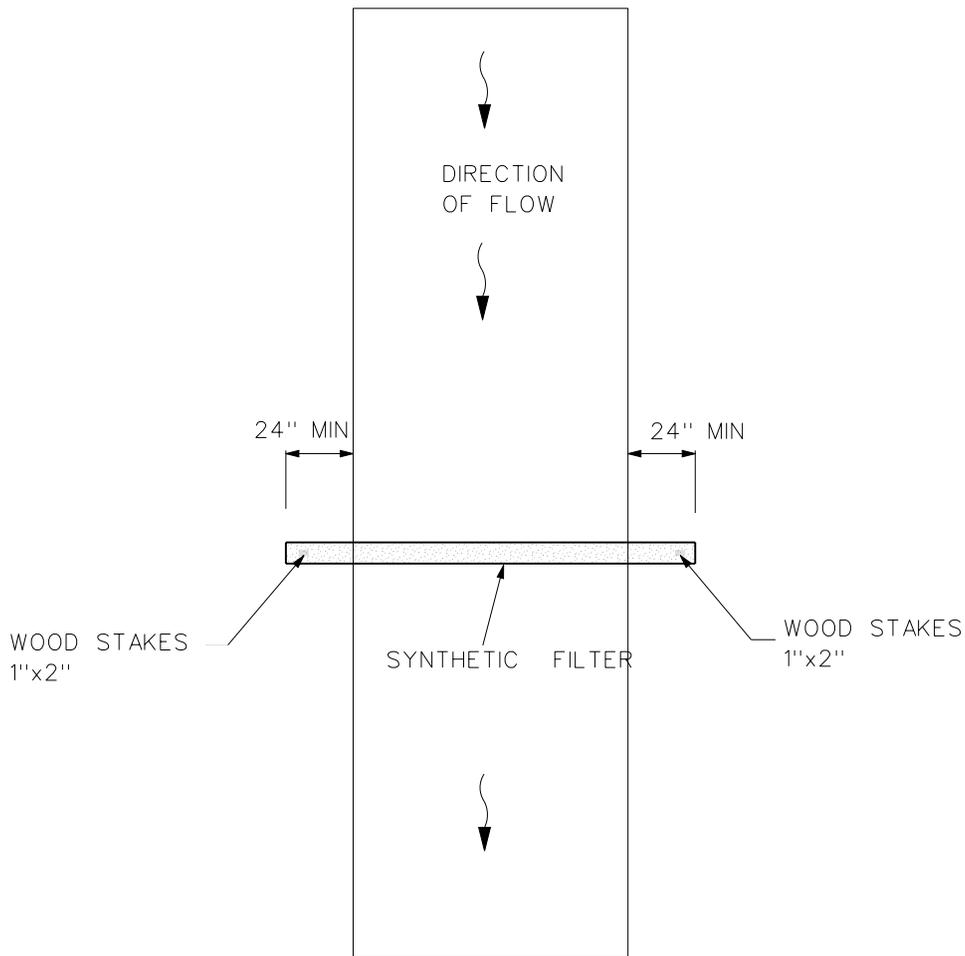
NOTE:

1. GEOHAY OR APPROVED EQUAL.
2. IF OVERFLOW HOLES ARE PRESENT IN THE SYNTHETIC FILTER, THEY SHOULD BE INSTALLED AT A 45° ANGLE.



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 WWW: <http://www.largo.com>

TITLE: Engineering Design and Construction Standards		DESCRIPTION: Synthetic Curb Inlet Filter	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-13	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



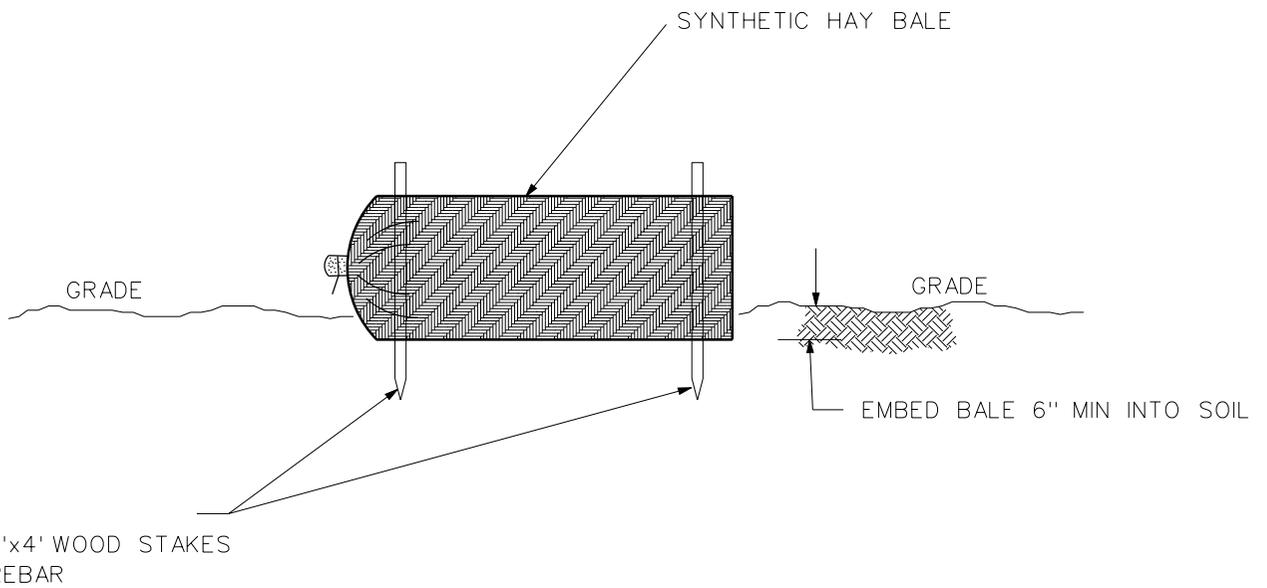
**NOTE:**

1. GEOHAY OR APPROVED EQUAL.



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 WWW: <http://www.largo.com>

TITLE: Engineering Design and Construction Standards		DESCRIPTION: Synthetic Ditch Pavement Filters	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-14	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



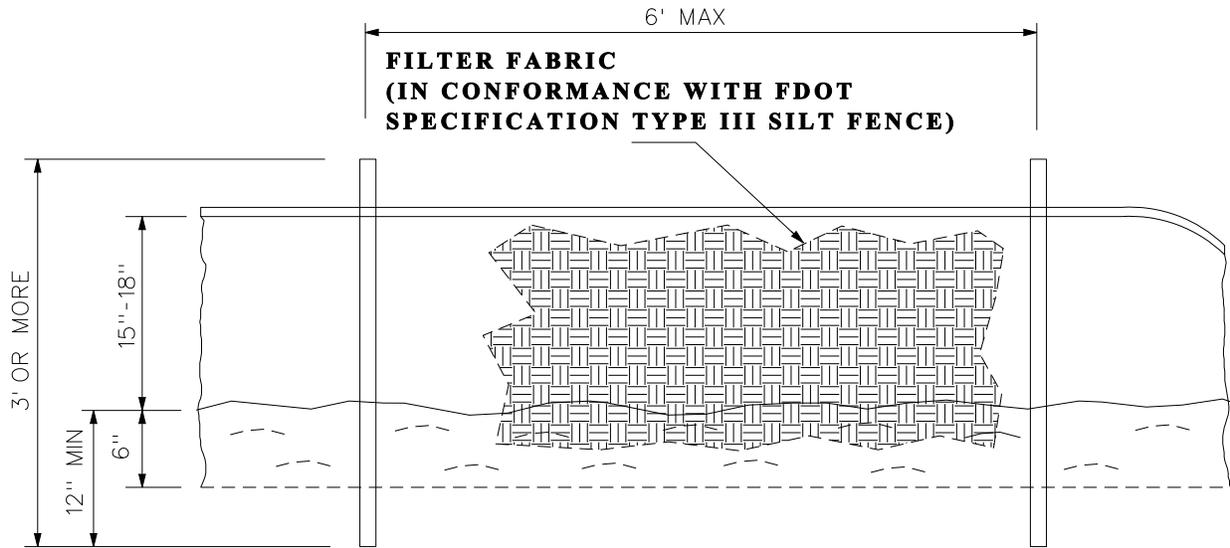
- NOTE:**
- 1. GEOHAY OR APPROVED EQUAL.
  - 2. IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.



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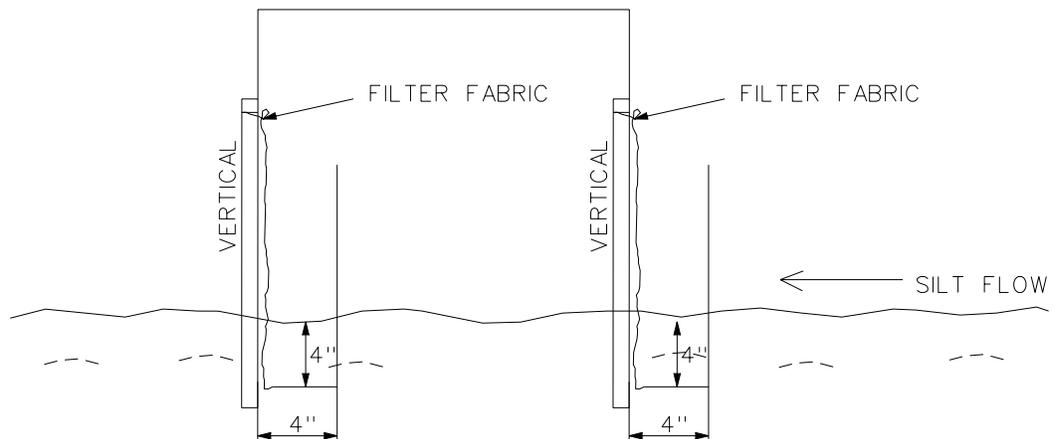
TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Synthetic Haybale Installation</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SE-15</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

## DOUBLE ROW SILT FENCE



ELEVATION

DOUBLE ROW SILT FENCE  
3' MIN. SEPARATION DISTANCE, 4' MAX.



SECTION

**NOTES:**

1. THE FABRIC SHALL FACE THE AREA OF CONSTRUCTION WITH THE STAKES ON THE OUTSIDE AWAY FROM CONSTRUCTION.
2. FABRIC MUST BE TRENCHED IN AND BACK FILLED. THIS CAN BE DONE WITH A TRENCHER, FRONT BUCKET, OR BY HAND. FLAP MUST BE FOUR INCHES BELOW GRADE AND EXTEND FOUR INCHES TOWARDS THE FLOW OF SILT.
3. DOUBLE ROW SHALL BE USED ON ANY SITE NEAR A WATER BODY OR A STORM WATER CONVEYANCE SYSTEM. DOUBLE ROW WILL ALSO BE USED ON ANY SITE THAT IS NEAR AN INLET STRUCTURE THAT LEADS DIRECTLY TO A WATER BODY, EVEN IF THE SITE ITSELF IS NOT NEAR THE WATER BODY.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Double Row Silt Fence	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>SE-16</b>	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



**City of Largo**  
**2008 Engineering Design and Construction Standards**  
**Roadway and Traffic (RT) Section 2020 Updates**  
**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-01	RT-010	Residential Pavement Section	<p><b><u>SKETCH:</u></b>            -Changed multiple fixed dimensions to minimum and maximum dimension requirements.            -Added alternate sidewalk location and width adjacent to roadway curb.            -Removed sidewalk description and replaced with RT-140 cross reference.            -Added underdrain DD-04 cross reference.            -Changed “gutter” call out to “curb” and added RT-130 cross reference.            -Changed “sub-grade” to “sub-base”</p> <p><b><u>NOTES/SPECS:</u></b>            -Split the general pavement specifications chart into separate minimum pavement specifications charts for residential pavement and collector and above pavement.            -Wearing surface asphalt changed from 1.5” S-III to 1.5” SP 9.5 for residential pavement and 3” min. SP 12.5 for collector and above.            -Base for collector and above pavement changed from 8” to 10.5” min. crushed concrete or limerock.            - Added note 4: “Refer to RT-060 for pavement joints.”            -Added note 5: “Install curb where required by plan.”            -Added note 6: “Refer to comprehensive development code for future R.O.W. width and multimodal requirements.”</p>
RT-02	RT-020	Typical Residential Road and Right-Of- Way Section	<p>Title changed from “Typical Residential Road and Parkway Section” to “Typical Residential Road and Right-Of-Way Section”.</p> <p><b><u>SKETCH:</u></b>            -Changed multiple fixed dimensions with “varies” or minimum dimension requirements.            -Changed spacing from 3’ between back of curb and center of utility pole to 2’ from back of curb to face of utility pole.            -Added 2’ clear zone between back of sidewalks and face of fire hydrants or other obstructions.            -Removed fixed horizontal offset distance for water mains from roadway curb.            -Updated pavement layers to reflect changes to RT-010.            -Removed thicknesses and material types of roadway pavement, base, and sub-base callouts.            -Added alternate sidewalk location and width adjacent to roadway curb.</p> <p><b><u>NOTES/SPECS:</u></b>            -Changed “parkway” to “Right-of-Way” in note 1.            -Removed note: “Distance may require adjustment if subsurface drains are required”            -Added Note 2: “Utilities are required to meet clear zone requirements.”            -Added Note 3: “Refer to RT-010 for pavement section details.”</p>



**City of Largo**  
**2008 Engineering Design and Construction Standards**  
**Roadway and Traffic (RT) Section 2020 Updates**  
**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-03	RT-030	Minimum Residential Roadway Width and Radii	<ul style="list-style-type: none"> <li>-Changed right-of-way width and curb width from fixed dimensions to "varies".</li> <li>-Changed clear zone width from 6' wide to 5' minimum width.</li> <li>-Changed sidewalk call out from "5' sidewalk" to "5' min. sidewalk"</li> <li>-Removed outer edge of pavement radius call out.</li> <li>-Added curb cross reference to RT-130.</li> <li>-Added Note 1: "All call outs are to edge of pavement unless otherwise noted."</li> </ul>
RT-04	RT-040	Typical Turning Radii Cul-De-Sac Street	<ul style="list-style-type: none"> <li>-Removed maximum length detail sketch and respective Note 1.</li> <li>-Changed clear zone from 6' wide to 5' min. width to match RT-030.</li> <li>-Added curb cross reference to RT-130.</li> <li>-Added Note 2: "All radius designs and call outs are to edge of pavement unless otherwise noted."</li> </ul>
RT-05	RT-050	Driveway Locations at Intersections	<ul style="list-style-type: none"> <li>-Updated sketch with no technical changes.</li> </ul>
RT-06	RT-060	Pavement Joint	<ul style="list-style-type: none"> <li>-Changed pavement base cross section to remove 6" base step and 6" asphalt extension to saw cut point and replaced with 2' minimum asphalt extension to saw cut from complete base replacement.</li> <li>-Added base removal and replacement call out.</li> <li>-Updated asphalt removal note to include asphalt replacement.</li> <li>-Updated asphalt and base call out with RT-010 cross reference.</li> </ul>
RT-07	RT-070	Pavement Repair	<p><b><u>SKETCH:</u></b></p> <ul style="list-style-type: none"> <li>-Removed Trench Width note from surface restoration dimension.</li> <li>-Removed 50' dimension from milling callout.</li> <li>-Updated pavement joint to reflect RT-060 and added cross reference to call out.</li> <li>-Removed asphalt saw cut/surface joint dimension from base replacement limits.</li> <li>-Added typical trench index RT-080 cross reference.</li> </ul> <p><b><u>NOTES/SPECS:</u></b></p> <ul style="list-style-type: none"> <li>-Note 3: Added city approval requirement for base replacement with flowable fill.</li> <li>-Note 5: Replaced specifications within note with cross reference to RT-010.</li> <li>-Note 8: removed "please refer to most recent version of city of largo resurfacing program index map" with "contractor to verify with engineering staff" regarding age of the existing pavement.</li> <li>-Note 9: Added RT-080 cross reference for pipe bedding.</li> </ul>



**City of Largo**  
**2008 Engineering Design and Construction Standards**  
**Roadway and Traffic (RT) Section 2020 Updates**  
**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-08	RT-080	Typical Trench	<p><b><u>SKETCH:</u></b>            -Changed max lift for remaining back fill from 12” max lifts to 6” max lifts.            -Added 6” vertical dimension to bedding material.</p> <p><b><u>NOTES/SPECS:</u></b>            -Note 1: Changed bedding graded rock material from “washed” to “unwashed” and clarified when wrapping is required.</p>
RT-09	RT-090	Brick Pavement Trench Repair	<p>-Changed Title from “Paving Restoration” to “Brick Pavement Trench Repair”</p> <p><b><u>SKETCH:</u></b>            -Removed all call out references to the now removed note 4.            -Removed 12” vertical dimension for flowable fill base and replaced with cross reference to RT-080.            -Removed pay item and compaction phrasing from typical trench call out and replaced with RT-080 cross reference.            -Removed 12” from outside of pipe trench width dimensions.</p> <p><b><u>NOTES/SPECS:</u></b>            -Removed Notes 1 &amp; 4 regarding pay items.            - Note 3: Added RT-260 cross reference.</p>
RT-10	RT-100	Structure Bedding	<p>-Changed title from "Standard Bedding" to "Structure Bedding"</p> <p><b><u>SKETCH:</u></b>            - Added “unwashed” rock bedding requirement</p> <p><b><u>NOTES/SPECS:</u></b>            -Note 3 added for pipe bedding cross reference.</p>
RT-11	RT-110	Flowable Fill Mix	-Updated organization with quality of live improvements, no technical changes.
RT-12	RT-120	Milling and Resurfacing Various Roads	-No technical changes.



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**2008 Engineering Design and Construction Standards**  
**Roadway and Traffic (RT) Section 2020 Updates**  
**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-13	RT-130	Curb and Gutter	<p><b><u>SKETCHES:</u></b>            -Changed radius from 1/2" to 3/4" at back of curb for miami curb and miami drop curb sketches.            -Removed 1/2" offset from the top and bottom of the face of miami and miami drop curb sketches.            -Added 1/4" vertical dimension between top of asphalt and front of curb on miami and miami drop curb sketches.            -Added 1/2" joint seal to FDOT Type D curb sketch.            -Added 3/4" radius to concrete pavement adjacent to joint seal with Type D curb.            -Added new detail sketch for Concrete Slant Curb.</p> <p><b><u>NOTES/SPECS:</u></b>            -Added fibermesh requirement to all concrete curbing.</p>
RT-14	RT-140	Sidewalks	<p>-Updated locations for 6" thick sidewalk to include 10' either side of industrial and commercial access.            -Clarified 2% slope in "Section A-A" is maximum.</p>
RT-15	RT-150	Curb-Cut Sidewalk Ramps	<p>-Changed "Truncated Domes" to "Detectable Warning" where applicable.</p> <p><b><u>SKETCHES:</u></b>            -Changed curb return radius on 6" vertical curb in transition from 2' radius at front of curb to 2' radius at back of curb.            -Changed ramp width at returned curb ramps from 4'-5" wide to 5'-0" wide.</p> <p><b><u>NOTES/SPECS:</u></b>            -Added to note 2: "All detectable warnings in city right-of-way shall be yellow. Check applicable agency standard color for county and state right-of-way."</p>
RT-16	RT-160	Intersection Control	<p><b><u>SKETCHES:</u></b>            -Replaced 10' crosswalk dimension with cross reference note to RT-170.            -Updated 2' min. dimension between EOP and crosswalk to specify "Edge of crosswalk"            -Replaced 4' dimension between crosswalk and stop bar with reference to Note 4.            -Added cross reference to RT-170 to crosswalk sketch for school crosswalks.            -Added note for stop sign to "align with stop bar"            Added 10' offset dimension between EOP and center of stop sign.</p> <p><b><u>NOTES/SPECS:</u></b>            -Changed Note 3: added cross reference to RT-180.            -Added Note 4: "4' between edge of crosswalk or crossing location and edge of stop bar."</p>



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**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-17	RT-170	Crosswalk	<p><b><u>STANDARD CROSSWALK:</u></b>            -Updated 2' dimension between EOP and crosswalk to specify "edge of crosswalk".            -Updated crosswalk dimension to specify inside edge to inside edge measurements.            -Note 2 changed from: "signing required at mid-block pedestrian crosswalks" to "signs at mid-block pedestrian crosswalks without beacons to be designed and installed per the Manual of Uniform Traffic Control Devices, Latest Edition. Signs at mid-block pedestrian crosswalks with beacons to be designed and installed per FDOT Standard Index 654-001 and 665-001."            -Added cross reference to RT-150 for sidewalk.</p> <p><b><u>SCHOOL CROSSWALK:</u></b>            -Added "spacing of lines selected to avoid wheel path" to crosswalk marking callout.            -Updated note 2 with current FDOT standard plans index number: "711-001"            -Added cross reference to RT-150 for sidewalk.</p>
RT-18	RT-180	Pavement Marking Specifications	<p>-Updated all FDOT references with the current equivalents.            - Alternate permanent marking material "stay mark marking tape or equivalent" no longer allowed. Note has been removed.</p>
RT-19	RT-190	Traffic Sign	<p>-Removed callout with "MUTCD designation: W1-3R; Sign size to be noted if other than standard"            -Added sidewalk and minimum offset from signage dimension.</p>
N/A	RT-191	Specialized Parking Signs	<b>NEW STANDARD</b>
RT-20	RT-200	Street Sign	<p><b><u>SKETCH:</u></b>            -U-Channel Post call out changed to include: "(Retro-reflective material strip to be installed on post for the following sign types: Red - Stop, yield and do not enter signs; Yellow – warning signs; Green – school signs.)"</p> <p><b><u>SPECS:</u></b>            -Removed "(SILVER)" from specification for letters on street signs.</p>
RT-21	RT-210	Parking Lot	<p>-Added angle dimension symbol to angled parking sketch and updated related table with consistent symbology.            -Added "Min. Dimension" titles to 90° Parking and 45° and 60° Parking charts.            - "Curb stop" replaced with "Wheel stop"            -Removed "*Handicap Spaces – 12.0'" and "***Handicap spaces – Use C'" notes from below angled parking chart.            -Added Note 1: "All Handicap Parking shall have a 5' accessible aisle per ADA requirements (see RT-220)"</p>



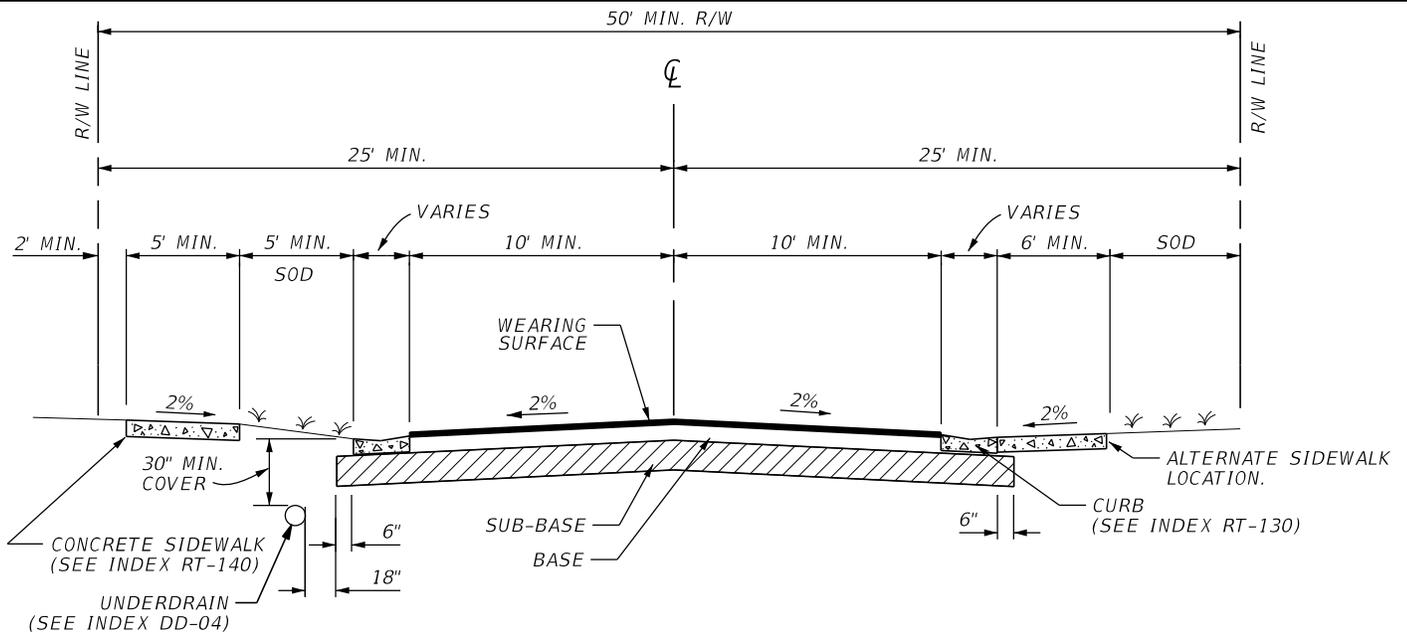
**City of Largo**  
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**Roadway and Traffic (RT) Section 2020 Updates**  
**Revision Log**

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-22	RT-220	Typical Parking Lot Spaces/Section	<p><b>SKETCH:</b></p> <ul style="list-style-type: none"> <li>-Removed Pavement Section sketch and parking stall dimensions chart.</li> <li>-Removed “precast” from the wheel stop call out.</li> <li>-Updated handicap sign cross reference from FTP-25 to FTP-20-06.</li> <li>-Added compact car sign and “COMPACT” pavement markings to the compact stall.</li> <li>-Replaced standard stall width and depth with variables referenced in RT-210.</li> <li>-Updated compact space CDC cross reference to current CDC section.</li> <li>-Changed “Loading Zone” call out to “Access Aisle”</li> <li>-Added notes specifying dimensions measured center to center and edge to edge.</li> <li>- Updated Access Aisle dimension to be 5’ minimum</li> <li>- Updated materials in “Pavement Section”</li> </ul> <p><b>NOTES/SPECS:</b></p> <ul style="list-style-type: none"> <li>-Added “as directed by the city engineer” to note 1 regarding use of wheel stops.</li> <li>-Added Note 3: “Thermoplastic pavement markings shall be installed within the right-of-way. Painted pavement markings are allowed on private property.”</li> <li>-Added Note 4: “Refer to RT-191 for parking sign requirements and CDC... for compact vehicle requirements”</li> </ul>
N/A	RT-221	Electric Vehicle Parking Spaces	<b>NEW STANDARD</b>
RT-23	RT-230	Wheel Stops	No technical changes.
RT-24	RT-240	Bollard Detail	<ul style="list-style-type: none"> <li>-Added optional pipe cap call out.</li> <li>-Added Note 1: “All dimensions are minimum requirements.”</li> </ul>
RT-25	N/A	N/A	Standard has been removed. Information incorporated into RT-090.
RT-26	RT-260	Brick Street Reconstruction	<ul style="list-style-type: none"> <li>-Updated Dimensions to reflect 10' min. wide lanes and 5' clear zone between sidewalk and roadway.</li> <li>-Added alternate sidewalk location adjacent to roadway curb.</li> <li>-Changed sand bedding thickness from 1”-2” to 2”.</li> <li>-Added cross reference to RT-140 to sidewalk call out.</li> <li>-Note 2: Removed “Additional bricks required shall be provided by the city of Largo” from note.</li> <li>-Note 4: existing note for broom swept sand cement mix removed and replaced with “Spread a mix of 3 parts FDOT silica sand to 1 part grout over replacement area. Roll with steel wheel roller.”</li> </ul>



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**Roadway and Traffic (RT) Section 2020 Updates**  
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2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
RT-27	RT-270	Driveway	<ul style="list-style-type: none"> <li>-Changed 1' min. offset of mitered end section from driveway edge to 2' min.</li> <li>-Added requirement for brick and paver driveways to require city engineer approval.</li> <li>-Removed redundant sidewalk notes that exist in RT-140.</li> <li>-Added note: "circular driveway construction requires engineering review and approval."</li> <li>-Removed specifications for base under paver driveway and replaced with detail reference.</li> <li>-Added new detail for header curb for use at paver driveways.</li> </ul>
RT-28	RT-280	Sidewalk Deflection	<ul style="list-style-type: none"> <li>- Removed permit requirement for tree removal</li> <li>-Added additional requirement for 3' power pole offset from sidewalk if transformer is present.</li> <li>-Removed notes 8, 9, and 10 regarding manhole adjustment, sidewalk offset from existing trees, and deflection curves respectively.</li> <li>-Added note cross referencing CDC for sidewalk minimum offsets and added corresponding call out.</li> </ul>
RT-29	RT-290	ADA Ramps	<ul style="list-style-type: none"> <li>-Replaced "Truncated domes" with "Detectable warning" and adjusted placement location.</li> <li>-Changed "Loading Zone" call out to "Access Aisle" and added slope requirements.</li> </ul>
RT-30	RT-300	Sight Triangle	<ul style="list-style-type: none"> <li>-Merged sight triangle and cut a way section details into sight triangle section detail.</li> <li>-Added note to refer to FDOT FDM 212.11.1 for limits of median sight obstruction for 4-lane and 6-lane divided roads.</li> <li>-Adjusted sight line datum from 3'-5" above pavement surface to 3'-6" above pavement surface.</li> <li>-Updated note 1 with corrected cross reference.</li> <li>-Added note 2 to refer to CDC chapter 9 for additional design guidance.</li> </ul>
RT-31	RT-310	Sight Triangle Distances	<ul style="list-style-type: none"> <li>-Updated existing sight distance measurements.</li> <li>-Added 4 lane undivided [without left turn lane] sight distance chart.</li> <li>-Removed examples of specific roads from details</li> <li>-Updated tables to reflect conditions <math>\leq 30</math> mph.</li> <li>-Added Note: "If crossing street is maintained by another agency, use most restrictive agency's criteria.</li> </ul>
N/A	RT-320	Speed Table Assembly – Flat Top	<b>NEW STANDARD</b>



MINIMUM PAVEMENT SPECIFICATIONS - RESIDENTIAL PAVEMENT	
WEARING SURFACE	1½" TYPE SP-9.5
BASE	8" CRUSHED CONCRETE OR LIMEROCK COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180 (100 LBR). PRIME OR TACK LIMEROCK, OR SPRAY CRUSHED CONCRETE WITH WATER BEFORE PAVING PER F.D.O.T. STANDARDS.
SUB-BASE	12" STABILIZED (40 LBR) AND COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180.

MINIMUM PAVEMENT SPECIFICATIONS COLLECTOR AND ABOVE	
WEARING SURFACE	3" MIN. SP-12.5 (MIN. TWO LIFTS)
BASE	10½" MIN. CRUSHED CONCRETE OR LIMEROCK COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180 (100 LBR). PRIME OR TACK LIMEROCK, OR SPRAY CRUSHED CONCRETE WITH WATER BEFORE PAVING PER F.D.O.T. STANDARDS.
SUB-BASE	12" STABILIZED (40 LBR) AND COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180.

**NOTES:**

1. VARIATION FROM MATERIAL SPECIFICATIONS WILL BE CONSIDERED ON A CASE BY CASE BASIS BY THE CITY ENGINEER.
2. BACK OF SIDEWALK TO MATCH CENTERLINE CROWN ELEVATION.
3. UNDER DRAIN REQUIREMENTS MAY BE REDUCED OR WAIVED AS APPROPRIATE BY THE CITY ENGINEER.
4. REFER TO INDEX RT-060 FOR PAVEMENT JOINTS.
5. INSTALL CURB WHERE REQUIRED BY PLAN.
6. REFER TO COMPREHENSIVE DEVELOPMENT CODE FOR FUTURE R.O.W. WIDTH AND MULTIMODAL REQUIREMENTS.

**CONSTRUCTION INDEX RT-010**  
RESIDENTIAL PAVEMENT SECTION  
(N.T.S.)

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INDEX NUMBER  
**RT-010**

DESCRIPTION  
**Residential Pavement Section**

PUBLICATION DATE  
**JULY 7, 2020**

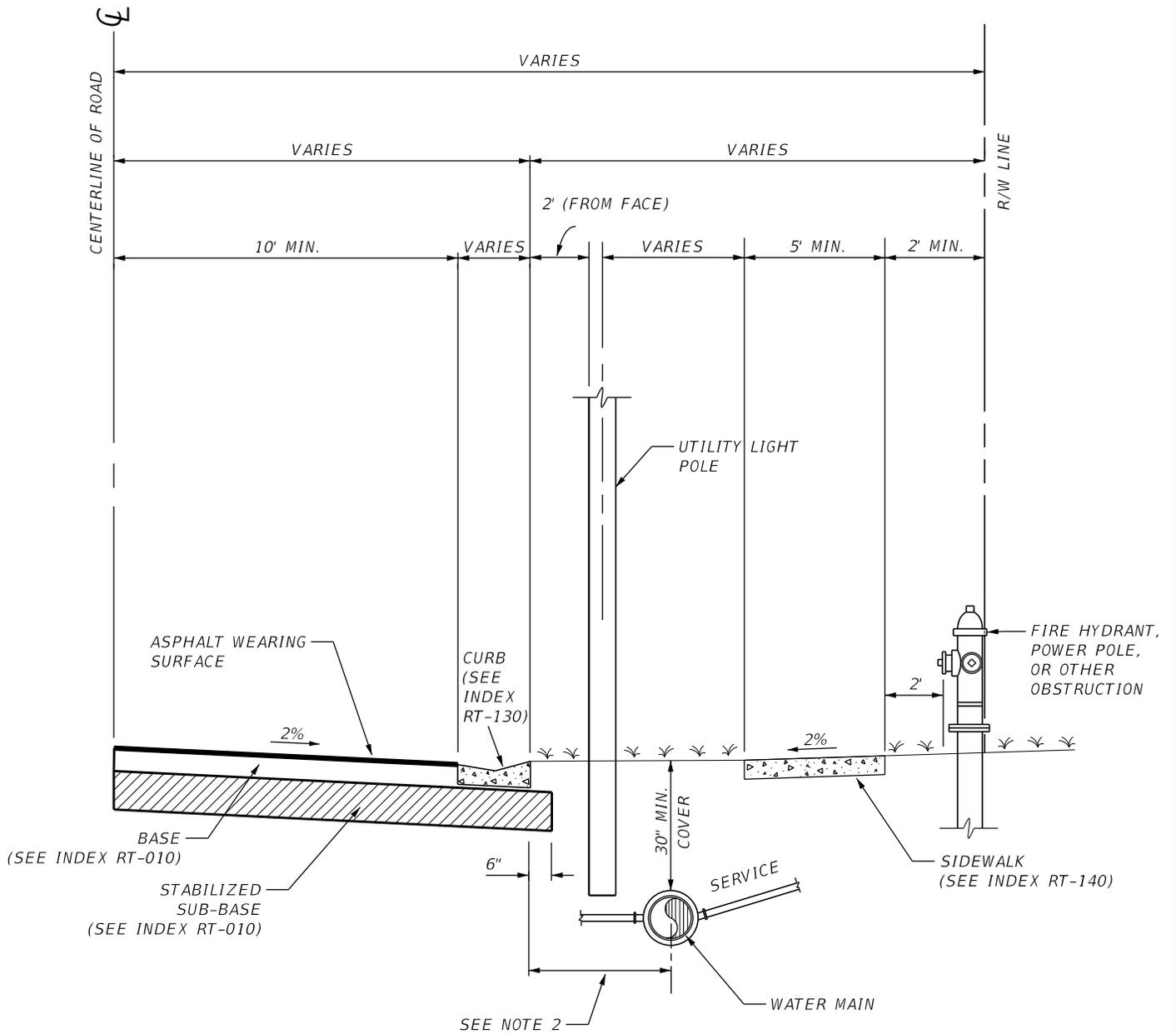
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CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**

**Engineering Design and Construction Standards**



**NOTES:**

1. RIGHT-OF-WAY SHALL BE ROUGH GRADE PRIOR TO WATER METER INSTALLATION.
2. UTILITIES ARE REQUIRED TO MEET CLEAR ZONE REQUIREMENTS.
3. REFER TO INDEX RT-010 FOR PAVEMENT SECTION DETAILS.

**CONSTRUCTION INDEX RT-020**  
 TYPICAL RESIDENTIAL ROAD AND RIGHT-OF-WAY SECTION  
 (N.T.S.)

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INDEX NUMBER  
**RT-020**

DESCRIPTION  
**Typical Residential Road and Right-Of-Way Section**

PUBLICATION DATE  
**JULY 7, 2020**

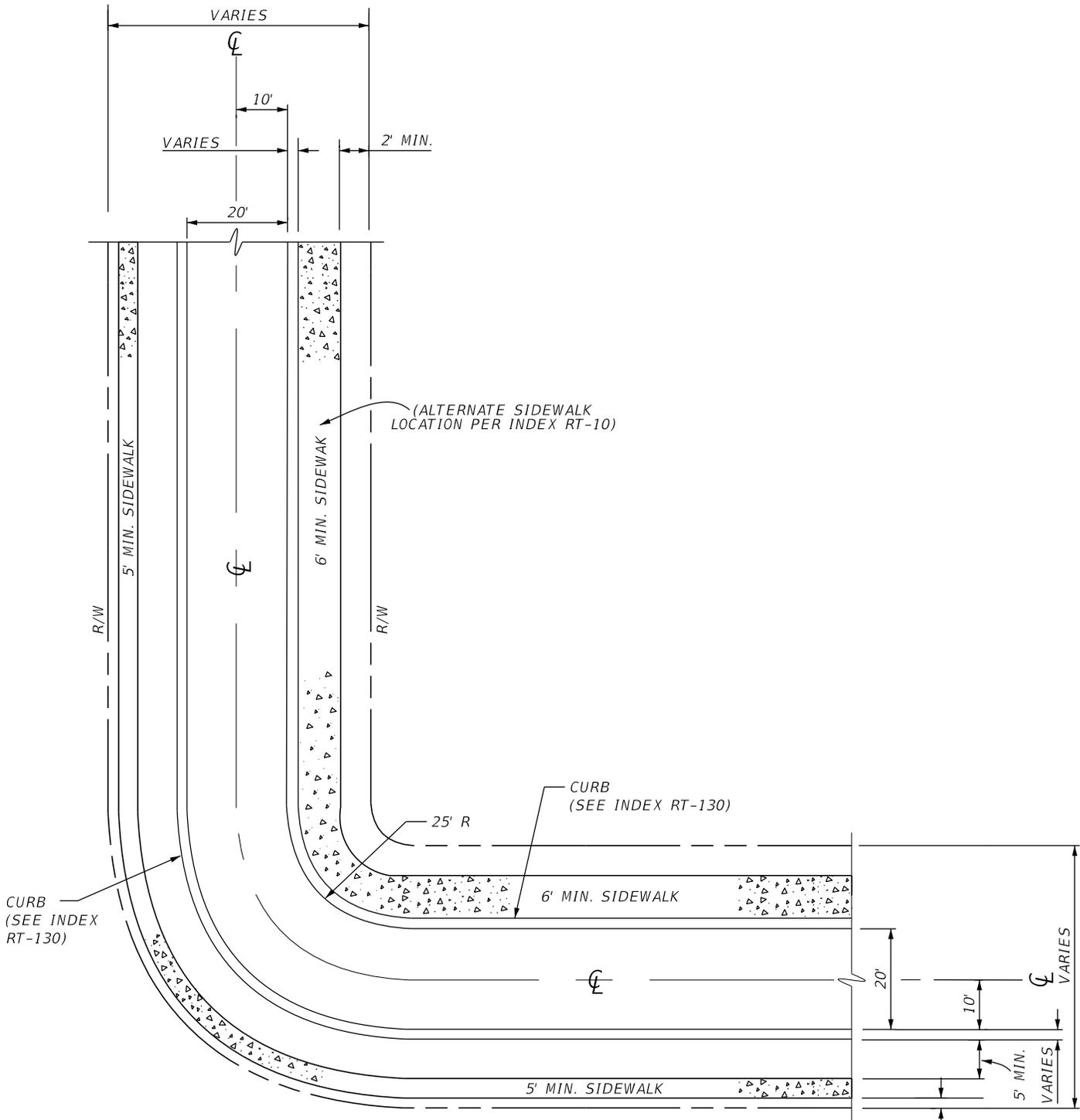
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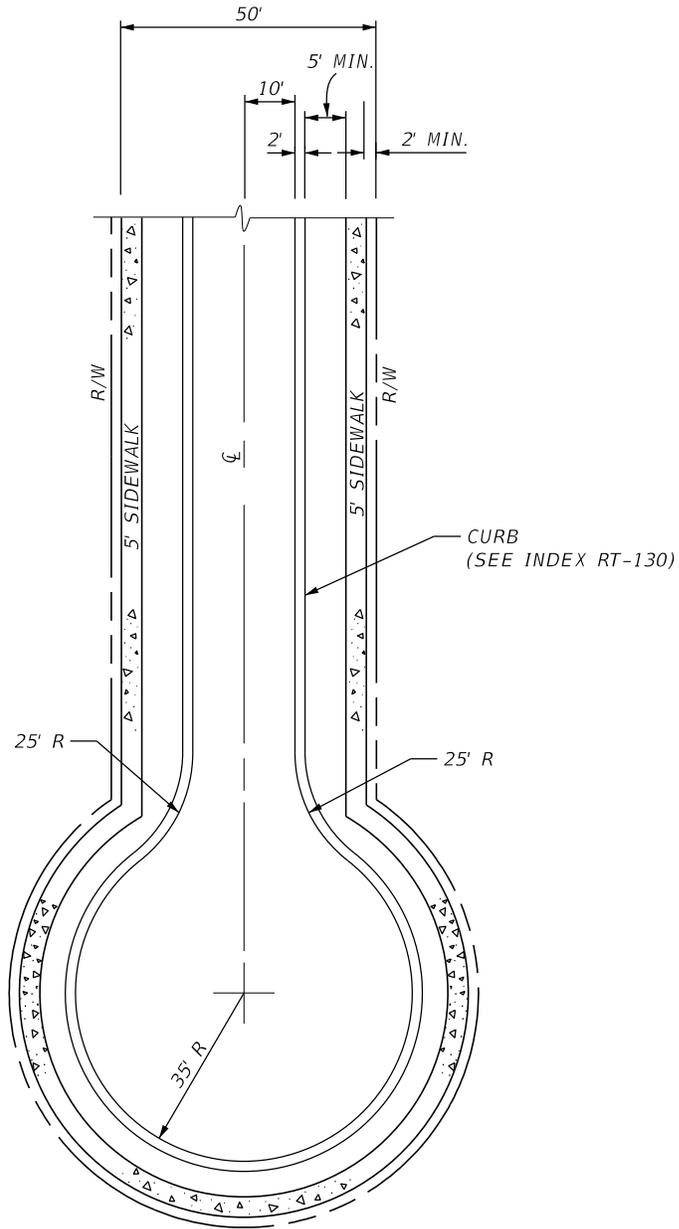


**NOTE:**

1. ALL CALL-OUTS ARE TO EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.

**CONSTRUCTION INDEX RT-030**  
 MINIMUM RESIDENTIAL ROADWAY WIDTH AND RADII  
 (N.T.S.)

<b>City of Largo - Engineering Services Department</b> 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER <b>RT-030</b>	DESCRIPTION <b>Minimum Residential Roadway Width and Radii</b>
PUBLICATION DATE <b>JULY 7, 2020</b>	DRAWING SCALE <b>N.T.S.</b>	TITLE <b>Engineering Design and Construction Standards</b>	
CITY ENGINEERING DIRECTOR <b>JERALD WOLOSZYNSKI</b>	ASST. ENGINEERING DIRECTOR <b>RAFAL CIESLAK</b>		



PLAN

NOTES:

1. ALTERNATIVE TURNAROUNDS WILL BE CONSIDERED ON A CASE-BY-CASE BASIS, AS REVIEWED BY PUBLIC WORKS AND THE FIRE DEPARTMENT AND APPROVED BY THE CITY ENGINEER.
2. ALL RADIUS DESIGNS AND CALL-OUTS ARE TO EDGE OF THE PAVEMENT UNLESS OTHERWISE NOTED.

CONSTRUCTION INDEX RT-040  
 TYPICAL TURNING RADII CUL-DE-SAC STREET  
 (N.T.S.)

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INDEX NUMBER

**RT-040**

DESCRIPTION

**Typical Turning Radii  
 Cul-De-Sac Street**

PUBLICATION DATE  
**JULY 7, 2020**

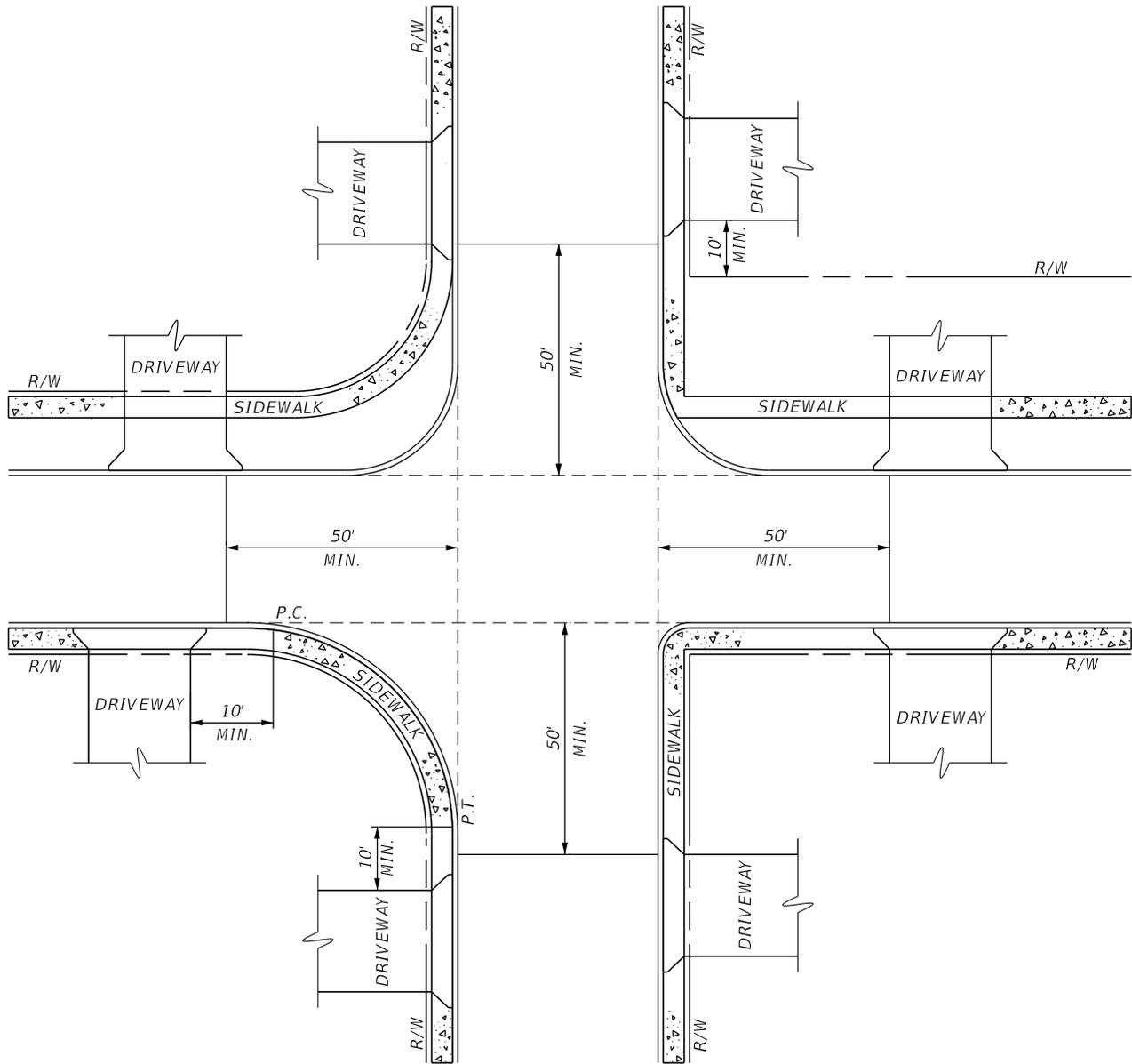
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TITLE

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**NOTE:**

1. DRIVEWAYS TO BEGIN A MINIMUM OF 50' FROM EDGE OF PAVEMENT, 10' FROM P.C. OR P.T., OR 10' FROM R/W LINE WHICHEVER IS GREATER.

**CONSTRUCTION INDEX RT-050**  
 DRIVEWAY LOCATIONS AT INTERSECTIONS  
 (N.T.S.)

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INDEX NUMBER  
**RT-050**

DESCRIPTION  
**Driveway Locations at Intersections**

PUBLICATION DATE  
**JULY 7, 2020**

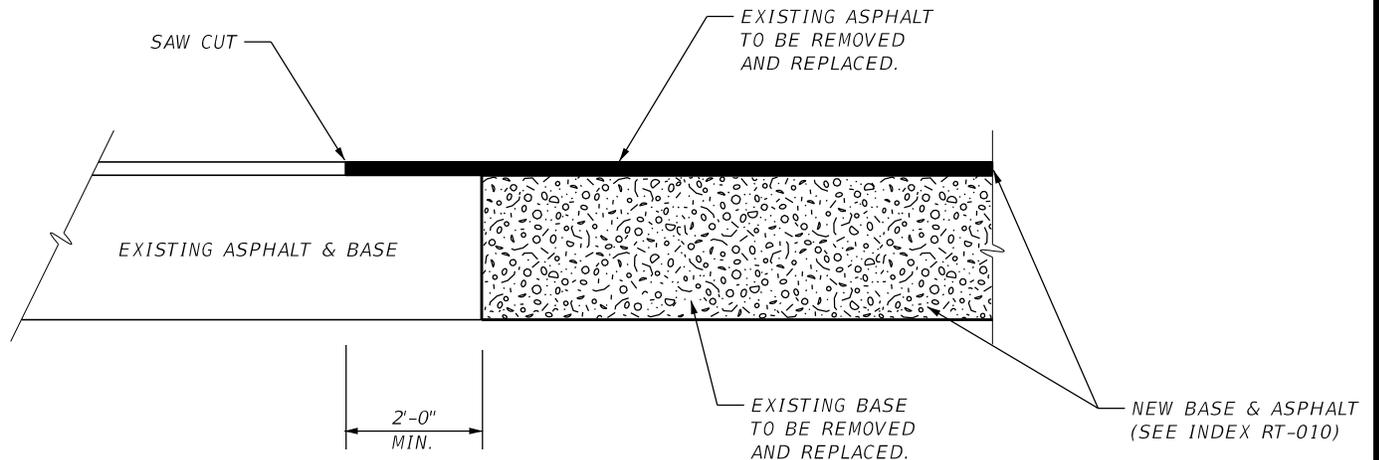
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**RAFAL CIESLAK**

**Engineering Design and Construction Standards**



**NOTE:**

1. THIS METHOD OF PAVEMENT JOINT SHALL BE USED FOR ANY APPLICATION OR CONSTRUCTION WHERE PROPOSED PAVEMENT AND BASE WILL BE CONNECTED TO EXISTING PAVEMENT AND BASE.

CONSTRUCTION INDEX RT-060  
PAVEMENT JOINT  
(N.T.S.)

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INDEX NUMBER

**RT-060**

DESCRIPTION

**Pavement Joint**

PUBLICATION DATE  
**JULY 7, 2020**

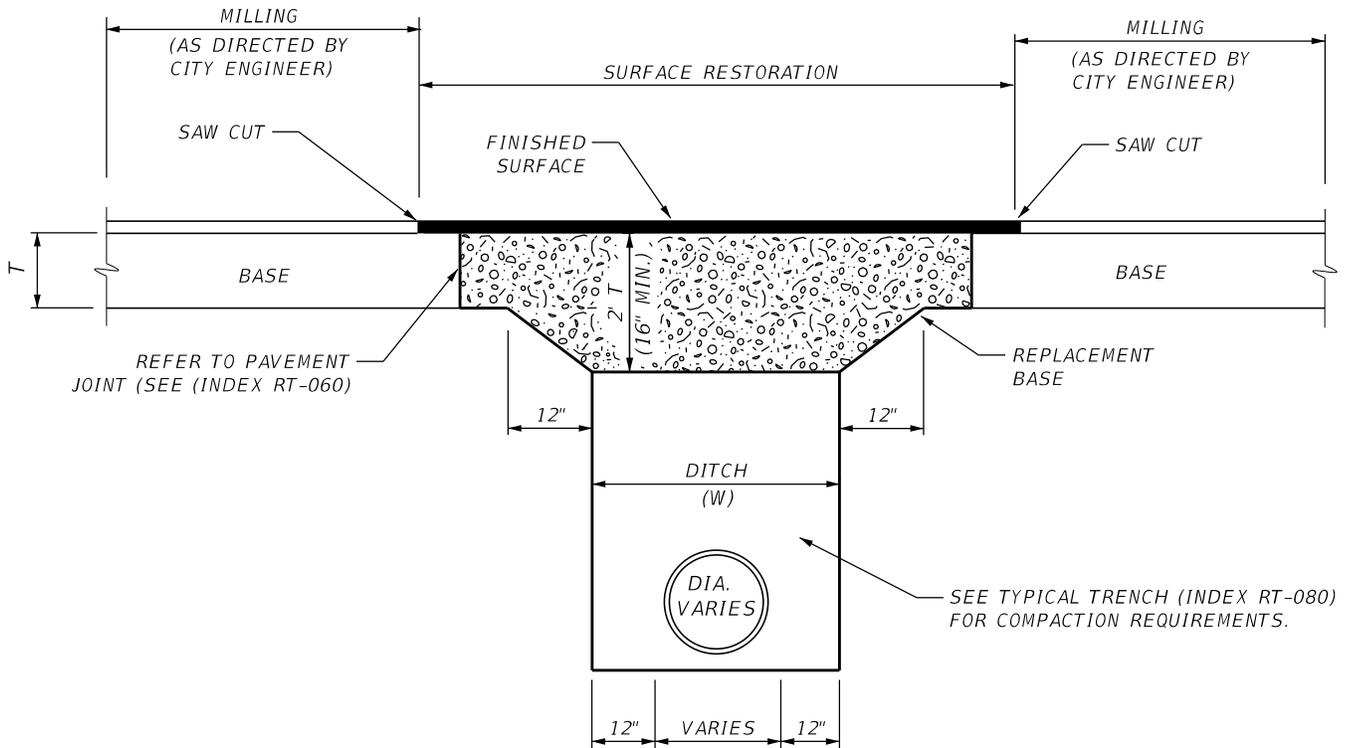
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**NOTES:**

1. REPLACEMENT BASE MATERIAL OVER DITCH SHALL BE AT MINIMUM 16" THICK OR TWICE THE THICKNESS OF THE EXISTING BASE, WHICHEVER IS GREATER.
2. BASE MATERIAL SHALL BE PLACED IN THREE OR MORE LIFTS AND EACH LIFT COMPACTED TO 98% DENSITY PER A.A.S.H.T.O. T-180, LBR 100 (MAX. LIFT THICKNESS = 6").
3. FLOWABLE FILL MAY BE USED AS A REPLACEMENT FOR SUB-BASE MATERIAL WITH CITY'S APPROVAL.
4. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED AND ALL SURFACES TACK COATED.
5. SURFACE MATERIAL SHALL BE CONFORM TO INDEX RT-010.
6. ANY PAVEMENT CUTS SHALL BE COLD PATCHED AT END OF EACH WORKING DAY TO FACILITATE UNHINDERED TRAFFIC FLOW.
7. ALL DISTURBED PAVEMENT MARKINGS SHALL BE RESTORED IN ACCORDANCE WITH CITY STANDARDS.
8. NO OPEN CUT OF ROADS THAT HAVE BEEN NEWLY BUILT OR RESURFACED WITHIN THE LAST FIVE YEARS. CONTRACTOR TO VERIFY WITH ENGINEERING STAFF.
9. SEE INDEX RT-080 FOR BEDDING REQUIREMENTS ON ALL PIPING.

**CONSTRUCTION INDEX RT-070**  
 PAVEMENT REPAIR  
 (N.T.S.)

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INDEX NUMBER  
**RT-070**

DESCRIPTION  
**Pavement Repair**

PUBLICATION DATE  
**JULY 7, 2020**

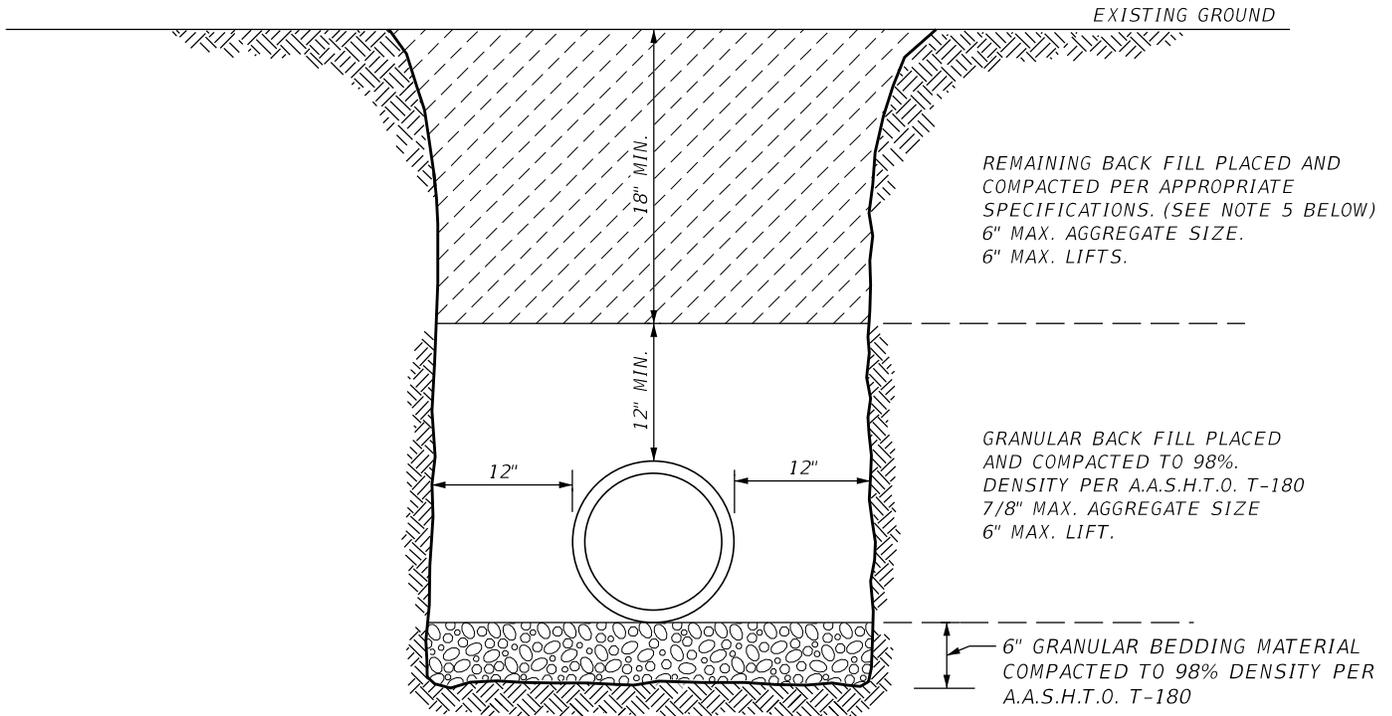
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**RAFAL CIESLAK**

**Engineering Design and  
 Construction Standards**



NOTES:

1. BEDDING SHALL CONSIST OF UNWASHED AND GRADED ROCK 3/8"-7/8" SIZING. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGE ROCKS SHALL BE REMOVED. BEDDING SHALL BE WRAPPED WHEN UNDER ROADWAY.
2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
3. THE PIPE SHALL BE PLACED IN A DRY TRENCH.
4. BACK FILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGE ROCK, MUCK, AND DEBRIS.
5. COMPACT BACK FILL TO 100% DENSITY, (A.A.S.H.T.O. T-99, METHOD C)
6. COMPACTION AND DENSITY TESTS SHALL BE COMPLETED DURING BACK FILL OPERATIONS; CONTRACTORS NOT FOLLOWING THIS PROCEDURE, FOR WHATEVER REASONS, SHALL BE REQUIRED TO RE-EXCAVATE THE AREA IN QUESTION, DOWN TO THE BEDDING MATERIAL, THEN BACK FILL IN ACCORDANCE WITH THE ABOVE PROCEDURES.

CONSTRUCTION INDEX RT-080  
TYPICAL TRENCH  
(N.T.S.)

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INDEX NUMBER

**RT-080**

DESCRIPTION

**Typical Trench**

PUBLICATION DATE  
**JULY 7, 2020**

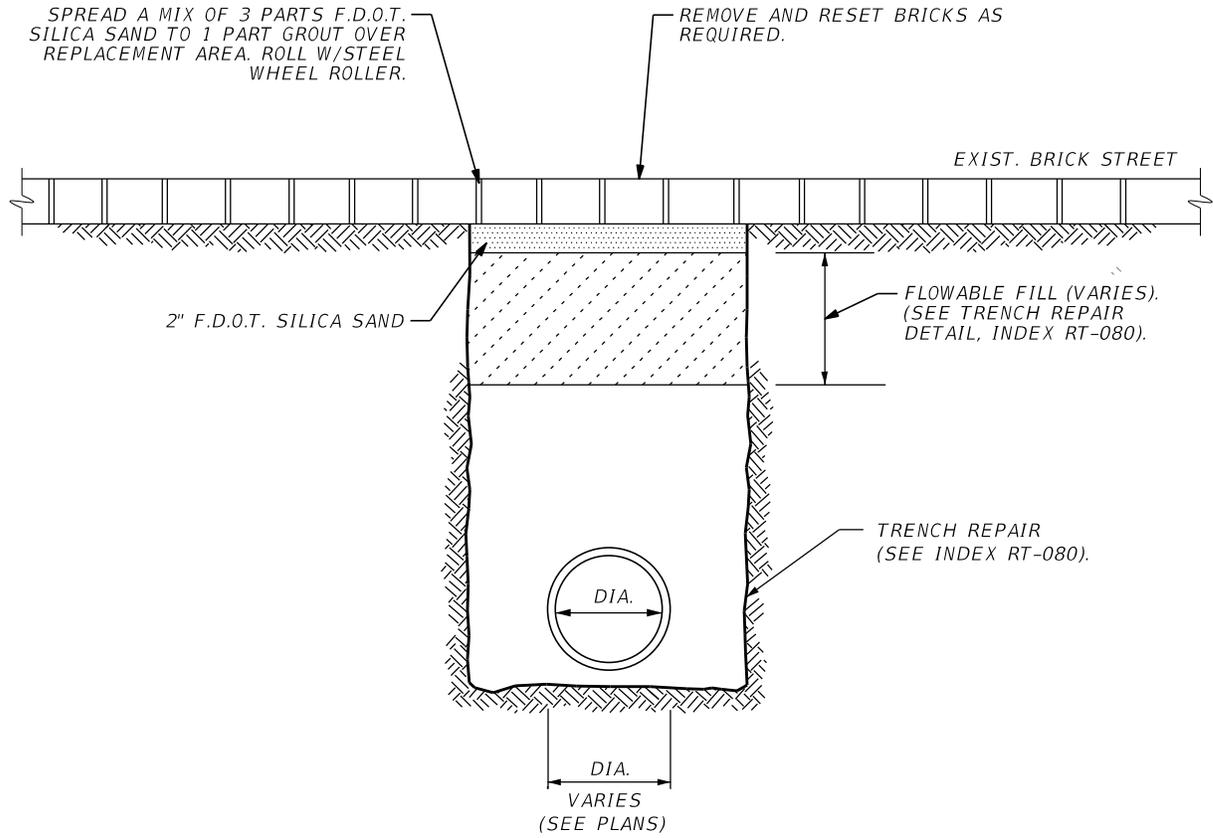
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Construction Standards**

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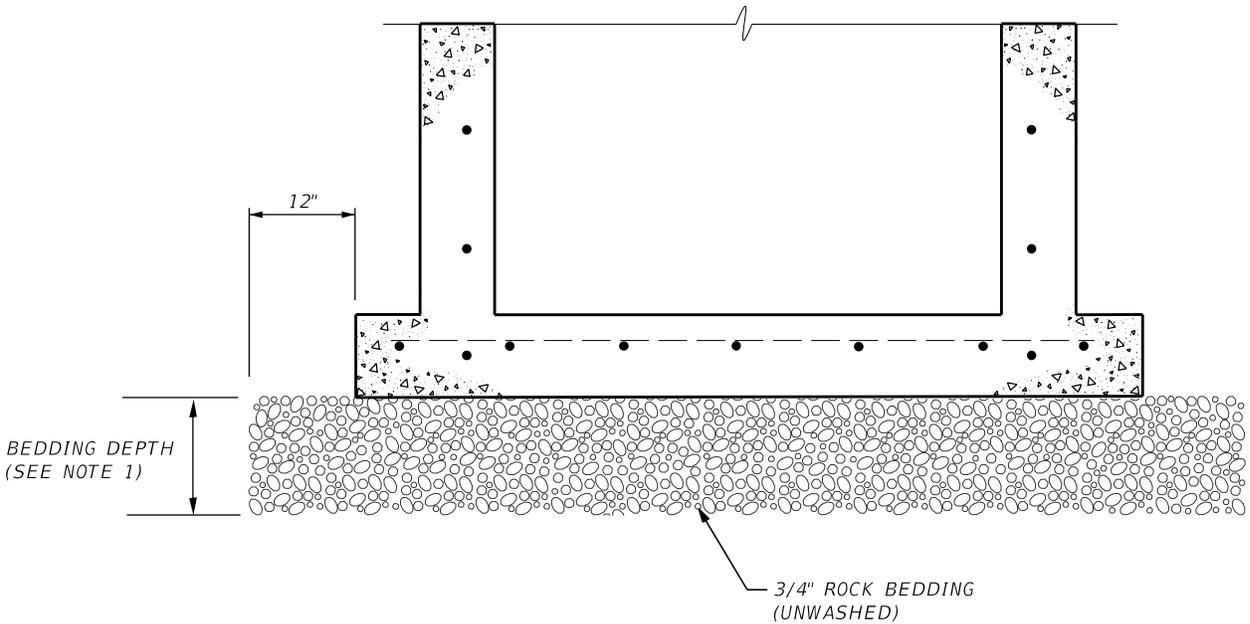


NOTES:

1. CONTRACTOR SHALL ENDEAVOUR TO KEEP TRENCHING DISTURBANCE TO A MINIMUM IN BRICK PAVEMENT AREAS.
2. REPLACED BRICKS TO MATCH EXISTING PATTERN, SLOPE AND ELEVATION.
3. THIS INDEX RT-090 SHALL BE UTILIZED IN AREAS WHERE EXISTING BRICK STREETS WILL REQUIRE TRENCHING, BUT NO FULL WIDTH STREET RECONSTRUCTION IS PROPOSED (SEE INDEX RT-0260).

CONSTRUCTION INDEX RT-090  
 BRICK PAVEMENT TRENCH REPAIR  
 (N.T.S.)

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PUBLICATION DATE <b>JULY 7, 2020</b>	DRAWING SCALE <b>N.T.S.</b>	TITLE <b>Engineering Design and Construction Standards</b>	
CITY ENGINEERING DIRECTOR <b>JERALD WOLOSZYNSKI</b>	ASST. ENGINEERING DIRECTOR <b>RAFAL CIESLAK</b>		



**NOTES:**

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.
2. IF STRUCTURE INCLUDES WEEP HOLES, ROCK SHALL BE WRAPPED IN FILTER FABRIC THAT MEETS THE REQUIREMENTS OF F.D.O.T. SPECIFICATION SECTION 985.
3. SEE DRAINAGE AND WASTEWATER DETAILS FOR ANY ADDITIONAL BEDDING WRAPPING REQUIREMENTS

CONSTRUCTION INDEX RT-100  
 STRUCTURE BEDDING  
 (N.T.S.)

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PUBLICATION DATE <b>JULY 7, 2020</b>	DRAWING SCALE <b>N.T.S.</b>	TITLE <b>Engineering Design and Construction Standards</b>	
CITY ENGINEERING DIRECTOR <b>JERALD WOLOSZYNSKI</b>	ASST. ENGINEERING DIRECTOR <b>RAFAL CIESLAK</b>		

GENERAL UTILITY TRENCH MIX

CEMENT 50 lbs  
FLYASH 0 lbs  
AIR STAB 3 oz  
SAND 2500 lbs  
WATER 333 lbs

FLOWABLE AND EXCAVATABLE  
40 - 80 psi

HIGH FLOWABLE UTILITY TRENCH MIX

CEMENT 50 lbs  
FLYASH 150 lbs  
AIR STAB 3 oz  
SAND 2500 lbs  
WATER 333 lbs

FLOWABLE AND EXCAVATABLE  
60 - 80 psi

FAST SET UTILITY TRENCH MIX

CEMENT 125 lbs  
FLYASH 0 lbs  
AIR STAB 3 oz  
SAND 2500 lbs  
WATER 333 lbs  
ACCEL 128 oz

FAST SET FLOWABLE AND EXCAVATABLE  
100 - 125 psi

ABANDONED TANK FILL

CEMENT 30-60 lbs  
FLYASH 0-100 lbs  
AIR STAB 3 oz  
SAND 2300 lbs  
WATER 333 lbs

HIGHLY FLOWABLE AND EXCAVATABLE  
50 - 80 psi

ANNULAR RINGS MIX

CEMENT 30-60 lbs  
FLYASH 0-100 lbs  
AIR STAB 3 oz  
SAND 2300 lbs  
WATER 333 lbs

1,000 FT HORIZONTAL FLOW  
HIGHLY PUMPABLE, HIGHLY FLOWABLE  
FLOW LONG DISTANCES IN TIGHT PLACES  
100 - 150 psi

PUMP MIX (FOR LARGER 4" PUMPS)

CEMENT 50 lbs  
FLYASH 250 lbs  
AIR STAB 3 oz  
SAND 2300 lbs  
WATER 350 lbs

HIGHLY PUMPABLE, HIGHLY FLOWABLE  
100 - 150 psi

PUMP MIX (FOR SMALLER 2" PUMPS)

CEMENT 100 lbs  
FLYASH 300 lbs  
AIR STAB 3 oz  
SAND 2300 lbs  
WATER 350 lbs

HIGHLY PUMPABLE, HIGHLY FLOWABLE  
100 - 150 psi

NOTE:

1. THESE MIXES ARE PROVIDED AS A STARTING POINT FOR THE GENERATION OF DESIGNS FOR VARIOUS APPLICATIONS. THE DESIGNS SHOULD BE TESTED PRIOR TO USE AND ADJUSTED TO MEET SPECIFIC STRENGTH AND SET REQUIREMENTS.

CONSTRUCTION INDEX RT-110  
FLOWABLE FILL MIX  
(N.T.S.)

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INDEX NUMBER

**RT-110**

DESCRIPTION

**Flowable Fill Mix**

PUBLICATION DATE  
**JULY 7, 2020**

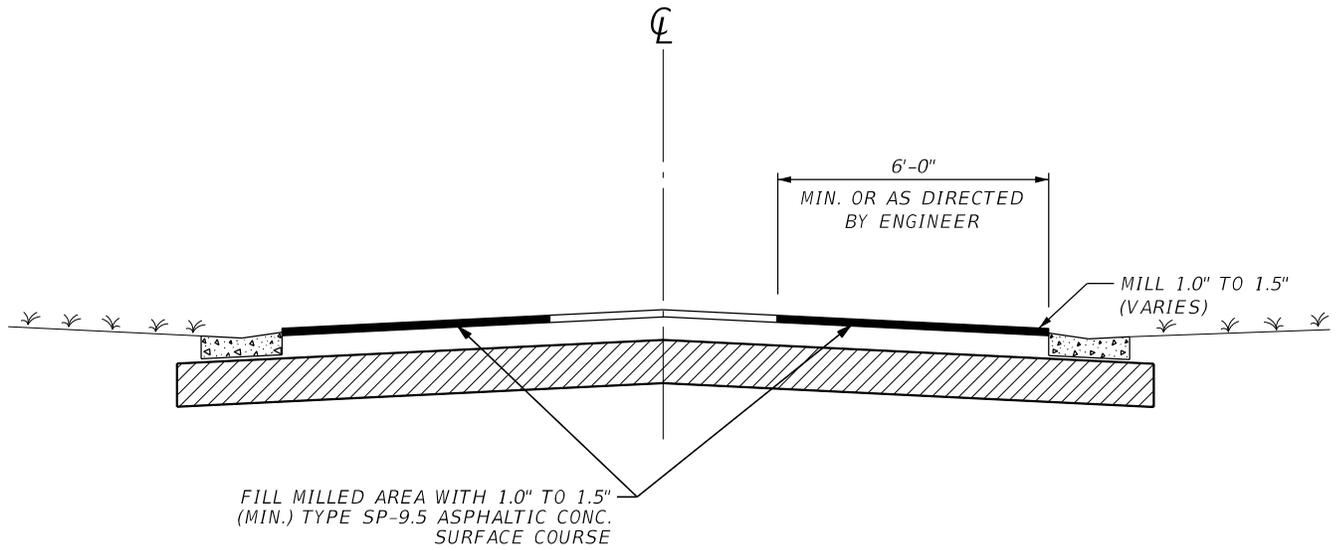
DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**



NOTE:

1. ALL MILLINGS REMAIN THE PROPERTY OF THE CITY UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

CONSTRUCTION INDEX RT-120  
MILLING AND RESURFACING VARIOUS ROADS  
(N.T.S.)

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INDEX NUMBER

**RT-120**

DESCRIPTION

**Milling and Resurfacing  
Various Roads**

PUBLICATION DATE  
**JULY 7, 2020**

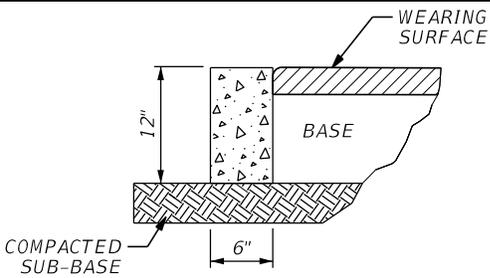
DRAWING SCALE  
**N.T.S.**

TITLE

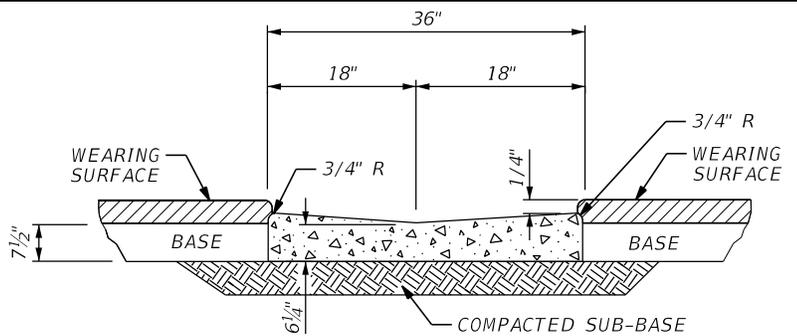
**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

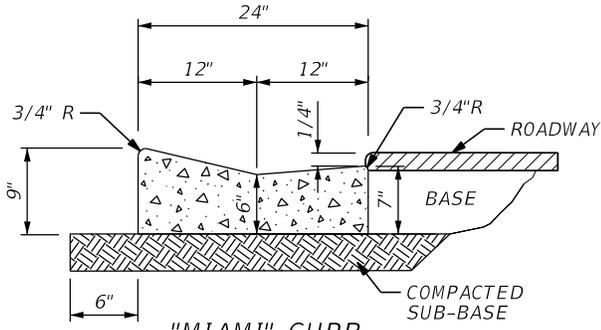
ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**



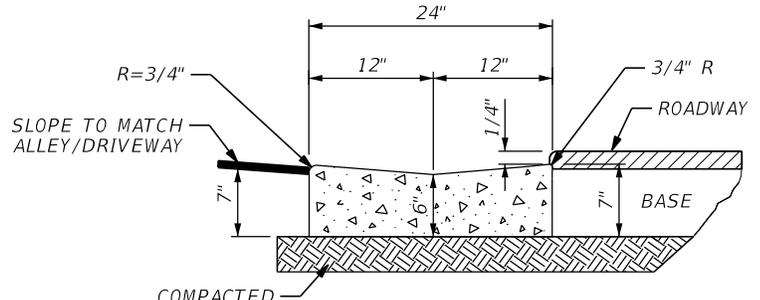
**CONCRETE HEADER CURB**



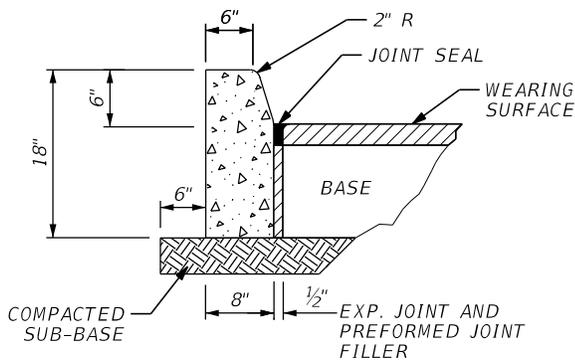
**VALLEY CURB**



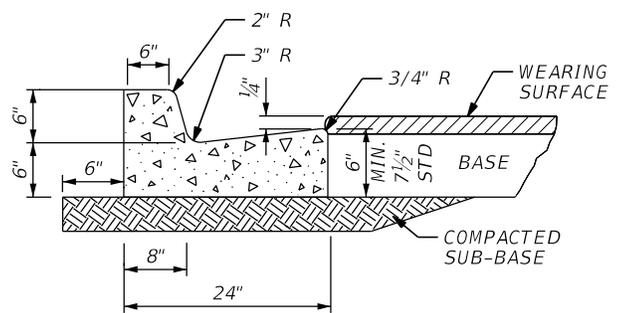
**"MIAMI" CURB**



**"MIAMI" DROP CURB  
(AT DRIVEWAYS AND ALLEYS)**



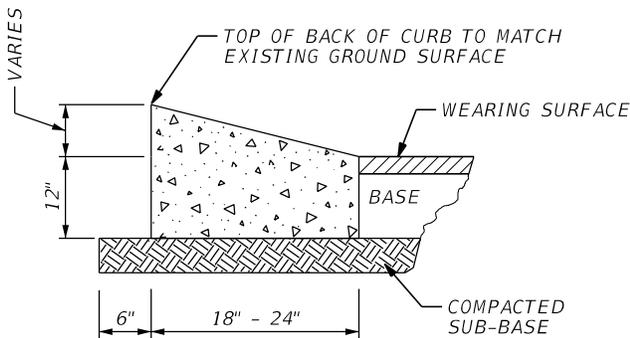
**FDOT TYPE "D" CONCRETE CURB**



**NOTE:**

WHEN USED ON HIGH SIDE OF ROADWAYS, CROSS SLOPE OF THE GUTTER SHALL MATCH THE CROSS SLOPE OF THE ADJACENT PAVEMENT AND THE THICKNESS OF THE LIP SHALL BE 6".

**FDOT TYPE "F" CONCRETE CURB**



**CONCRETE "SLANT" CURB**

**NOTES:**

1. ROADWAY SUB-BASE SHALL IN ALL CASES EXTEND 6" BEYOND CURBING.
2. SAWCUTS AT 10' CENTERS SHALL BE MADE WITHIN 24 HOURS OF CONCRETE PLACEMENT.
3. CONCRETE SHALL BE 3000 P.S.I. WITH FIBERMESH.

**CONSTRUCTION INDEX RT-130**

CURB AND GUTTER  
(N.T.S.)

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INDEX NUMBER

**RT-130**

DESCRIPTION

**Curb and Gutter**

PUBLICATION DATE  
**JULY 7, 2020**

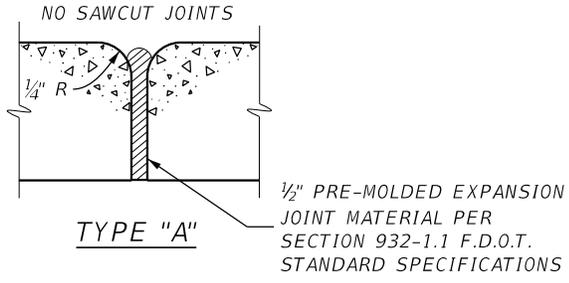
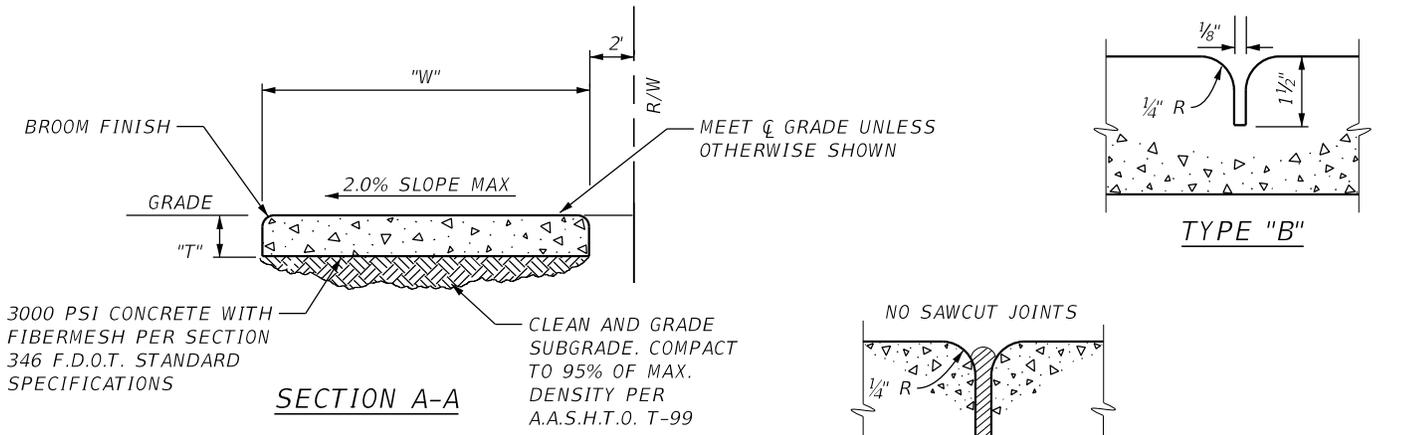
DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**



**SIDEWALK JOINTS**

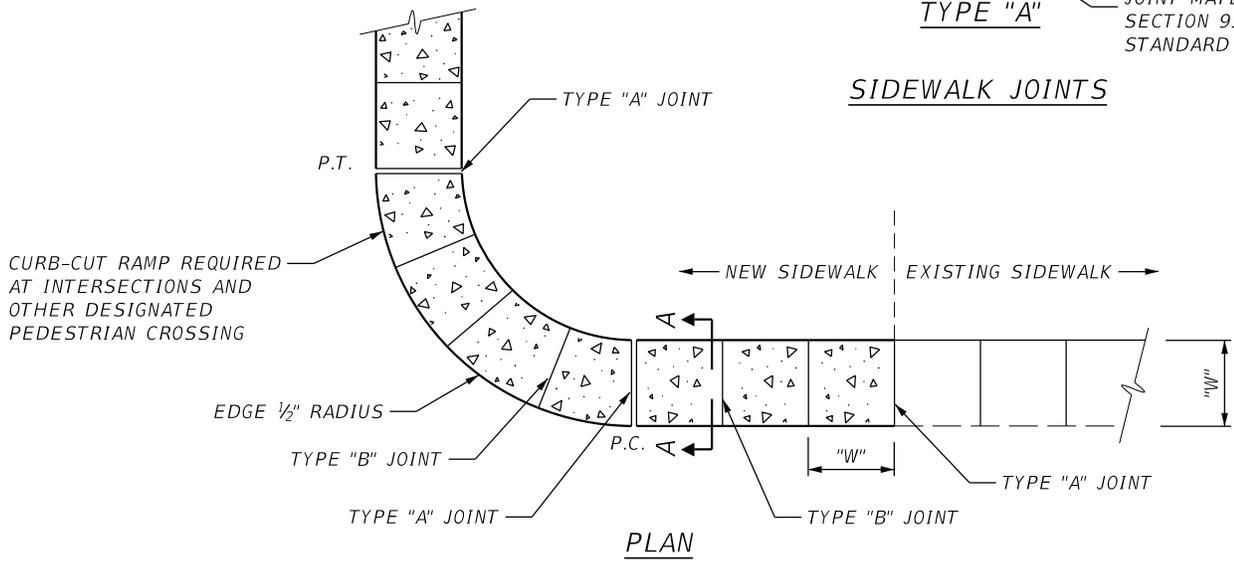


TABLE OF SIDEWALK THICKNESS - "T"	
RESIDENTIAL AREAS	4"
10' EITHER SIDE OF CROSS-STREETS, COMMERCIAL AND INDUSTRIAL ACCESS.	6"
AT DRIVEWAYS & OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER.	

TABLE OF SIDEWALK WIDTHS - "W"	
RESIDENTIAL ROADS.	5'
ARTERIAL AND COLLECTOR ROADS.	5'
OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER.	

TABLE OF SIDEWALK JOINTS	
TYPE	LOCATION
"A"	P.C. AND P.T. OF CURVES JUNCTION OF EXISTING AND NEW SIDEWALKS AND EVERY 50' FOR 5' WIDE.
"B"	WIDTH OF SIDEWALK CENTER TO CENTER ON SIDEWALKS SCORED DURING PLACEMENT WITHIN 24 HOURS OF PLACEMENT.
"A"	WHERE SIDEWALK ABUTS CONCRETE CURBS, DRIVEWAYS, AND SIMILAR STRUCTURES.

**CONSTRUCTION INDEX RT-140**  
SIDEWALKS  
(N.T.S.)

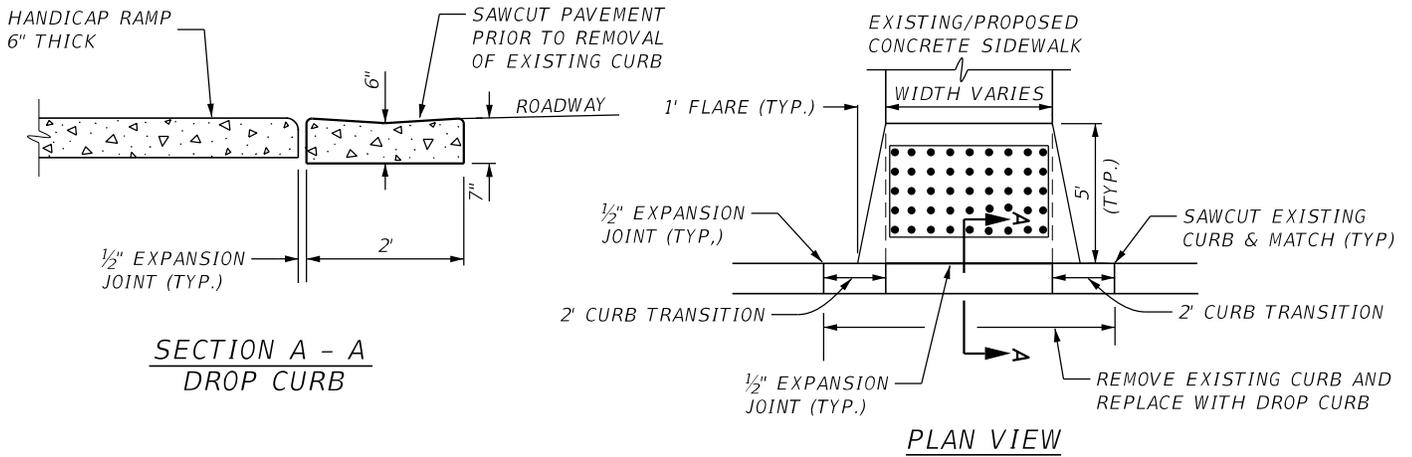
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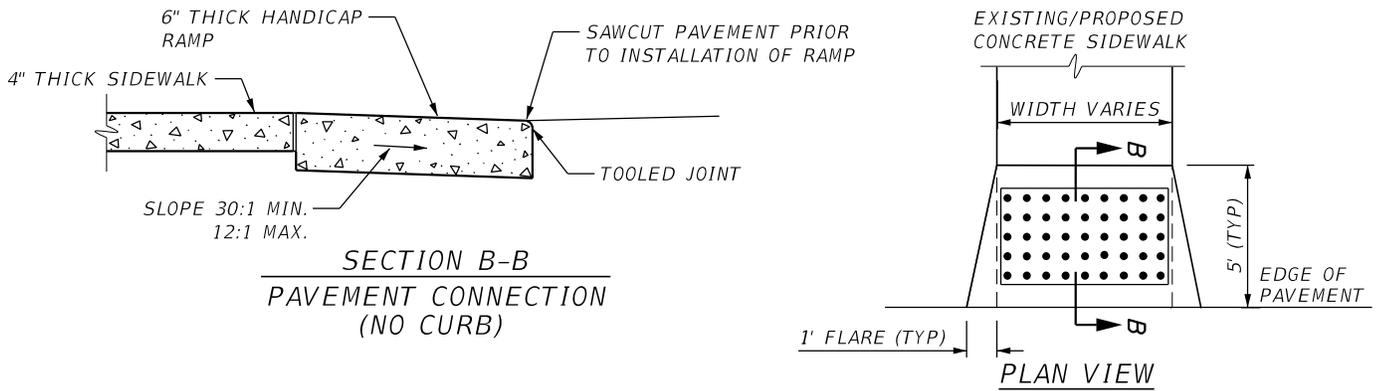
INDEX NUMBER	DESCRIPTION
<b>RT-140</b>	<b>Sidewalks</b>

PUBLICATION DATE	DRAWING SCALE
<b>JULY 7, 2020</b>	<b>N.T.S.</b>
CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
<b>JERALD WOLOSZYNSKI</b>	<b>RAFAL CIESLAK</b>

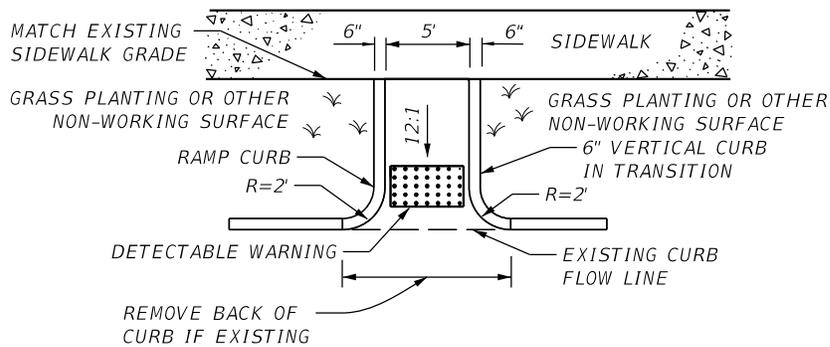
TITLE  
**Engineering Design and Construction Standards**



P.C. TYPE-A HANDICAP RAMP



P.C. TYPE-B HANDICAP RAMP



NOTES:

1. RAMP SHALL COMPLY WITH THE UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND WITH THE AMERICANS WITH DISABILITIES ACT OF 1990 (ADA).
2. RAMPS SHALL HAVE A DETECTABLE WARNING, IN COMPLIANCE WITH REQUIREMENTS OF F.D.O.T. STANDARD PLANS FOR ROAD CONSTRUCTION, INDEX 522-002. ALL DETECTABLE WARNINGS IN CITY RIGHT-OF-WAY SHALL BE YELLOW. CHECK APPLICABLE AGENCY STANDARD COLOR FOR COUNTY AND STATE RIGHT-OF-WAY.

CONSTRUCTION INDEX RT-150  
CURB-CUT SIDEWALK RAMPS  
(N.T.S.)

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INDEX NUMBER

**RT-150**

DESCRIPTION

**Curb-Cut Sidewalk Ramps**

PUBLICATION DATE  
**JULY 7, 2020**

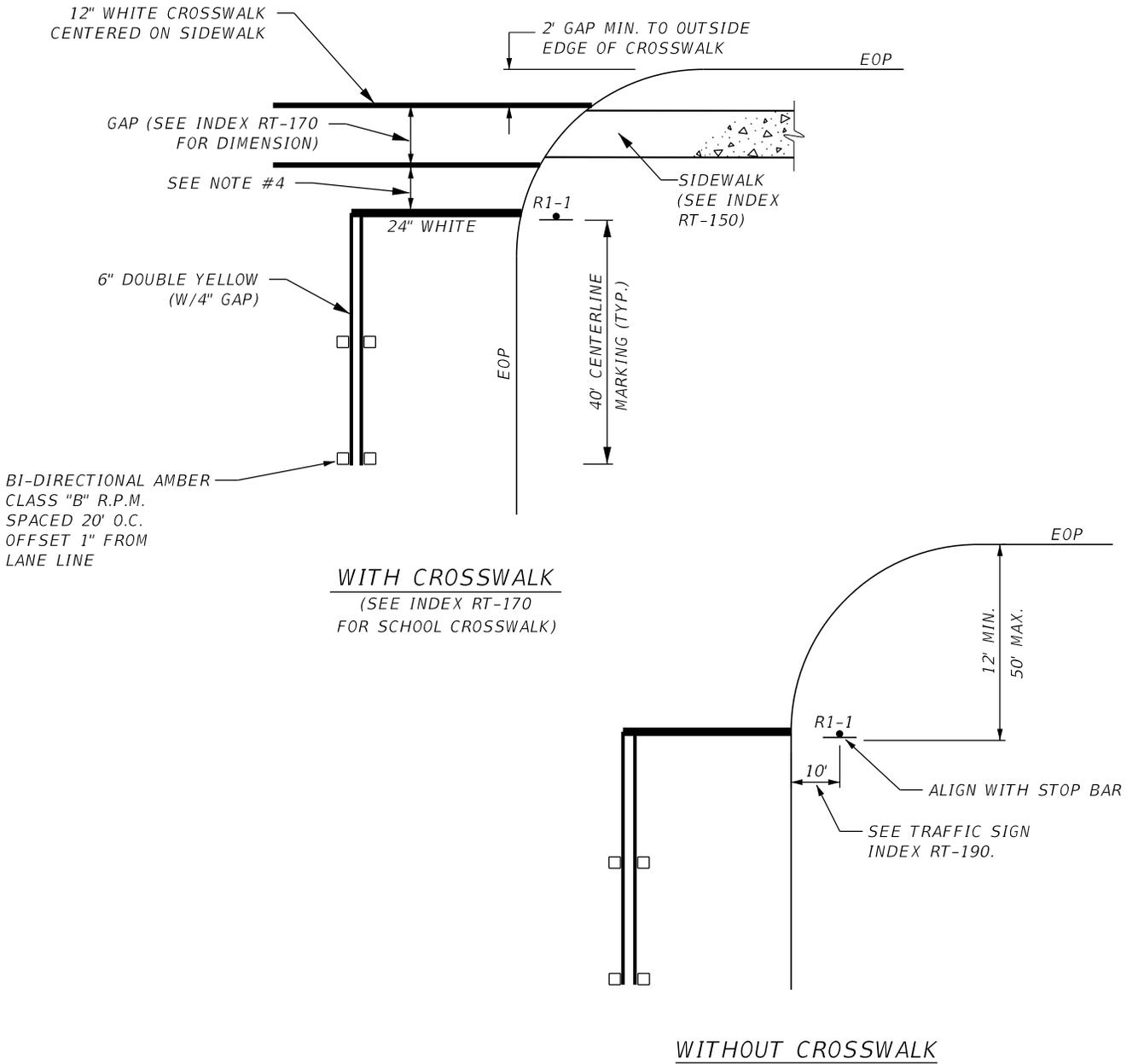
DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**



NOTES:

1. THE 40' OF CENTERLINE MARKING AND R.P.M.'S ARE ONLY REQUIRED ON AN APPROACH TO A COLLECTOR, MINOR ARTERIAL, ARTERIAL OR MAJOR HIGHWAY.
2. ALL STRIPING AND DELINEATION SHALL BE THERMOPLASTIC AND CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. SEE PAVEMENT MARKING SPECIFICATION INDEX RT-180 FOR FURTHER DETAILS.
4. 4' BETWEEN EDGE OF CROSSWALK OR CROSSING LOCATION AND EDGE OF STOP BAR.

CONSTRUCTION INDEX RT-160  
INTERSECTION CONTROL  
(N.T.S.)

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INDEX NUMBER  
**RT-160**

DESCRIPTION  
**Intersection Control**

PUBLICATION DATE  
**JULY 7, 2020**

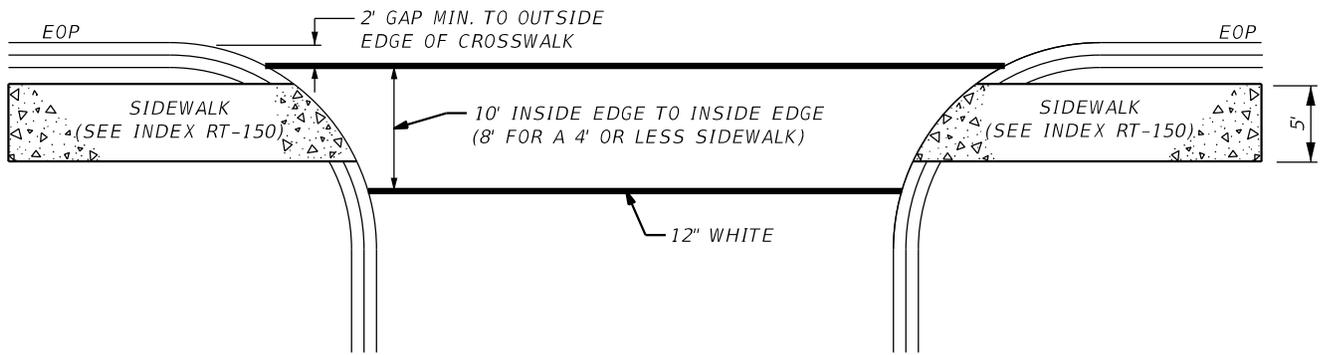
DRAWING SCALE  
**N.T.S.**

TITLE

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**RAFAL CIESLAK**

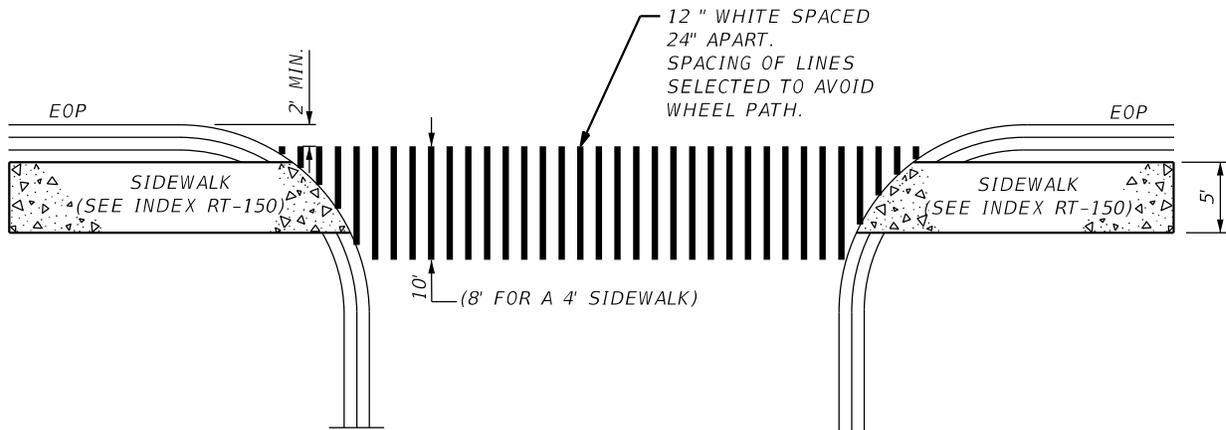
**Engineering Design and  
Construction Standards**



STANDARD CROSSWALK

NOTES:

1. STANDARD CROSSWALK STRIPING TO BE INSTALLED AT THE FOLLOWING LOCATIONS:
  - SIGNALIZED INTERSECTIONS
  - ALONG COLLECTORS OR ARTERIALS
  - BIKE PATH CROSSINGS
  - CROSSWALKS WITH HIGH EXPECTED PEDESTRIAN VOLUME
  - SCHOOL ACCESS ROUTES.
2. SIGNS AT MID-BLOCK PEDESTRIAN CROSSWALKS WITHOUT BEACONS TO BE DESIGNED AND INSTALLED PER THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION. SIGNS AT MID-BLOCK PEDESTRIAN CROSSWALKS WITH BEACONS TO BE DESIGNED AND INSTALLED PER F.D.O.T. STANDARD INDEX 654-001 AND 665-001.



SCHOOL CROSSWALK

NOTES:

1. SCHOOL CROSSWALK STRIPING TO BE USED AS DIRECTED.
2. SIGNS AND ADVANCED PAVEMENT MESSAGES TO BE DESIGNED AND INSTALLED PER F.D.O.T. STANDARD PLANS INDEX 711-001.

CONSTRUCTION INDEX RT-170  
CROSSWALK  
(N.T.S.)

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INDEX NUMBER  
**RT-170**

DESCRIPTION  
**Crosswalk**

PUBLICATION DATE  
**JULY 7, 2020**

DRAWING SCALE  
**N.T.S.**

TITLE

CITY ENGINEERING DIRECTOR  
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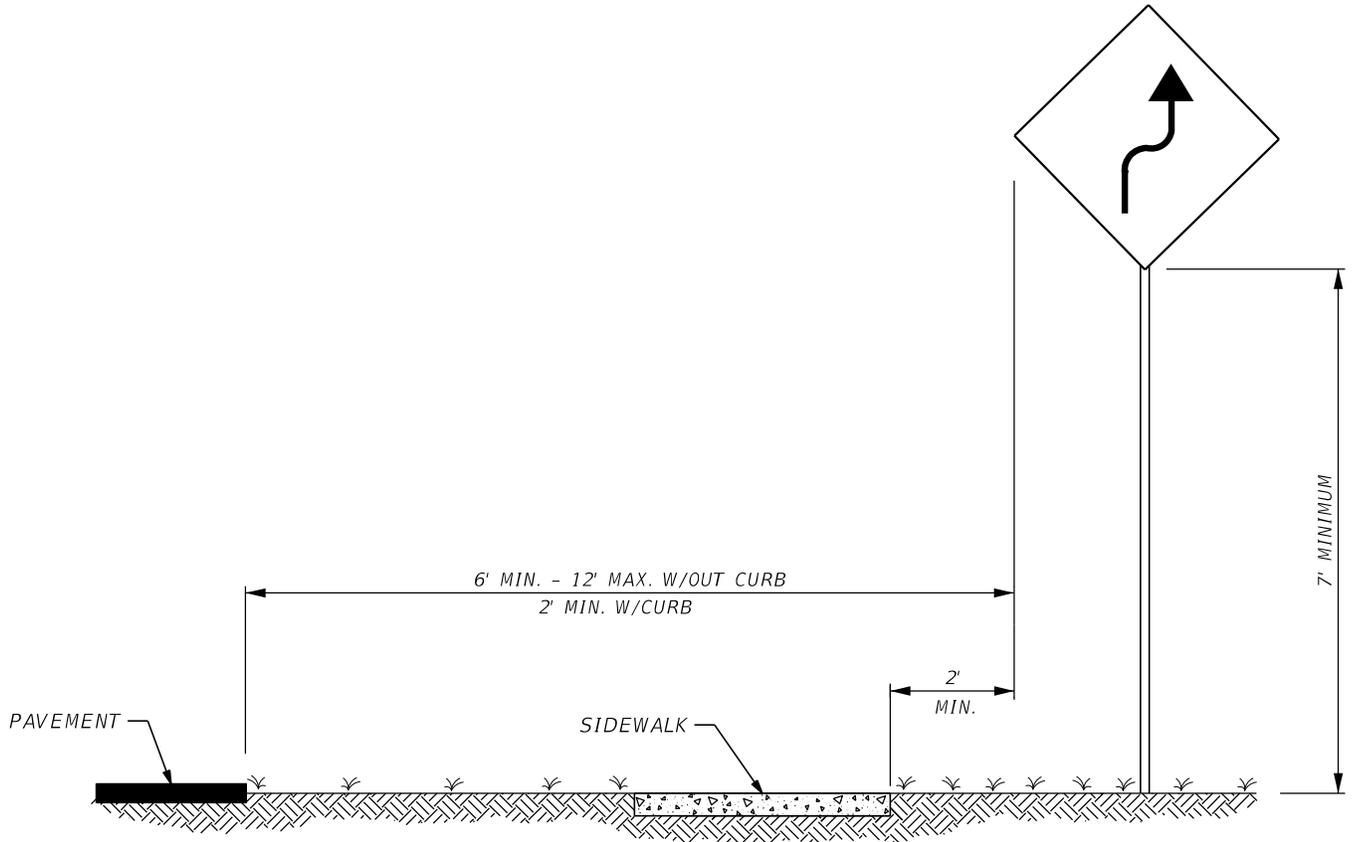
ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**

**Engineering Design and  
Construction Standards**

1. ALL ROAD PAVEMENT MARKINGS SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS OF THIS STANDARD INDEX, AND SHALL CONFORM TO THE REQUIREMENTS OF FLORIDA DEPARTMENT OF TRANSPORTATION (F.D.O.T.) STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION AND THE U.S. FEDERAL HIGHWAY AUTHORITY (FHWA) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D). ANY DEVIATION FROM THIS STANDARD MUST BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.
2. PERMANENT MARKINGS INSTALLATION:  
ALL MARKINGS SHALL BE INSTALLED BY THE EXTRUSION METHOD. MARKINGS SHALL BE FREE OF WEAVES, BOWS, DRIPS, DRAGS, AND OTHER DEGRADING ITEMS. INSTALLATION OF PAVEMENT MARKINGS SHALL BE PERFORMED 14 DAYS AFTER THE FINAL SURFACE LAYER OF ASPHALT IS APPLIED.
3. PERMANENT MARKINGS MATERIALS:  
ALL MATERIALS SHALL BE LEAD-FREE, NON-SOLVENT BASED THERMOPLASTIC, AND SHALL MEET ALL F.D.O.T. SPECIFICATIONS.
4. PERMANENT MARKINGS THICKNESS:  
ALL MARKINGS SHALL BE INSTALLED TO YIELD 90 MILS OF MATERIAL MEASURED ABOVE THE PAVEMENT SURFACE.
5. REFLECTIVE BEADS:  
REFLECTIVE BEADS ARE TO BE INSTALLED PER F.D.O.T. SPECIFICATIONS ON ALL MARKINGS.
6. PERMANENT MARKINGS LAYOUT:  
LAYOUT SHALL BE MADE PRIOR TO INSTALLATION. MARKING LAYOUT SHALL BE INSPECTED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF FINAL MARKINGS.
7. ALL PAVEMENT MARKINGS:  
ALL PAVED SURFACES SHALL BE PROPERLY MARKED PRIOR TO THE HOURS OF DARKNESS.
8. RAISED PAVEMENT MARKERS (R.P.M.S.)  
R.P.M.S. SHALL BE INSTALLED ON ALL LANE LINES AND CENTERLINE, SPACED AT 20' OR 40', PER F.D.O.T. INDEX No. 706-001. R.P.M.S SHALL BE A 4'x4" TYPE CLASS "B" MARKER MEETING F.D.O.T. SPECIFICATIONS AND SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO USE. R.P.M.S. SHALL BE INSTALLED USING THERMOPLASTIC ON ASPHALT AND EPOXY ON CONCRETE.
9. TEMPORARY PAVEMENT MARKINGS:  
TEMPORARY MARKINGS SHALL BE USED ONLY AS SPECIFIED IN THIS STANDARD INDEX, OR AS APPROVED AND / OR DIRECTED BY THE CITY ENGINEER.
10. OTHER PAVEMENT SURFACES:  
INTERIOR MARKINGS IN PRIVATE LOTS AND INTERMEDIATE PAVEMENT SURFACES MAY BE MARKED WITH F.D.O.T. APPROVED MATERIALS, I.E: PERMANENT PAINT ETC.
11. PRIVATE PARKING LOTS:  
THERMOPLASTIC FOR STOP BARS AND CROSS WALKS. ALL OTHER PAINT MAY BE USED. FOURTEEN (14) DAY CURE TIME ON ASPHALT FOR BOTH.

CONSTRUCTION INDEX RT-180  
PAVEMENT MARKING SPECIFICATIONS

<b>City of Largo - Engineering Services Department</b> 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER <b>RT-180</b>	DESCRIPTION <b>Pavement Marking Specifications</b>
PUBLICATION DATE <b>JULY 7, 2020</b>	DRAWING SCALE <b>N.T.S.</b>	TITLE <b>Engineering Design and Construction Standards</b>	
CITY ENGINEERING DIRECTOR <b>JERALD WOLOSZYNSKI</b>	ASST. ENGINEERING DIRECTOR <b>RAFAL CIESLAK</b>		



SIGN SYMBOL: 

NOTES:

1. ALL SIGNS SHALL FOLLOW F.H.W.A. "STANDARD HIGHWAY SIGNS", "THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND F.D.O.T. "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION".
2. ALL SIGNS SHALL BE FACED WITH HIGH INTENSITY SHEETING MATERIAL OR BETTER.
3. SIGNS SHALL BE MANUFACTURED WITH 0.080" ALUMINUM BLANK.
4. POSTS SHALL BE GALVANIZED CHANNEL AT 2 LBS/L.F.
5. ANY DEVIATION FROM THIS TYPICAL SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

CONSTRUCTION INDEX RT-190

TRAFFIC SIGN  
(N.T.S.)

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INDEX NUMBER

**RT-190**

DESCRIPTION

**Traffic Sign**

PUBLICATION DATE  
**JULY 7, 2020**

DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

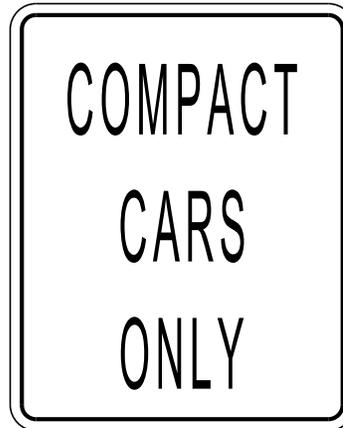
CITY ENGINEERING DIRECTOR  
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ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**

FTP-20-06  
12"x18"



FTP-22-06 (OPTIONAL)  
6"x12"



12"x18"

NOTES:

1. FINE PER STATE OR LOCAL ORDINANCE.
2. MOUNT ON STANDARD SIGN POST (SEE INDEX RT-200).
3. SEE INDEX RT-190 FOR ADDITIONAL SIGN NOTES.

CONSTRUCTION INDEX RT-191  
SPECIALIZED PARKING SIGNS  
(N.T.S.)

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INDEX NUMBER

**RT-191**

DESCRIPTION

**Specialized Parking Signs**

PUBLICATION DATE  
**JULY 7, 2020**

DRAWING SCALE  
**N.T.S.**

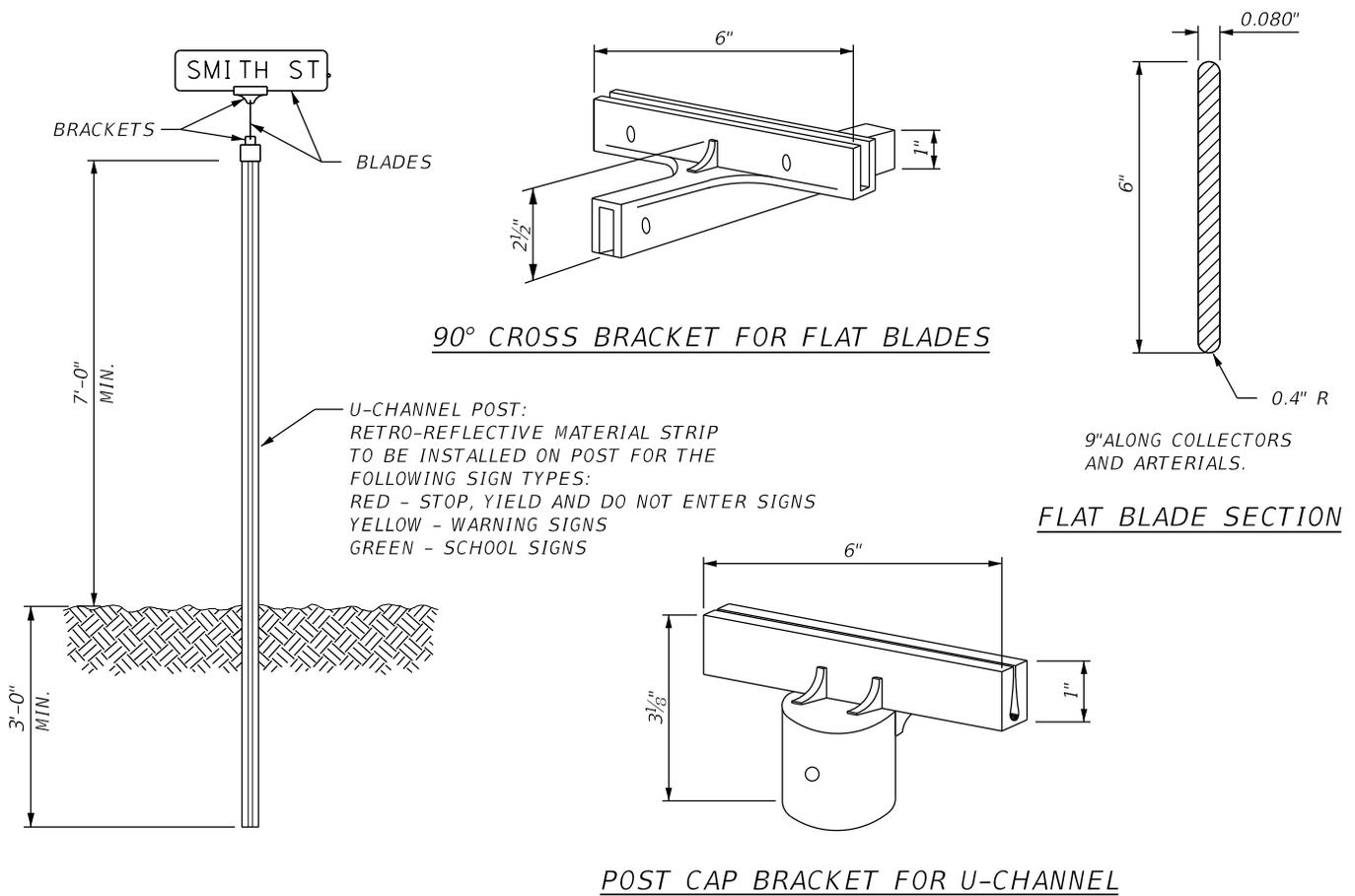
TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**





**GENERAL SPECIFICATIONS:**

**BLADE:** ALCOA NO.86054,6063-T6 ALLOY, ETCHED DEGREASED DEBURRED, WITH NO.1200 ALDOLINE FINISH WITH HIGH INTENSITY BACKGROUND DIMENSIONS 6" OR 9" HEIGHT, 24", 30" OR 36" LENGTHS.

**LETTERS:** NAME 4" SERIES "B" HIGH INTENSITY  
 SUFFIX 2" SERIES "B" HIGH INTENSITY

ALL LETTERS FOR SIGNS ALONG COLLECTOR OR ARTERIAL ROADWAYS SHALL BE 6" SERIES "B" WITH 4" SERIES "B" SUFFIX ON 9" HIGH BLADES.

**POST:** STEEL GALVANIZED U-CHANNEL, 2 LBS/FT. PER A.S.T.M. A 123 WITHOUT ANCHOR PLATES.

**BRACKETS:** DIE CAST HIGH STRENGTH ALUMINUM ALLOY, MIN. TENSILE STRENGTH 45,000 P.S.I., DEGREASED, TUMBLED AND POLISHED, SIDES OF ALL SLOTS SHALL BE SOLID METAL WITH TWO HOLES PER SLOT DRILLED TO 7/32" AND TAPPED TO 1/4" TO RECEIVE STAINLESS STEEL ALLEN HEAD SET SCREWS, SKIRT OF POST CAP BRACKET TO BE DRILLED AND TAPPED FOR 3 SCREWS OF WHICH NO TWO ARE TO BE LESS THAN 90° OR MORE THAN 135° APART (METRO HUSKEY No. 6 OR EQUAL).

**NOTE:**

1. PLACEMENT OF SIGN ON THE RIGHT-OF-WAY SHALL CONFORM TO THE CITY TRAFFIC SIGN STANDARD (INDEX RT-190).

**CONSTRUCTION INDEX RT-200**

STREET SIGN  
(N.T.S.)

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INDEX NUMBER  
**RT-200**

DESCRIPTION  
**Street Sign**

PUBLICATION DATE  
**JULY 7, 2020**

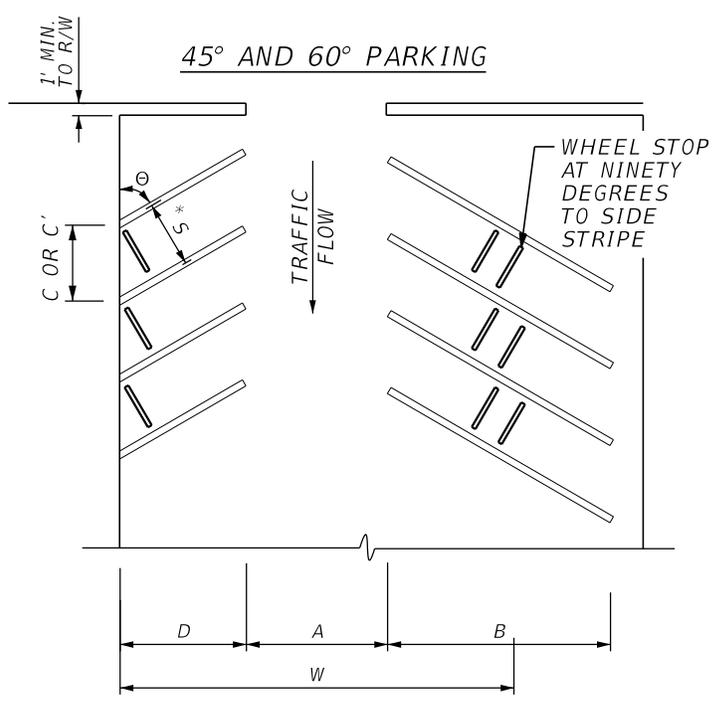
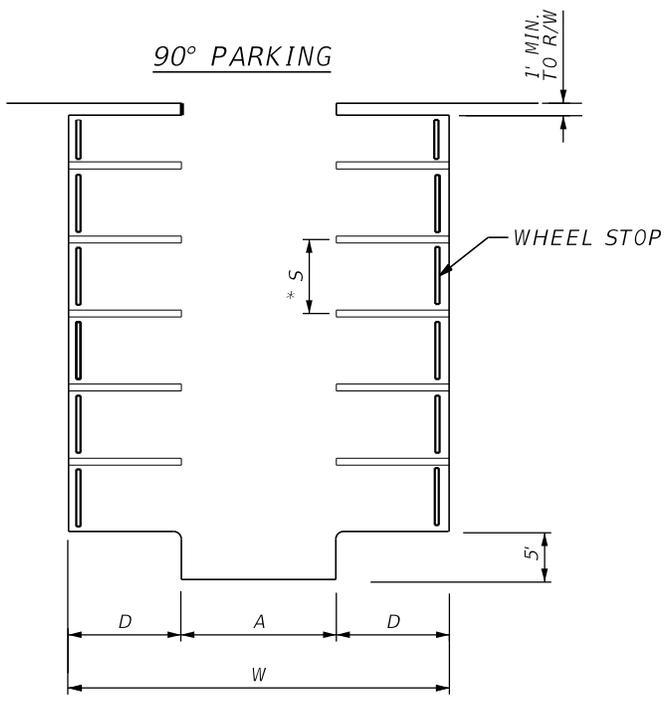
DRAWING SCALE  
**N.T.S.**

TITLE

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**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**

**Engineering Design and  
Construction Standards**

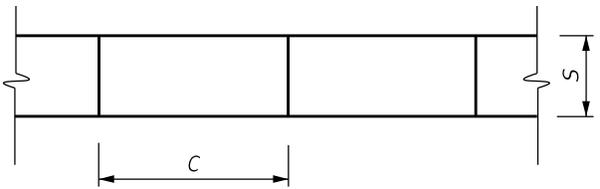


MIN. DIMENSION		
	DEFINITION	90°
T	THROAT DEPTH	50.0'***
A	AISLE	24.0'
S	STALL WIDTH	9.0'
D	STALL DEPTH	18.0'
W	MODULE WIDTH	60.0'

\* HANDICAP SPACES -12.0'  
 \*\* WHERE FEASIBLE

MIN. DIMENSION			
	DEFINITION	$\theta=60^\circ$	$\theta=45^\circ$
A	AISLE	18.0'	14.0'
B	DOUBLE SPACE LENGTH	36.0'	32.0'
C	STALL SPACING	10.5'	12.75'
C'	HANDICAP STALL SPACING	14.0'	17.0'
S	STALL WIDTH (PARALLEL TO WHEEL STOP)	9.0'	9.0'
D	STALL DEPTH	20.0'	19.0'
W	MODULE WIDTH	58.0'	52.0'

PARALLEL PARKING



	STANDARD	PP
C	STALL LENGTH	22.0'
S	STALL WIDTH	8.0'

NOTE:

1. ALL HANDICAP PARKING SHALL HAVE A 5' ACCESSIBLE AISLE PER ADA REQUIREMENTS (SEE INDEX RT-220).

CONSTRUCTION INDEX RT-210  
 PARKING LOT  
 (N.T.S.)

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INDEX NUMBER  
**RT-210**

DESCRIPTION  
**Parking Lot**

PUBLICATION DATE  
**JULY 7, 2020**

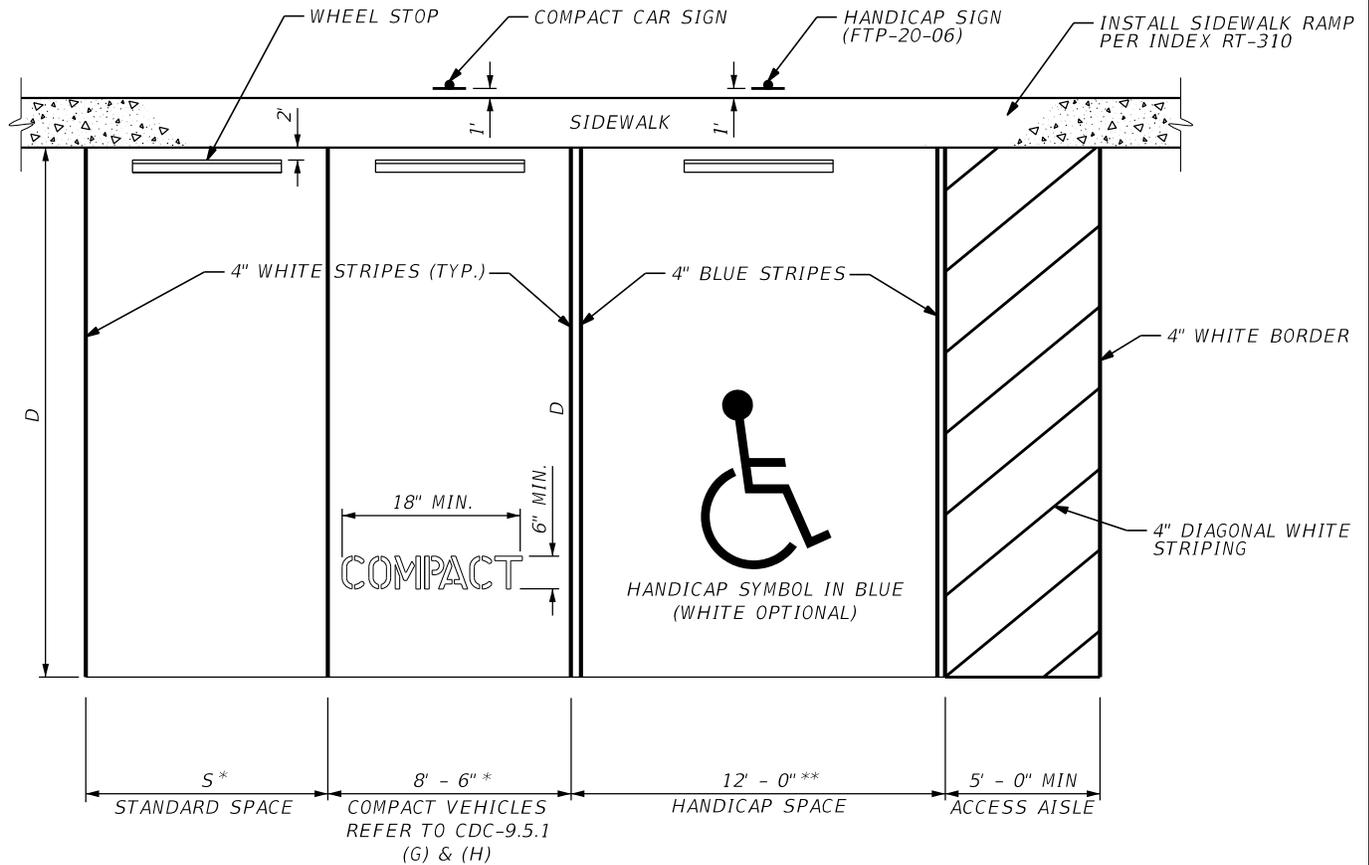
DRAWING SCALE  
**N.T.S.**

TITLE

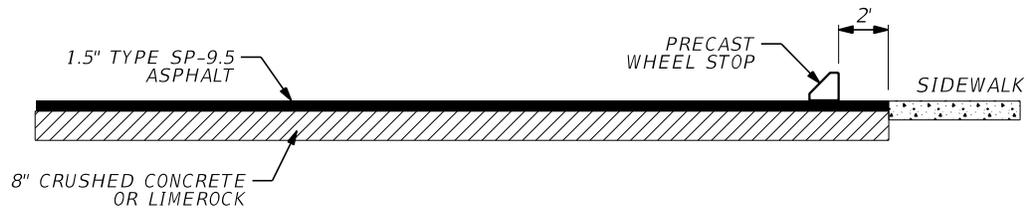
**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**



\* MEASURED FROM CENTER TO CENTER OF STRIPING.  
 \*\* MEASURED FROM CENTER OF PARKING STRIPE TO OUTSIDE OF ACCESS AISLE STRIPE.



**PAVEMENT SECTION**

**NOTES:**

1. PARKING SHALL HAVE WHEEL STOP FOR ALL PARKING SPACES EXCEPT FOR PARALLEL PARKING SPACES OR AS DIRECTED BY THE CITY ENGINEER.
2. HANDICAP SIGNS SHALL BE MOUNTED AT 7" (PAVEMENT TO BOTTOM OF SIGN).
3. THERMOPLASTIC PAVEMENT MARKINGS SHALL BE INSTALLED WITHIN THE RIGHT-OF-WAY. PAINTED PAVEMENT MARKINGS ARE ALLOWED ON PRIVATE PROPERTY.
4. REFER TO INDEX RT-191 FOR PARKING SIGN REQUIREMENTS. REFER TO CDC-9.5.1 (G) & (H) FOR COMPACT VEHICLE REQUIREMENTS.
5. SEPARATION BETWEEN BLUE AND WHITE STRIPES SHALL BE 2".

**CONSTRUCTION INDEX RT-220**  
 TYPICAL PARKING LOT SPACES/SECTION  
 (N.T.S.)

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INDEX NUMBER  
**RT-220**

DESCRIPTION  
**Typical Parking Lot Spaces/Section**

PUBLICATION DATE  
**JULY 7, 2020**

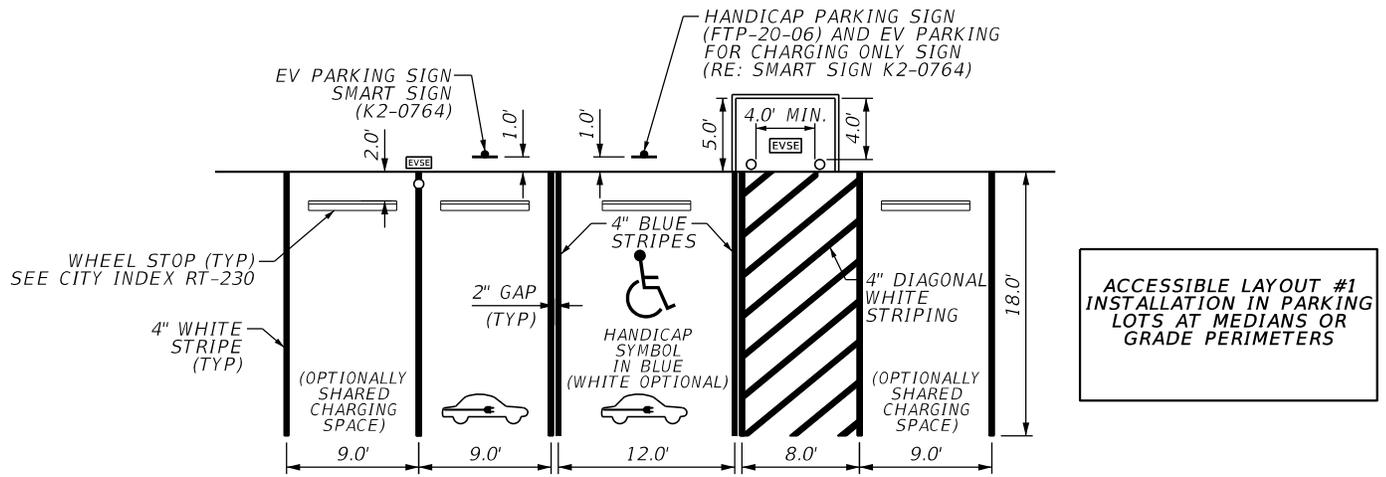
DRAWING SCALE  
**N.T.S.**

TITLE

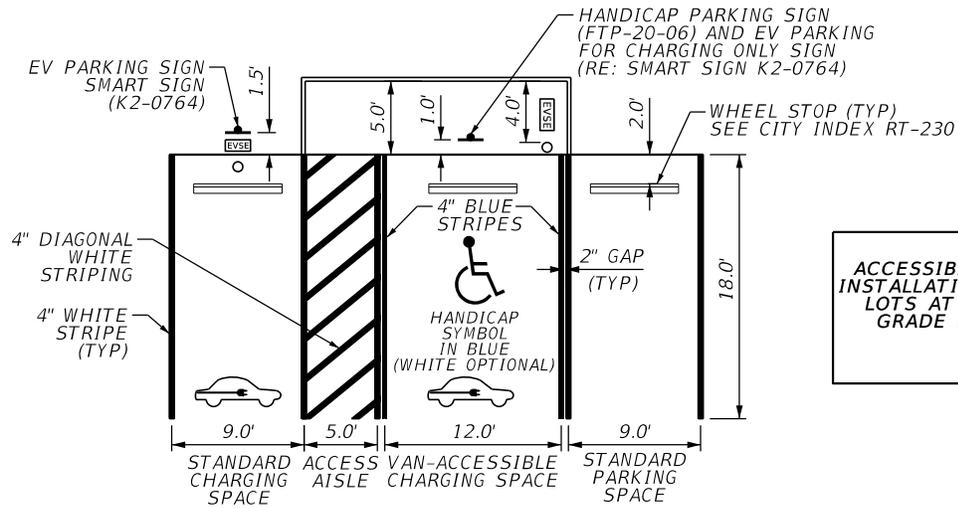
CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
**RAFAL CIESLAK**

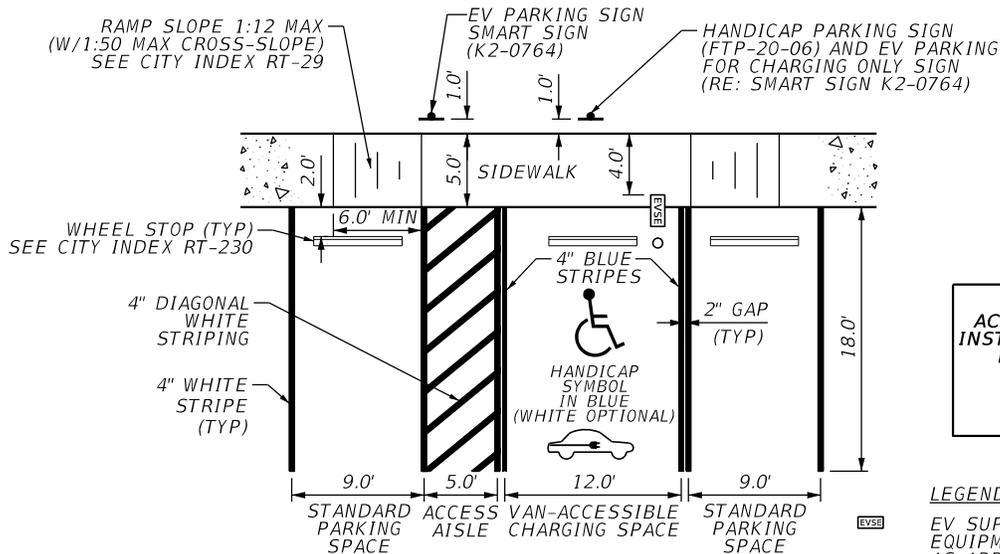
**Engineering Design and Construction Standards**



**ACCESSIBLE LAYOUT #1  
INSTALLATION IN PARKING  
LOTS AT MEDIANS OR  
GRADE PERIMETERS**



**ACCESSIBLE LAYOUT #2  
INSTALLATION IN PARKING  
LOTS AT MEDIANS OR  
GRADE PERIMETERS**



**ACCESSIBLE LAYOUT #3  
INSTALLATION IN PARKING  
LOTS AT SIDEWALK  
BOUNDARIES**

- LEGEND**
- EVSE EV SUPPLY EQUIPMENT (CHARGING EQUIPMENT) MAY BE ORIENTED AS APPROPRIATE
  - OPTIONAL PROTECTIVE BOLLARD
  - EV (ELECTRIC VEHICLE) SYMBOL (WHITE AND/OR GREEN)

**CONSTRUCTION INDEX RT-221  
ELECTRIC VEHICLE PARKING SPACES  
(N.T.S.)**

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INDEX NUMBER  
**RT-221**

DESCRIPTION  
**Electric Vehicle  
Parking Spaces**

PUBLICATION DATE  
**JULY 7, 2020**

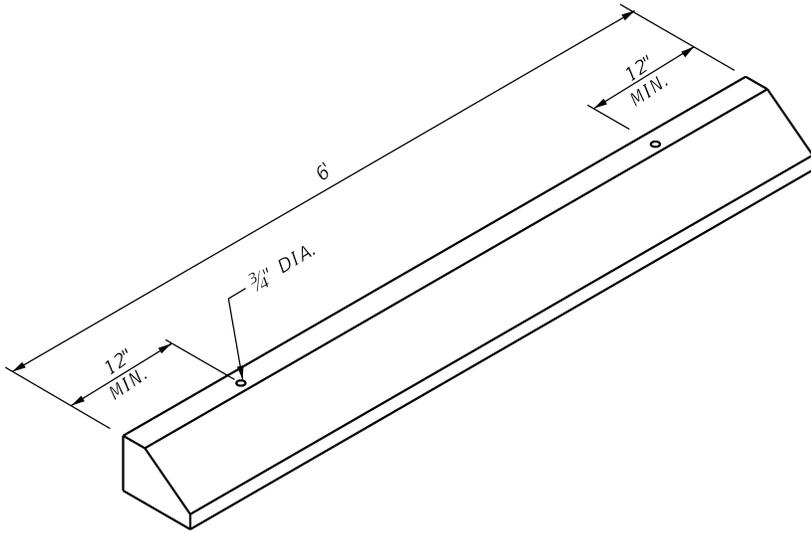
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**N.T.S.**

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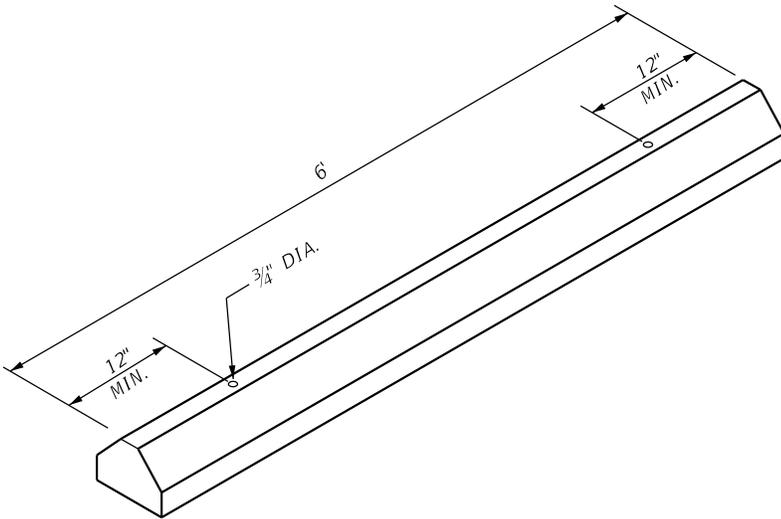
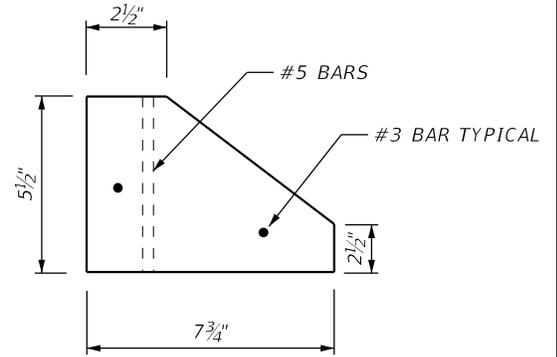
CITY ENGINEERING DIRECTOR  
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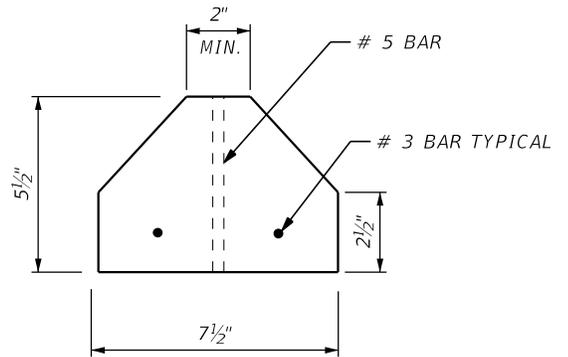
**Engineering Design and  
Construction Standards**



TYPE "A"



TYPE "C"



NOTES:

1. CONCRETE TO BE 3,000 P.S.I.
2. WHEEL STOPS TO BE SECURED TO PAVEMENT WITH TWO 18" NO. #5 BARS.
3. RECYCLED PLASTIC WHEEL STOPS MAY BE USED IN LIEU OF CONCRETE.
4. DIMENSIONS OF WHEEL STOPS MAY DIFFER FROM THE ABOVE SPECIFICATIONS IF APPROVED BY CITY ENGINEER.

CONSTRUCTION INDEX RT-230

WHEEL STOPS  
(N.T.S.)

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INDEX NUMBER

**RT-230**

DESCRIPTION

**Wheel Stops**

PUBLICATION DATE  
**JULY 7, 2020**

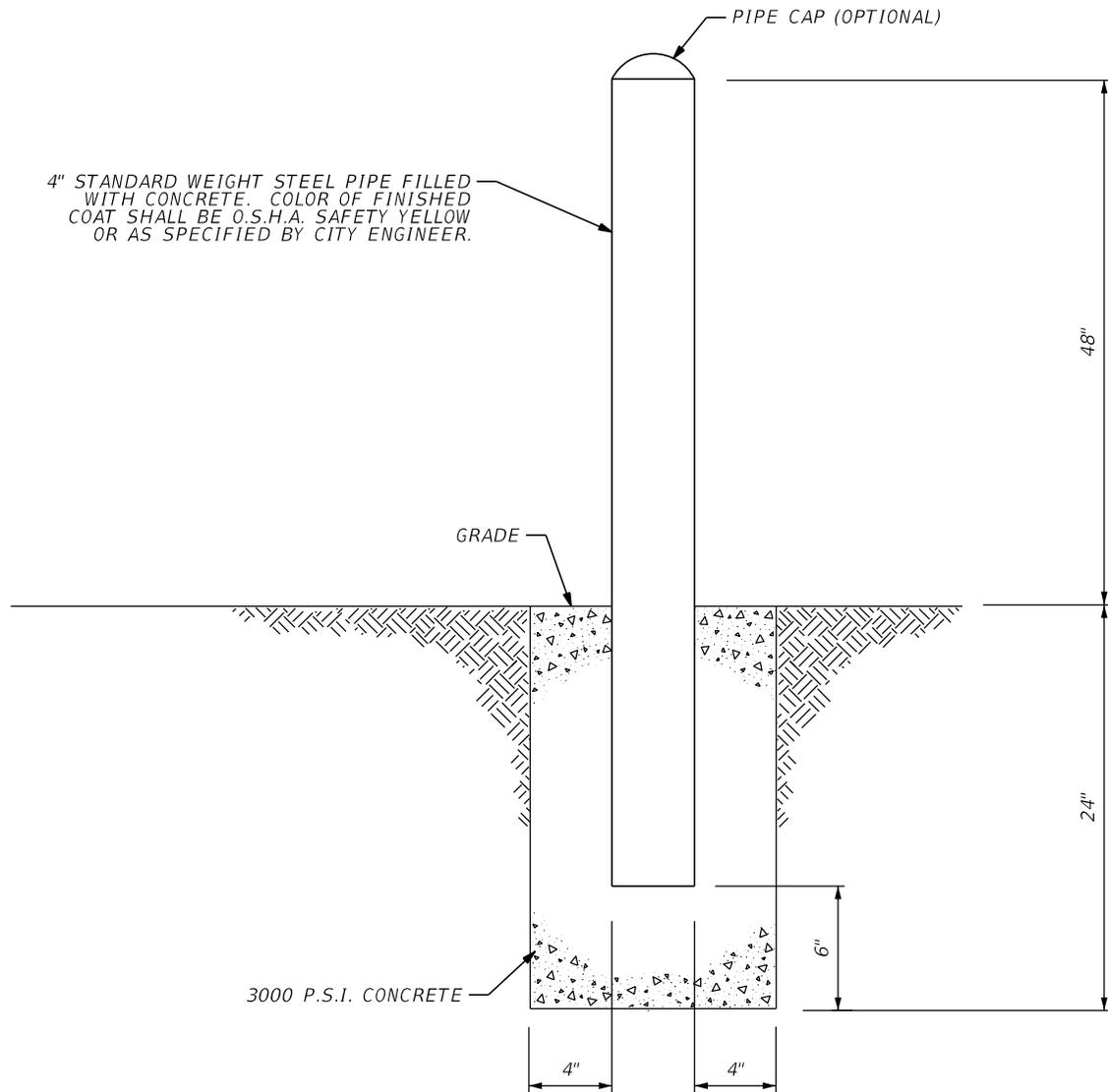
DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
**JERALD WOLOSZYNSKI**

ASST. ENGINEERING DIRECTOR  
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BOLLARD INDEX RT-240

NOTES:

1. ALL DIMENSIONS ARE MINIMUM REQUIREMENTS.

CONSTRUCTION INDEX RT-240  
BOLLARD DETAIL  
 (N.T.S.)

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INDEX NUMBER

**RT-240**

DESCRIPTION

**Bollard Detail**

PUBLICATION DATE  
**JULY 7, 2020**

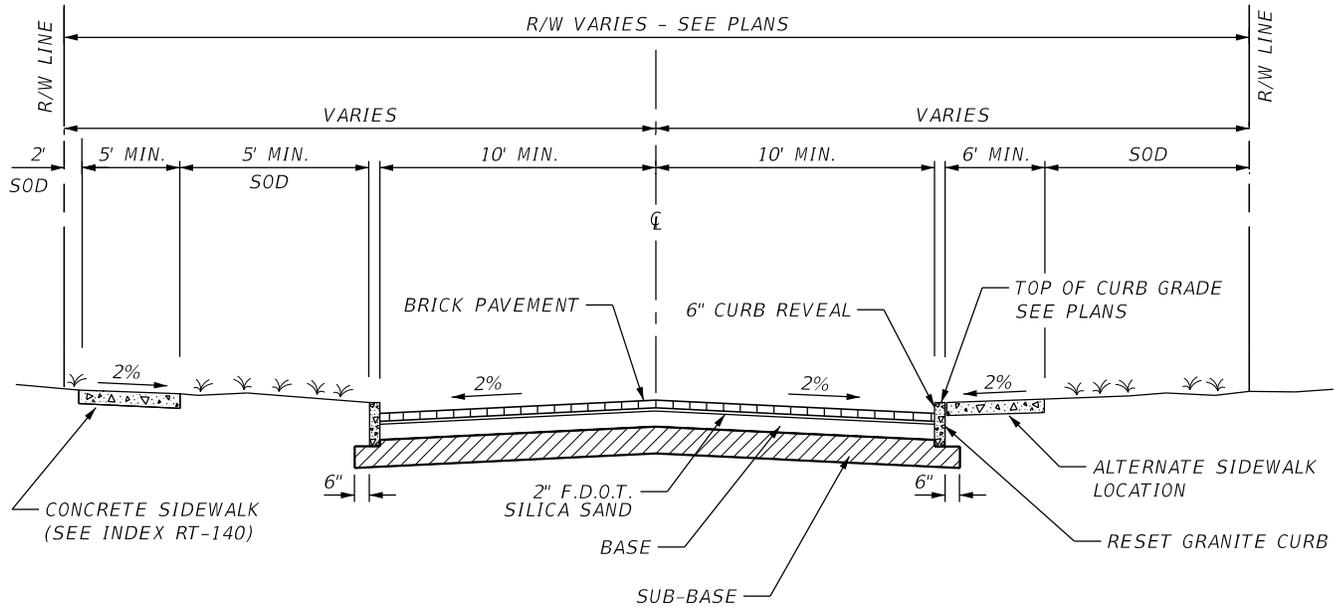
DRAWING SCALE  
**N.T.S.**

TITLE

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 Construction Standards**

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PAVEMENT SPECIFICATIONS	
WEARING SURFACE	BRICK
BASE	8" CRUSHED CONCRETE COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180. (100 LBR) OR AS IDENTIFIED IN FIELD
SUB-BASE	NOT APPLICABLE

**NOTES:**

1. ALL GRANITE CURB TO REMAIN IN PLACE.
2. BRICKS SHALL BE HAND REMOVED AND CLEANED PRIOR TO RESETTING.
3. EXISTING SAND BASE SHALL BE REMOVED AND REPLACED WITH AN 8" CRUSHED CONCRETE BASE AND 2" SAND BEDDING.
4. SPREAD A MIX OF 3 PARTS F.D.O.T. SILICA SAND TO 1 PART GROUT OVER REPLACEMENT AREA. ROLL WITH STEEL WHEEL ROLLER.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE OF TRAFFIC DURING THE PROJECT.

**CONSTRUCTION INDEX RT-260**  
BRICK STREET RECONSTRUCTION  
(N.T.S.)

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INDEX NUMBER  
**RT-260**

DESCRIPTION  
**Brick Street Reconstruction**

PUBLICATION DATE  
**JULY 7, 2020**

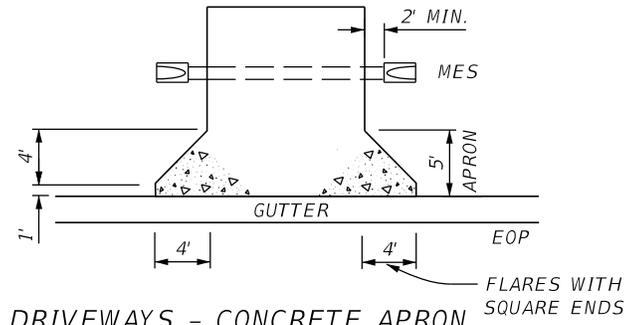
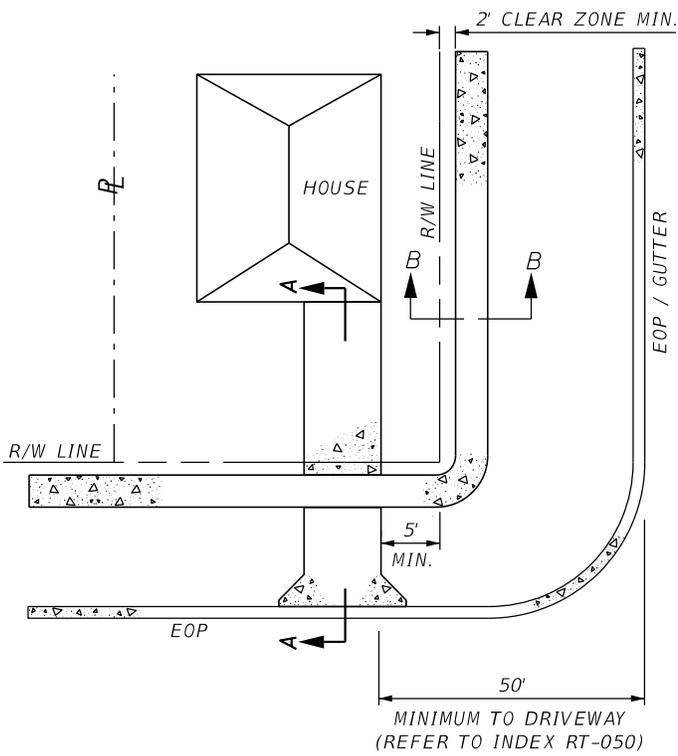
DRAWING SCALE  
**N.T.S.**

TITLE

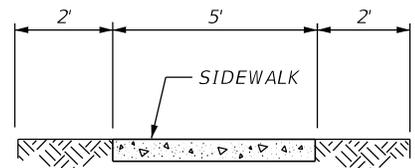
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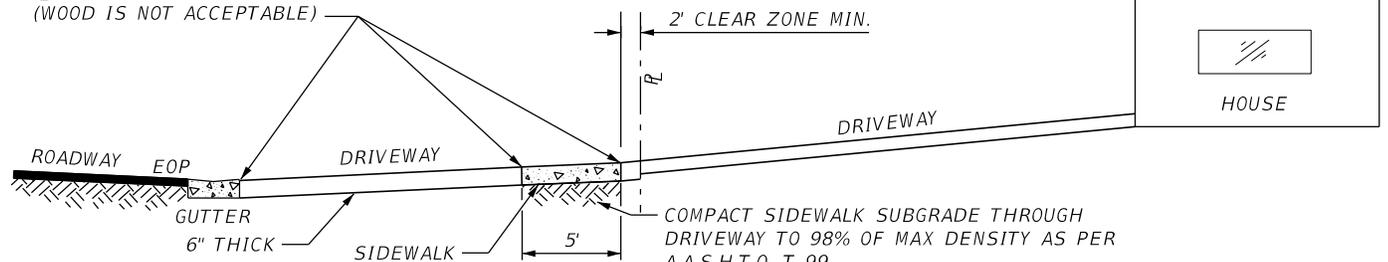
DRIVEWAYS - CONCRETE APRON



TWO (2') FOOT CLEAR ZONE.  
NO OBSTRUCTIONS OR PLANTERS

SIDEWALK CROSS-SECTION B-B

1/2" EXPANSION JOINT MATERIAL  
(WOOD IS NOT ACCEPTABLE)

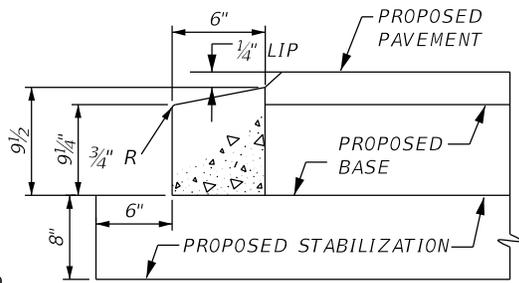


COMPACT SIDEWALK SUBGRADE THROUGH DRIVEWAY TO 98% OF MAX DENSITY AS PER A.A.S.H.T.O. T-99

SIDEWALK CROSS-SECTION A-A

**NOTES:**

- SIDEWALK:  
ALL SIDEWALK TO BE IN ACCORDANCE WITH INDEX RT-140.  
SIDEWALK MUST RUN CONTINUOUSLY THROUGH DRIVEWAYS.
- DRIVEWAYS:  
ALL DRIVEWAY APRONS ARE TO BE CONCRETE, BRICK OR PAVERS.  
(ALL BRICK AND PAVER DRIVEWAYS TO BE APPROVED BY CITY ENGINEER.)  
10' MINIMUM TO 24' MAXIMUM WIDTH (NOT TO EXCEED 35% OF FRONT LINEAR MEASUREMENT.)  
CONCRETE TO BE 6" THICK WITHIN R.O.W.  
(PROPERTY LINE TO CURB OR EDGE OF PAVEMENT).  
5' MINIMUM SETBACK FROM PROPERTY LINE.  
PAVERS IN R.O.W. MUST BE INSTALLED WITH HEADER CURB AND PER INDEX 260.
- CURB CUTS INCLUDING CIRCULAR DRIVEWAYS:  
CIRCULAR DRIVEWAY CONSTRUCTION REQUIRES CITY ENGINEER REVIEW AND APPROVAL.  
CORNER LOT CURB CUTS SHALL BE ON STREET WITH LOWEST FUNCTIONAL CLASSIFICATION.
- DRAINAGE: (IF APPLICABLE)  
DRAINAGE PIPES UNDER DRIVEWAYS MUST BE RCP 15" MINIMUM DIAMETER OR 12"x18" ERCP WITH MITERED END AND 2' MINIMUM SETBACK OR AS APPROVED BY THE CITY ENGINEER.
- STRUCTURAL REINFORCEMENT:  
ALL CONCRETE WITHIN RIGHT-OF-WAY SHALL BE 3,000 PSI MINIMUM WITH FIBERMESH IN RIGHT-OF-WAY.



PROFILE VIEW OF HEADER CURB

TO USE FOR PAVER DRIVEWAY

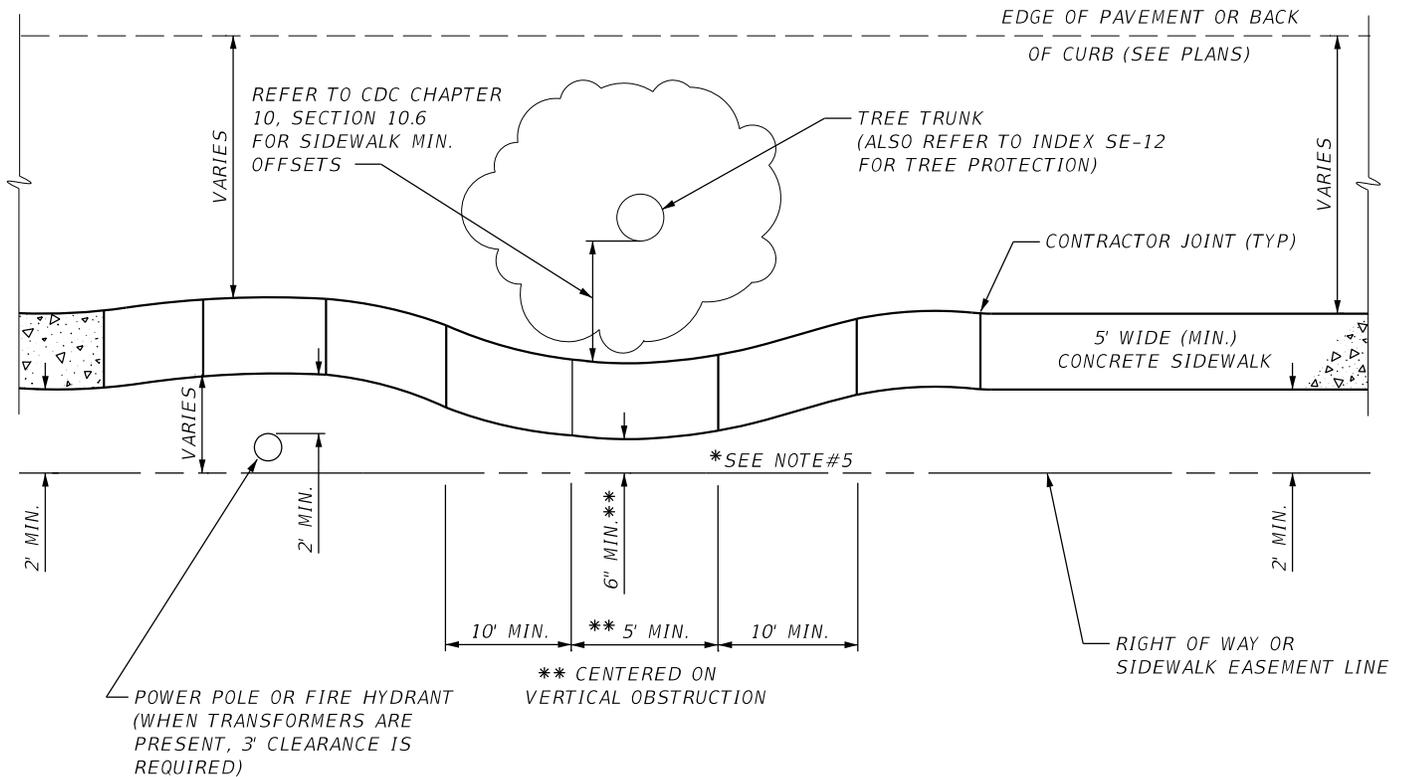
**CONSTRUCTION INDEX RT-270**

DRIVEWAY  
(N.T.S.)

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PUBLICATION DATE <b>JULY 7, 2020</b>	DRAWING SCALE <b>N.T.S.</b>
CITY ENGINEERING DIRECTOR <b>JERALD WOLOSZYNSKI</b>	ASST. ENGINEERING DIRECTOR <b>RAFAL CIESLAK</b>



INDEX NUMBER <b>RT-270</b>	DESCRIPTION <b>Driveway</b>
TITLE <b>Engineering Design and Construction Standards</b>	



PLAN VIEW

NOTES:

1. ADJUST SIDEWALK TO AVOID OBSTRUCTIONS, AS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. CONSTRUCTION OF SIDEWALKS SHALL MEET A.D.A. REQUIREMENTS AS SPECIFIED IN INDEX RT-140.
3. POWER POLES SHALL BE MOVED AS NEEDED.
4. TREES SHALL BE TRIMMED TO MAINTAIN VERTICAL CLEARANCE (FOLLOWING ANSI 300 STANDARDS): NINE (9') FEET FOR SIDEWALKS AND EIGHTEEN (18') FEET FOR ROADS.
- \*5. MAXIMUM LATERAL DEFLECTION SHALL BE 5:1.
6. REMOVE TREE ROOTS WITHIN TEN INCHES (10") OF PROPOSED GRADE. ROOTS SHALL ROOT PRUNE PRIOR TO REMOVAL COORDINATE WITH CITY STAFF.
7. CONTRACTION JOINTS SHALL MEET INDEX RT-140.
8. CRITICAL ROOT ZONE: REFER TO CDC CHAPTER 10, SECTION 10.6 FOR SIDEWALK MINIMUM OFFSETS.
9. CONTRACTOR SHALL TAKE GREAT CARE IN THE REMOVAL AND REPLACEMENT OF SIDEWALK UNDER THE CANOPY OF EXISTING TREES, IN ORDER TO MINIMIZE THE DISTURBANCE OF THE ROOT ZONE. INSTALLATION OF THE NEW SIDEWALK UNDER THE CANOPY ZONE SHALL BE ON GRADE IF CONDITIONS ALLOW. TO PROTECT THE ROOT ZONE FROM COMPACTION, THE CONTRACTOR MAY BE REQUIRED TO LAY DOWN MULCH. THE MULCH MAY BE SUPPLIED BY THE CITY OF LARGO.
10. ANY DAMAGE TO TREES BY THE CONTRACTOR WILL RESULT IN FINE OR REPLACEMENT BY THE CONTRACTOR. FINE SHALL BE THE CITY STANDARD FEE.

CONSTRUCTION INDEX RT-280  
 SIDEWALK DEFLECTION  
 (N.T.S.)

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INDEX NUMBER  
**RT-280**

DESCRIPTION  
**Sidewalk Deflection**

PUBLICATION DATE  
**JULY 7, 2020**

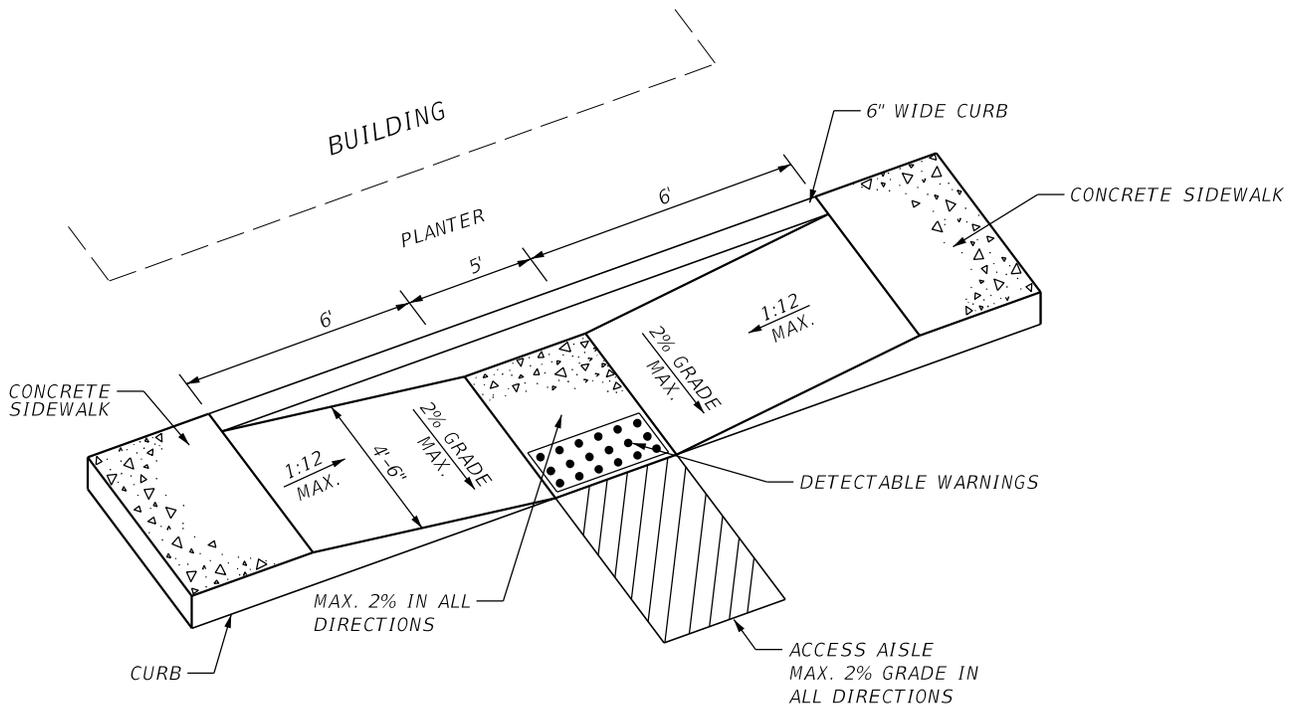
DRAWING SCALE  
**N.T.S.**

TITLE

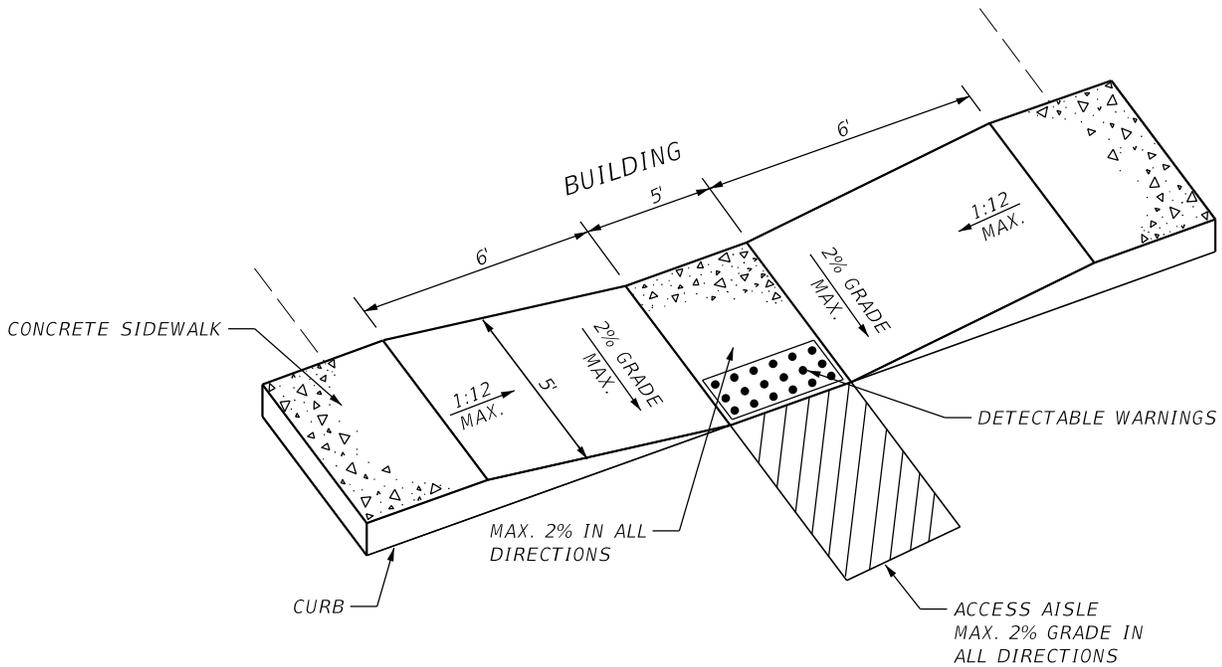
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**RAFAL CIESLAK**

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 Construction Standards**



WHEN BUILDING HAS PLANTER AGAINST SIDEWALK  
(N.T.S.)



WHEN BUILDING ABUTS SIDEWALK  
(N.T.S.)

CONSTRUCTION INDEX RT-290  
ADA RAMPS  
(N.T.S.)

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INDEX NUMBER  
**RT-290**

DESCRIPTION  
**ADA Ramps**

PUBLICATION DATE  
**JULY 7, 2020**

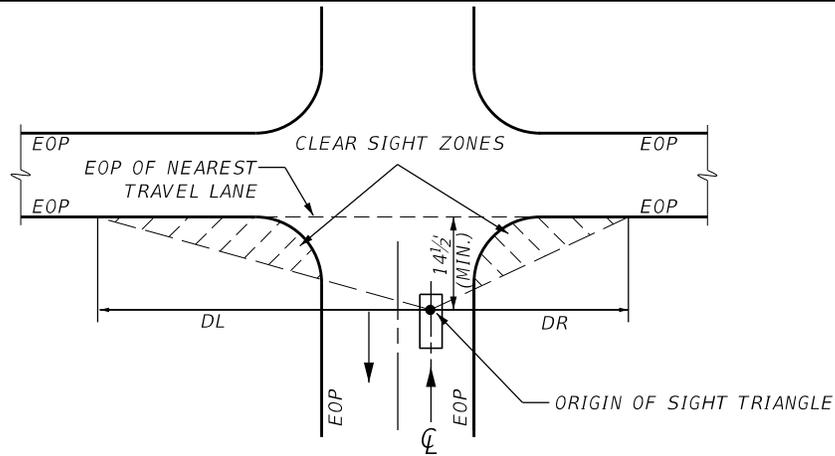
DRAWING SCALE  
**N.T.S.**

TITLE

CITY ENGINEERING DIRECTOR  
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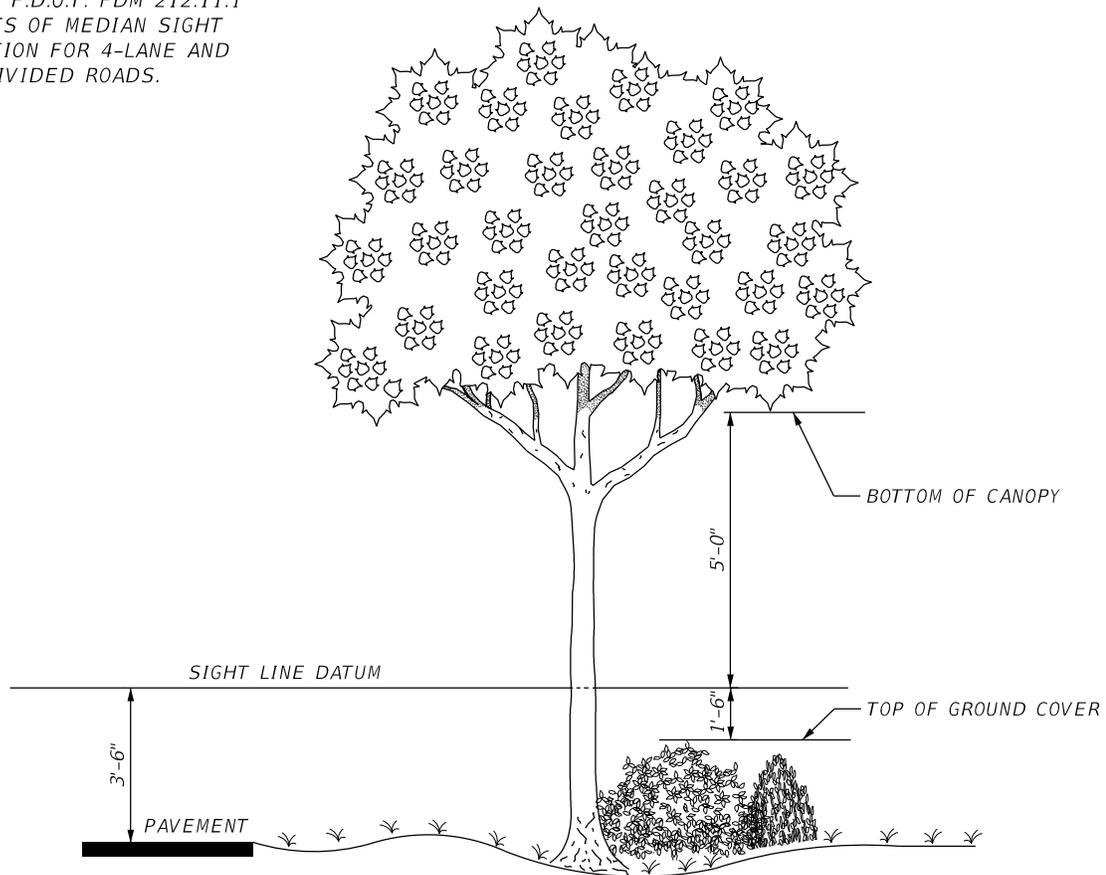
**Engineering Design and  
Construction Standards**



NOTE:

SIGHT TRIANGLE SECTION

REFER TO F.D.O.T. FDM 212.11.1 FOR LIMITS OF MEDIAN SIGHT OBSTRUCTION FOR 4-LANE AND 6-LANE DIVIDED ROADS.



VISIBILITY TRIANGLE FROM STREET INTERSECTIONS

NOTES:

1. THE INTENT OF THIS STANDARD IS TO PROVIDE A WINDOW WITH VERTICAL LIMITS OF NOT LESS THAN 5' ABOVE AND 1'-6" BELOW THE SIGHT LINE DATUM, AND HORIZONTAL LIMITS DEFINED BY LIMITS OF CLEAR SIGHT. REFER TO INDEX RT-310 FOR DISTANCES.
2. REFER TO CITY OF LARGO, FL: COMPREHENSIVE DEVELOPMENT CODE CHAPTER 9: ACCESS MANAGEMENT, TRAFFIC CIRCULATION AND PARKING STANDARDS FOR ADDITIONAL DESIGN GUIDANCE.

CONSTRUCTION INDEX RT-300

SIGHT TRIANGLE  
(N.T.S.)

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INDEX NUMBER

**RT-300**

DESCRIPTION

**Sight Triangle**

PUBLICATION DATE  
**JULY 7, 2020**

DRAWING SCALE  
**N.T.S.**

TITLE

**Engineering Design and  
Construction Standards**

CITY ENGINEERING DIRECTOR  
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1. 2 LANE UNDIVIDED  
(TYPICAL RESIDENTIAL STREET)

MPH	DL (FT)	DR (FT)
≤ 30	240	155
35	275	175
40	315	200
45	355	225

2. 2 LANE WITH LEFT TURN LANE

MPH	DL (FT)	DR (FT)
≤ 30	195	135
35	230	160
40	260	180
45	290	200

3. 4 LANE UNDIVIDED

MPH	DL (FT)	DR (FT)
≤ 30	255	120
35	295	135
40	335	155
45	375	175

4. 4 LANE UNDIVIDED WITH  
LEFT TURN LANE

MPH	DL (FT)	DR (FT)
≤ 30	205	110
35	245	130
40	275	145
45	310	165

5. 4 LANE DIVIDED  
MEDIAN < 22'

MPH	DL (FT)	DR (FT)	DM (FT)
≤ 30	280	90	325
35	325	100	380
40	375	115	430
45	420	130	485

6. 6 LANE DIVIDED  
MEDIAN < 22'

MPH	DL (FT)	DR (FT)	DM (FT)
≤ 30	295	80	355
35	345	90	415
40	395	105	470
45	445	115	530

NOTE:

IF CROSSING STREET IS MAINTAINED BY ANOTHER AGENCY, USE MOST RESTRICTIVE AGENCY'S CRITERIA.

CONSTRUCTION INDEX RT-310  
SIGHT TRIANGLE DISTANCES  
(N.T.S.)

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INDEX NUMBER

**RT-310**

DESCRIPTION

**Sight Triangle Distances**

PUBLICATION DATE  
**JULY 7, 2020**

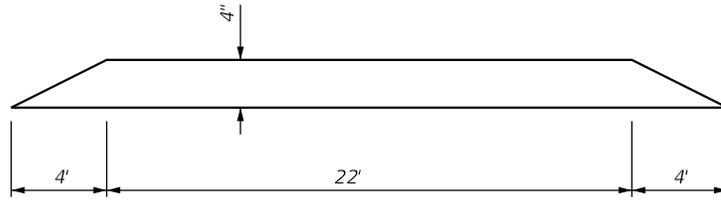
DRAWING SCALE  
**N.T.S.**

TITLE

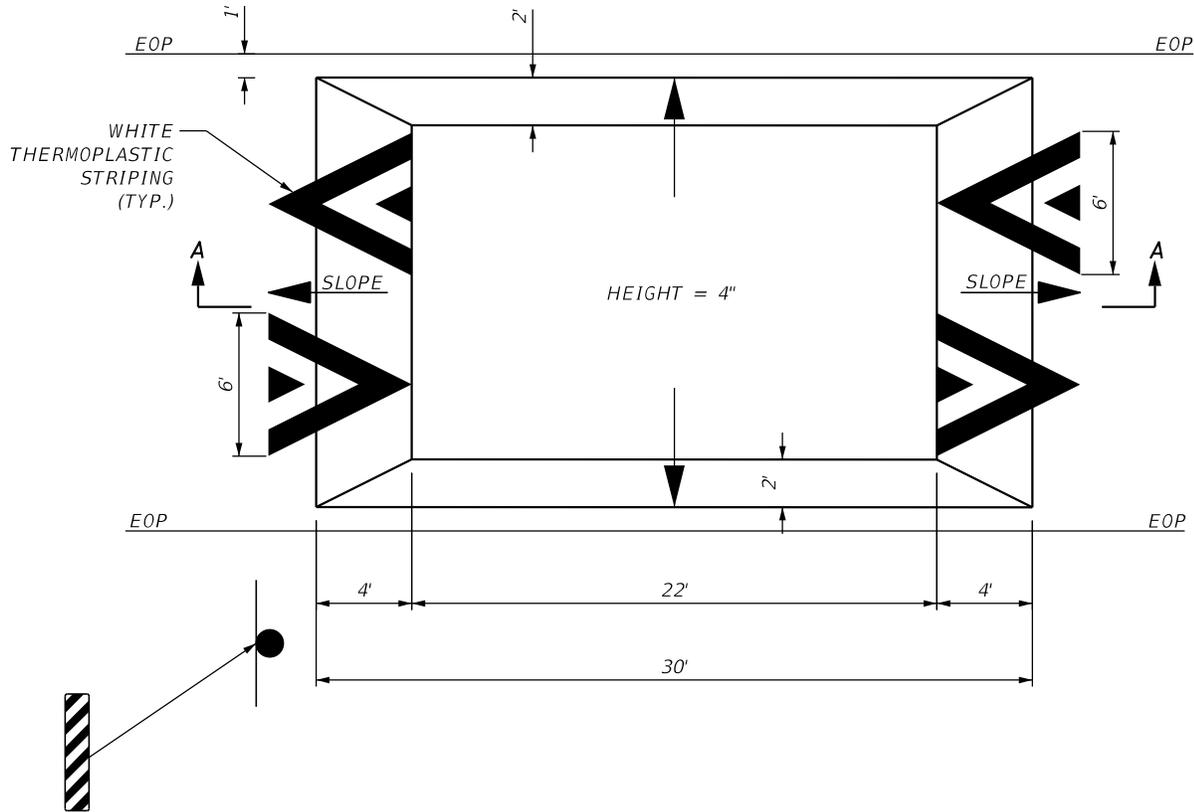
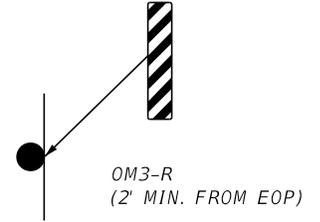
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Construction Standards**

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SECTION A-A  
(N.T.S.)



OM3-R (2' MIN. FROM EOP)

NOTES:

1. LOCATIONS OF SPEED TABLES TO BE FIELD DETERMINED BY ENGINEER.
2. CONSTRUCTION TO CONFORM TO SUPPLEMENTAL SPECIFICATION.
3. SIGNAGE & PAVEMENT MARKINGS SHALL CONFORM TO M.U.T.C.D.
4. DIMENSIONS MAY VARY AS APPROVED BY CITY ENGINEER.

CONSTRUCTION INDEX RT-320  
SPEED TABLE ASSEMBLY FLAT TOP  
(N.T.S.)

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INDEX NUMBER  
**RT-320**

DESCRIPTION  
**Speed Table Assembly  
Flat Top**

PUBLICATION DATE  
**JULY 7, 2020**

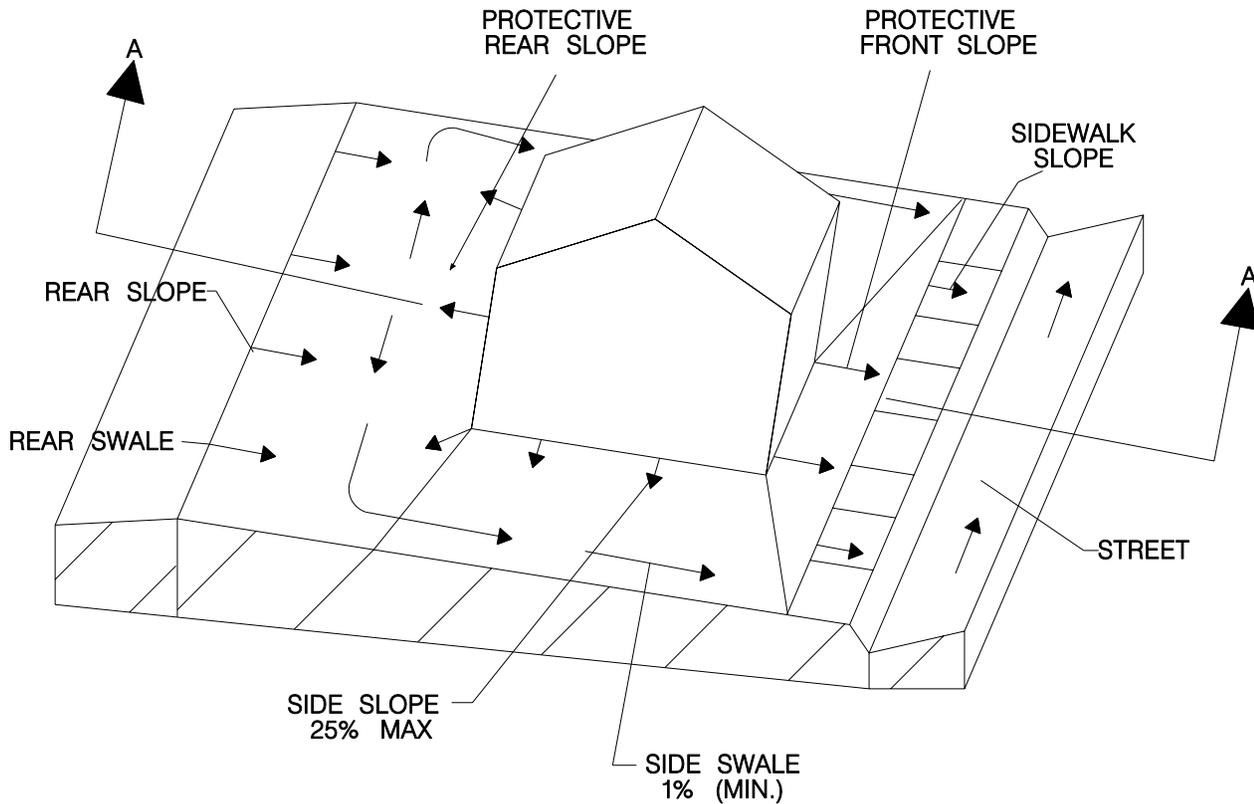
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**N.T.S.**

TITLE

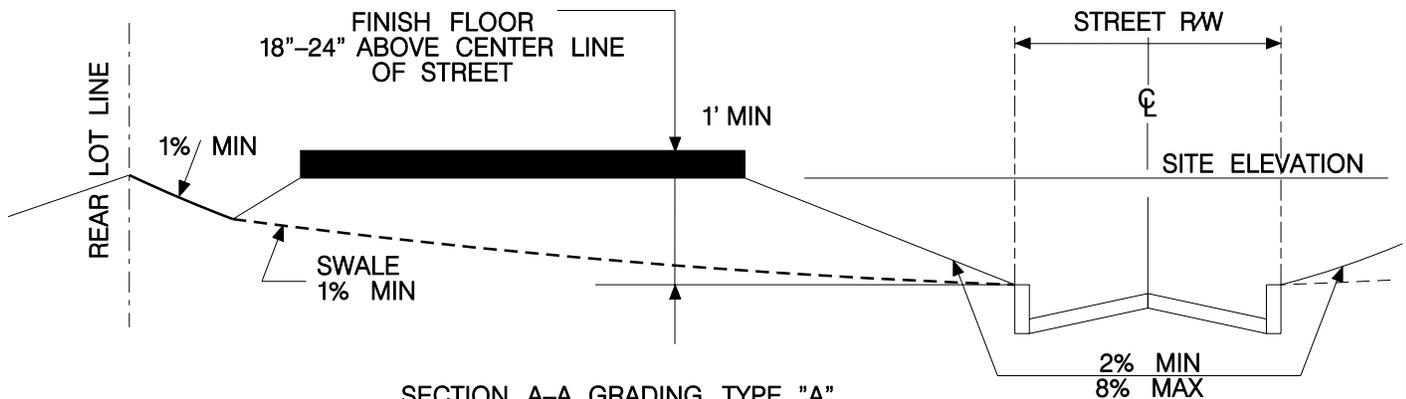
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**Engineering Design and  
Construction Standards**



TYPE "A" ALL DRAINAGE TO STREET WITH A 1% (MIN.) SWALE



SECTION A-A GRADING TYPE "A"

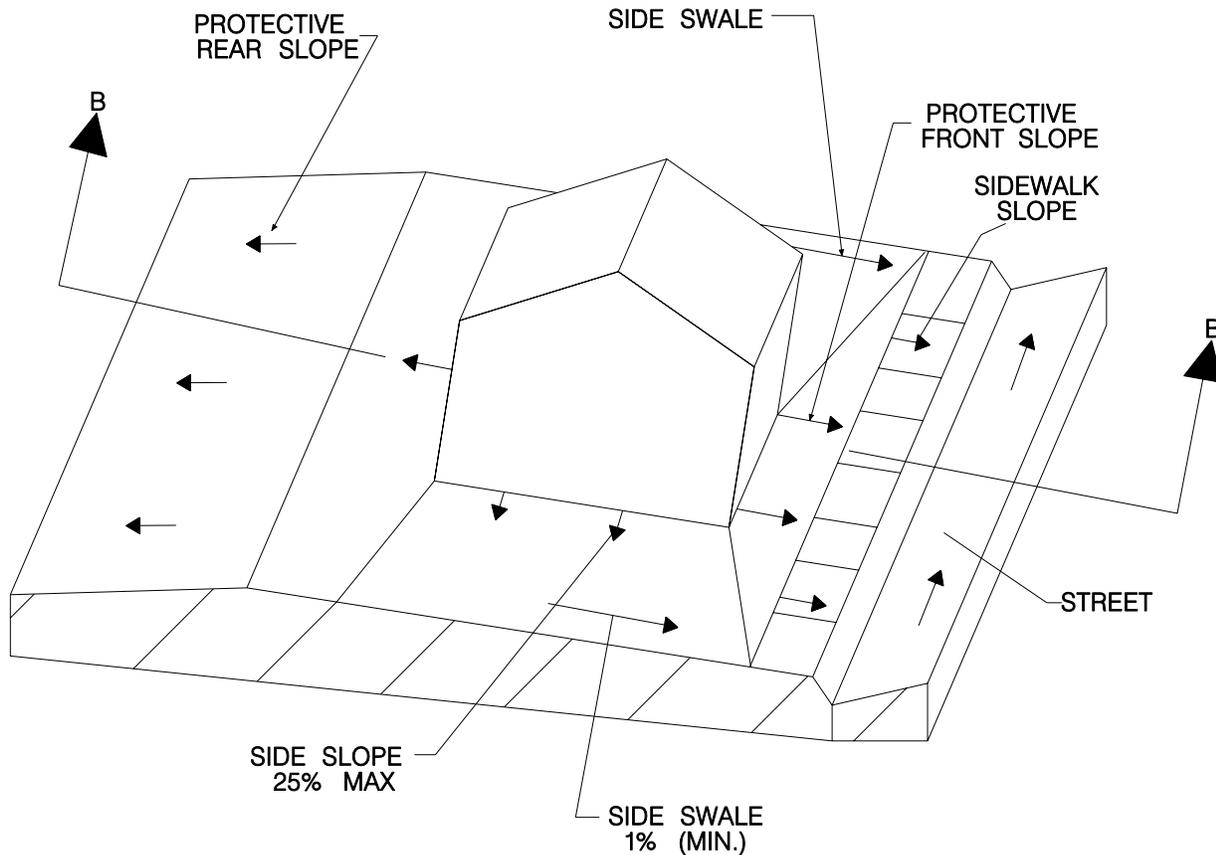
NOTES:

- 1.) DESIGN PLANS MUST SHOW EXISTING AND PROPOSED ELEVATIONS FOR BUILDING AND LOT CORNERS
- 2.) FOR TYPE "A" GRADING MIN. FINISH FLOOR SHALL BE 18"-24" ABOVE THE CENTERLINE OF THE STREET, AND NOT LESS THAN ONE FOOT ABOVE 100 YEAR BASE FLOOD ELEVATION(BFE), OR AS DIRECTED BY THE CITY ENGINEER
- 3.) ROOF GUTTERS AND YARD DRAINS MAY BE REQUIRED, AS DIRECTED BY THE CITY ENGINEER TO PROVIDE ADEQUATE DRAINAGE.
- 4.) DESIGN PLANS FOR IN-FILL LOTS IN EXISTING SUBDIVISIONS MUST SHOW EXISTING ELEVATIONS 15' ONTO ADJACENT PROPERTIES AND AT 15' ON CENTER TO VALIDATE THE LOT GRADING DESIGN.
- 5.) SIDE SLOPES SHALL NOT EXCEED A MAXIMUM OF 4:1.
- 6.) LOTS WITHIN THE VELOCITY ZONE, THE 100 YEAR FLOOD ZONE, AND IN-FILL LOTS WILL REQUIRE DRAINAGE AND ACCEPTABLE GRADE TRANSITIONS TO ADJACENT LOT ELEVATIONS.
- 7.) LOT GRADING SHALL MAINTAIN HISTORICAL FLOW PATHS AND PREVENT THE ACCUMULATION OF WATER, OR CREAT EXCESSIVE RUNOFF ONTO ADJACENT PROPERTIES
- 8.) REAR SWALE'S SHALL DRAIN TO SIDE SWALE'S AND TO STREETS ON EACH LOT AND SHALL FUNCTION INDEPENDENTLY FROM ALL ADJOINING LOTS.

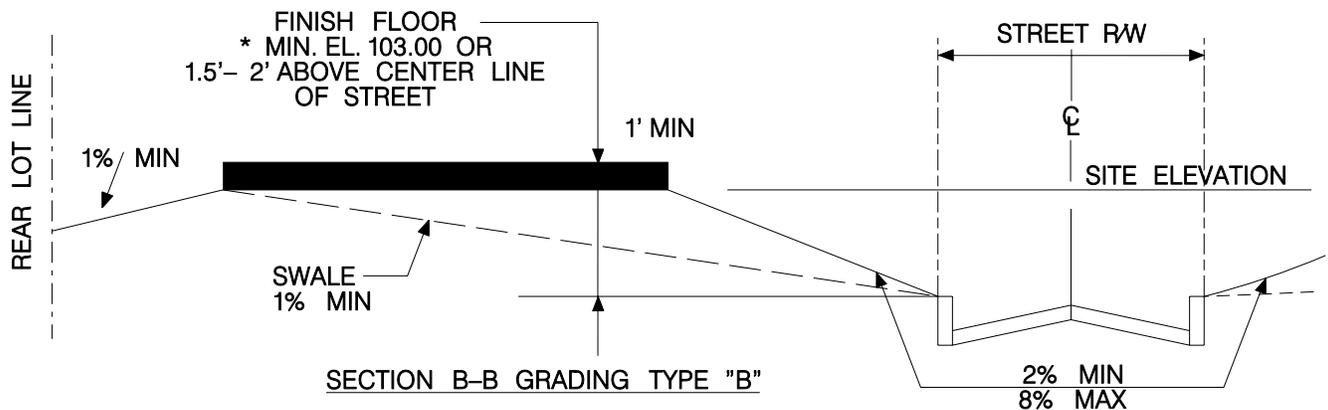


**City of Largo**  
 Community Development Department  
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 201 Highland Avenue, Largo, FL, 33770-2512  
 TEL: (727) 587-6713 FAX: (727) 586-7413  
 WWW: <http://www.largo.com>

TITLE: Engineering Design and Construction Standards		DESCRIPTION: Residential Grading Type "A"	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RG-01	
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE		



TYPE "B" ALL DRAINAGE TO STREET WITH A 1% (MIN.) SWALE



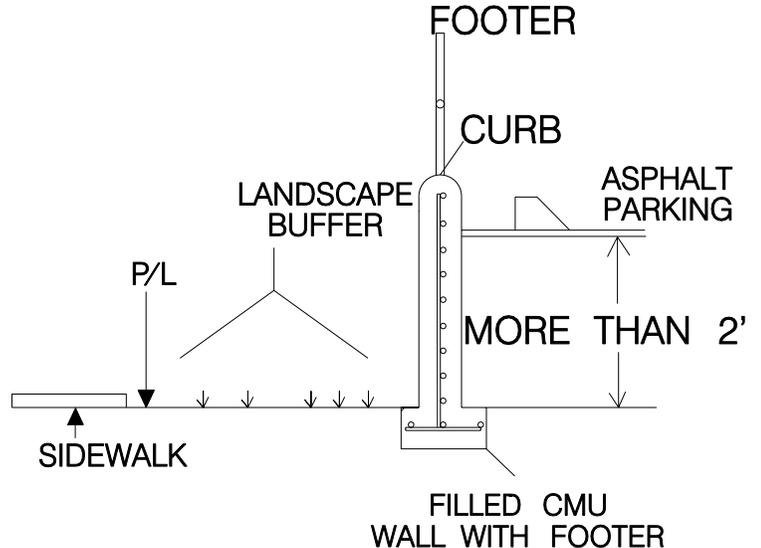
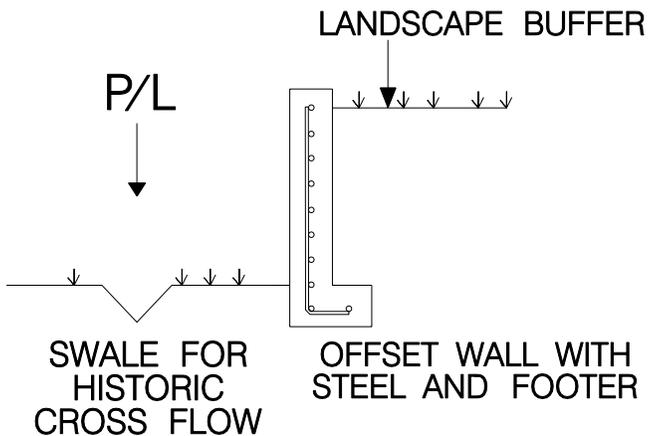
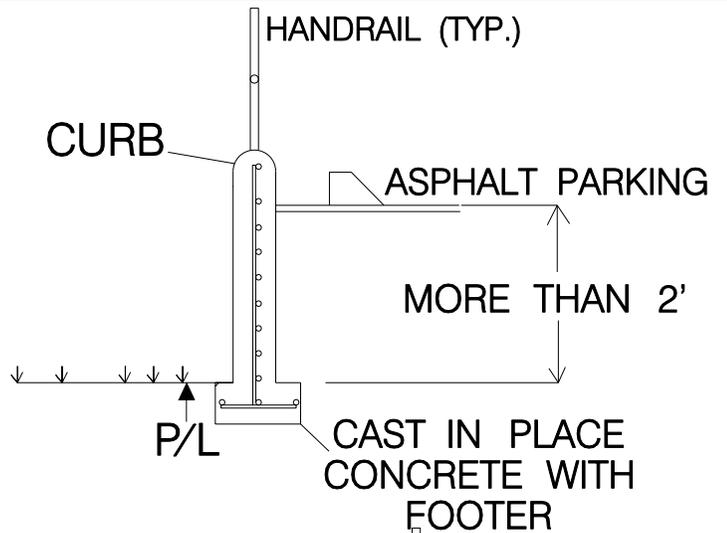
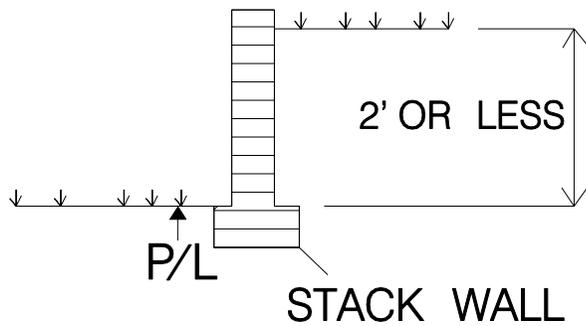
SECTION B-B GRADING TYPE "B"

- 1.) DESIGN PLANS MUST SHOW EXISTING AND PROPOSED ELEVATIONS ARE REQUIRED FOR POINTS ON ALL BUILDING AND LOT CORNERS.
- 2.) FOR TYPE "B" GRADING, MIN. ELEVATION SHALL BE 18"-24" ABOVE THE CENTERLINE OF THE STREET AND NOT LESS THAN ONE FOOT ABOVE THE 100YEAR BASE FLOOD ELEVATION(BFE) OR AS DIRECTED BY THE CITY ENGINEER.
- 3.) ROOF GUTTERS AND YARD DRAINS MAY BE REQUIRED, AS DETERMINED BY THE CITY ENGINEER TO PROVIDE ADEQUATE DRAINAGE.
- 4.) DESIGN PLANS FOR IN-FILL LOTS IN EXISTING SUBDIVISIONS MUST SHOW EXISTING ELEVATIONS 15' ONTO ADJACENT PROPERTIES AND AT 15' ON CENTER TO VALIDATE THE LOT GRADING DESIGN.
- 5.) SIDE SLOPES SHALL NOT EXCEED A MAXIMUM OF 4:1.
- 6.) LOTS WITHIN THE VELOCITY ZONE, THE 100 YEAR FLOOD ZONE, AND INFILL LOTS WILL REQUIRE DRAINAGE AND ACCEPTABLE GRADE TRANSITIONS TO ADJACENT LOT ELEVATIONS.
- 7.) LOT GRADING SHALL MAINTAIN HISTORICAL FLOW PATHS AND PREVENT THE ACCUMULATION OF WATER, OR CREATE EXCESSIVE RUNOFF ONTO ADJACENT PROPERTIES.
- 8.) TYPE "B" LOT GRADING IS USED WHERE:
  - A.) AN INVERTED CROWN ALLEY EXISTS AT REAR.
  - B.) HISTORICAL FLOW PATHS OCCUR TO AN EXISTING STORMWATER SYSTEM OR OVER LAND WITH A SLOPE GREATER THAN 1%.
- 9.) SIDE SWALES SHALL DRAIN TO THE STREET ON EACH LOT AND SHALL FUNCTION INDEPENDANTLY FROM ALL ADJOINING LOTS.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Residential Grading Type "B"	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RG-02	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS P.E.	NOT TO SCALE		



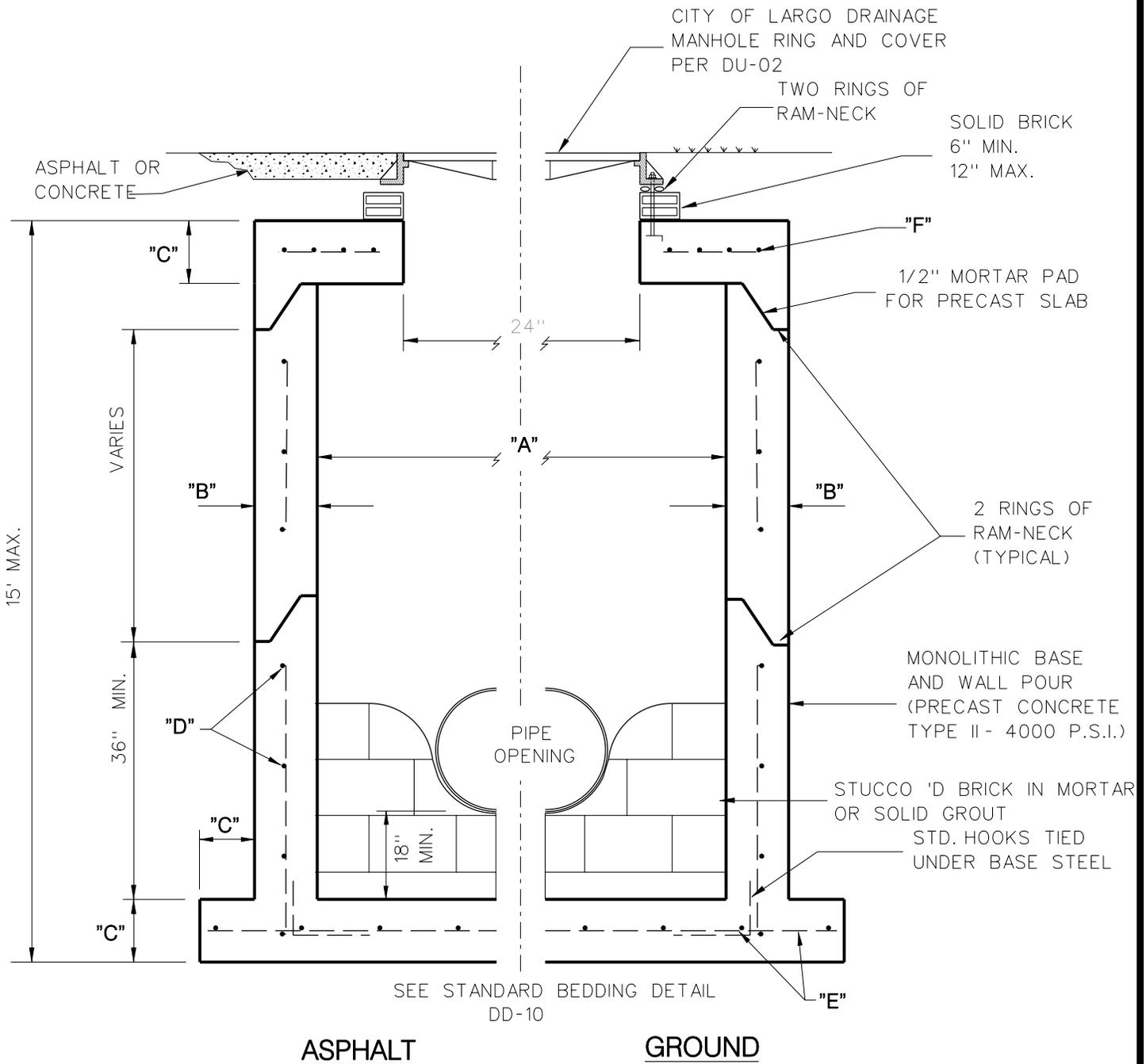
**NOTES**

1. ALL GRADE CHANGES AT PROPERTY LINES, ADJACENT TO PRIVATE PROPERTY OR R.O.W., SHALL NOT EXCEED A 6:1 SLOPE.
2. IF GRADE CHANGE IS TOO GREAT BETWEEN PROPERTIES, A RETAINING WALL OF APPROPRIATE HEIGHT SHALL BE CONSTRUCTED TO REDUCE THE GRADES TO 6:1.
3. THE TYPE OF WALL MATERIAL, HEIGHT OF WALL AND PLACEMENT OF WALL WILL DEPEND ON SPECIFIC SITE CONDITIONS. ANY VARIATIONS SHALL BE APPROVED, IN WRITING, BY THE CITY OF LARGO ENGINEERING SERVICES DIVISION. FAILURE TO OBTAIN ADVANCED APPROVAL WILL RESULT IN DEMOLITION AND/OR RECONSTRUCTION OF THE WALL BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE. OTHER SITE OBSTRUCTIONS OF THE WALL, SHALL BE INCLUDED IN THE DEMOLITION AND RECONSTRUCTION.
4. SWALES, DRAINAGE INLETS, ETC MAY BE NECESSARY TO CONTROL EXISTING CROSS FLOW DRAINAGE AND PREVENT FLOODING OF ADJACENT PROPERTIES.
5. BOTH PLAN AND PROFILE VIEWS OF WALL, SWALES AND INLETS SHALL BE INCLUDED IN CIVIL SITE PLANS FOR REVIEW AND APPROVAL DURING DEVELOPMENT REVIEW. PLAN VIEWS WILL ALSO BE INCLUDED IN LANDSCAPE PLANS FOR REVIEW BY THE BUILDING DIVISION.
6. LANDSCAPING PLANTS AND MATERIALS THAT ARE RESISTANT TO WASH OUT OR FLOATING, AND ARE SUITABLE FOR THE GRADE AND RESISTANT TO EROSION SHALL BE SPECIFIED.
7. ABOVE ARE SOME COMMON PROBLEMS AND THE PREFERRED SOLUTIONS. ANY CONDITIONS NOT COVERED, MUST BE BROUGHT TO CITY OF LARGO'S ATTENTION DURING REVIEW FOR ASSISTANCE WITH SPECIFIC APPLICATION.
8. THIS DETAIL IS FOR GENERAL WALL PLACEMENT REQUIREMENTS. ACTUAL WAL DESIGN MUST BE DONE BY A REGISTERED PROFESSIONAL STRUCTUAL ENGINEER.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>PERIMETER GRADING</b>	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>CG-01</b>	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



ASPHALT

GROUND

"A"	"B"	"C"	"D"	"E"	"F"	MAX. PIPE
4'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 4 @ 12" OCEW	# 4 @ 6" OCEW	30"
5'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 5 @ 12" OCEW	# 5 @ 6" OCEW	42"
6'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 5 @ 6" OCEW	# 5 @ 6" OCEW	48"
8'-0" DIA	8"	12"	# 4 @ 10" OCEW	# 5 @ 6" OCEW	# 6 @ 6" OCEW	72"



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TITLE:  
**Engineering Design and  
 Construction Standards**

DESCRIPTION:  
**Drainage Manhole and  
 Other Storm Structures**

COMMUNITY DEVELOPMENT DIRECTOR:  
 CAROL STRICKLIN A.I.C.P.

PUBLICATION DATE:  
 November 18, 2008

INDEX NUMBER:

CITY ENGINEER:  
 LELAND E. DICUS, P.E.

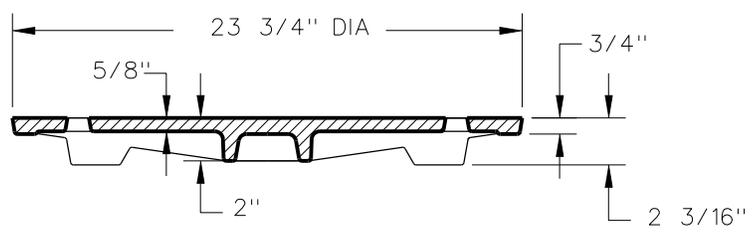
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**DD-01**

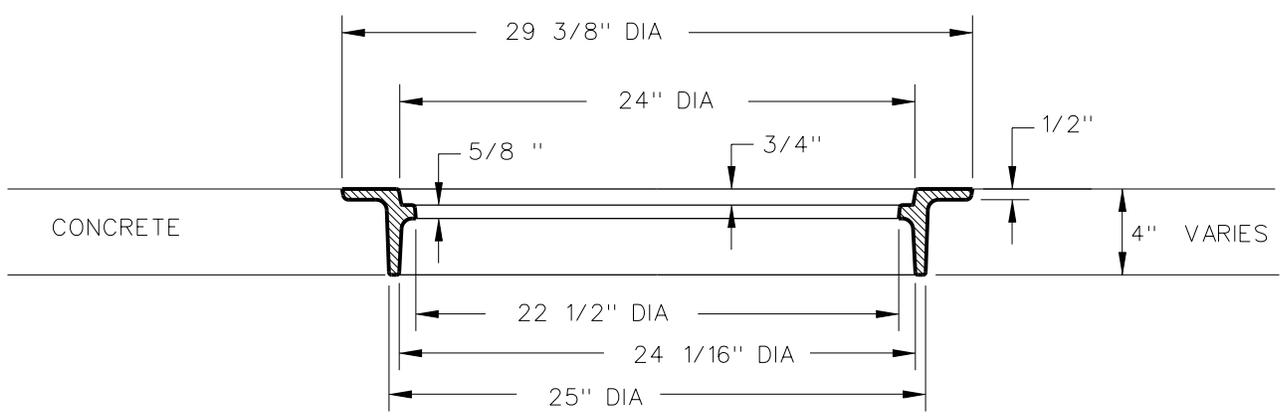




**SOLID COVER**



**SOLID COVER SECTION**



**FRAME**

**NOTES:**

1. FRAME AND COVER SHALL BE EAST JORDAN IRONWORKS, INC. MODEL V-1317, OR APPROVED EQUAL, COATED WITH BITUMASTIC COAL TAR.
2. WHERE INLET GRATE IS REQUIRED USE 316 O-RING AND 5640 GRATE.



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TITLE:  
**Engineering Design and Construction Standards**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P**

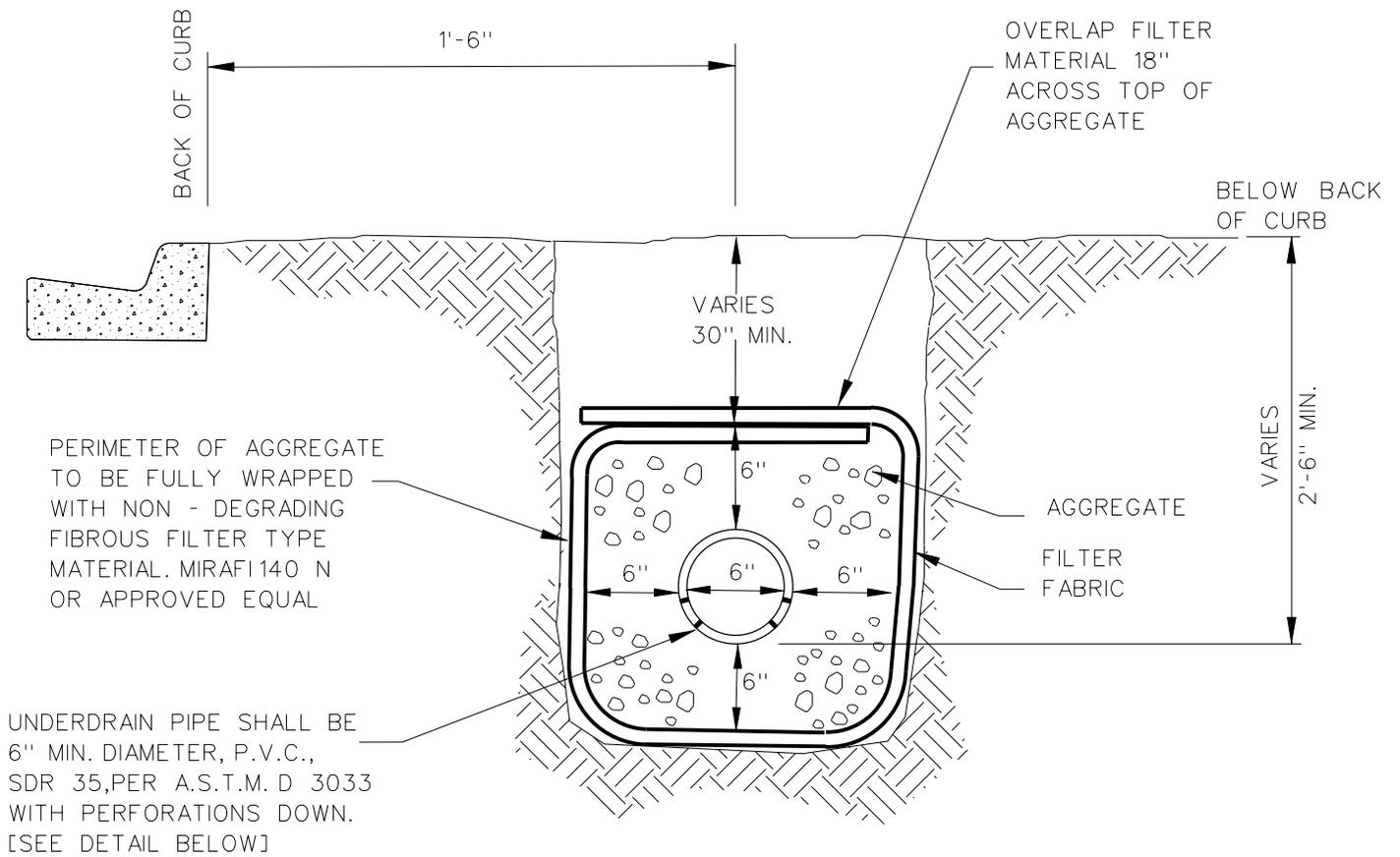
CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

DESCRIPTION:  
**Drainage Inlet Frame and Cover, Non Traffic**

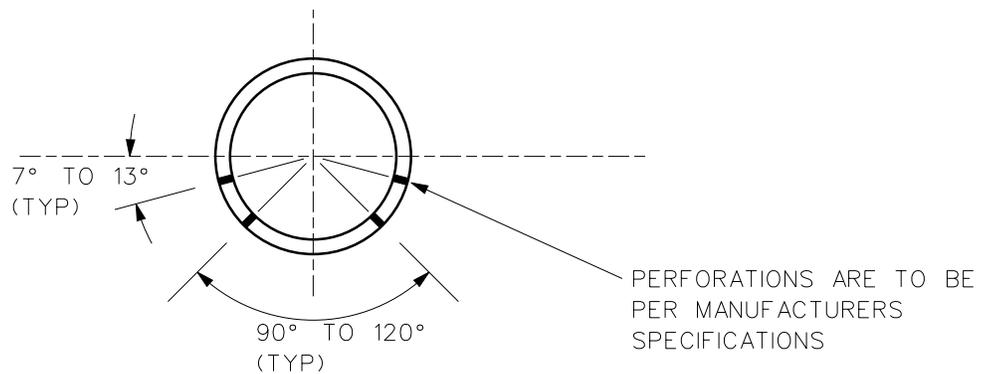
PUBLICATION DATE:  
**November 18, 2008**

DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**DD-03**



**TYPICAL SECTION**



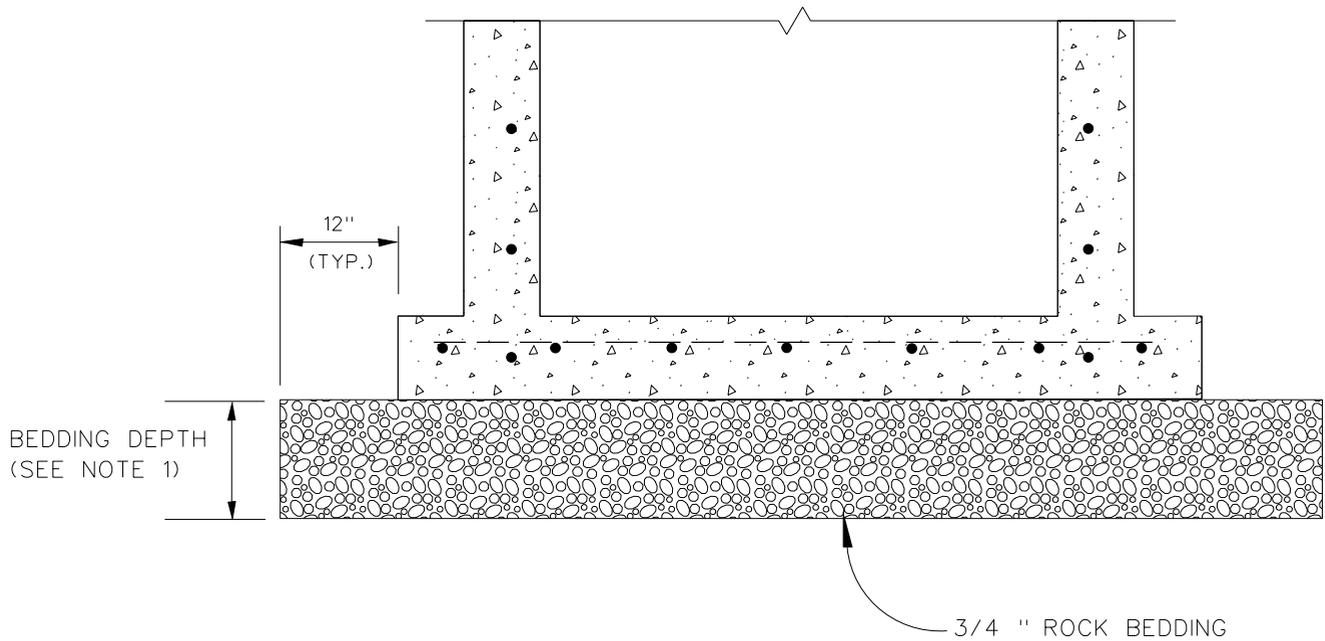
**NOTES:**

1. P.V.C. PIPE SHALL CONFORM TO EITHER A.S.T.M. F758, A.S.T.M. F949, OR A.S.T.M. D3034.
2. AGGREGATE SHALL BE COURSE AGGREGATE #57. LIMEROCK BASE ROCK SHALL NOT BE USED.
3. DIAMETER OF PERFORATIONS SHALL BE 3/16" TO 3/8"
4. AGGREGATE SHALL EXTEND 6" BEYOND END OF PERFORATED P.V.C.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>UNDERDRAIN</b>
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>DD-04</b>
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



NOTES:

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.
2. IF STRUCTURE INCLUDES WEEP HOLES, ROCK SHALL BE WRAPPED IN FILTER FABRIC THAT MEETS THE REQUIREMENTS OF F.D.O.T. SPECIFICATION SECTION 985.



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TITLE:

**Engineering Design and  
 Construction Standards**

DESCRIPTION:

**Standard Bedding**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

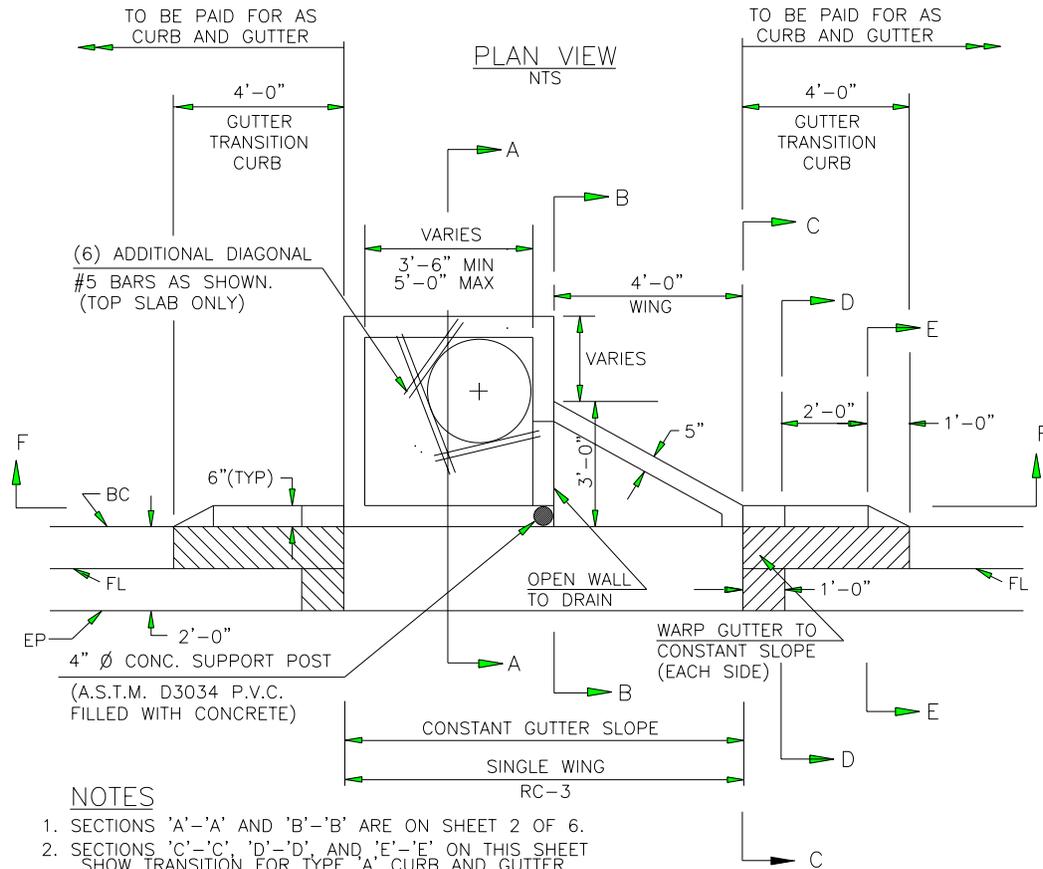
PUBLICATION DATE:  
**November 18, 2008**

INDEX NUMBER:

**DD-05**

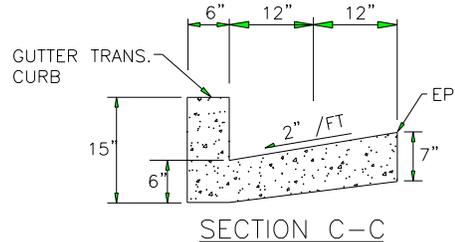
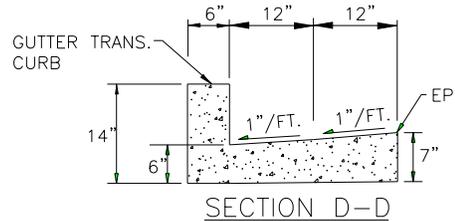
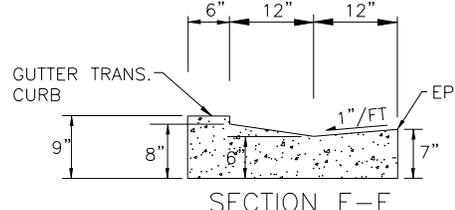
CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

DRAWING SCALE:  
**NOT TO SCALE**



**NOTES**

1. SECTIONS 'A'-'A' AND 'B'-'B' ARE ON SHEET 2 OF 6.
2. SECTIONS 'C'-'C', 'D'-'D', AND 'E'-'E' ON THIS SHEET SHOW TRANSITION FOR TYPE 'A' CURB AND GUTTER.
3. TRANSITION FOR TYPE 'F' CURB IS ON SHEET 4 OF 6.
4. SECTION 'F'-'F' IS ON SHEET 3 OF 6.
5. RC-4 IS SYMMETRICAL ABOUT THE CENTERLINE.
6. RC-5 IS CONSTRUCTED WITHOUT WINGS.

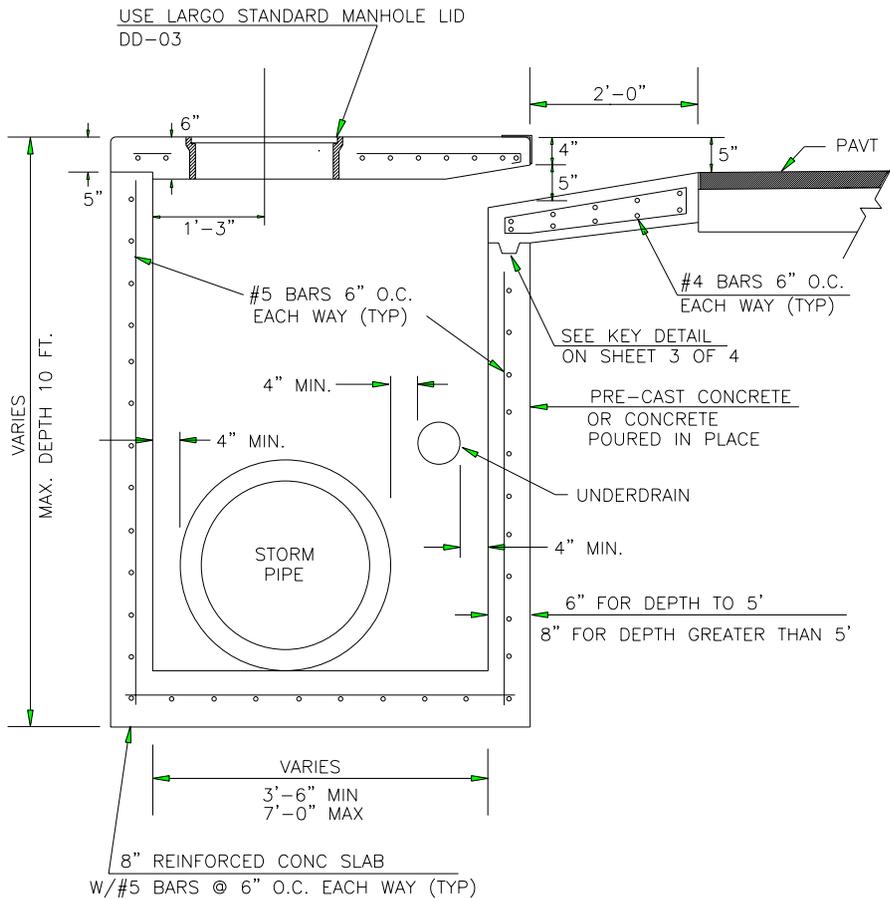


See Sections DD-07 through DD-11



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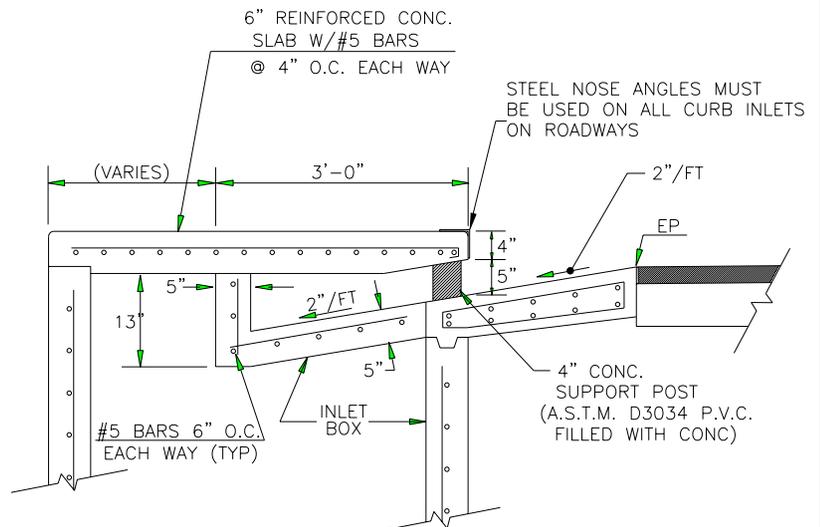
TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Curbed Inlet Details Pg. 1 of 6</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>DD-06</b>	
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



SECTION A-A  
NTS

NOTES

1. RC-4 IS SYMMETRICAL ABOUT THE CENTERLINE
2. RC-5 IS CONSTRUCTED WITHOUT WINGS



SECTION B-B

(VIEW THROUGH INLET BOX AND WING TRANSITION)

See Sections DD-06 and DD-08 Through DD-11



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TITLE:  
**Engineering Design and Construction Standards**

DESCRIPTION:  
**Curbed Inlet Details Pg. 2 of 6**

COMMUNITY DEVELOPMENT DIRECTOR:  
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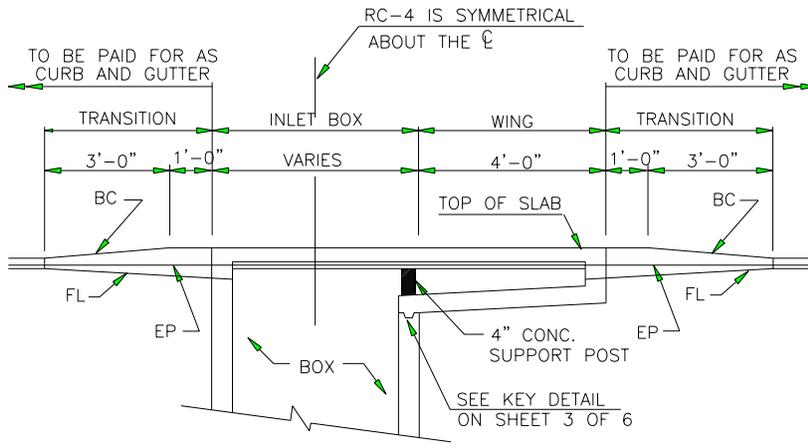
PUBLICATION DATE:  
 November 18, 2008

INDEX NUMBER:

CITY ENGINEER:  
 LELAND E. DICUS P.E.

DRAWING SCALE:  
 NOT TO SCALE

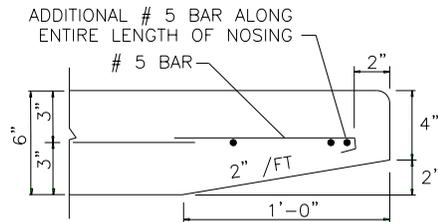
**DD-07**



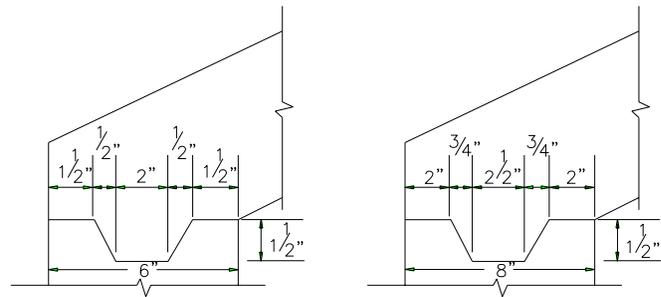
SECTION F-F  
NTS

NOTES

1. RC-4 IS SYMMETRICAL ABOUT THE CENTERLINE
2. RC-5 IS CONSTRUCTED WITHOUT WINGS



NOSING DETAIL  
NTS



KEY DETAIL  
NTS

See Sections DD-06 Through DD-07 and DD-09 Through DD-11



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TITLE:  
**Engineering Design and  
Construction Standards**

DESCRIPTION:  
**Curbed Inlet Details  
Pg. 3 of 6**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

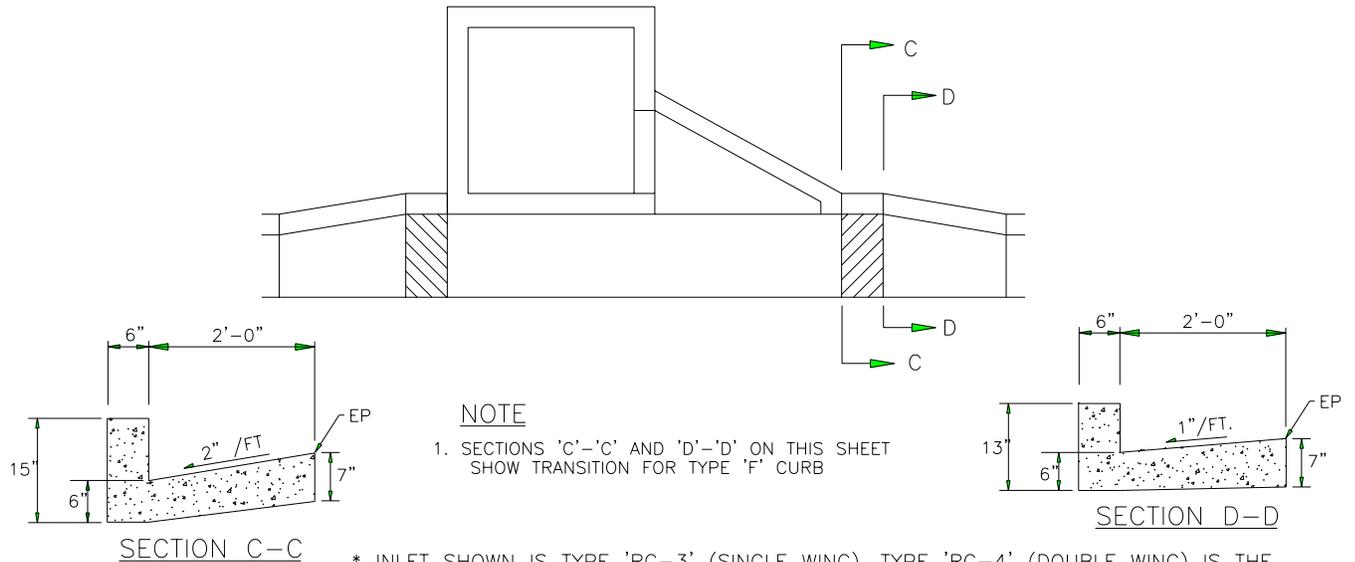
PUBLICATION DATE:  
**November 18, 2008**

INDEX NUMBER:

CITY ENGINEER:  
**LELAND E. DICUS P.E.**

DRAWING SCALE:  
**NOT TO SCALE**

**DD-08**



**NOTE**  
 1. SECTIONS 'C'-'C' AND 'D'-'D' ON THIS SHEET SHOW TRANSITION FOR TYPE 'F' CURB

\* INLET SHOWN IS TYPE 'RC-3' (SINGLE WING). TYPE 'RC-4' (DOUBLE WING) IS THE SAME AS 'RC-3', EXCEPT THAT IT IS SYMMETRICAL ABOUT CENTERLINE OF BOX, AND RC-5 IS THE SAME, EXCEPT THAT IT IS CONSTRUCTED WITHOUT WINGS.

**GENERAL NOTES**

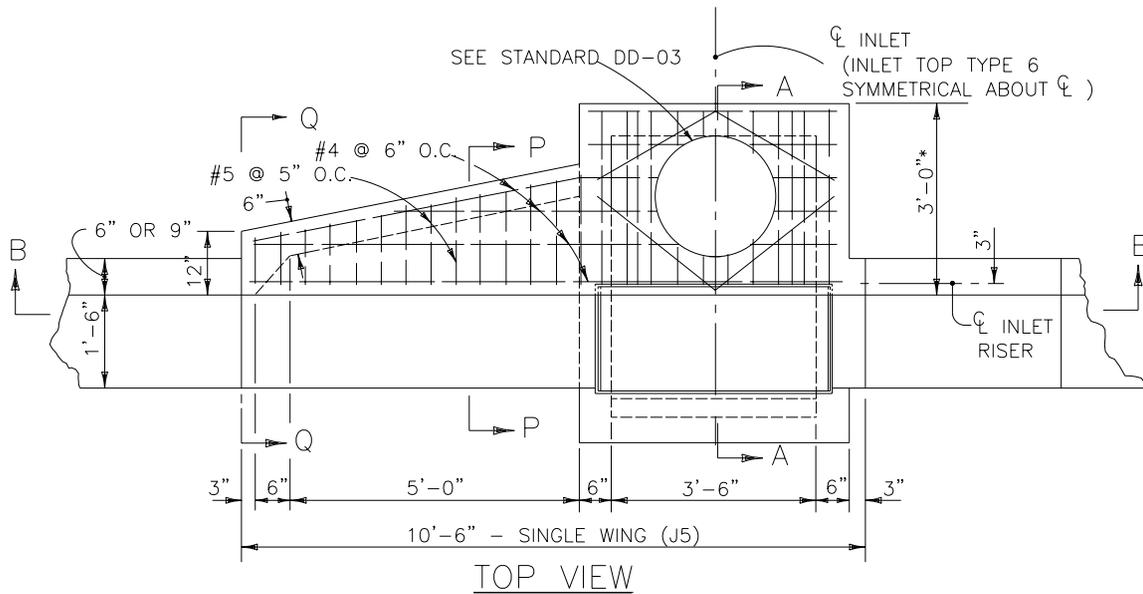
1. THESE INLETS ARE FOR USE WITH THE CITY OF LARGO'S APPROVED CURB AND GUTTER DESIGNS. (RT-13)
2. C OF INLETS SHOULD BE LOCATED AT PROPERTY LINES UNLESS OTHERWISE APPROVED.
3. COVER FOR ALL REINFORCING STEEL SHALL BE 2" MINIMUM.
4. SUGGESTED MAXIMUM INLET DESIGN FLOWS FOR 0.4% PROFILE GRADE AND 1/4"/FT. CROSS SLOPE.  
 RC-3: 4.5 CFS (3'-6" WIDTH) / 5.5 CFS (5'-0" WIDTH)  
 RC-4: 6.5 CFS (3'-6" WIDTH) / 7.5 CFS (5'-0" WIDTH)  
 RC-5: 3 CFS (3'-6" WIDTH) / 4 CFS (5'-0" WIDTH)
5. INLETS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE, AND MAY BE EITHER PRECAST OR POURED IN PLACE.
6. CONCRETE SHALL BE CLASS II, WITH  $F_c' = 3000$  PSI (MIN). ( $F_c' = 4000$  PSI (MIN) FOR TOP SLAB).
7. REINFORCING STEEL SHALL BE GRADE 40, DEFORMED, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 615 (GRADE 60 FOR TOP SLAB.)
8. WHEN INLET TOPS EXTEND INTO SIDEWALK OR OTHER PAVED AREAS, THE FINISHED SURFACE OF THE INLET TOPS SHALL CONFORM TO THE FINISHED GRADE AND CROSS SLOPE OF THE ADJACENT SIDEWALK OR PAVEMENT. TO ACHIEVE THIS CONFORMITY THE DEPTH OF THE INLET SLAB MAY BE INCREASED WHERE NECESSARY, AND/OR THE HEIGHT OF THE INLET SIDE AND REAR WALLS MAY BE INCREASED OR DECREASED AS REQUIRED. HOWEVER, THE THICKNESS OF THE INLET SLAB AT ANY POINT SHALL NOT BE LESS THAN THAT SHOWN IN THE PLANS, AND NO ADJUSTMENT SHALL BE MADE TO THE DEPTH OF INLET OPENINGS OR THE HEIGHT OF THE TOP FRONT EDGE OF THE INLET SLAB.
9. UNLESS OTHERWISE NOTED, ALL EXPOSED EDGES AND CORNERS OF CONCRETE SHALL HAVE A 3/4" CHAMFER.
10. FDOT TYPE 'J' BOTTOM MAY BE USED WITH 'RC-3', 'RC-4' AND 'RC-5' INLETS. IN SUCH CASES THE STRUCTURE BOTTOM MAY BE ROTATED AS DIRECTED BY ENGINEER IN ORDER TO FACILITATE CONNECTIONS BETWEEN THE STRUCTURE WALLS AND STORM SEWER PIPES.

See Sections DD-06 Through DD-08 and DD-10 Through DD-11



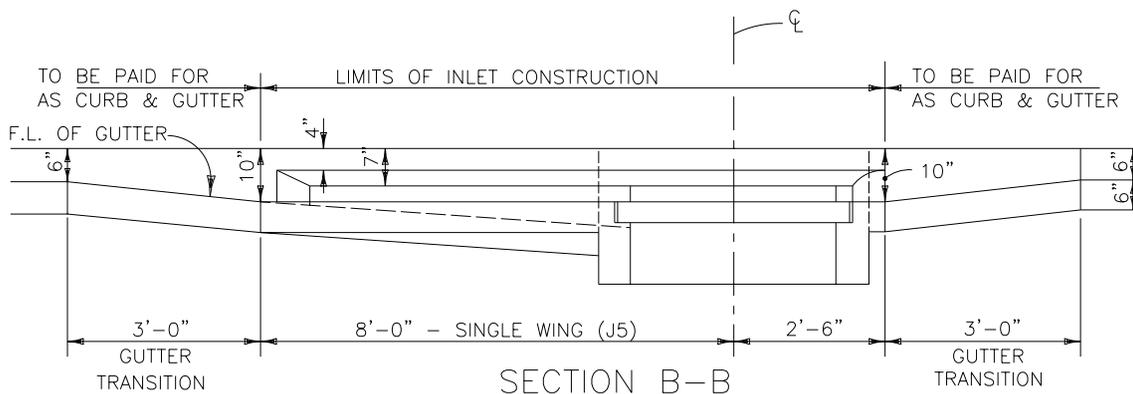
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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Curbed Inlet Detail Pg. 4 of 6	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: DD-09	
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE		



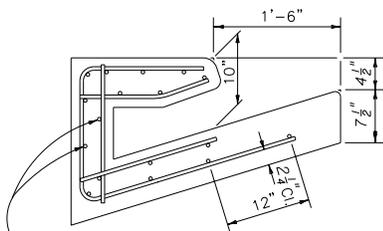
TOP VIEW

NTS



SECTION B-B

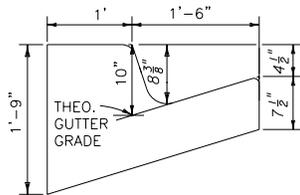
(CURB INLET TOP TYPE J6 IS SYMMETRICAL ABOUT THE CENTER LINE)



INTERMEDIATE BARS  
(DISCONTINUED WHEN  
SPACE BETWEEN ADJACENT  
LONGITUDINAL CLOSER  
THAN 8" CENTERS)

SECTION P-P

NTS



SECTION Q-Q

NTS

GENERAL NOTES

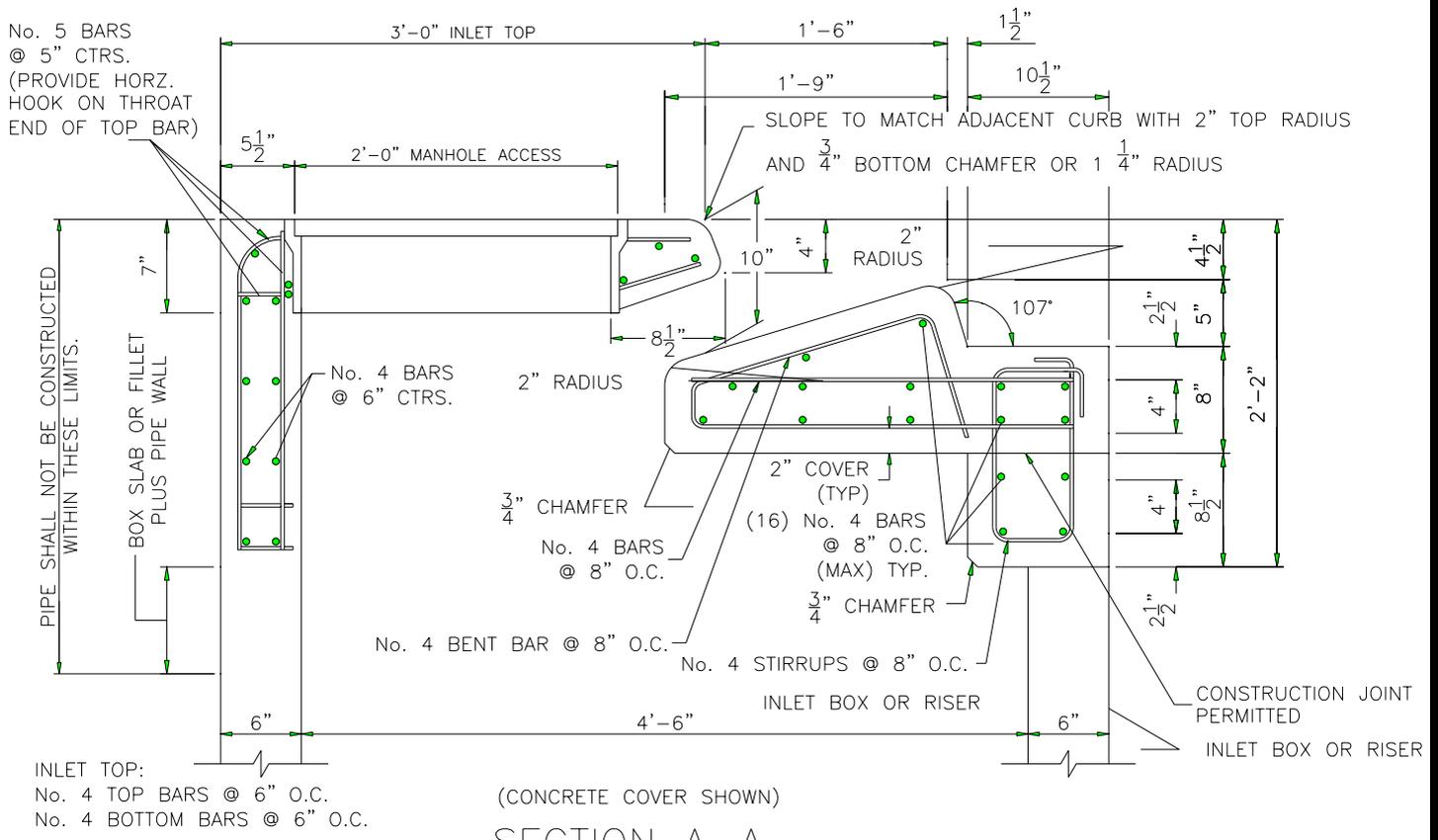
1. COVER FOR ALL REINFORCING STEEL SHALL BE 2" MINIMUM.
2. INLETS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE, AND MAY BE EITHER PRECAST OR POURED IN PLACE.
3. CONCRETE SHALL BE CLASS II, WITH  $F_c' = 3000$  PSI (MIN). CONCRETE SHALL BE IN ACCORDANCE WITH SECTION 346 OF F.D.O.T.'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
4. REINFORCING STEEL SHALL BE GRADE 60, DEFORMED, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 615.
5. UNLESS OTHERWISE NOTED, ALL EXPOSED EDGES AND CORNERS OF CONCRETE SHALL HAVE A 3/4" CHAMBER.

See Sections DD-06 Through DD-09 and DD-11



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Curbed Inlet Details Pg. 5 of 6	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: DD-10	
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE		



NOTE: MANHOLE COVER & FRAME TO BE LARGO STANDARD DD-03  
 CONTRACTOR TO SUBMIT SHOP DRAWING TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.  
 J5 DESIGNATES A SINGLE WING INLET.  
 J6 DESIGNATES A DOUBLE WING INLET.

See Section DD-06 Through DD-10



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Curbed Inlet Details Pg. 6 of 6</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>DD-11</b>	
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

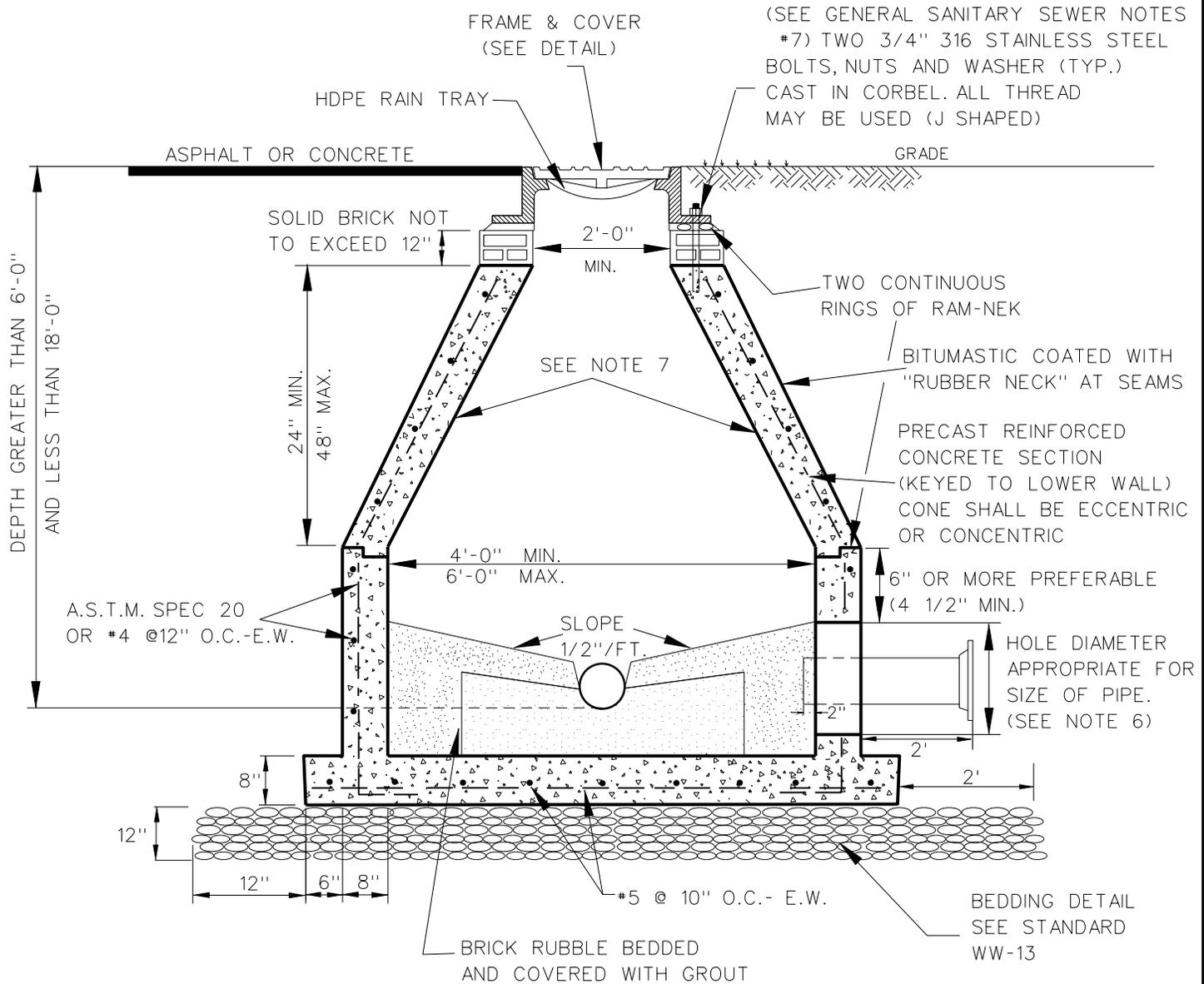
## GENERAL SANITARY SEWER NOTES

1. MANHOLES SHALL BE INSPECTED BY THE CITY AFTER THE COMPLETION OF ALL BASE WORK, AND PRIOR TO SURFACE TREATMENT.
2. ALL OPENINGS IN PRE-CAST MANHOLES SHALL BE CAST AT TIME OF MANUFACTURE. CONNECTIONS TO EXISTING MANHOLES SHALL BE CORE ENTRY ONLY.
3. ALL MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE.
4. ALL P.V.C. GRAVITY SEWER PIPES SHALL CONFORM TO A.S.T.M. D-3034, S.D.R.-35, LATEST REVISIONS, WITH PUSH-ON RUBBER GASKET JOINTS.
5. ALL D.I.P. GRAVITY SEWER PIPES SHALL BE CLASS 52, EPOXY LINED OR AS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. NO SERVICE CONNECTIONS, WYES, SERVICES OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS, EXCEPT UPON APPROVAL OF THE CITY ENGINEER.
7. MANHOLE FRAMES THAT ARE NOT SUPPORTED BY ASPHALT OR CONCRETE SHALL BE ATTACHED TO THE PRE-CAST STRUCTURE WITH A MINIMUM OF TWO 3/4" 316 STAINLESS STEEL BOLTS, NUTS AND WASHERS. FRAMES SHALL BE SEALED WITH A MINIMUM OF TWO 1/2" BEADS OF RAM-NEK CAULKING.
8. TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER ON UNDISTURBED SOIL. IF UNSUITABLE SUBSURFACE MATERIAL IS ENCOUNTERED, EXCAVATE EXTRA 6" AND BACK FILL WITH 3/4" GRAVEL.
9. P.V.C. PIPES SHALL BE LAID IN STRICT CONFORMANCE TO THE MANUFACTURER'S SPECIFICATIONS (E.G., "JOHNS MANVILLE RING TITE P.V.C. PIPE INSTALLATION GUIDE" OR EQUAL.) BACKFILLING OF UTILITY TRENCHES WILL NOT BE ALLOWED UNTIL INSPECTED BY THE CITY.
10. BACK FILL MATERIAL FOR SEWER MAIN AND LINES SHALL BE NON-COHESIVE, NON-PLASTIC MATERIAL FREE OF ALL DEBRIS, LUMPS AND ORGANIC MATTER. BACK FILL MATERIAL PLACED WITHIN 1' OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN 2" IN DIAMETER (1" FOR P.V.C. PIPE), AND NO STONE LARGER 6" IN DIAMETER WILL BE PERMITTED IN ANY BACK FILL MATERIAL.
11. ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACK FILLED AND STABILIZED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO THE CONTRACTOR LEAVING THE CONSTRUCTION SITE.
12. IN ANY INSTANCE WHERE SEWER LINES ARE NOT INSTALLED WITHIN PUBLIC RIGHTS-OF-WAY, ALL LINES SHALL BE LOCATED IN A PUBLIC UTILITY EASEMENT, AND CITY MAINTENANCE RESPONSIBILITY IS MANHOLE TO MANHOLE ONLY.
13. UPON COMPLETION OF THE WORK AND PRIOR TO PLACEMENT OF ASPHALT A VISUAL INSPECTION AND VIDEO RECORDING SHALL BE MADE OF THE COMPLETED SYSTEM. THE CITY SHALL APPROVE THE SYSTEM PRIOR TO IT BEING PLACED IN SERVICE, AND BEING ACCEPTED FOR MAINTENANCE.
14. COMPLETE "AS-BUILT" INFORMATION RELATIVE TO MANHOLES, VALVES, SERVICES, FITTINGS, PIPE LENGTHS, INVERTS AND SLOPES SHALL BE ACCURATELY RECORDED AND SUBMITTED TO THE CITY, AND MUST BE SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR.
15. AT THE END OF THE ONE (1) YEAR WARRANTY PERIOD THE CITY WILL T.V. INSPECT, AND CHECK MANHOLE JOINTS AND CONNECTIONS TO DETERMINE IF REPAIRS ARE NECESSARY BEFORE THE WARRANTY BOND IS RELEASED.
16. ONLY EIGHT(8") INCH MAINS (PRIVATE), NOT SIX(6") INCH WILL BE VISUALLY INSPECTED AND VIDEO RECORDED. EIGHT(8") INCH PIPE LESS THAN SIXTY(60') FEET LONG WILL BE EXEMPT.



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<small>TITLE:</small>		<small>DESCRIPTION:</small>	
<b>Engineering Design and Construction Standards</b>		<b>General Sanitary Sewer Notes</b>	
<small>COMMUNITY DEVELOPMENT DIRECTOR:</small> <b>CAROL STRICKLIN A.I.C.P.</b>	<small>PUBLICATION DATE:</small> <b>November 18, 2008</b>	<small>INDEX NUMBER:</small> <b>WW-01</b>	
<small>CITY ENGINEER:</small> <b>LELAND E. DICUS, P.E.</b>	<small>DRAWING SCALE:</small> <b>NOT TO SCALE</b>		



**NOTES:**

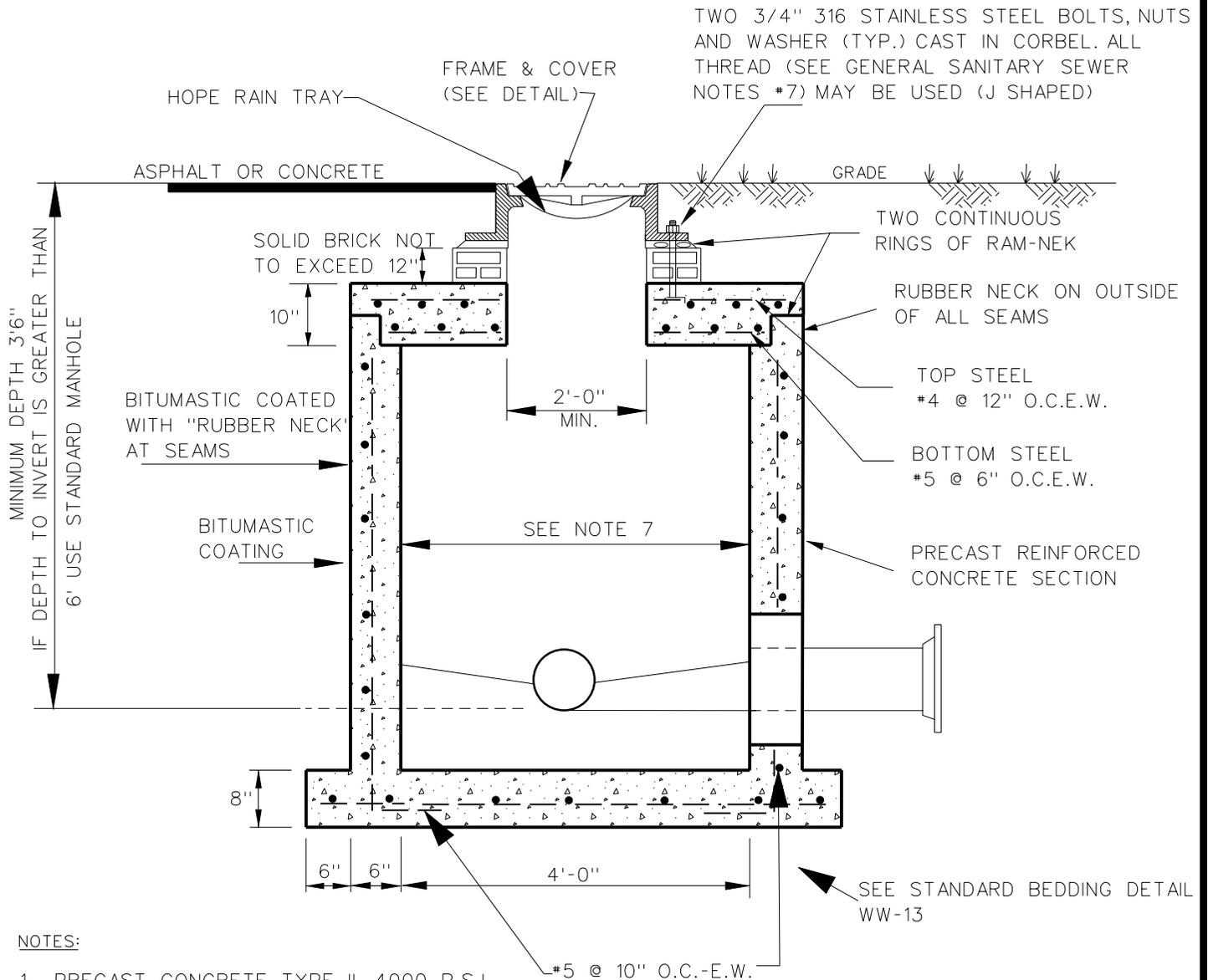
1. PRECAST CONCRETE TYPE II, 4000 P.S.I.
2. TWO CONTINUOUS RINGS OF RAM-NEK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS.
3. ALL OPENINGS SHALL BE SEALED WITH HDPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM.
5. ALL PIPE HOLES SHALL BE PRECAST.
6. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM, OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.
7. INSIDE OF MANHOLE SHALL BE LINED WITH HDPE THERMAL PLASTIC LINER, FIBERGLASS LINER OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS. THE HDPE LINER SHALL PROVIDE BACK PRESSURE RESISTANCE OF 29 P.S.I. AND SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRECAST OPERATION. OUTSIDE OF MANHOLE SHALL BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH A.S.T.M. C-478, LATEST STANDARD. UNLESS OTHERWISE DIRECTED BY OWNER.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Standard Manhole	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: WW-02	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		





**NOTES:**

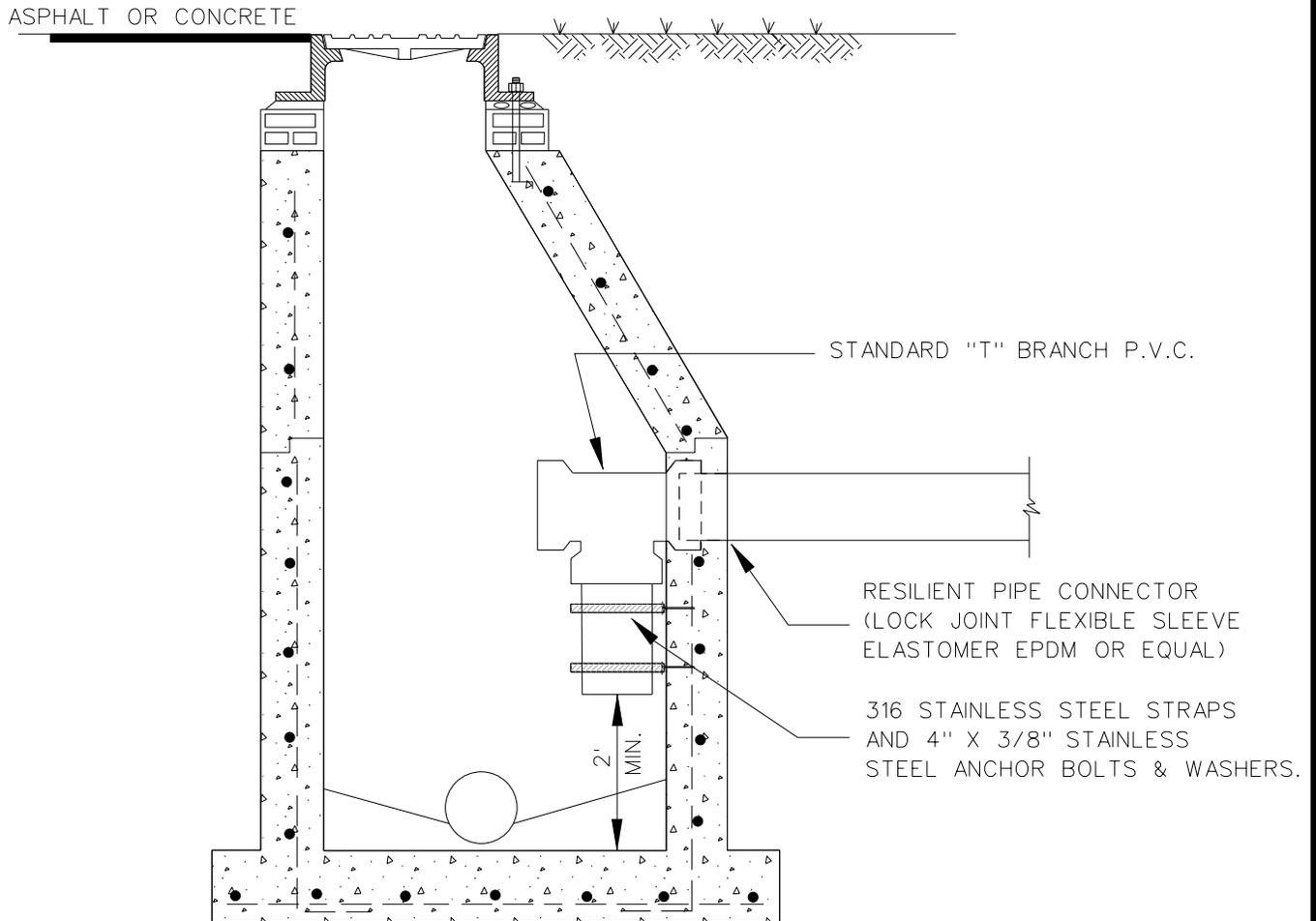
1. PRECAST CONCRETE TYPE II, 4000 P.S.I.
2. TWO CONTINUOUS RINGS OF RAM-NEK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS.
3. ALL OPENINGS SHALL BE SEALED WITH HDPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM.
5. ALL PIPE HOLES SHALL BE PRECAST.
6. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM, OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.
7. INSIDE OF MANHOLE SHALL BE LINED WITH H.D.P.E. THERMAL PLASTIC LINER, FIBERGLASS LINER OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS. THE H.D.P.E. LINER SHALL PROVIDE BACK PRESSURE RESISTANCE OF 29 P.S.I. AND SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRECAST OPERATION. OUTSIDE OF MANHOLE SHALL BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C-478, LATEST STANDARD. UNLESS OTHERWISE DIRECTED BY OWNER.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Shallow Manhole	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: WW-04	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

INSIDE DROP MANHOLE



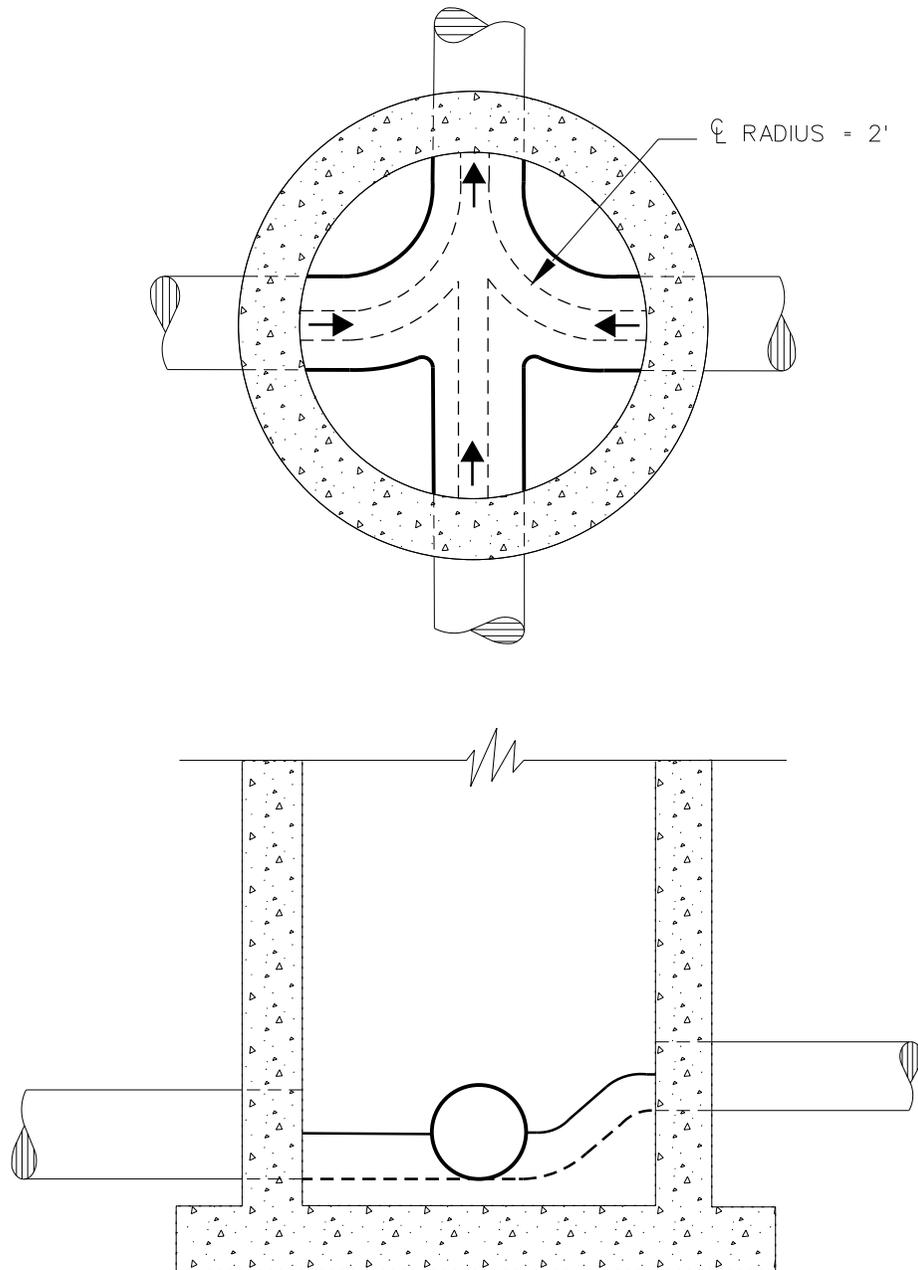
NOTES:

1. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN INVERT CHANNEL.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Inside Drop Manhole	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	WW-05	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS, P.E.	NOT TO SCALE		



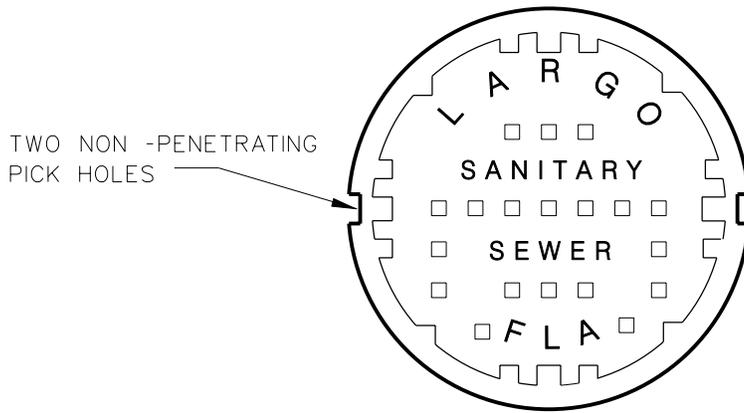
NOTES:

1. ALL INVERT CHANNELS ARE TO BE CONSTRUCTED FOR SMOOTH FLOW WITHOUT OBSTRUCTION OR TURBULENCE.
2. PROPERLY SHAPED SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS TO PROVIDE FOR SMOOTH FLOWS.
3. SOLID MANHOLE BRICK PERMITTED AS FLOW CHANNEL BUILDUP, EXCEPT IN HDPE THERMAL PLASTIC LINED MANHOLES.
4. ALL INVERTS SHALL HAVE A MINIMUM OF 1/4" PER FOOT 1/10 OR 10% FALL.

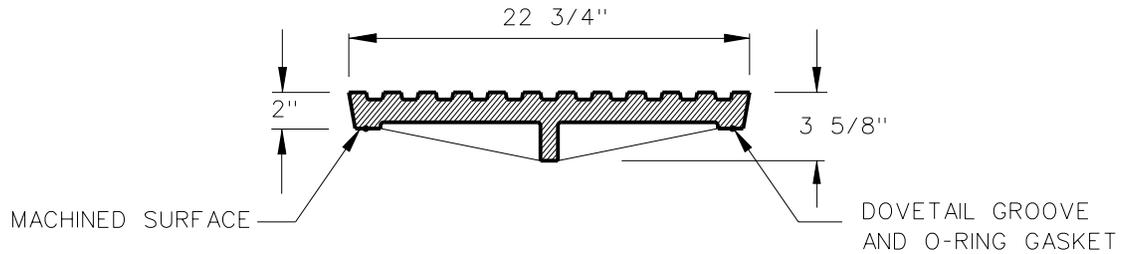


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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Invert Flow Channels</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>WW-06</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

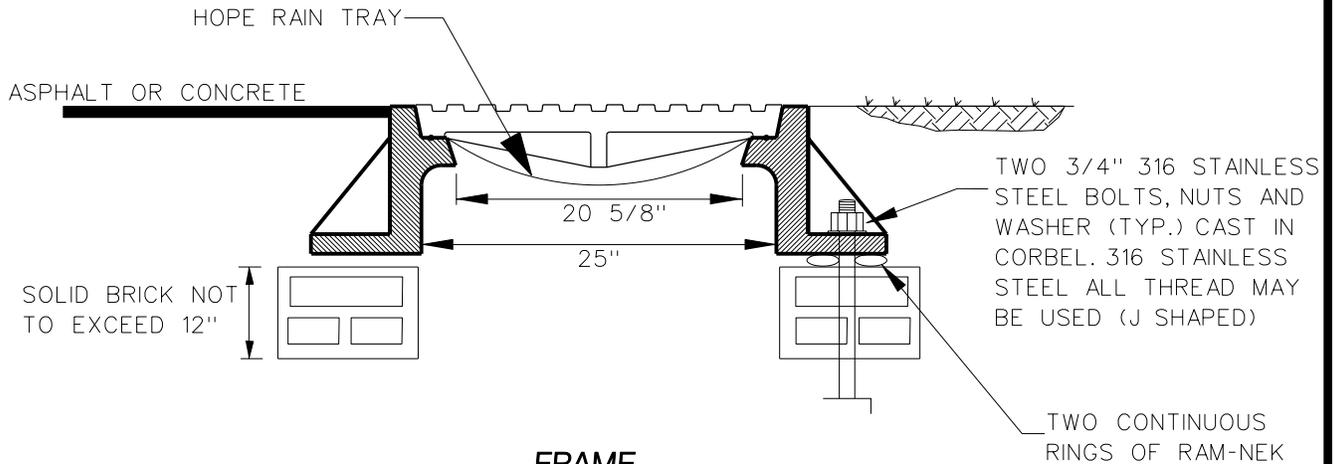


**SOLID COVER**



**SOLID COVER SECTION**

MIN. WEIGHT: 130 lbs.



**FRAME**

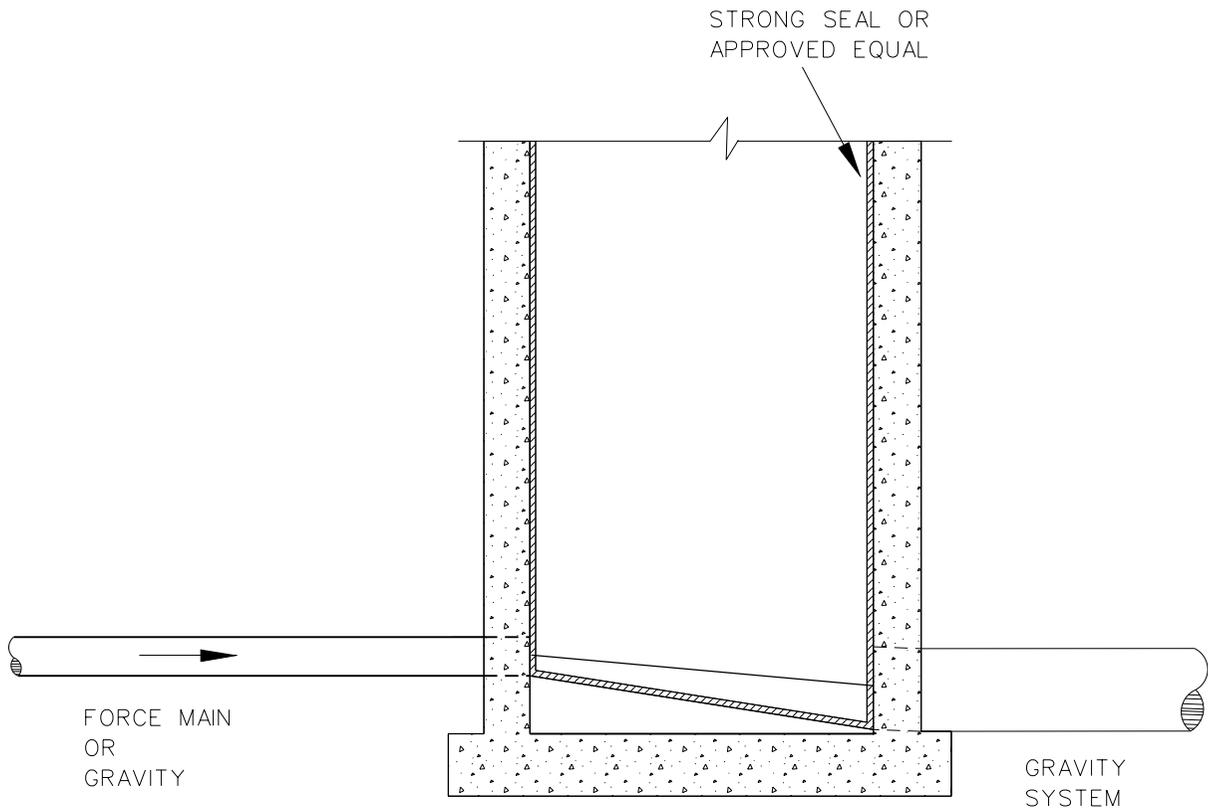
**NOTES:**

1. FRAME AND COVER SHALL BE U.S. FOUNDRY No.485G-ORS, COATED WITH BITUMASTIC COAL TAR.
2. COVER SHALL BE TYPE "G" AND SHALL CONTAIN "LARGO SANITARY SEWER" IMPRINTED AND NON-SKID CAST PATTERN.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Sanitary Sewer Manhole Frame and Cover</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>WW-07</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**MANHOLE**

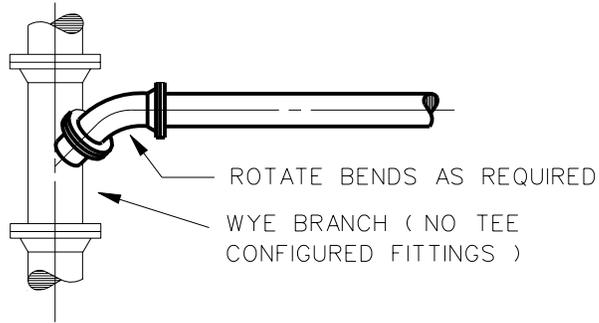
**NOTES:**

1. GRAVITY LINES TO ENTER MANHOLE NO LESS THAN 90° FROM FORCE MAIN.
2. FORCE MAIN TO ENTER MANHOLE AS CLOSE AS POSSIBLE TO 180° TO CENTERLINE OF FLOW FOR GRAVITY OUTLET.
3. THE INVERT LEVEL OF FORCE MAIN AT POINT OF ENTRY SHALL BE 6" ABOVE INVERT OF MANHOLE.
4. ENTRY INTO EXISTING MANHOLES SHALL CONSIST OF CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH 316 STAINLESS STEEL EXPANSION RING.
5. IF ELEVATION DROP IS REQUIRED TO ENTER MANHOLE APPROVAL SHALL BE OBTAINED FROM CITY ENGINEER.
6. FLOW CHANNEL REQUIRED.

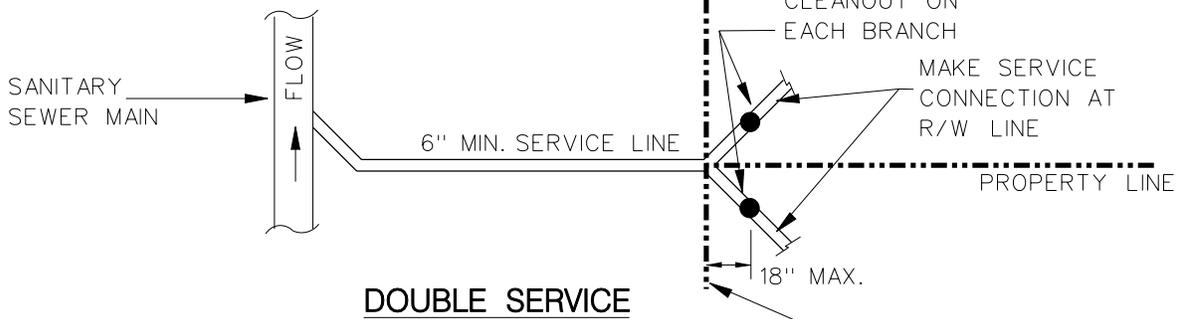
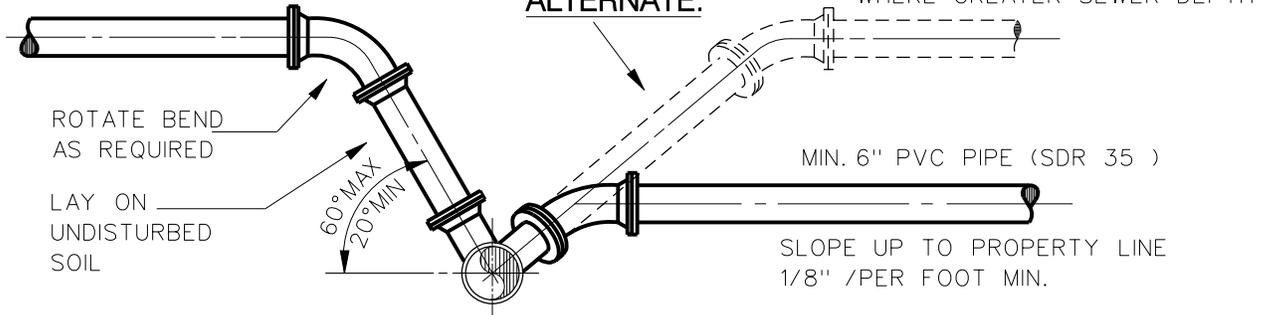


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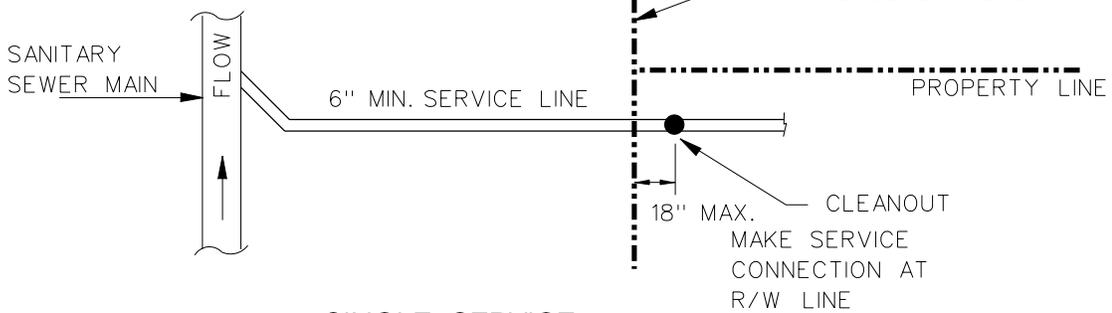
TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Sanitary Sewer Force Main Manhole Entrance</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>WW-08</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



SLOPE UP TO PROPERTY LINE  
1/8" /PER FOOT MIN.



**DOUBLE SERVICE**



**SINGLE SERVICE**

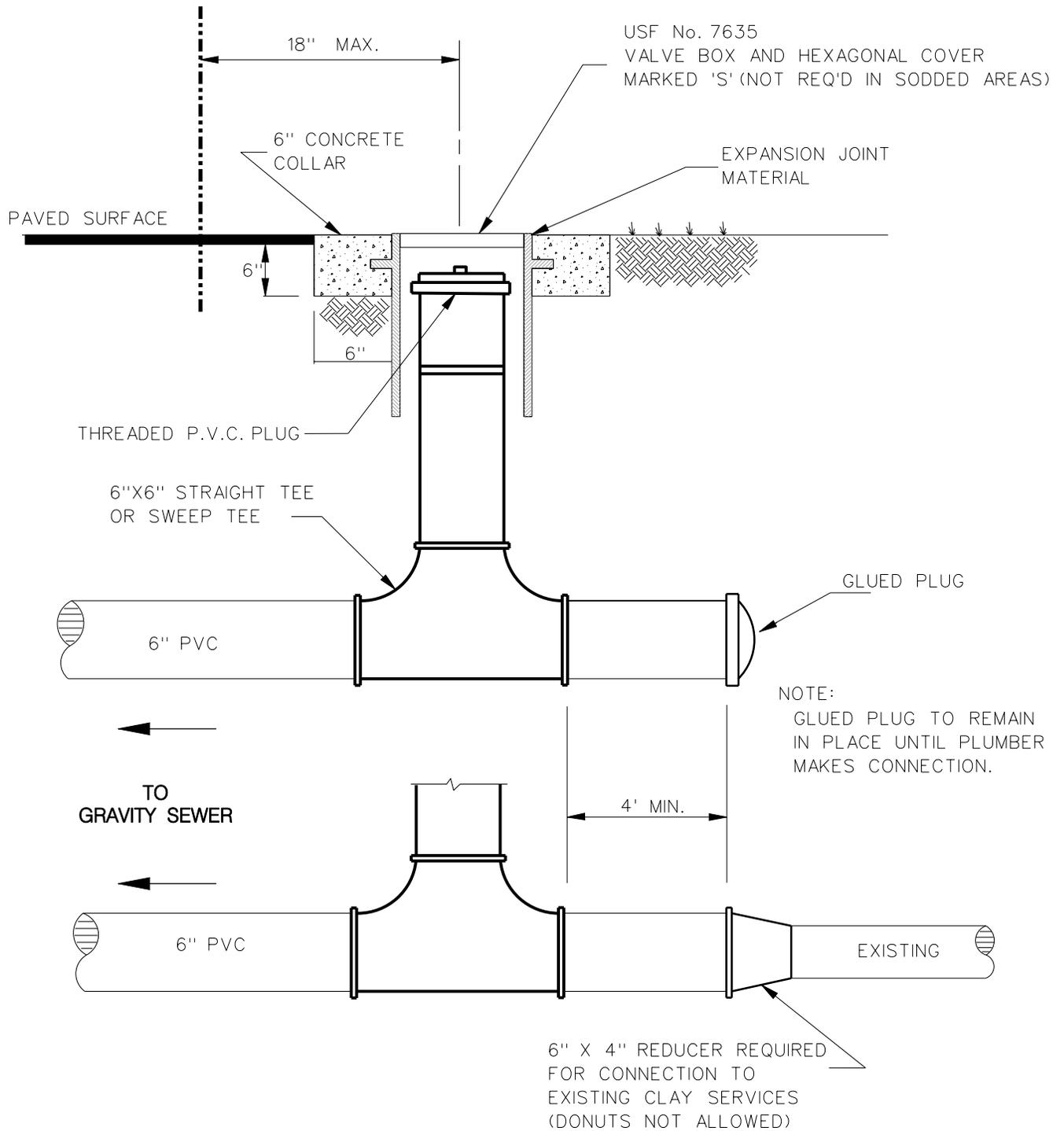
**NOTE:**

1. SERVICE LATERALS SHALL TERMINATE INSIDE THE PROPERTY LINE AT A DEPTH OF 3 FEET WITH CLEANOUT AND MARKED WITH A 2"x4" TREATED STAKE PAINTED GREEN.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Sanitary Sewer Service Lay-Out	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: WW-09	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



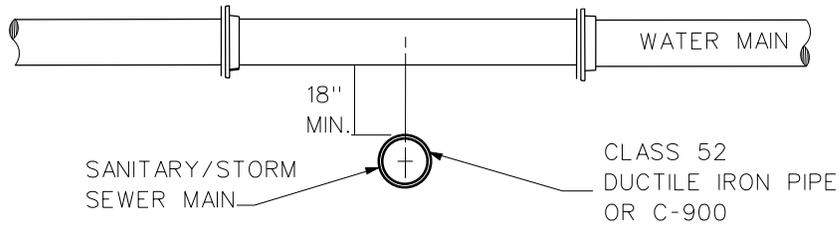
NOTES:

1. NEW SERVICES SHALL BE 6" P.V.C.
2. CONTRACTOR SHALL BE REQUIRED TO MAKE CONNECTION TO EXISTING SERVICES AND TO PROVIDE UNINTERRUPTED SERVICE.

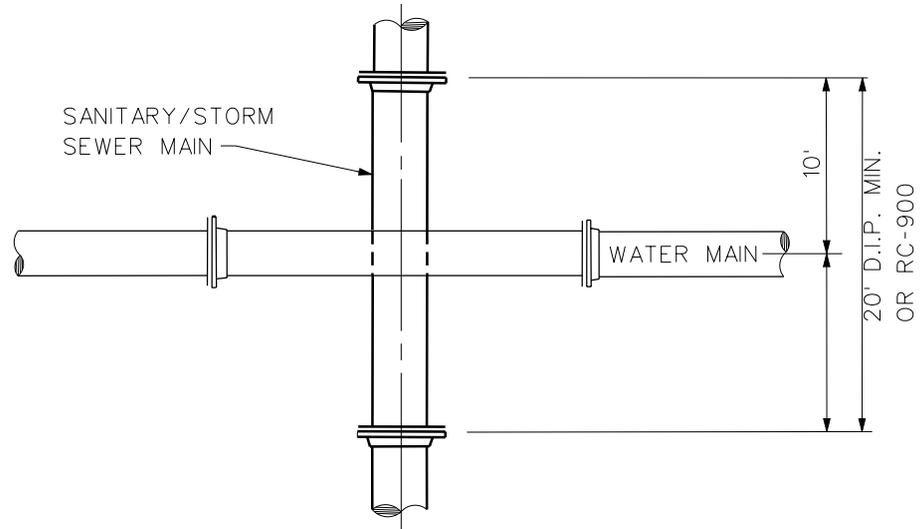


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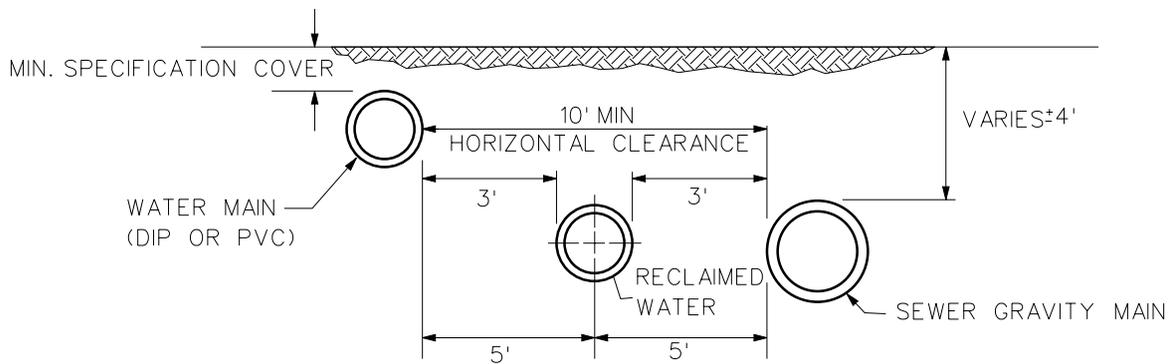
TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Sanitary Sewer Clean-Out</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>WW-10</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**CROSS SECTION VIEW**



**PLAN VIEW**



**HORIZONTAL CLEARANCE**

SEE NOTES PAGE WW-12



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Water Main and Sanitary Sewer Line Conflict</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>WW-11</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

# REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION NOTES

## PARALLEL INSTALLATION

1. POTABLE WATER, WASTEWATER GRAVITY/FORCE, OR RECLAIMED WATER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A MINIMUM OF HORIZONTAL DISTANCE 10' SHALL BE MAINTAINED BETWEEN POTABLE WATER AND ANY TYPE OF WASTEWATER LINE WHENEVER POSSIBLE. THE DISTANCE SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN-FOOT SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE WASTEWATER LINE AND AT AN ELEVATION SO THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE WASTEWATER LINE.
2. IF IT IS IMPOSSIBLE TO MAINTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE, THE WATER SHALL BE CONSTRUCTED OF D.I.P. AND THE WASTEWATER LINE SHALL BE C900 P.V.C. AND PRESSURE TESTED TO ONE-HUNDRED AND FIFTEY (150) P.S.I. TO INSURE WATER TIGHTNESS BEFORE BACKFILLING. THE PIPELINE JOINTS SHALL BE STAGGERED SO THAT THE WATER MAIN JOINTS SHALL BE AS FAR APART AS POSSIBLE FROM THE JOINTS ON THE WASTEWATER LINE
3. A MINIMUM HORIZONTAL SEPARATION OF FIVE (5) FEET CENTER TO CENTER THREE (3) FEET OUTSIDE EDGE TO OUTSIDE EDGE SHALL BE MAINTAINED BETWEEN RECLAIMED WATER MAINS AND POTABLE WATER OR WASTEWATER GRAVITY OR FORCE MAINS.

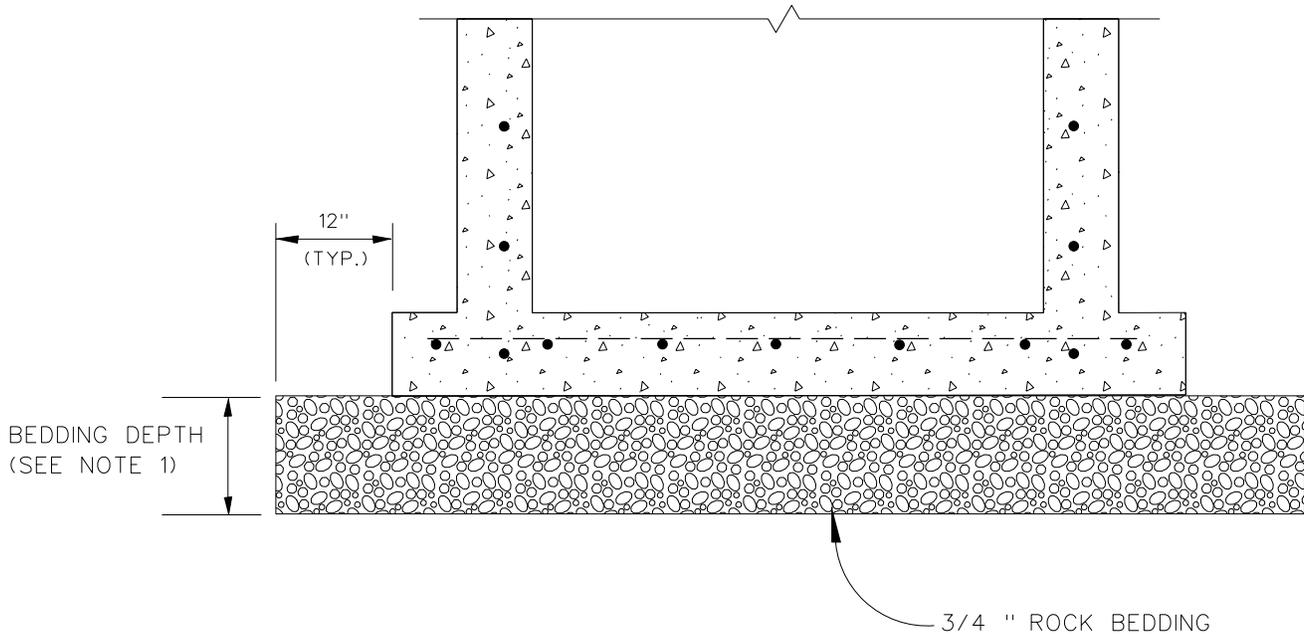
## CROSSINGS

1. WASTEWATER MAINS SHALL CROSS UNDER RECLAIMED WATER MAINS. WASTEWATER AND RECLAIMED MAINS SHALL CROSS UNDER POTABLE WATER MAINS, WHEREVER POSSIBLE. THE MINIMUM VERTICAL DISTANCE BETWEEN MAINS AT A CROSSING IS EIGHTEEN (18) INCHES. THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER/RECLAIMED MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
2. WHERE WASTEWATER OR RECLAIMED MAINS MUST CROSS A WATER MAIN WITH LESS THAN EIGHTEEN (18) INCHES OF VERTICAL CLEARANCE, THE RECLAIMED AND POTABLE WATER MAIN MUST BE CONSTRUCTED OF DUCTILE IRON PIPE AT THE CROSSING. A WASTEWATER GRAVITY OR FORCE MAIN SHALL BE CONSTRUCTED WITH C900 P.V.C. AT THE CROSSING. ALTERNATIVELY, ONE OF THE CROSSING MAINS SHALL BE ENCLOSED WITHIN A TWENTY (20) FOOT LONG STEEL OR P.V.C. CASING CENTERED ON THE CROSSING.
3. WHERE A WATER MAIN MUST CROSS UNDER A WASTEWATER GRAVITY MAIN, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE GRAVITY MAIN TO MAINTAIN LINE AND GRADE



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<small>TITLE:</small> <b>Engineering Design and Construction Standards</b>		<small>DESCRIPTION:</small> <b>Water Main and Sanitary Sewer Line Conflict</b>	
<small>COMMUNITY DEVELOPMENT DIRECTOR:</small> <b>CAROL STRICKLIN A.I.C.P.</b>	<small>PUBLICATION DATE:</small> <b>November 18, 2008</b>	<small>INDEX NUMBER:</small> <b>WW-12</b>	
<small>CITY ENGINEER:</small> <b>LELAND E. DICUS, P.E.</b>	<small>DRAWING SCALE:</small> <b>NOT TO SCALE</b>		



**NOTES:**

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.
2. IF STRUCTURE INCLUDES WEEP HOLES, ROCK SHALL BE WRAPPED IN FILTER FABRIC THAT MEETS THE REQUIREMENTS OF F.D.O.T. SPECIFICATION SECTION 985.

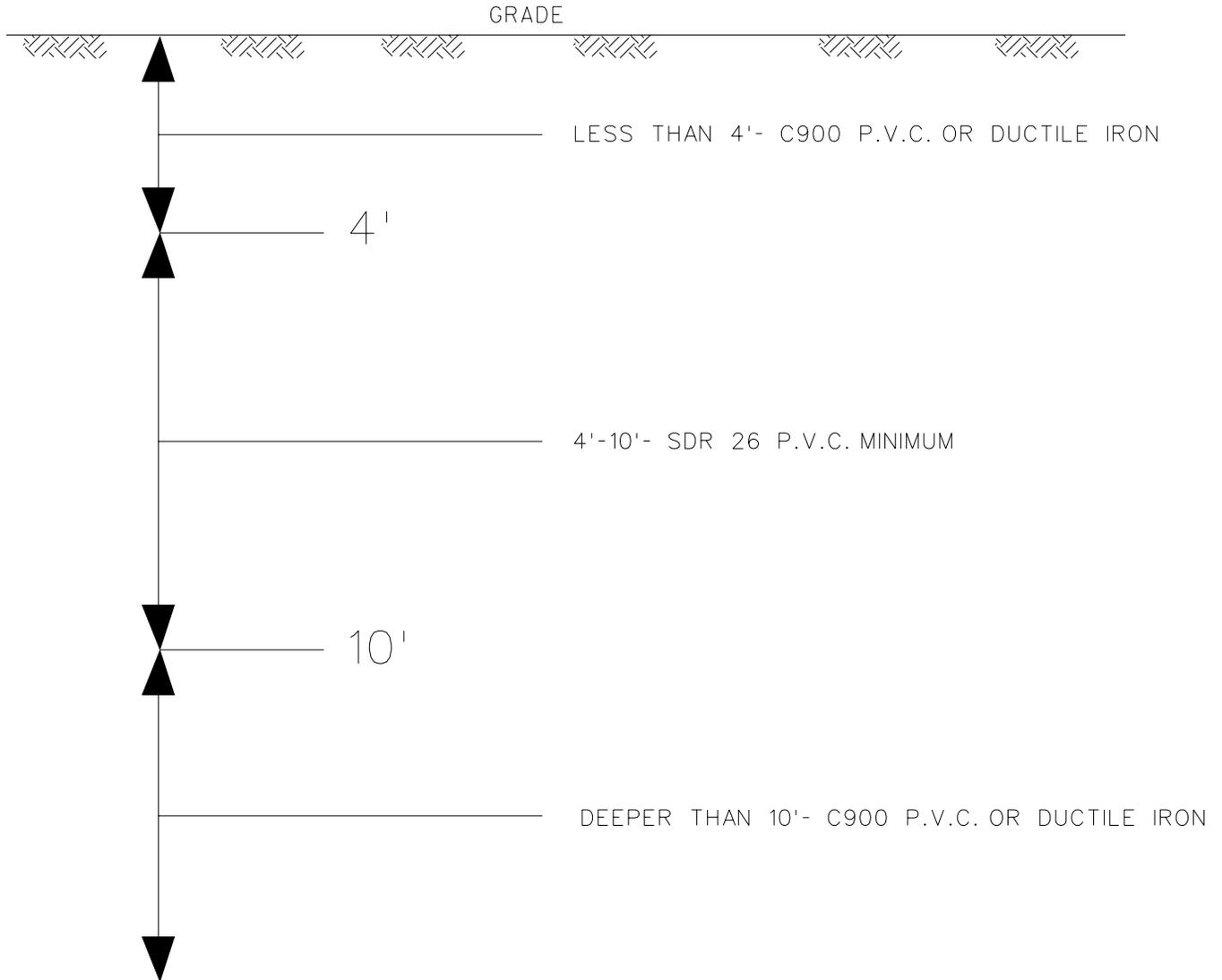


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TITLE: <b>Engineering Design and Construction Standards</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>

DESCRIPTION: <b>Standard Bedding</b>
INDEX NUMBER: <b>WW-13</b>

DEPTH LIMITATIONS OF  
SANITARY SEWER LINES



NOTE:

1. BURIED MAGNETIC TAPE SHALL BE PLACE IN THE TOP ONE (1') FOOT OF BACK FILL DIRECTLY ABOVE PIPE.
2. SDR 35 P.V.C. WILL NOT BE ALLOWED AT ANY DEPTH UNDER ANY CIRCUMSTANCES.
3. ALL P.V.C. SHALL BE GREEN IN COLOR FROM FACTORY (NO PAINT).
4. ALL DUCTILE IRON SHALL BE CLASS 52 WITH POLY LINING.



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TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

DEPTH OF SEWER PIPE

COMMUNITY DEVELOPMENT DIRECTOR:

CAROL STRICKLIN A.I.C.P.

PUBLICATION DATE:

November 18, 2008

INDEX NUMBER:

WW-14

CITY ENGINEER:

LELAND E. DICUS, P.E.

DRAWING SCALE:

NOT TO SCALE

## LIFT STATION MATERIAL SPECIFICATIONS

### VALVE VAULT

PRE-CAST CONCRETE OF ADEQUATE SIZE TO ACCOMMODATE ALL VALVES, FITTINGS, AND PUMP CONNECTIONS, WITH A MINIMUM 24" CLEARANCE BETWEEN THE INSIDE WALLS AND ALL VALVES AND/OR FITTINGS. VAULT TO BE DRAINED TO THE WET WELL USING A GRAVITY LINE OF 4" DIAMETER SCHEDULE 80 PVC, INCORPORATING A P-TRAP STYLE CHECK VALVE TO PREVENT SEWER GASES FROM ENTERING THE VAULT FROM THE WET WELL WITH A RUBBER SEAL AND GASKET. THE OUTSIDE OF THE VAULT SHALL BE COATED WITH A LAYER OF BITUMASTIC COATING.

### VALVES

ISOLATION VALVES SHALL BE ANTI-FREEZE TYPE GATE VALVES, MOUNTED THREE FEET OUTSIDE OF THE VALVE BOX, OUTSIDE OF THE WET WELL. VALVES MUST BE FLANGED AND MUST BE ADEQUATELY SUPPORTED. CHECK VALVES SHALL BE SWING-TYPE CHECK VALVES WITH WEIGHTED ARMS. CHECK VALVES MUST BE FLANGED ON BOTH ENDS AND MUST BE ADEQUATELY SUPPORTED.

### PIPING

DUCTILE IRON CLASS 52 FLANGED, MINIMUM 4" DIAMETER FROM EACH PUMP, AND MINIMUM 4" DIAMETER WHERE TWO ARE MANIFOLDED TOGETHER FOR SINGLE DISCHARGE.

### WET WELL

CONSTRUCTION SHALL BE OF REINFORCED CONCRETE MADE OF TYPE 2 CEMENT. INSIDE OF WET WELL SHALL BE LINED WITH H.D.P.E. THERMAL PLASTIC LINER AND SHALL HAVE A MINIMUM 6' INSIDE DIAMETER, WITH ONE 8" MINIMUM INFLUENT LINE ARRANGED TO AVOID AIR ENTRAPMENT AS FLOW ENTERS. THE HDPE LINER SHALL CONSIST OF STUDS PRODUCED DURING THE EXTRUSION PROCESS, AND SHALL PROVIDE A BACK-PRESSURE RESISTANCE OF 29 P.S.I. THE HDPE LINER SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRE-CAST OPERATION, AND SHALL BE MANUFACTURED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. THE SUMP AREA BELOW THE INFLUENT LINE INVERT SHALL BE A MINIMUM 4' DEEP WITH A TAPERED BOTTOM TO AVOID SLUDGE DEPOSITS. INFLUENT PIPE CONNECTION AND WET WELL JOINTS SHALL BE EITHER O-RING GASKETS OR FLEXIBLE WATERTIGHT JOINTS.

FOUNDATION SLAB SHALL BE SET ON AN 18" LAYER OF WASHED ROCK, WRAPPED IN FILTER FABRIC. (SEE STANDARD BEDDING DETAIL). THE OUTSIDE OF THE VAULT SHALL BE COATED WITH A LAYER OF BITUMASTIC COATING.

### SPARE PARTS

- 1 - COMPLETE SPARE MOTOR AND PUMP, INCLUDING CABLE LEADS
- 1 - MOTOR STARTER W/ OL BLOCK
- 1 - MAIN BREAKER
- 1 - POWER SUPPLY
- 1 - PUMP CONTROL MODULE
- 1 - RADIO INTERFACE MODULE
- 1 - 7 1/2 AMP BATTERY

### HATCH COVERS

HATCH COVERS TO BE ALUMINUM WITH 316 STAINLESS STEEL HARDWARE HASP ARRANGEMENT FOR PADLOCK. HEAVY-DUTY TRAFFIC BEARING ALUMINUM SHALL BE USED WHEN COVERS ARE INSTALLED WITHIN 10' OF A HARD SURFACE STREET. HATCHES SHALL BE SPRING LOADED, AND EQUIPPED WITH A SAFETY ARM. ALL HATCH COVERS SHALL HAVE A GASKET SEAL.

### GUIDE/SLIDE RAILS

IN ORDER TO STANDARDIZE INSTALLATION AND SERVICE PRACTICES, THE FOLLOWING BREAK-AWAY FITTING SHALL BE PROVIDED FOR EACH PUMP PUT INTO SERVICE. EACH BREAK-AWAY FITTING SHALL BE FLYGT AND SHALL INCLUDE THE STATIONARY BASE ELBOW, UPPER GUIDE RAIL SUPPORT BRACKET AND MOVEABLE FITTING AS SPECIFIED. ALL COMPONENTS SHALL BE CAST IRON OR STAINLESS STEEL (INCLUDING HARDWARE). MATING CONTRACT BETWEEN MOVEABLE AND STATIONARY FITTINGS SHALL BE OFF-VERTICAL, UTILIZING THE PUMP WEIGHT TO ASSURE A LEAK-FREE CONNECTION EVEN AT HIGH DISCHARGE PRESSURE, MATING FACE SHALL UTILIZE O-RING DESIGN CAPTURED IN DOVE-TAIL GROOVE OF MOVABLE FITTING. GUIDE RAILS SHALL BE 2", SCHEDULE 40, 316 STAINLESS STEEL AND SHALL BE ADEQUATELY SECURED TO THE BOTTOM AND/OR THE SIDE OF THE WET WELL.

### WATER CONNECTION

MINIMUM 3/4" WATER SERVICE WITH RPZ BACKFLOW PREVENTER, CUT OFF VALVE W/ BOX, AND METER APPROVED BY PINELLAS COUNTY UTILITIES SHALL BE PROVIDED AND POSITIONED NEAR THE CONTROL STAND PROVIDE A 3/4" TEE AND SERVICE LINE WITH REDUCING BUSHING AND A 3/4" HOSE BIB AT CONTROL PANEL.

### PUMPS

PUMPS SHALL BE MOUNTED SECURELY WITH APPROVED ANCHORS, 316 STAINLESS STEEL HARDWARE, SLIDE RAIL ACCESS, MINIMUM 3 HP, 3" SOLIDS HANDLING, 4" DISCHARGE DIAMETER. PUMPS SHALL BE MANUFACTURED BY FLYGT, AND SHALL BE DESIGNED TO OPERATE NEAR OPTIMUM EFFICIENCY. MINIMUM TWO PUMPS SHALL BE INSTALLED IN ONE LIFT STATION WITH DEVICES TO PREVENT MOTORS FROM DRAWING MORE THAN FULL LOAD RATED AMPERAGE. VIBRATION MUST NOT BE EXCESSIVE ON ANY PART OF THE PUMP CURVE.

### FLOAT

FLOATS TO BE NORMALLY OPEN WEIGHTED STYLE LOCATED AND HUNG ON 316 STAINLESS STEEL RACK HOOKS, AND POSITIONED SO AS NOT TO INTERFERE WITH REMOVAL OF PUMPS OR OPERATION OF THE STATION. FLOATS MUST NOT CONTAIN MERCURY LIQUID.



## City of Largo

Public Works Department  
Engineering Services Division

201 Highland Avenue, Largo, FL, 33770-2512  
TEL: (727) 587-6713 FAX: (727) 586-7413  
WWW: <http://www.largo.com>

TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

General Lift Station  
Requirements

PUBLIC WORKS DIRECTOR:

**CHRIS A. KUBALA**

PUBLICATION DATE:

**JUNE 1, 2000**

INDEX NUMBER:

**LS-01-A**

CITY ENGINEER:

**MICHAEL J. STAFFOPOULOS**

DRAWING SCALE:

**NOT TO SCALE**

LIFT STATION MATERIAL NOTES

1. INSIDE OF WET WELLS TO BE LINED WITH H.P.D.E. THERMAL PLASTIC LINER. OUTSIDE OF WET WELLS TO BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M OR AN APPROVED EQUAL.
2. VALVES AND VALVE BOX INTERIOR TO BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M OR APPROVED EQUAL.
3. HATCH COVERS TO BE ALUMINUM, SPRING LOADED, AND GASKETED.
4. WATER CONNECTIONS TO HAVE 3/4" SERVICE WITH REDUCING BUSHINGS FOR 3/4" SERVICE AT CONTROL PANEL.
5. COLOR SLATS IN CHAIN LINK FENCE TO MATCH EXISTING AREA. (TROPICAL FENCE)
6. R.T.U. SHOULD REMAIN OUTSIDE OF CONTROL CABINET AT EXISTING STATIONS DUE TO HIGH AMBIENT TEMPERATURE.
7. EMERGENCY GENERATOR CONNECTION MELTRIC \* 29043 480 VOLT, MELTRIC \* 29073 240 VOLT OR RUSSELL-STOLL 200 AMP 500V AC 4 WIRE MALE ADAPTER CATALOG \* FCF 3144R.
8. CONDUITS TO BE SEALED IN CONTROL CABINET WITH NYLON STRAIN RELIEF CONNECTORS AND "DUCT SEAL" OR EQUAL.
9. OVERFLOW ALARM SHALL CONSIST OF AN ALARM HORN AND A BLINKING 150 WATT INCANDESCENT LIGHT WITH A RED GLOBE, GUARD, AND MOUNTING BASE, LOCATED ON THE SIDE OF THE CONTROL PANEL.
10. ALL CONTROLS SHALL BE TESTED BY THE CONTRACTOR AND VERIFIED BY ENVIRONMENTAL SERVICES MAINTENANCE PRIOR TO BEING ACCEPTED BY THE CITY.

LIFT STATION INSTALLATION NOTES

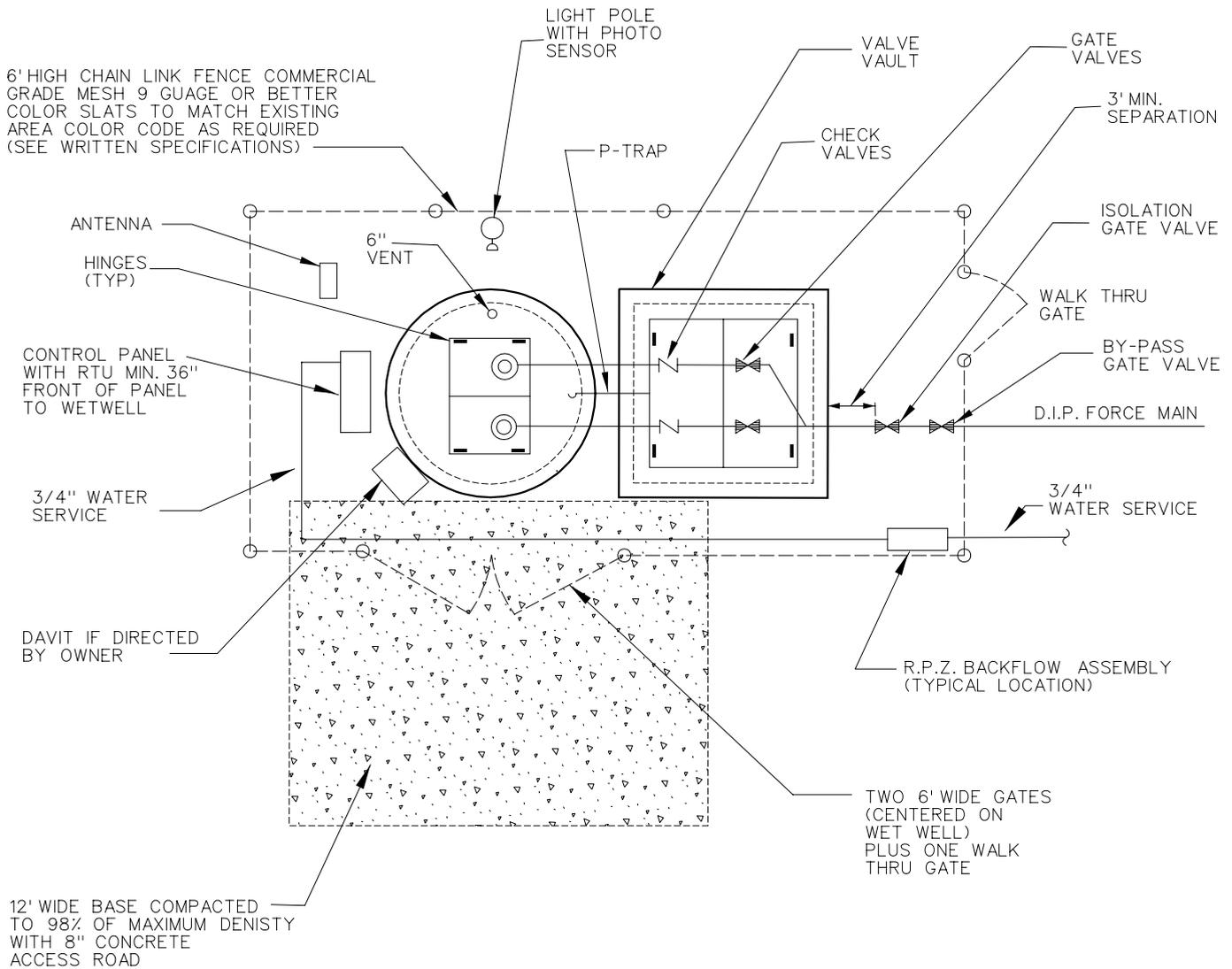
1. SEAL ALL CONDUITS IN THE CABINET WITH ELECTRICAL DUCT SEAL OR CLOSED CELL POLYURETHANE FOAMED INSULATION TO KEEP OUT FUMES AND MOISTURE. SUPPORT CABLES WITH P.V.C. STRAIN RELIEF CONNECTORS.
2. CONDUITS TO F.P.C. SERVICE POINT SHALL BE RIGID GALVANIZED P.C.V. COATED. CONDUITS TO WELL SHALL BE ON SCHEDULE 80 P.V.C., 2" FOR ALL.
3. TEST BY MEGGERING ALL WIRES AND MOTORS. READINGS SHOULD BE 20 MEGOHMS OR MORE TO GROUND. (DO NOT MEGGER LOW VOLTAGE CONTROLS).
4. OPERATE PUMPS, CHECK DIRECTION, RECORD VOLTAGE AND AMPERAGE WITH EACH AND BOTH RUNNING. ALL WORK TO BE COMPLETED WITH SUPPLIER'S FIELD REPRESENTATIVE PRESENT.
5. CHECK OPERATION WITH OWNER'S PORTABLE GENERATOR. CHANGE DIRECTIONS IF NECESSARY TO PROVIDE CORRECT ROTATION.
6. PANEL MUST BE NO CLOSER THAN 36" TO WET WELL OPENING AS MEASURED FROM FRONT OF PANEL.
7. PROVIDE SEPARATE 2" CONDUIT FOR EACH PUMP CABLE AND ONE 2" CONDUIT FOR FLOAT SWITCHES
8. ALL HARDWARE IN WET WELL SHALL BE 316 STAINLESS STEEL INCLUDING ANCHORS.
9. ALL CABLES TO WET WELL SHALL BE CONTINUOUS WITH NO SPLICES.
10. CABLE FOR PUMP MOTORS SHALL BE OF SUFFICIENT LENGTH TO ALLOW PUMP MOTORS TO BE REMOVED FOR SERVICING.
11. STAINLESS STEEL CABLE WITH 18" OF STAINLESS STEEL CHAIN MOUNTED TO PUMP TO ASSIST IN EMERGENCY PUMP REMOVAL.
12. ELECTRICAL AND MECHANICAL EQUIPMENT PROTECTED FROM 100-YEAR FLOOD.
13. PUMP STATION FULLY OPERATIONAL AND ACCESSIBLE DURING 25-YEAR FLOOD, IN NO CASE LESS THAN 10-YEAR FLOOD.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: General Lift Station Requirements	
PUBLIC WORKS DIRECTOR: CHRIS A. KUBALA	PUBLICATION DATE: JUNE 1, 2000	INDEX NUMBER: LS-01-B	
CITY ENGINEER: MICHAEL J. STAFFOPOULOS	DRAWING SCALE: NOT TO SCALE		



**NOTES:**

ENGINEER TO DESIGN SITE PLAN USING THE ABOVE EXAMPLE. DESIGN CRITERIA "SITE PLAN LOCATION" DETAIL SHALL BE DRAWN TO SCALE WITH:

1. INDICATE NORTH ARROW.
2. FENCE WITH TWO 6' WIDE GATES AND (1) 48" WALKTHRU GATE.
3. INFLUENT LINE ENTRY LOCATION.
4. HINGE LOCATION.
5. SHOW POWER SERVICE FEED (WITH "AS BUILTS").
6. 36"-42" SEPARATION BETWEEN PANEL AND WET WELL OPENING.
7. EMERGENCY PUMP OUT LOCATION (SHALL BE SAME SIZE AS PUMP DISCHARGE).
8. DESIGN TO BE COORDINATED WITH LIFT STATION PLAN AND PROFILE.
9. INFLUENT MAIN SHALL BE CLEAR OF PANEL AND VAULT.
10. WHERE UNDERGROUND ELECTRIC SERVICE SPECIFIES, CONTRACTOR TO SUPPLY POLE AND LIGHT FIXTURE.

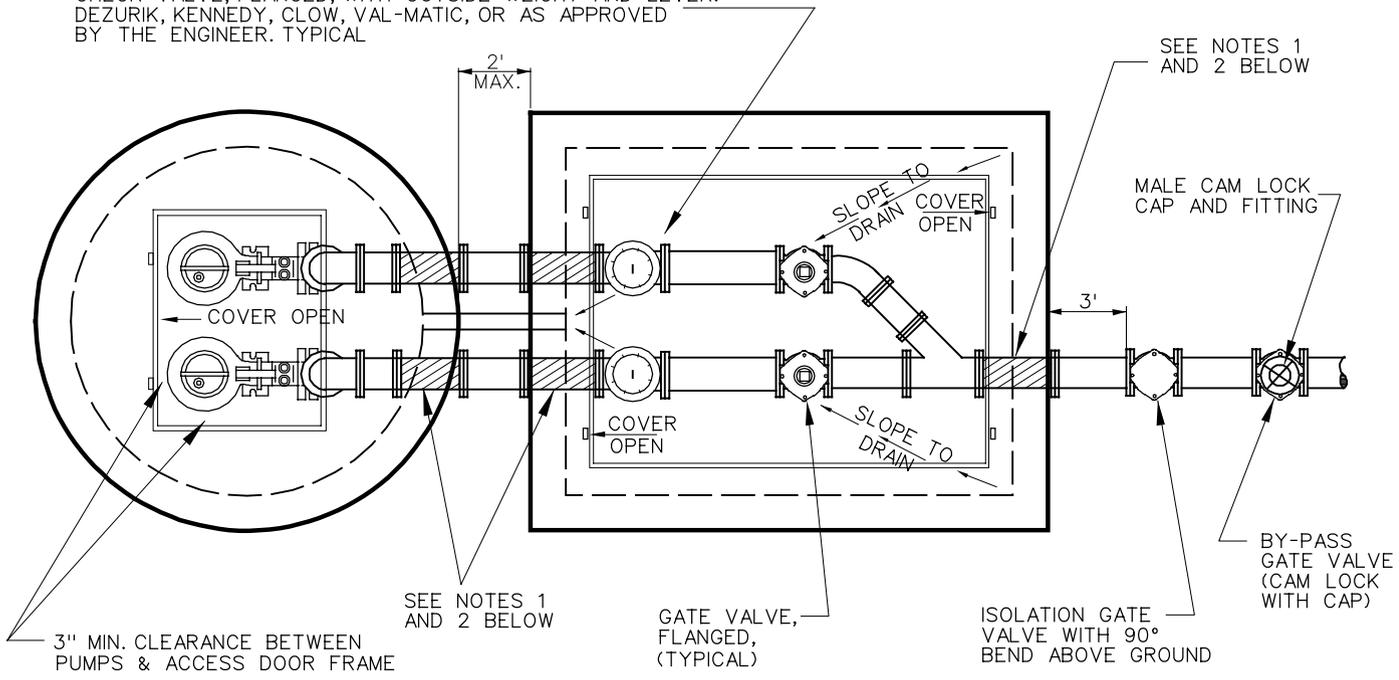


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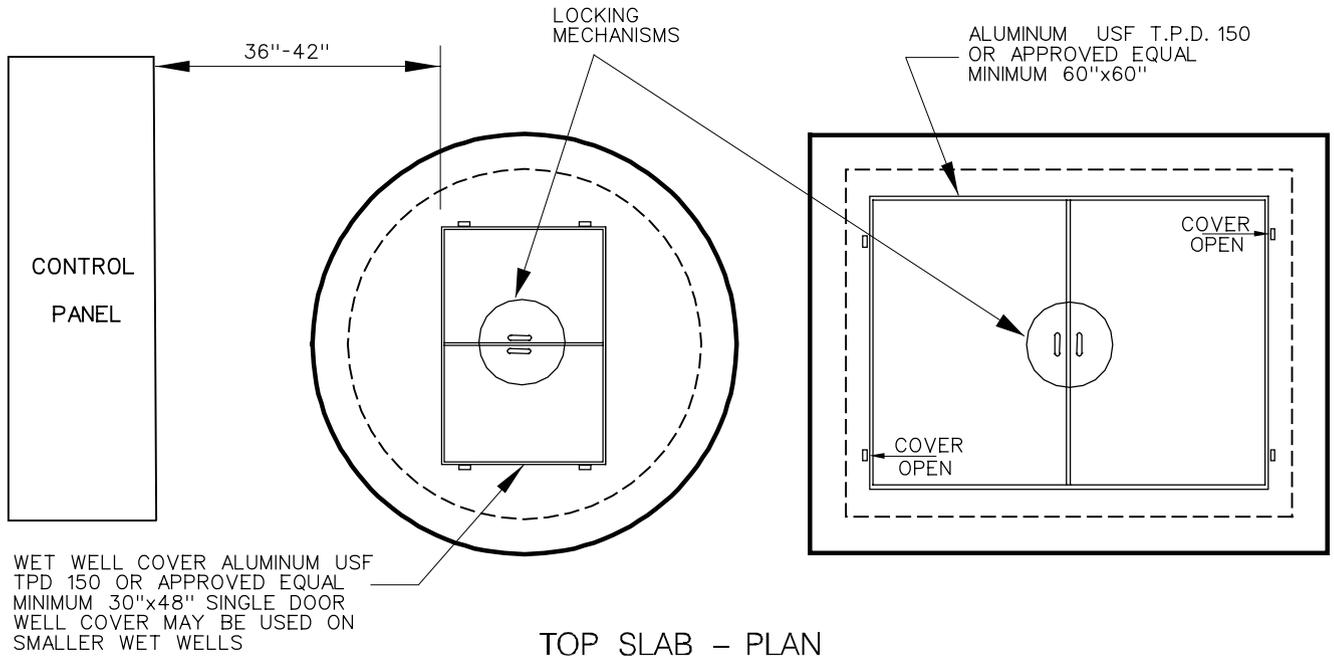
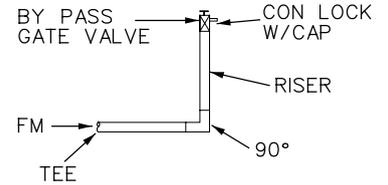
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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Lift Station Layout	
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CITY ENGINEER: MICHAEL J. STAFFOPOULOS	DRAWING SCALE: NOT TO SCALE		

CHECK VALVE, FLANGED, WITH OUTSIDE WEIGHT AND LEVER.  
 DEZURIK, KENNEDY, CLOW, VAL-MATIC, OR AS APPROVED  
 BY THE ENGINEER. TYPICAL



PLAN VIEW GRADE ELEVATION



TOP SLAB - PLAN

NOTE:

1. ALL PIPE HOLES SHALL BE PRECAST.
2. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER E.P.D.M., OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.



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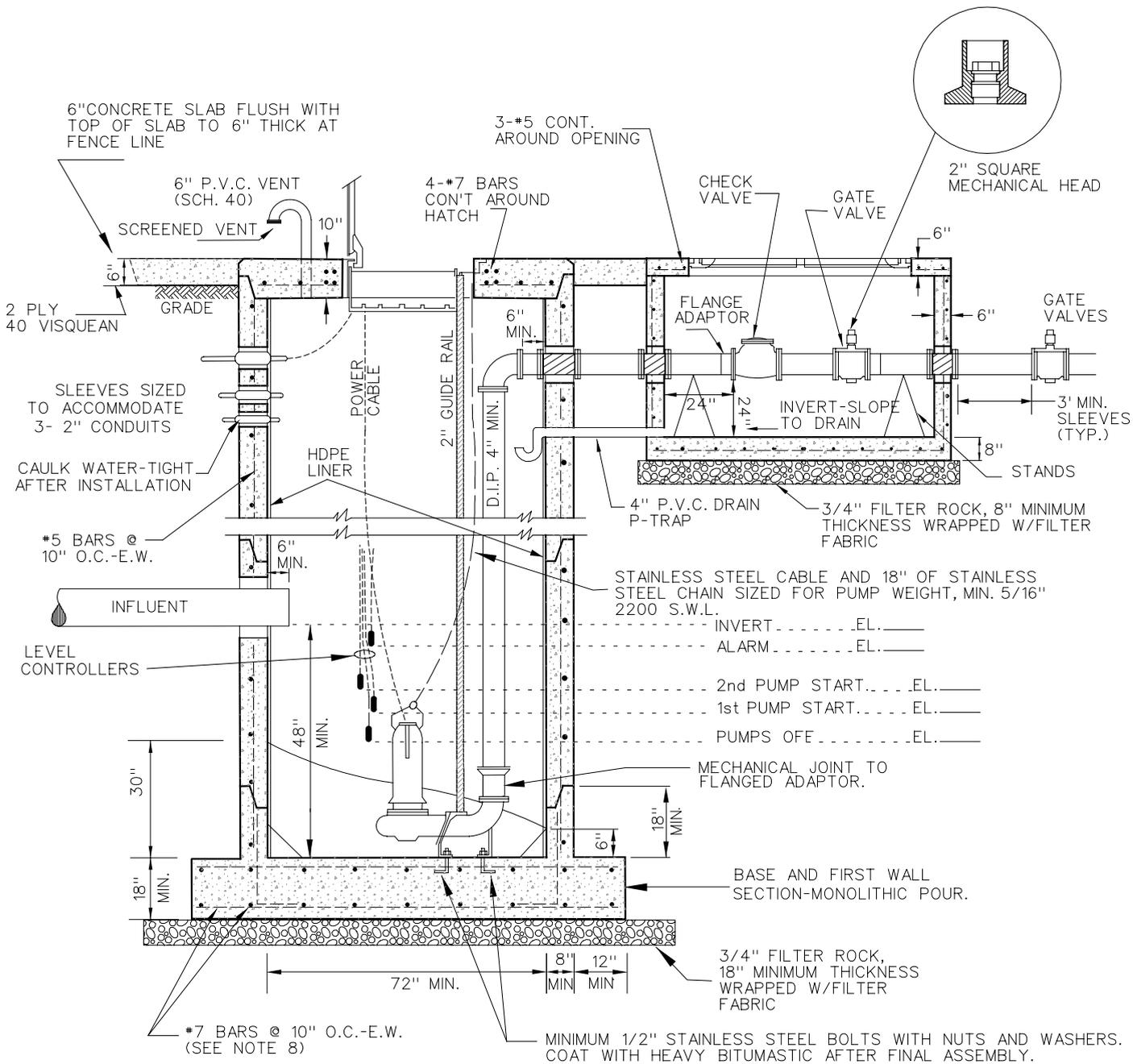
TITLE:  
 Engineering Design and  
 Construction Standards

DESCRIPTION:  
 Lift Station  
 Plan

PUBLIC WORKS DIRECTOR:  
**CHRIS A. KUBALA**  
 CITY ENGINEER:  
**MICHAEL J. STAFFOPOULOS**

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**LS-03**



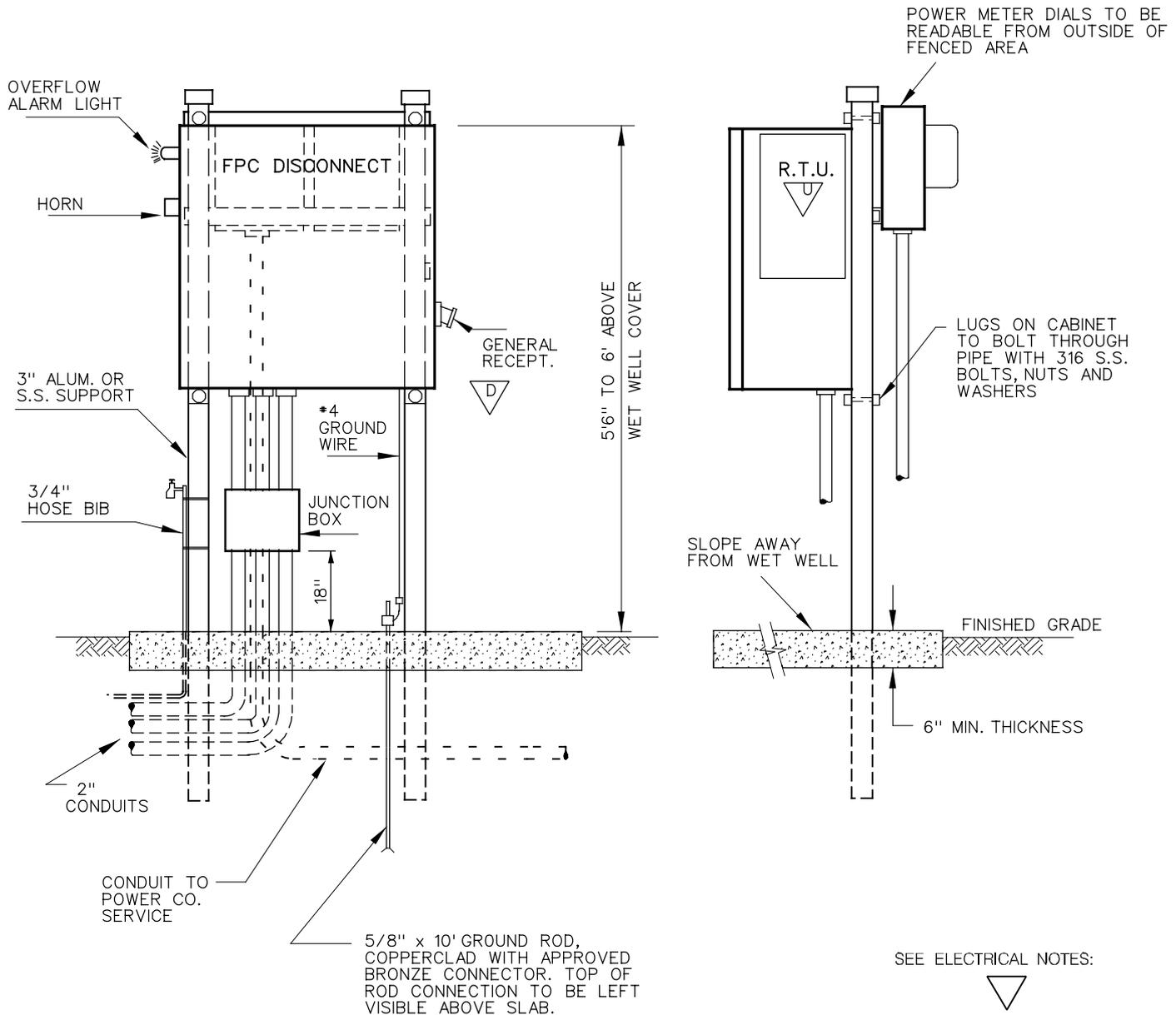
**NOTES:**

1. TWO ROWS OF CONTINUOUS RAM-NEK, ALL EXTERIOR JOINTS SHALL HAVE CONTINUOUS RUBBER NEK, RAM-NEK & ON-SHRINKING GROUT IN ACCORDANCE WITH STANDARD MANHOLE SPECIFICATIONS.
2. INTERIOR OF WET WELL TO BE LINED WITH HDPE THERMAL PLASTIC LINER AS DESCRIBED IN THE LIFT STATION GENERAL REQUIREMENTS.
3. WET WELL PIPING AND VALVE VAULT PIPING TO RECEIVE TWO COATS OF KOOPERS BITUMASIC 300M, 8-10 MILS D.F.T./COAT OR EQUAL. FIRST COAT RED, SECOND COAT BLACK.
4. ALL STEEL IN WET WELL SHALL BE STAINLESS STEEL INCLUDING GUIDE BARS, LIFTING CHAIN, CABLE SUPPORTS, CABLE HOLDER & GUIDE BAR BRACKET. (TYPE 316 55 MIN.).
5. TYPE II REINFORCED CONCRETE (\* 5 BARS @ 10" O.C.-E.W. UNLESS OTHERWISE INDICATED), 4000 p.s.i.
6. SEE PLAN FOR CORRECT ORIENTATION OF PIPES, VENT AND OTHER FIXTURES.
7. ALL HARDWARE INSIDE AND OUT OF WET WELL AND VALVE PIT SHALL BE STAINLESS STEEL. (TYPE 316).
8. ADDITIONAL BOTTOM SLAB REINFORCING MAY BE REQUIRED FOR DEPTH >20' AND/OR DIAMETERS >8'.
9. PROVIDE POTABLE WATER TO STATION, PROVIDE RECLAIMED IF ALVALIBLE.
10. WET WELL EXTERIOR AND VALVE BOX INTERIOR AND EXTERIOR SHALL BE COATED WITH BITUMATIC.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Lift Station Profile	
PUBLIC WORKS DIRECTOR: CHRIS A. KUBALA	PUBLICATION DATE: JUNE 1, 2000	INDEX NUMBER: LS-04	
CITY ENGINEER: MICHAEL J. STAFFOPOULOS	DRAWING SCALE: NOT TO SCALE		



SEE ELECTRICAL NOTES:



**NOTES:**

1. MINIMUM FUSABLE DISCONNECT
2. SERVICE WIRE SIZE- #3 COPPER, 100A MAIN, 100A EMERGENCY BREAKER STARTER MOTOR- NEMA SIZE 1, 20A MOTOR CIRCUIT PROTECTOR TRIP RATING.
3. ALL ELECTRICAL COMPONENT MUST BE SIZED ACCORDINGLY TO MOTOR SIZE THIS IS TO INCLUDE THE FUSABLE DISCONNECT, MAIN AND EMERGENCY BREAKER STARTER, MOTOR GENERATOR RECEPTICAL WIRE AND CONDUIT SIZE.
4. PANEL TO BE SIGNED AND POSTED ACCORDINGLY TO MEET ALL SPECIFICATIONS AND CODE.
5. MINIMUM CONTROLS SHALL INCLUDE RTU AND RAIN GAUGE.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Lift Station Control Panel	
PUBLIC WORKS DIRECTOR: <b>CHRIS A. KUBALA</b>	PUBLICATION DATE: <b>JUNE 1, 2000</b>	INDEX NUMBER: <b>LS-05</b>	
CITY ENGINEER: <b>MICHAEL J. STAFFOPOULOS</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

## REMOTE WIRELESS RAINFALL MONITOR

**FUNCTION:**

COLLECTS RAINFALL IN .01 INCH INCREMENTS, STORES UP TO 8" AND WIRELESSLY TRANSMITS AMOUNT CURRENTLY STORED EVERY 72 SECONDS TO AN EXISTING PC BASE STATION.

**OPERATIONAL REQUIREMENTS:**

THE SYSTEM SHALL INCLUDE TIPPING SPOON RAIN COLLECTOR WITH A SCALE FACTOR OF .01 INCH PER TIP. THE TIP SHALL BE STORED BY A MICROCONTROLLER INTERFACE UNIT. THE INTERFACE UNIT SHALL PROVIDE STORAGE FOR UP TO 8" OF RAIN AND SHALL RE-SET AUTOMATICALLY WHEN 8" IS REACHED. THE INTERFACE UNIT MUST AUTOMATICALLY ENCODE THE RAIN DATA. THE INTERFACE UNIT SHALL BE PROGRAMMED TO CONTROL AN UNLICENSED DIGITAL CB RADIO OF 10W OUTPUT TO AUTOMATICALLY TRANSMIT THE ENCODED RAIN DATA EVERY 72 SECONDS. THE RADIO AND A 17 FT. CB BASE STATION ANTENNA SHALL BE INCLUDED.

**POWER REQUIREMENTS:**

THE MONITOR SHALL UTILIZE LESS THAN 0.5 WATTS OF POWER AT 12VDC AND SHALL INCLUDE A 7AHR SEALED LEAD ACID BATTERY, 5W SOLAR CHARGE, AND 10W VOLTAGE REGULATOR.

**MECHANICAL PACKAGING REQUIREMENTS:**

THE RADIO, INTERFACE UNIT, BATTERY AND CHARGER SHALL BE HOUSED IN A NEMA 4X FIBERGLASS ENCLOSURE. AN ALUMINUM CHARGER MOUNTING BRACKET SHALL BE PROVIDED TO MOUNT THE 5W SOLAR COLLECTOR.

**GENERAL SYSTEM REQUIREMENTS:**

THE REMOTE MONITOR SHALL BE DESIGNED TO BE SOFTWARE AND PROTOCOL COMPATIBLE WITH AN EXISTING PC BASE STATION INSTALLED AT THE LARGO STORMWATER OFFICE (BELTECH PART NUMBER BTS 100). THE REMOTE MONITOR SHALL BE INSTALLED WITH ADEQUATE ANTENNA TIP HEIGHT TO INSURE RELIABLE COMMUNICATION WITH THE BASE STATION (GENERALLY 20FT. AT BASE OF ANTENNA) BUT WILL REQUIRE GREATER HEIGHT FOR DISTANCES GREATER THAN 8 MILES.

**APPROVED VENDOR AND PART NUMBER:**

BELTECH\* P/N BTS101 OR EQUIVALENT WILL MEET THE REQUIREMENTS OF THIS SPECIFICATION.

\*BELTECH SYSTEMS, INC.  
13,000 98TH AVE. N.  
SEMINOLE, FL. 33776  
PH: 727-397-1805  
OR APPROVED EQUAL



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WWW: <http://www.largo.com>

TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

Remote Wireless Rainfall  
Monitor Requirement

PUBLIC WORKS DIRECTOR:

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LS-06

CITY ENGINEER:

MICHAEL J. STAFFOPOULOS

DRAWING SCALE:

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## LIFT STATION GENERAL ELECTRICAL REQUIREMENTS

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES. COMPONENTS SHALL BE APPROVED AND LISTED BY UNDERWRITER'S LABS, AND SHALL BE SO LABELED FOR THE SERVICE INTENDED.
  - A. ALL PANELS ARE TO BE MANUFACTURED PER DRAWING AND WRITTEN SPECIFICATIONS.
2. THE PUMP CONTROL PANEL SHALL BE FURNISHED COMPLETELY ASSEMBLED AND WIRED, WITH THE FOLLOWING MINIMUM FEATURES:
  - A. STAINLESS STEEL ENCLOSURE, 14 GAUGE, TYPE \*316, WELDED SEAM, WITH WHITE EPOXY FINISH. ALL HARDWARE \*316 STAINLESS STEEL, WITH PIANO HINGE, NEOPRENE GASKET, 3-POINT LATCH WITH PADLOCK HARDWARE AND DRIP SHIELD FOR MODIFIED NEMA 12 CONSTRUCTION. OUTSIDE DOOR SHALL BE BLANK WITH ALL CONTROL COMPONENTS MOUNTED ON OR PROJECTING THROUGH DEAD FRONT HINGED INNER PANEL. HEAVY COMPONENTS SHALL BE MOUNTED ON AN ALUMINUM BACK-MOUNTING PANEL. INNER PANELS SHALL BE ALUMINUM. OUTER DOOR SHALL HAVE 9" X 11" STAINLESS STEEL POCKET FOR LOG BOOK, AND LATCH TO SECURE THE OUTER DOOR AND DEAD FRONT IN AN OPEN POSITION. THE TOP OF PANEL SHALL BE 5'-6" TO 6'-0" ABOVE THE WET WELL COVER. ALL PANELS, METER BOXES AND TELEMETRY BOXES ARE TO BE MOUNTED ON \*316 STAINLESS STEEL STRUTS WITH \*316 STAINLESS STEEL FASTENING DEVICES AND SHALL BE SUPPORTED BY AT LEAST 3" \*316 STAINLESS STEEL PIPE CAPPED AT THE TOP.
  - B. MAIN AND EMERGENCY CIRCUIT BREAKERS SHALL BE 3-POLE MECHANICALLY INTERLOCKED SUCH THAT BOTH CANNOT BE ENGAGED AT THE SAME TIME, AND SHALL BE THE SAME SIZE SQUARE D COMPONENTS.
  - C. SERVICE RATED OUTSIDE FUSED DISCONNECT SWITCH ON REAR OF PANEL, NEMA 4, STAINLESS STEEL, WITH AIC RATING EQUAL TO THE INCOMING SERVICE.
  - D. GENERATOR RECEPTACLE SHALL BE PROVIDED.
  - E. TWO (2) SEPARATE SINGLE POLE CIRCUIT BREAKERS FOR CONTROL CIRCUIT AND TELEMETRY.
  - F. 20A DUPLEX RECEPTACLE GROUND FAULT INTERRUPTER TYPE WITH CIRCUIT BREAKER.
  - G. SURGE/LIGHTING ARRESTOR ON INCOMING LINE TO BE ONE JOSLYN 9200-9A FOR 3 PHASE.
  - H. CONTROLLER WITH OVERCURRENT PROTECTION, SHORT CIRCUIT PROTECTION AND DISCONNECT FOR EACH MOTOR, SQUARE D, OR "MAG GUARD".
  - I. HAND, OFF, AUTOMATIC (HOA) SWITCH AND PUMP RUN LIGHT.
  - J. 120/24V CONTROL TRANSFORMER FOR OPERATION OF FLOATS.
  - K. PUMP CABLES TO BE SEALED AT PANEL WITH A P.V.C. STRAIN RELIEF CONNECTOR. ALL ENTRIES INTO THE PANEL FROM THE WET WELL SHALL BE SEALED WITH DUCT SEAL ONLY.
  - L. WEIGHTED NON-MERCURY FLOAT SWITCH, POLYPROPOLYENE COVER INTEGRAL CORD. ROTO-FLOAT, OR AN APPROVED EQUAL.
  - M. MINIMUM 8-1/2" X 11" SCHEMATIC AND PUMP DATA SHEET SHALL BE PERMANENTLY AFFIXED TO THE INTERIOR OF THE ENCLOSURE DOOR. THE DATA SHEET SHALL BE EXTRUDED VINYL HOMOPOLYMER LAMINATE.
  - N. ALL CONDUITS TO WET WELL SHALL BE SCHEDULE 80 P.V.C. WITH 90 DEGREE ELECTRICAL SWEEP BENDS.
  - O. ALL PANEL WIRING SHALL BE COLOR CODED AND NUMBERED TO CORRESPOND TO DRAWINGS. STANDARD COLORS SHALL BE BLACK FOR 120V SUPPLY, WHITE FOR NEUTRAL, GREEN FOR GROUND, AND RED FOR CONTROL USING 120V WITH BLUE FOR 24V CONTROL WIRING OR APPROVED EQUAL. MINIMUM SIZE \*14 AWG COPPER. ALL EXTERNAL WIRING SHALL BE BROUGHT TO NUMBERED TERMINALS. ALL WIRING SHALL BE FRONT ACCESSIBLE. ALL RELAY BASES TO BE FRONT-MOUNTED AND WIRED WITH SCREW TERMINALS. NO SOLDERED CONNECTIONS PERMITTED. A VINYL PLASTIC LAMINATED 11" X 17" SCHEMATIC DRAWING SHALL BE PERMANENTLY FIXED INSIDE THE OUTER DOOR. A SEPARATE STICK ON PLASTIC LABEL SHALL SHOW THE MOTOR DATA; HP; R.P.M.; FULL LOAD AMPS; SERIAL NUMBERS; PUMP SIZE; IMPELLER NUMBER AND SIZE; DESIGN GPM AND TDH.
  - P. ALL SERVICE ENTRANCE CONDUCTORS TO BE COPPER.
  - Q. FLOATS SHALL BE 24V AC.
  - R. DEAD FRONT SHALL HAVE INDICATOR LIGHTS WITH PUSH TO TEST BUTTONS FOR SEAL AND THERMAL FAIL.
  - S. SEE DRAWING FOR SEAL FAIL AND THERMALS, RTU POINTS, RELAYS, TIME DELAY RESET. (HIGH VOLTAGE CONTROL, LOW VOLTAGE CONTROL, PANEL LAYOUT).
  - U. THERMALS AND SEAL FAIL SHALL NOT INTERFERE WITH STATION OPERATION.
    - R.T.U. BREAKER AND CONTROL BREAKER SHALL BE ON THE SAME PHASE TO AVOID A POSSIBLE DEAD SHORT CONDITION.



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TITLE:

Engineering Design and  
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DESCRIPTION:

Lift Station  
Electrical Notes

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**CHRIS A. KUBALA**

PUBLICATION DATE:

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**LS-07**

CITY ENGINEER:

**MICHAEL J. STAFFOPOULOS**

DRAWING SCALE:

**NOT TO SCALE**

## LIFT STATION ELECTRICAL PANEL REQUIREMENTS

1. ENCLOSURE TO BE \*316 STAINLESS STEEL WEATHERPROOF. PANEL TO BE LOCKABLE AND EQUIPPED WITH DEAD FRONT AND FLUORESCENT LIGHT INSIDE.
2. NEMA RATED CLASS 8536 STARTERS TO BE SQUARE D.
3. STARTERS/CONTROL CIRCUITS SHALL BE 120V AC.
4. FLOATS SHALL BE 24V AC ONLY WITH UNSPLICED CABLES INSTALLED IN A 2" CONDUIT (S.C.H. 80 P.V.C.).
5. EMERGENCY GENERATOR CONNECTION SHALL BE MELTRIC RUSSELL.
6. CABLES/WIRES FOR EACH PUMP MOTOR SHALL BE UNSPLICED, INSTALLED IN A SEPARATE 2" CONDUIT (SCH 80 P.V.C.).
7. G.F.I. TO BE INSTALLED IN ENCLOSURE ON A SEPARATE BREAKER.
8. THE REMOTE TELEMETRY UNIT (RTU) SHALL BE ON A DEDICATED BREAKER.
9. CONTROL VOLTAGE SHALL BE ON A DEDICATED BREAKER.
10. CONDUITS BETWEEN WET WELL AND ENCLOSURE SHALL BE SEALED TO PREVENT GASES FROM ENTERING ENCLOSURE. ("DUCT SEAL ")
11. POWER DISTRIBUTION BLOCKS TO BE USED.
12. TERMINAL STRIPS (30 POINTS MINIMUM) SHALL BE USED FOR INTERFACE BETWEEN RTU AND CONTROL CABINET.
13. AN INTERLOCK SHALL BE INSTALLED BETWEEN MAIN/EMERGENCY BREAKER.
14. EACH MOTOR SHALL HAVE A SEPARATE BREAKER.
15. JOSLYN MFG. CO. SURGE-SUPPRESSOR TEC. CAT. NO. Z-650, 48-62 HZ, 650V MAX. LISTED 851N.
16. PANEL TO INCLUDE HOA SWITCHES FOR MANUAL OVERRIDE OF SYSTEM IF TELEMETRY FAILS.
17. ALARM FLOAT SHALL BE POWERED OFF OF TELEMETRY STAND-BY BATTERY AND CAPABLE OF OPERATING OFF A 24V AC TRANSFORMER.
18. SUPPORT STAND SHALL CONSIST OF STAINLESS STEEL COMPONENTS AND SHALL BE SECURED IN A CONCRETE BASE.
19. PUMP BREAKERS MUST PROVIDE THE ABILITY TO BE LOCKED AND TAGGED OUT.
20. A STAINLESS FUSED ELECTRICAL DISCONNECT SHALL BE PROVIDED BETWEEN THE FLORIDA POWER METER AND THE CONTROL BOX.
21. A LIGHTNING AND SURGE ARRESTOR (TYPE DITEK \*DTK-120/240 H011HL) SHALL BE PROVIDED. IN ADDITION, ONE SPARE SHALL BE INCLUDED.
22. THERE SHALL BE A RUN INDICATOR LIGHT ON THE DEAD FRONT PANEL FOR EACH PUMP/MOTOR.
23. INSTALLATION MUST MEET ALL NEC AND CITY CODES.
24. CONTROL CABINET SHALL BE GROUNDED TO A SEPARATE 5/8 " X 20' COPPER GROUND ROD.
25. BREAKERS ARE TO BE SQUARE D.
26. OVERLOAD RESETS THROUGH DEAD FRONT.
27. NEUTRAL BLOCK TO BE ISOLATED FROM CABINET AND SIZED PER CABINET WITH A MINIMUM OF 8 LUGS.



### City of Largo

Public Works Department  
Engineering Services Division

201 Highland Avenue, Largo, FL, 33770-2512  
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WWW: <http://www.largo.com>

TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

General Lift Station  
Panel Requirements

PUBLIC WORKS DIRECTOR:

**CHRIS A. KUBALA**

PUBLICATION DATE:

**JUNE 1, 2000**

INDEX NUMBER:

**LS-08**

CITY ENGINEER:

**MICHAEL J. STAFFOPOULOS**

DRAWING SCALE:

**NOT TO SCALE**

## REMOTE TERMINAL UNIT SPECIFICATIONS

### 1.0 REMOTE TERMINAL UNIT

THE REMOTE TERMINAL UNIT (RTU) SHALL BE A MICROCOMPUTER-BASED DATA COLLECTION AND DISSEMINATION SUBSYSTEM. THE RTU MUST BE FULLY COMPATIBLE WITH THE EXISTING TAC II TELEMETRY SYSTEM MANUFACTURED BY DATA FLOW SYSTEMS, INC. OF MELBOURNE, FLORIDA, AND MUST NOT REQUIRE ANY CHANGES IN THE TAC II SOFTWARE. THE RTU SHALL COMMUNICATE WITH THE CENTRAL SITE VIA A TWO-WAY RADIO LINK. THE RTU SHALL BE DESIGNED TO ACCOMMODATE PLUG-IN FUNCTION MODULES. THE SYSTEM SHALL BE CAPABLE OF BEING OUTFITTED, AT ANY TIME, WITH RTUS CAPABLE OF BEING CONFIGURED WITH UP TO FIFTEEN (15) FUNCTION MODULES PER RTU, WITH NO SOFTWARE OR FIRMWARE CHANGES TO THE SYSTEM. ALL SHEET METAL UTILIZED INSIDE THE ENCLOSURE MUST BE ANODIZED.

### 1.1 FUNCTION MODULES

THE FUNCTION MODULES SHALL BE DESIGNED SO THEY DO NOT HAVE CONFIGURATION SWITCHES OR STRAPS AND MAY BE EASILY ADDED IN THE FUTURE. THE FUNCTION MODULES MUST BE DESIGNED WITH SURGE SUPPRESSION ON ALL INPUTS AND OUTPUTS. REPLACEMENT OF A FUNCTION MODULE SHALL NOT REQUIRE THE USE OF TOOLS OR THE REMOVAL OF ANY INTERFACE WIRES. THERE SHALL BE NO COMPONENTS ASSOCIATED WITH THE FUNCTION MODULE MOUNTED TO THE MOTHERBOARD (PASSIVE BACKPLANE). AN INTERLOCK SYSTEM SHALL BE PROVIDED TO PREVENT THE REMOVAL OF FUNCTION MODULES WITH THE POWER APPLIED. THE REMOTE TERMINAL UNIT SHALL SUPPORT A LOCAL SERIAL INTERFACE. THE LOCAL SERIAL INTERFACE SHALL PROVIDE LOCAL ACCESS TO ALL FUNCTIONS OF THE REMOTE TERMINAL UNIT. THE LOCAL SERIAL INTERFACE SHALL SUPPORT THE MONITORING OF THE RADIO COMMUNICATIONS LINK. THE RTUS SHALL BE ENCLOSED IN A NEMA 4X STAINLESS STEEL ENCLOSURE PAINTED WHITE. THE RTUS SHALL MEET OR EXCEED THE QUALITY, RELIABILITY, PERFORMANCE AND VERSATILITY OF THOSE MANUFACTURED BY DATA FLOW SYSTEMS, INC. OF MELBOURNE, FLORIDA.

#### 1.1.1 RADIO INTERFACE MODULE

EACH REMOTE TERMINAL UNIT SHALL REQUIRE ONE RADIO INTERFACE MODULE. THIS MODULE SHALL CONTROL THE TERMINAL RADIO DURING THE POLLING SEQUENCE. IN THE EVENT OF TRANSMISSIONS OF MORE THAN TEN SECONDS THIS MODULE SHALL SHUT DOWN THE TRANSMITTER. THIS PROTECTION FUNCTION SHALL BE IMPLEMENTED IN HARDWARE. FIRMWARE IMPLEMENTATION WILL NOT BE ACCEPTABLE. THE RADIO INTERFACE MODULE SHALL HAVE A SERVICE PORT TO PROVIDE COMMUNICATIONS LINK MONITORING. THE SERVICE PORT SHALL ALSO PROVIDE THE CAPABILITY TO DIRECTLY MONITOR AND/OR CONTROL EACH MODULE IN THE REMOTE TERMINAL UNIT. THE RADIO INTERFACE MODULE UTILIZED AT THE REMOTE TERMINAL UNITS SHALL BE INTERCHANGEABLE WITH THE RADIO INTERFACE MODULE AT THE CENTRAL SITE. THE SYSTEM SHALL BE CAPABLE OF UTILIZING UP TO 250 RADIO INTERFACE MODULES PER COMMUNICATIONS LINK AND UP TO 15 FUNCTIONS PER RADIO INTERFACE MODULE. ALL COMMUNICATIONS SHALL BE IN ASCII AND UTILIZE AN ERROR DETECTING AND CORRECTION DATA TRANSFER PROTOCOL. COMMUNICATIONS BETWEEN THE CENTRAL SITE AND THE REMOTE TERMINAL UNITS SHALL HAVE A MINIMUM SPEED OF 1200 BITS/SECOND. EACH RADIO INTERFACE MODULE SHALL HAVE A RADIO TRANSCEIVER MOUNTED TO IT. THE RADIO SHALL BE AN FM TRANSCEIVER WHICH OPERATES IN THE 450 MHZ TO 475 MHZ FREQUENCY RANGE.

##### 1.1.1.1 TRANSMITTER SPECIFICATIONS

RF POWER OUTPUT:	ADJUSTABLE FROM 1.0 TO 2.0 W
SPURIOUS OUTPUT:	-50 DBC MAX.
HARMONIC OUTPUT:	-50 DBC MAX.
FREQ. STABILITY:	+/- 5 PPM
MODULAR DEVIATION:	ADJUSTABLE TO 5 KHZ
FREQUENCY RESPONSE:	FLAT +/- 2.0 DB FROM 50 HZ TO 10 KHP
TOTAL HARMONIC DISTORTION:	5% MAX
FM HUM AND NOISE:	-50 DB MAX
CARRIER ATTACK TIME:	5 MS
TX FREQUENCY:	451.0625 MHZ

##### 1.1.1.2 RECEIVER SPECIFICATIONS

SENSITIVITY:	.25 UV MAX FOR 10 DB S+N/N
QUIETING:	1.5 UV MAX FOR 20 DB QUIETING
SIGNAL PRESENT THRESHOLD:	.4 UV +/- 3 DB
INTERMODULATION:	-18 DBM TYPICAL THIRD ORDER INTERCEPT
IF SELECTIVITY:	6 DB BW = +/- 7.5 KHZ MIN. 60 DB BW = +/- 25 KHZ MAX.
TOTAL HARMONIC DISTORTION:	5% MAX
FREQUENCY STABILITY:	+/- 10 PPM
RX FREQUENCY:	451.0625 MHZ

#### 1.1.2 DIGITAL MONITOR MODULE (IF REQUIRED)

THE DIGITAL MONITOR MODULE SHALL ACCEPT 12 ON/OFF INPUTS OF 12 TO 30 VOLTS AC OR DC. VOLTAGES FROM 100 TO 300 VOLTS AC OR DC SHALL BE ACCOMMODATED WITH THE USE OF AN INLINE VOLTAGE CONVERTER DEVICE. STATUS REPORTING OF THESE INPUTS SHALL HAVE AN ACCURACY OF +/- 2 SECONDS, THE ACCURACY BEING DEFINED AS TIME OF AN OCCURRENCE TO ACTUAL TIME RECORDED BY THE CENTRAL SITE COMPUTER. THE DIGITAL MONITOR MODULE SHALL NOT REQUIRE INTERFACING RELAYS TO MONITOR 24V DC, 115V AC, 220V AC OR 480V AC. THE DIGITAL MONITOR MODULE SHALL HAVE LEDS TO INDICATE: THE STATUS OF EACH INPUT POINT; RECEIVE COMMUNICATIONS; TRANSMIT COMMUNICATIONS; CPU FAULT; AND POWER STATUS. THE CONFIGURATION OF THE MONITOR POINTS AS ALARM POINTS OR MONITOR POINTS (PUMP RUN TIME MONITORS) SHALL BE OPERATOR CHANGEABLE. THE CONFIGURATION SHALL NOT REQUIRE ANY SOFTWARE OR FIRMWARE CHANGES IN THE SYSTEM.

#### 1.1.3 DIGITAL CONTROL MODULE (IF REQUIRED)

THE DIGITAL CONTROL MODULE SHALL PROVIDE FOR REMOTE CONTROL OF 8 INDEPENDENT 60 TO 280V AC DEVICES. THE CONTROL RELAYS SHALL BE SOLID STATE DEVICES WITH ZERO CROSSOVER DETECTION. EACH CONTROL POINT SHALL BE CAPABLE OF DRIVING A .5 AMP LOAD @ 280V AC (140V AC), WITH INRUSH CURRENT OF 5 AMPS. THE CONTROL MODULE SHALL HAVE THE CONFIGURABLE CAPABILITY TO AUTOMATICALLY SHUT DOWN ALL OUTPUTS IN THE CASE OF A POWER LOSS ON ANY ONE OF THE THREE PHASES. OPERATION INTERVENTION SHALL BE REQUIRED TO RESTART A CONTROL POINT AFTER A PHASE LOSS SHUTDOWN. ANY DISCRETE CONTROL POINT SHALL HAVE THE CAPABILITY OF BEING AUTOMATICALLY CONTROLLED BY ANY DISCRETE MONITOR POINT, AT THE SAME R.T.U. OR AT ANY OTHER RTU. THIS SHALL BE ACCOMPLISHED DURING CONFIGURATION AT THE CENTRAL SITE COMPUTER SYSTEM AND SHALL BE AVAILABLE FOR AN UNLIMITED NUMBER OF CONTROL POINTS. THE DIGITAL CONTROL MODULE SHALL HAVE LEDS TO INDICATE: THE STATUS OF EACH OUTPUT POINT; RECEIVE COMMUNICATIONS; TRANSMIT COMMUNICATIONS; C.P.U. FAULT; AND POWER STATUS.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Remote Terminal Unit RTU Specifications	
PUBLIC WORKS DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
<b>CHRIS A. KUBALA</b>	<b>JUNE 1, 2000</b>	<b>LS-09-A</b>	
CITY ENGINEER:	DRAWING SCALE:		
<b>MICHAEL J. STAFFOPOULOS</b>	<b>NOT TO SCALE</b>		

REMOTE TERMINAL UNIT SPECIFICATION CONTINUATION

1.1.4 PUMP CONTROL MODULE (IF REQUIRED)

THE PUMP CONTROL MODULE SHALL BE A MICROPROCESSOR-BASED MULTI-PUMP CONTROLLER MODULE DESIGNED FOR USE WITH THE TELEMETRY SYSTEM. AS A MINIMUM, THE PUMP CONTROL MODULE SHALL HAVE THE FOLLOWING FEATURES:

1. LOCAL AUTOMATIC CONTROL FROM FLOAT OR BUBBLER INPUTS.
2. LOCAL MANUAL CONTROL PROVIDED BY HOA SWITCHES. THE HOA SWITCHES SHALL FUNCTION WITH THE FLOATS TO PROVIDE EXTRA OPERATIONAL FLEXIBILITY, FOR INSTANCE, ONE PUMP CAN BE TAKEN OUT OF SERVICE FOR REPAIR BY THE HOA SWITCH, AND THE FLOATS WILL CONTROL THE REMAINING PUMP(S).
3. REMOTE CONTROL FROM THE CENTRAL SITE COMPUTER SHALL PROVIDE INDIVIDUAL PUMP OVERRIDES, STATION AND ALARM DISABLERS.
4. TRIPLEX/DUPLEX/SIMPLEX CONFIGURABLE. THE MODULE SHALL AUTOMATICALLY SENSE THE STATION TYPE AND CONFIGURE ITSELF.
5. TRIPLEX CONFIGURATION SHALL USE EMERGENCY HIGH, LAG 2, LAG 1, OFF AND EMERGENCY LOW FLOAT OR BUBBLER INPUTS.
6. DUPLEX AND SIMPLEX CONFIGURATIONS SHALL USE EMERGENCY HIGH, LEAD, OFF AND EMERGENCY LOW FLOATS.
7. THE ALTERNATOR FUNCTION SHALL ALTERNATE AROUND PUMPS THAT DON'T ALTERNATE WHEN CALLED. THE ALTERNATOR SHALL ALLOW THE OPERATOR TO OVERRIDE A PUMP ON OR OFF WITH THE HOA SWITCHES AND THE ALTERNATOR WILL STILL PROVIDE ALTERNATOR CONTROL OVER THE REMAINING PUMP(S).
8. THE PHASE MONITOR FUNCTIONS SHALL:
  - a) PROVIDE TRANSFORMER ISOLATION
  - b) DETECT LOSS OF PHASE, PHASE REVERSAL, AND LOW LEG PHASE PROBLEMS;
  - c) PROVIDE AUTOMATIC CALIBRATION FOR 220 OR 440V AC THREE PHASE POWER INPUTS.
9. ALARM LIGHT AND BELL OUTPUTS CAPABLE OF DRIVING 120V AC LOADS TO 1 AMP.
10. LOCAL INPUT FOR ALARM SILENCE SWITCH.
11. FLOAT ALARM REPORTING BACK TO THE CENTRAL SITE COMPUTER WHEN FLOATS ARE OPERATING OUT OF SEQUENCE.
12. EMERGENCY LOW FLOAT PROVIDES SHUT DOWN CONTROL WHEN FLOATS ARE OPERATING OUT OF SEQUENCE.
13. PUMPS/STARTER/BREAKER FAULT ALARMS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER. THE ALARMS SHALL BE ACTIVATED WHEN A PUMP IS CALLED TO RUN BUT FAILS TO RUN, OR IF THE PUMP IS TURNED OFF BY THE PCM BUT CONTINUES TO RUN.
14. HOA SWITCH ALARMS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER. ALARMS SHALL INDICATE THAT AN HOA SWITCH HAS BEEN LEFT IN THE HAND OR OFF POSITION.
15. PUMP RUN STATUS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER. PUMP RUN TIMES RECORDED WITH 2-SECOND ACCURACY.
16. RTU POWER STATUS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER.
17. LED INDICATORS SHALL BE PROVIDED FOR:
  - a) RTU POWER
  - b) ALARM BELL
  - c) USER-DEFINED INPUT
  - d) MODULE POWER
  - e) TRANSMIT AND RECEIVE DATA
  - f) PHASE ALARM/CALIBRATION
  - g) PROCESSOR FAULT
  - h) SIX FLOAT INPUTS
  - i) PUMPS ON/OFF
18. ALL INPUTS AND OUTPUTS SHALL BE OPTICALLY OR MAGNETICALLY ISOLATED AND SURGE SUPPRESSED WITHOUT ADDITIONAL RELAYS.

1.2 POWER SUPPLY

ALL FUNCTION MODULES IN THE REMOTE TERMINAL UNIT SHALL RUN OFF DC VOLTAGE FROM +7.5 VOLTS TO +13 VOLTS. THE POWER SUPPLY MODULE SHALL SUPPLY +12 VOLTS. A BATTERY BACKUP SHALL BE PROVIDED TO OPERATE THE SYSTEM FOR A MINIMUM OF 120 MINUTES IN THE EVENT OF POWER FAILURE. THE POWER SUPPLY SHALL BE SURGE PROTECTED. THE POWER SUPPLY SHALL BE SHORT CIRCUIT PROTECTED BY CURRENT LIMITING. NORMAL OPERATION SHALL AUTOMATICALLY RESUME WHEN THE SHORT CIRCUIT OVERLOAD IS REMOVED. THE POWER SUPPLY SHALL BE SIZED TO OPERATE THE SYSTEM WITH THE BATTERY REMOVED. THE POWER SUPPLY MODULE SHALL PROVIDE A BATTERY BACKED, ISOLATED BIAS VOLTAGE SOURCE. THE CIRCUIT BREAKER FOR THE POWER SUPPLY MODULE SHALL BE PART OF THE POWER SUPPLY MODULE. NEITHER THE USE OF TOOLS NOR THE DISCONNECTION OF ANY WIRES SHALL BE REQUIRED TO REMOVE THE POWER SUPPLY MODULE.

1.3 BATTERIES

THE REMOTE TERMINAL SHALL HAVE THE UNINTERRUPTABLE POWER SOURCE FUNCTION BUILT IN. THE POWER SUPPLY WILL KEEP THE BATTERIES AT A FLOAT CHARGE. THE BATTERIES SHALL NOT BE DAMAGED BY DEEP DISCHARGE.

1.3.1 ANTENNA SUBSYSTEM

AN 11.2 DB GAIN DIRECTIONAL ANTENNA SHALL BE USED TO TRANSMIT AND RECEIVE DATA AT THE REMOTE TERMINAL UNIT. IT SHALL BE SUPPORTED ON A MAST/POLE AND HAVE DC GROUNDING FOR LIGHTNING PROTECTION. THE ANTENNA MAST/POLE SHALL BE HOT DIPPED GALVANIZED FOR CORROSION PROTECTION. ALL HARDWARE SHALL BE GALVANIZED OR MADE OF STAINLESS STEEL. THE MAST SHALL MEET OR EXCEED THE QUALITY AND RELIABILITY OF THE AG20 MANUFACTURED BY ROHN. THE COAX CABLE UTILIZED SHALL BE THE TYPE THAT UTILIZES AN INSERT SEMI-LIQUID COMPOUND TO FLOOD THE COPPER BRAID. THE COAX CABLE SHALL MEET OR EXCEED THE QUALITY, RELIABILITY AND PERFORMANCE OF THAT MANUFACTURED BY D.B. PRODUCTS, INC. OF DALLAS, TEXAS.

1.4 ENCLOSURES

RTUS SHALL BE HOUSED IN NEMA 4X 316 STAINLESS STEEL ENCLOSURES, ACID-DIPPED AND PAINTED WHITE. ENCLOSURE SHALL ACCOMMODATE THE PLUG-IN MODULES TO MEET THE REQUIREMENTS PLUS AT LEAST ONE ADDITIONAL MODULE FOR EXPANSION. ENCLOSURE SHALL BE CAPABLE OF BEING LOCKED.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Remote Terminal Unit RTU Specifications	
PUBLIC WORKS DIRECTOR: <b>CHRIS A. KUBALA</b>	PUBLICATION DATE: <b>JUNE 1, 2000</b>	INDEX NUMBER: <b>LS-09-B</b>	
CITY ENGINEER: <b>MICHAEL J. STAFFOPOULOS</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

REMOTE TERMINAL UNIT SPECIFICATION CONTINUATION

1.5 TELEMETRY REQUIREMENTS

1. RTU 005 WITH BACKPLANE, BATTERY, CO-AXIAL CABLE, TOWER, MISCELLANEOUS HARDWARE.
2. RAINFALL TIPPING BUCKET (0.01" PER PULSE)
3. 0-100 P.S.I. TRANSMITTER (4-20 MA OUTPUT)
4. PUMP CONTROL MODULE
5. PULSE ACCUMULATOR MODULE
6. ANALOG MONITOR MODULE (PEAK)
7. RADIO INTERFACE MODULE
8. POWER SUPPLY MODULE (50W)

NOTES:

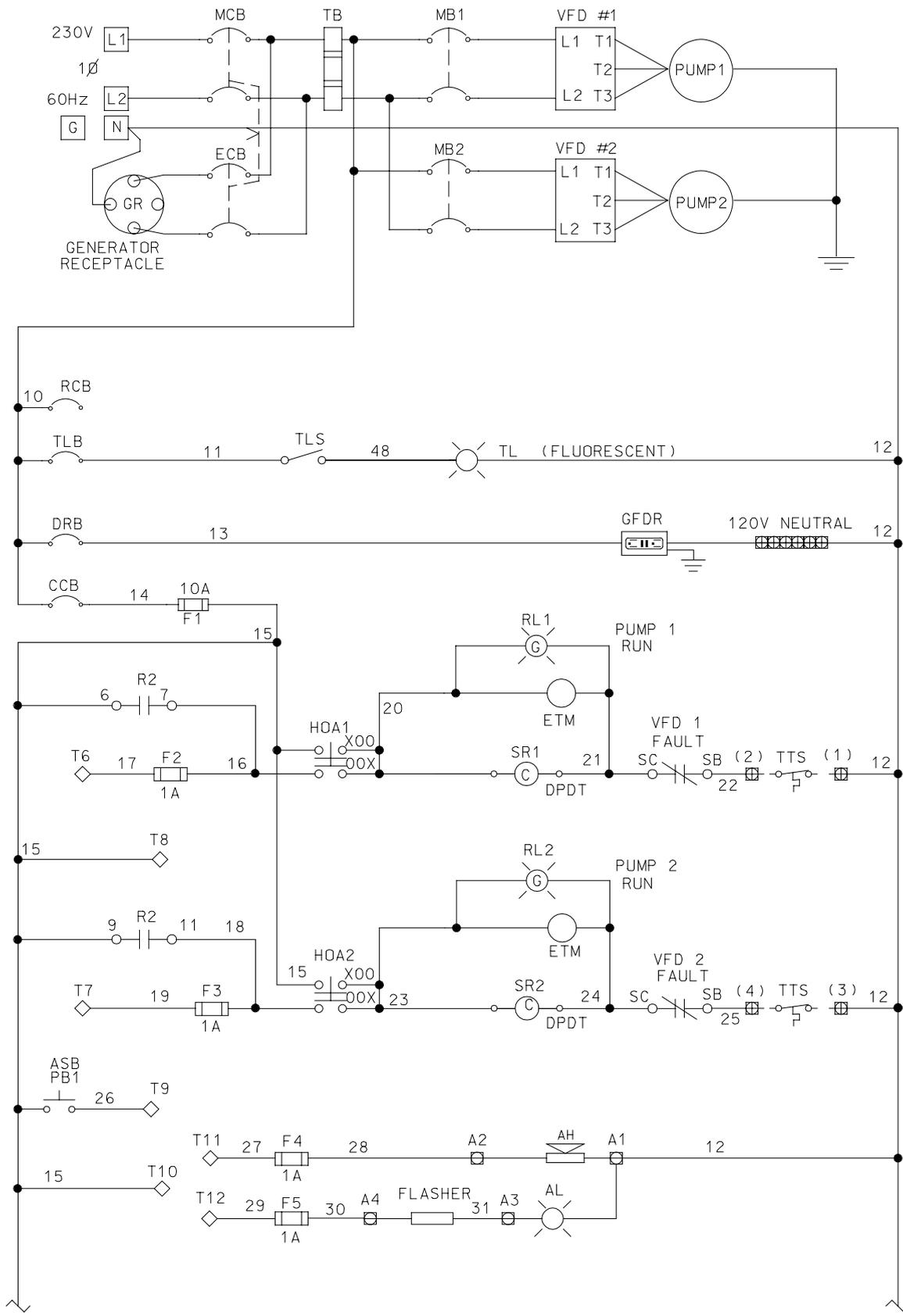
1. RAINFALL GAUGE AND 0-100 P.S.I. TRANSMITTER MUST BE THE SAME AS THE CITY'S EXISTING UNITS.
2. ALL OF THE ABOVE ITEMS ARE SUPPLIED BY DATA FLOW SYSTEMS OF MELBOURNE, FL.
3. PROVIDE SPARE BOARDS FOR ABOVE NUMBERS 4,7,AND 8.



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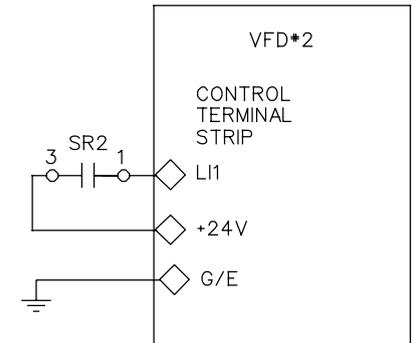
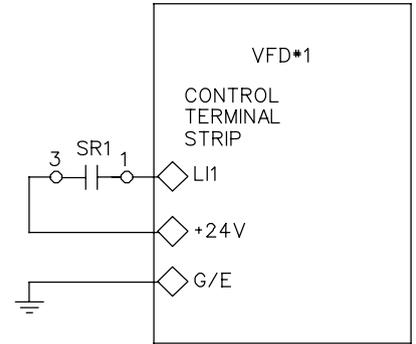
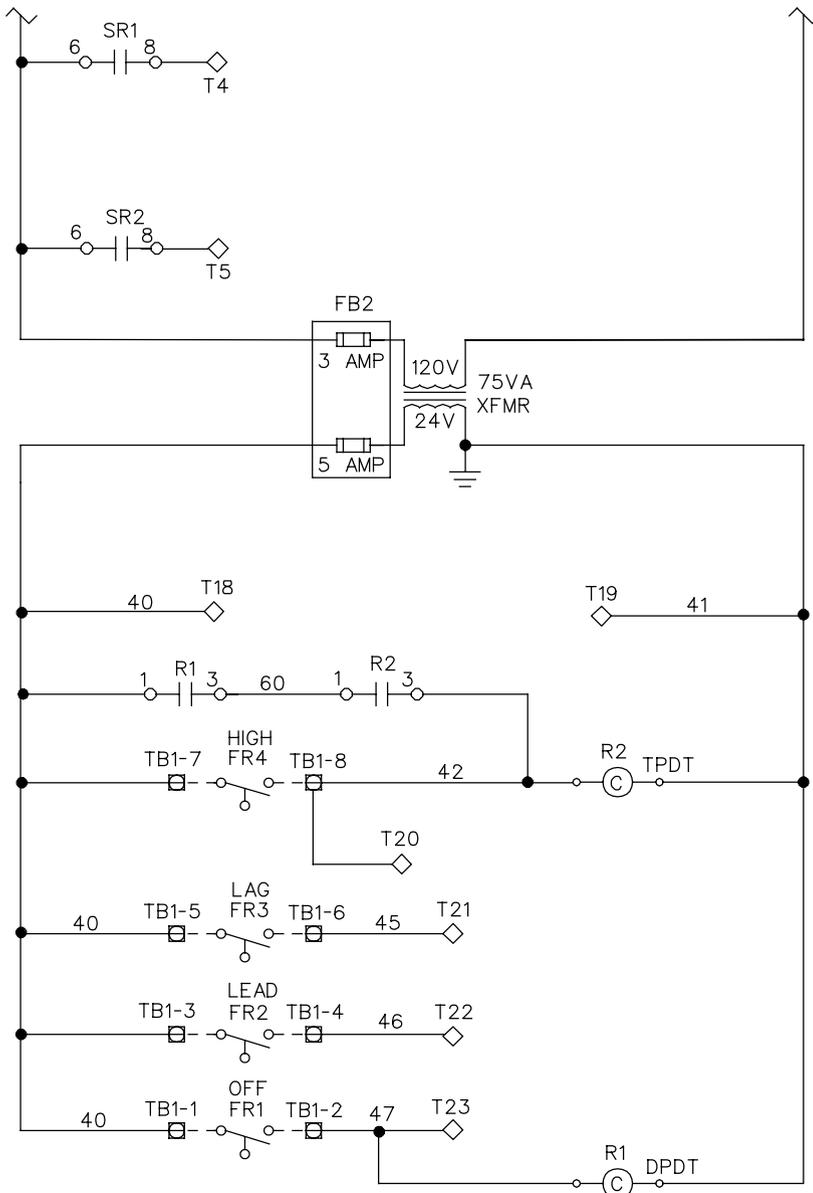
TITLE:  
 Engineering Design and  
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DESCRIPTION:  
 Panel Requirements  
 230V/1PH with VFD's

PUBLIC WORKS DIRECTOR:  
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**NOTES:**

- 1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
- 2) RTU BY OTHERS
- 3) CONTROL WIRE TO BE AWG 14 MIN.
- 4) WIRE MARKERS

**LEGEND**

- |   |   |
|---|---|
| <p>AH - ALARM HORN<br/>         AL - ALARM LIGHT<br/>         ASB - ALARM SILENCE BUTTON<br/>         CCB - CONTROL CIRCUIT BREAKER<br/>         DPDT - DOUBLE POLE DOUBLE THROW<br/>         DRB - DUPLEX RECEPTACLE BREAKER<br/>         ETM - ELAPSED TIME METER<br/>         F - FUSE<br/>         FB - FUSE BLOCK<br/>         FL - FLASHER<br/>         FR - FLOAT REGULATOR<br/>         GFDR - GROUND FAULT DUPLEX RECEPTACLE<br/>         GND - GROUND<br/>         GR - GENERATOR RECEPTACLE<br/>         HOA - HAND-OFF-AUTO SELECTOR SWITCH<br/>         MB - MOTOR BREAKER</p> | <p>MCB - MAIN CIRCUIT BREAKER<br/>         MS - MOTOR STARTER<br/>         OL - OVERLOAD<br/>         PB - PUSH BUTTON<br/>         PDB - POWER DISTRIBUTION BLOCK<br/>         PCU - PUMP CONTROL MODULE<br/>         PL - PILOT LIGHT<br/>         PM - PHASE MONITOR<br/>         R - RELAY<br/>         RL - RUNNING LIGHT<br/>         RTU - REMOTE TELEMETRY UNIT<br/>         T - TERMINAL<br/>         TB - TERMINAL BLOCK<br/>         TLS - TROUBLE LIGHT SWITCH<br/>         TTS - THERMAL TERMINAL STRIP<br/>         XDUCER - TRANSDUCER<br/>         XFMR - TRANSFORMER</p> |
|---|---|

**TERMINAL LEGEND**

- TTS
- TERMINAL BLOCK #3
- TERMINAL BLOCK #2 (TO RTU)



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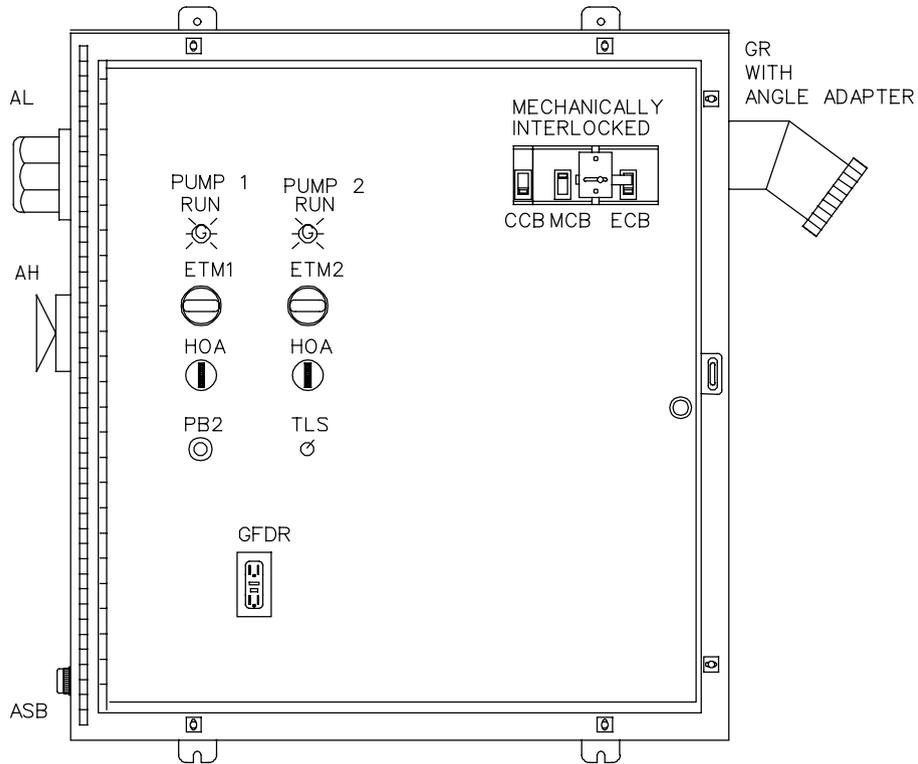
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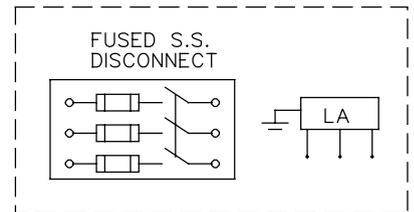
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**LS-10-B**



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT  
 NEMA TYPE 3R 316 S.S. ENCLOSURE WITH CONT. HINGE  
 ALL ENCLOSURE HARDWARE STAINLESS STEEL  
 TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER  
 3-POINT LATCH (NOT SHOWN)

SHIPPED AS PARTS



**NOTES:**

- 1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
- 2) RTU BY OTHERS
- 3) CONTROL WIRE TO BE AWG 14 MINIMUM



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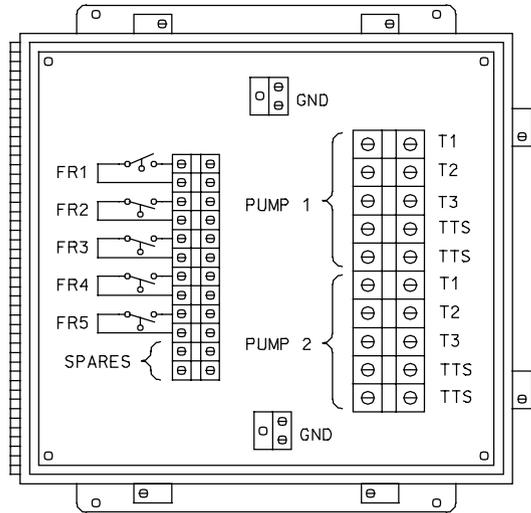
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RTU TERMINAL STRIP (TB2)

- T1 ◇
- T2 ◇
- T3 ◇
- T4 ◇ M1 INPUT LEAD
- T5 ◇ M2 INPUT LEAD
- T6 ◇ M1 START
- T7 ◇ M2 START
- T8 ◇ MS POWER
- T9 ◇ ALARM SILENCE
- T10 ◇ ALARM POWER
- T11 ◇ ALARM HORN
- T12 ◇ ALARM LIGHT
- T13 ◇
- T14 ◇
- T15 ◇
- T16 ◇
- T17 ◇
- T18 ◇ 24Vac POWER
- T19 ◇ 24Vac NEUTRAL
- T20 ◇ HIGH LEVEL
- T21 ◇ LAG PUMP ON
- T22 ◇ LEAD PUMP ON
- T23 ◇ PUMPS OFF



JUNCTION BOX, NEMA 4X S.S.  
DOOR REMOVED TO SHOW INSIDE LAYOUT

LEGEND

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>AH - ALARM HORN</li> <li>AL - ALARM LIGHT</li> <li>ASB - ALARM SILENCE BUTTON</li> <li>CCB - CONTROL CIRCUIT BREAKER</li> <li>DPDT - DOUBLE POLE DOUBLE THROW</li> <li>DRB - DUPLEX RECEPTACLE BREAKER</li> <li>ETM - ELAPSED TIME METER</li> <li>F - FUSE</li> <li>FB - FUSE BLOCK</li> <li>FL - FLASHER</li> <li>FR - FLOAT REGULATOR</li> <li>GFDR - GROUND FAULT DUPLEX RECEPTACLE</li> <li>GND - GROUND</li> <li>GR - GENERATOR RECEPTACLE</li> <li>HOA - HAND-OFF-AUTO SELECTOR SWITCH</li> <li>MB - MOTOR BREAKER</li> </ul> | <ul style="list-style-type: none"> <li>MCB - MAIN CIRCUIT BREAKER</li> <li>MS - MOTOR STARTER</li> <li>OL - OVERLOAD</li> <li>PB - PUSH BUTTON</li> <li>PDB - POWER DISTRIBUTION BLOCK</li> <li>PCU - PUMP CONTROL MODULE</li> <li>PL - PILOT LIGHT</li> <li>PM - PHASE MONITOR</li> <li>R - RELAY</li> <li>RL - RUNNING LIGHT</li> <li>RTU - REMOTE TELEMETRY UNIT</li> <li>T - TERMINAL</li> <li>TB - TERMINAL BLOCK</li> <li>TLS - TROUBLE LIGHT SWITCH</li> <li>TTS - THERMAL TERMINAL STRIP</li> <li>XDUCER - TRANSDUCER</li> <li>XFMR - TRANSFORMER</li> </ul> |
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PUBLIC WORKS DIRECTOR:  
CHRIS A. KUBALA

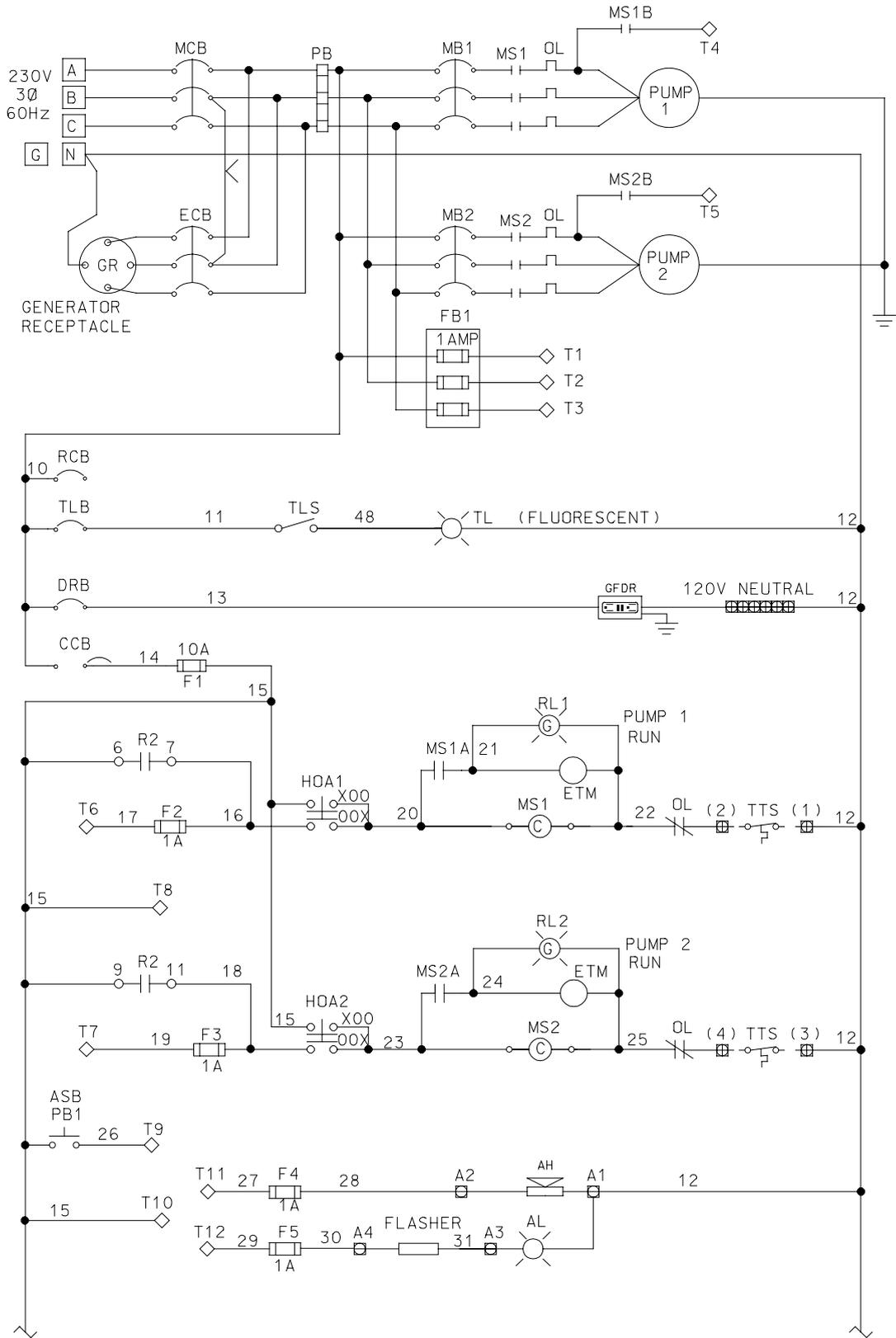
PUBLICATION DATE:  
JUNE 1, 2000

INDEX NUMBER:

CITY ENGINEER:  
MICHAEL J. STAFFOPOULOS

DRAWING SCALE:  
NOT TO SCALE

LS-10-D



# City of Largo

Public Works Department  
 Engineering Services Division  
 201 Highland Avenue, Largo, FL, 33770-2512  
 TEL: (727) 587-6713 FAX: (727) 586-7413  
 WWW: <http://www.largo.com>

TITLE:  
 Engineering Design and  
 Construction Standards

DESCRIPTION:  
 230V/3PH  
 RTU System

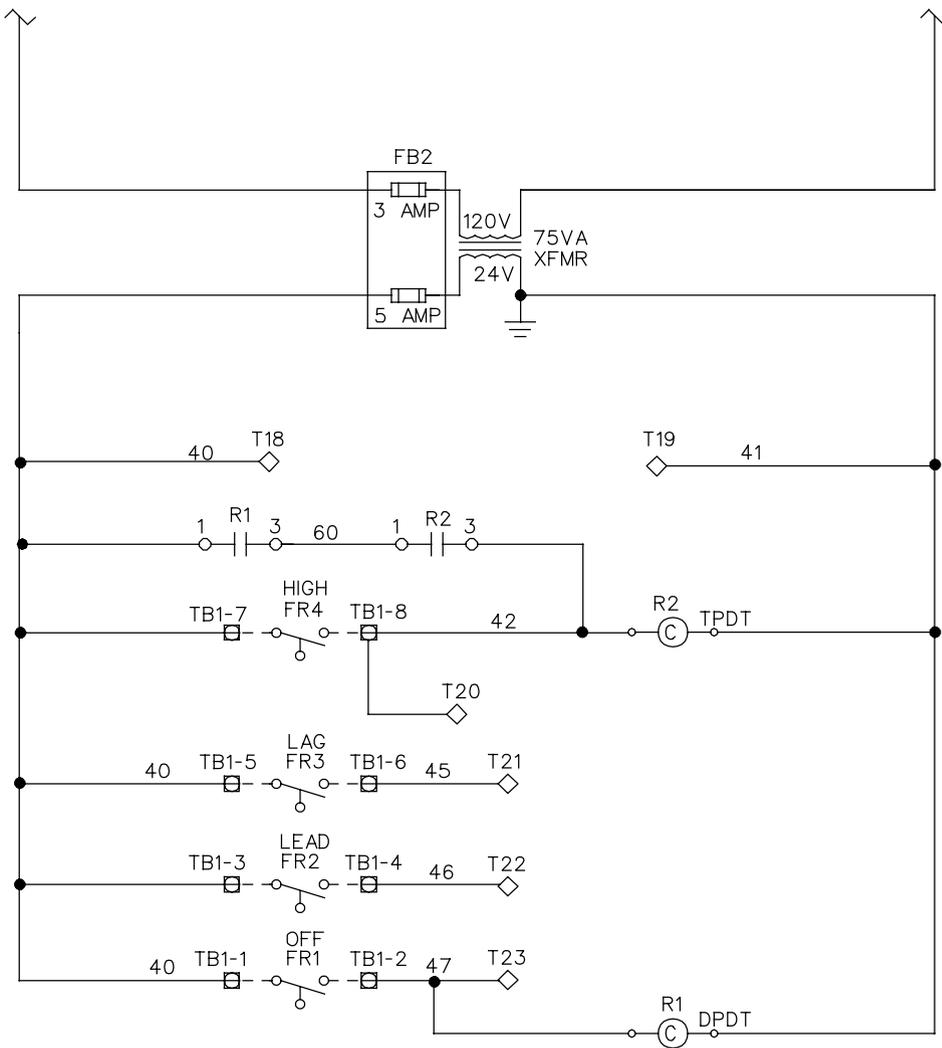
PUBLIC WORKS DIRECTOR:  
 CHRIS A. KUBALA

CITY ENGINEER:  
 MICHAEL J. STAFFOPOULOS

PUBLICATION DATE:  
 JUNE 1, 2000

DRAWING SCALE:  
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INDEX NUMBER:  
 LS-11-A



**NOTES:**

- 1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
- 2) RTU BY OTHERS
- 3) CONTROL WIRE TO BE AWG 14 MIN.
- 4) WIRE MARKERS

**LEGEND**

- |   |   |
|---|---|
| <p>AH - ALARM HORN<br/>         AL - ALARM LIGHT<br/>         ASB - ALARM SILENCE BUTTON<br/>         CCB - CONTROL CIRCUIT BREAKER<br/>         DPDT - DOUBLE POLE DOUBLE THROW<br/>         DRB - DUPLEX RECEPTACLE BREAKER<br/>         ETM - ELAPSED TIME METER<br/>         F - FUSE<br/>         FB - FUSE BLOCK<br/>         FL - FLASHER<br/>         FR - FLOAT REGULATOR<br/>         GFDR - GROUND FAULT DUPLEX RECEPTACLE<br/>         GND - GROUND<br/>         GR - GENERATOR RECEPTACLE<br/>         HOA - HAND-OFF-AUTO SELECTOR SWITCH<br/>         MB - MOTOR BREAKER</p> | <p>MCB - MAIN CIRCUIT BREAKER<br/>         MS - MOTOR STARTER<br/>         OL - OVERLOAD<br/>         PB - PUSH BUTTON<br/>         PDB - POWER DISTRIBUTION BLOCK<br/>         PCU - PUMP CONTROL MODULE<br/>         PL - PILOT LIGHT<br/>         PM - PHASE MONITOR<br/>         R - RELAY<br/>         RL - RUNNING LIGHT<br/>         RTU - REMOTE TELEMETRY UNIT<br/>         T - TERMINAL<br/>         TB - TERMINAL BLOCK<br/>         TLS - TROUBLE LIGHT SWITCH<br/>         TTS - THERMAL TERMINAL STRIP<br/>         XDUCER - TRANSDUCER<br/>         XFMR - TRANSFORMER</p> |
|---|---|

**TERMINAL LEGEND**

- ⊞ - TTS
- ⊞ - TERMINAL BLOCK \*3
- ◇ - TERMINAL BLOCK \*2 (TO RTU)



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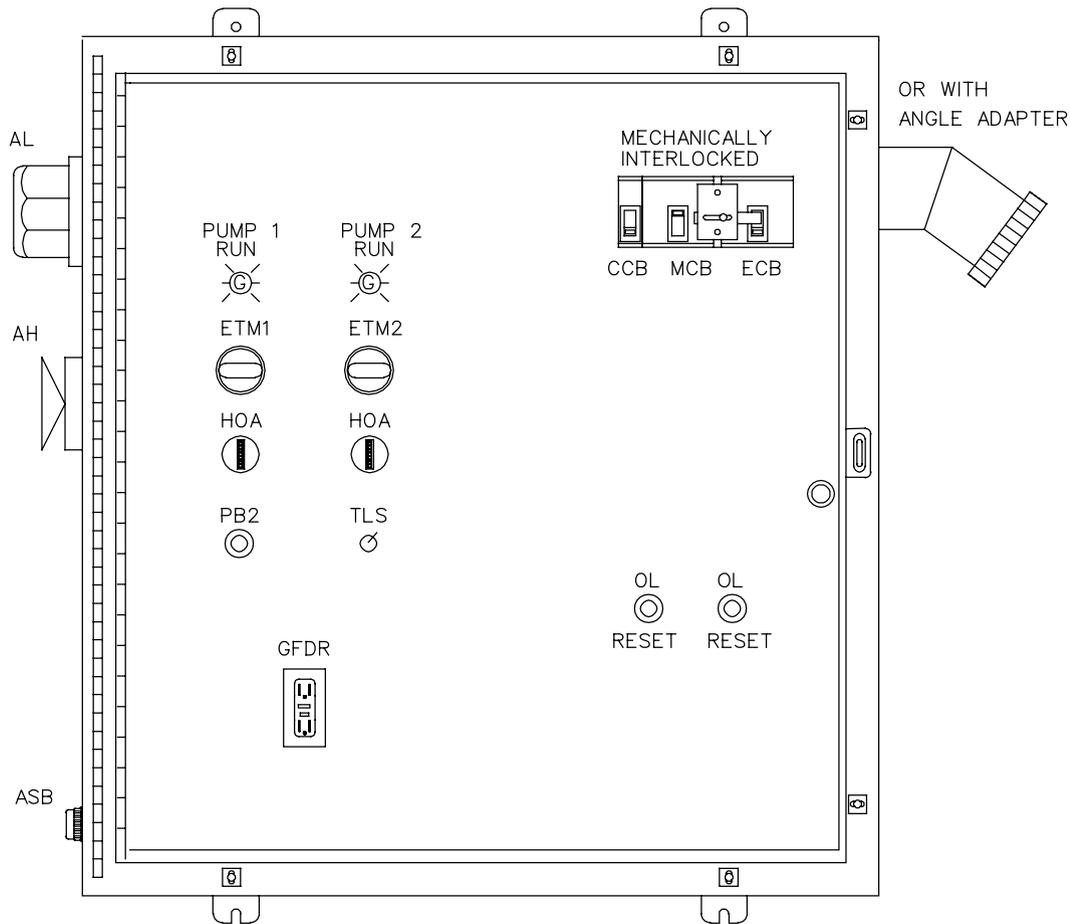
TITLE:  
 Engineering Design and  
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DESCRIPTION:  
 230V/3PH  
 RTU System

PUBLIC WORKS DIRECTOR:  
**CHRIS A. KUBALA**  
 CITY ENGINEER:  
**MICHAEL J. STAFFOPOULOS**

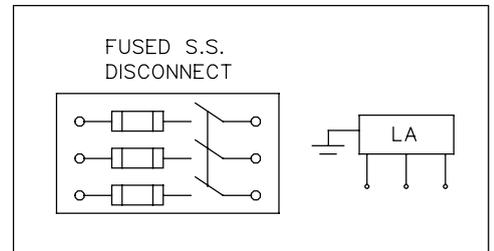
PUBLICATION DATE:  
**JUNE 1, 2000**  
 DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**LS-11-B**



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT  
 NEMA TYPE 3R 316 S.S. ENCLOSURE WITH CONT. HINGE  
 ALL ENCLOSURE HARDWARE STAINLESS STEEL  
 TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER  
 3-POINT LATCH (NOT SHOWN)

SHIPPED AS PARTS



**NOTES:**

- 1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
- 2) RTU BY OTHERS
- 3) CONTROL WIRE TO BE AWG 14 MIN.



## City of Largo

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TITLE:

Engineering Design and  
 Construction Standards

DESCRIPTION:

230V/3PH  
 RTU System

PUBLIC WORKS DIRECTOR:

**CHRIS A. KUBALA**

PUBLICATION DATE:

**JUNE 1, 2000**

INDEX NUMBER:

**LS-11-C**

CITY ENGINEER:

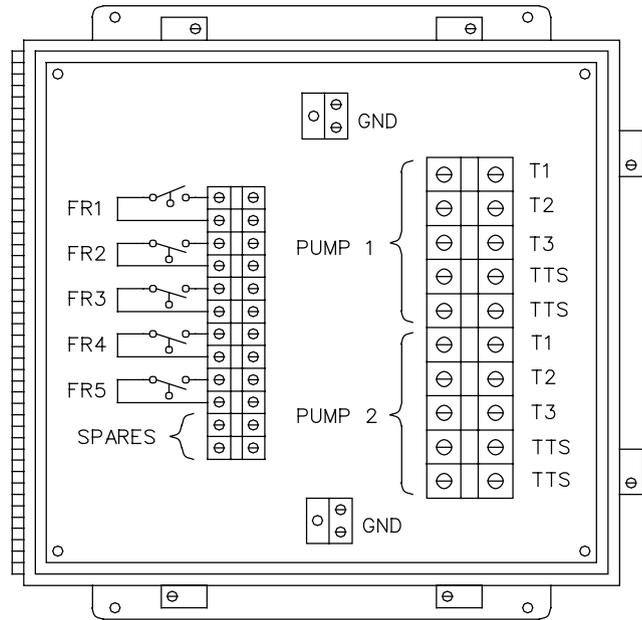
**MICHAEL J. STAFFOPOULOS**

DRAWING SCALE:

**NOT TO SCALE**

RTU TERMINAL STRIP  
(TB2)

- T1 ◇ PHASE A
- T2 ◇ PHASE B
- T3 ◇ PHASE C
- T4 ◇ M1 INPUT LEAD
- T5 ◇ M2 INPUT LEAD
- T6 ◇ M1 START
- T7 ◇ M2 START
- T8 ◇ MS POWER
- T9 ◇ ALARM SILENCE
- T10 ◇ ALARM POWER
- T11 ◇ ALARM HORN
- T12 ◇ ALARM LIGHT
- T13 ◇
- T14 ◇
- T15 ◇
- T16 ◇
- T17 ◇
- T18 ◇ 24Vac POWER
- T19 ◇ 24Vac NEUTRAL
- T20 ◇ HIGH LEVEL
- T21 ◇ LAG PUMP ON
- T22 ◇ LEAD PUMP ON
- T23 ◇ PUMPS OFF



JUNCTION BOX, NEMA 4X S.S.  
DOOR REMOVED TO SHOW INSIDE LAYOUT

LEGEND

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>AH - ALARM HORN</li> <li>AL - ALARM LIGHT</li> <li>ASB - ALARM SILENCE BUTTON</li> <li>CCB - CONTROL CIRCUIT BREAKER</li> <li>DPDT - DOUBLE POLE DOUBLE THROW</li> <li>DRB - DUPLEX RECEPTACLE BREAKER</li> <li>ETM - ELAPSED TIME METER</li> <li>F - FUSE</li> <li>FB - FUSE BLOCK</li> <li>FL - FLASHER</li> <li>FR - FLOAT REGULATOR</li> <li>GFDR - GROUND FAULT DUPLEX RECEPTACLE</li> <li>GND - GROUND</li> <li>GR - GENERATOR RECEPTACLE</li> <li>HOA - HAND-OFF-AUTO SELECTOR SWITCH</li> <li>MB - MOTOR BREAKER</li> </ul> | <ul style="list-style-type: none"> <li>MCB - MAIN CIRCUIT BREAKER</li> <li>MS - MOTOR STARTER</li> <li>OL - OVERLOAD</li> <li>PB - PUSH BUTTON</li> <li>PDB - POWER DISTRIBUTION BLOCK</li> <li>PCU - PUMP CONTROL MODULE</li> <li>PL - PILOT LIGHT</li> <li>PM - PHASE MONITOR</li> <li>R - RELAY</li> <li>RL - RUNNING LIGHT</li> <li>RTU - REMOTE TELEMETRY UNIT</li> <li>T - TERMINAL</li> <li>TB - TERMINAL BLOCK</li> <li>TLS - TROUBLE LIGHT SWITCH</li> <li>TTS - THERMAL TERMINAL STRIP</li> <li>XDUCER - TRANSDUCER</li> <li>XFMR - TRANSFORMER</li> </ul> |
|--|--|



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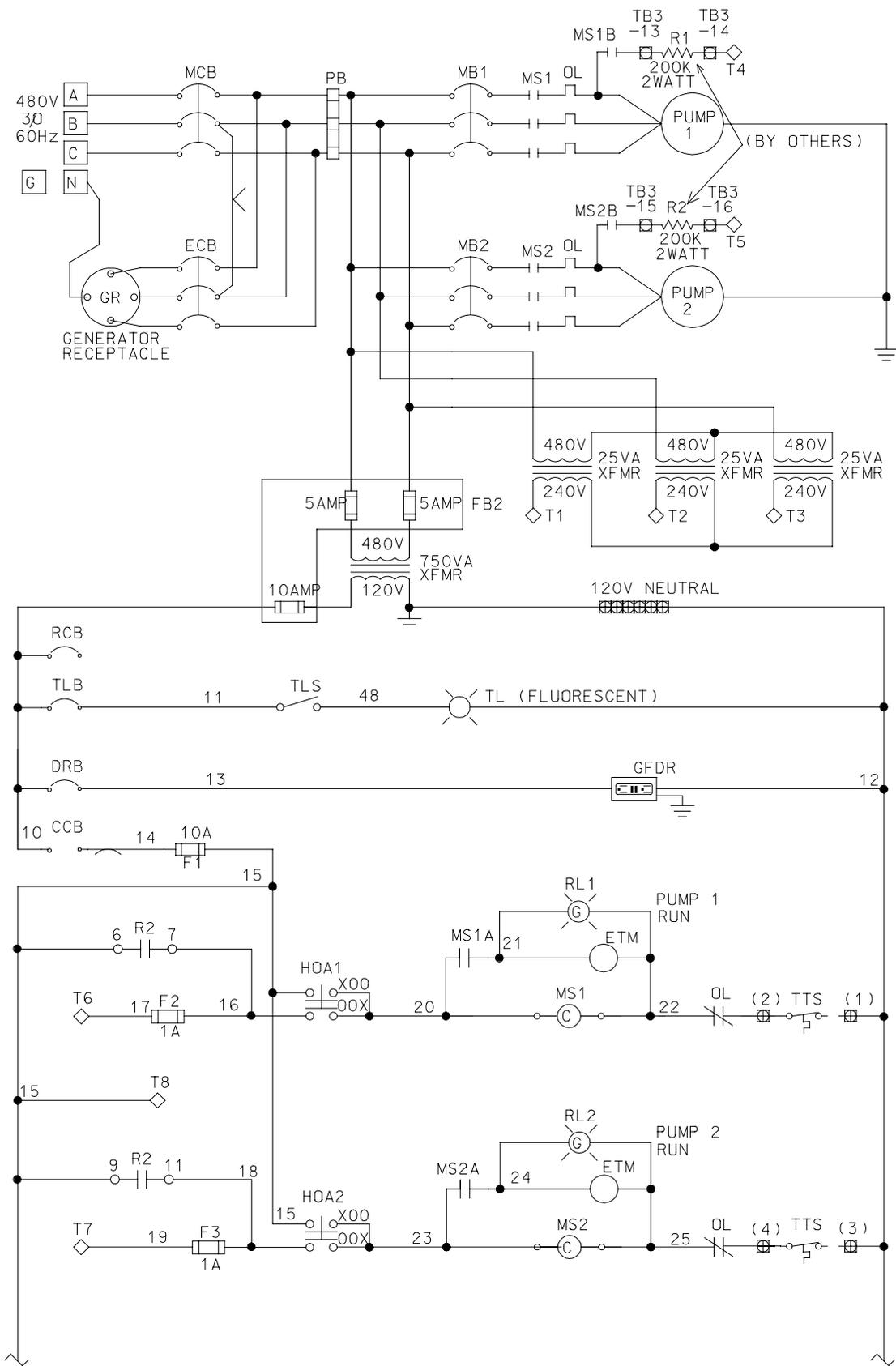
TITLE:  
Engineering Design and  
Construction Standards

DESCRIPTION:  
230V/3PH  
RTU System

PUBLIC WORKS DIRECTOR:  
**CHRIS A. KUBALA**  
CITY ENGINEER:  
**MICHAEL J. STAFFOPOULOS**

PUBLICATION DATE:  
**JUNE 1, 2000**  
DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**LS-11-D**



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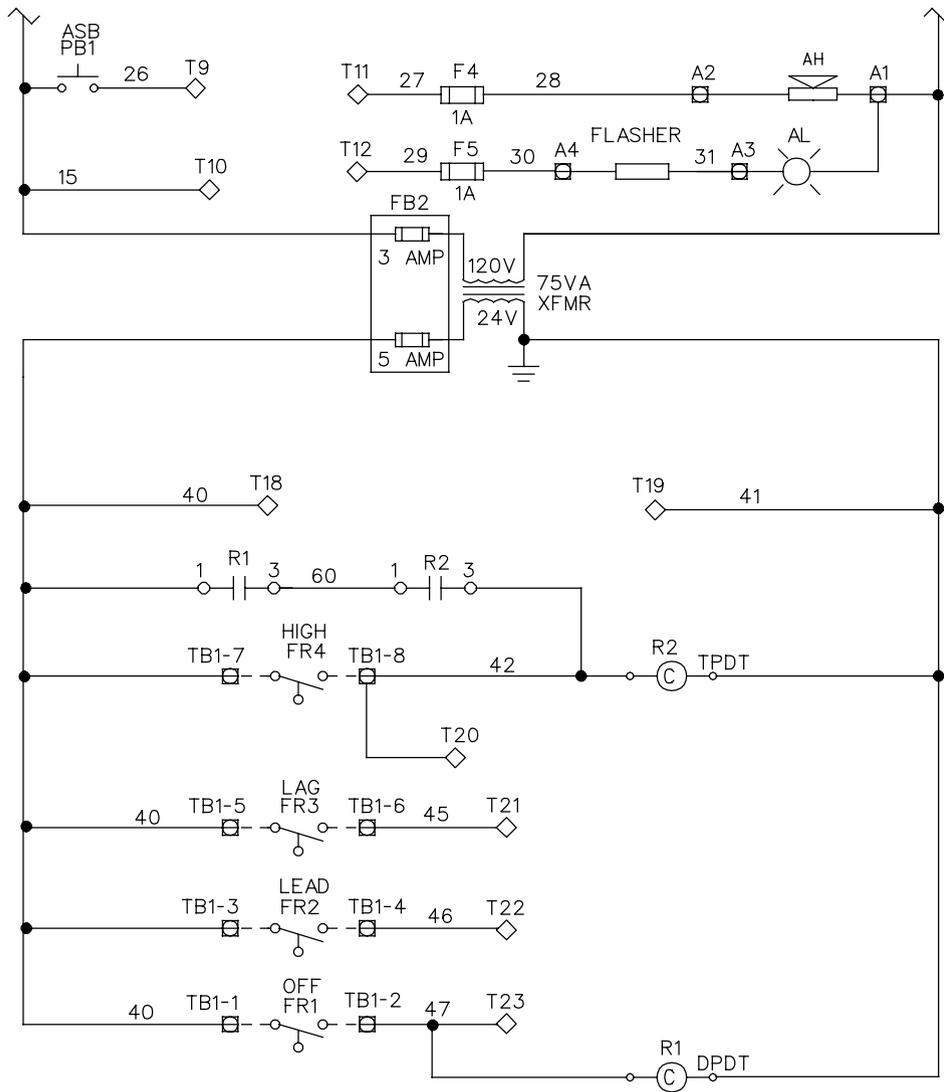
TITLE:  
 Engineering Design and  
 Construction Standards

DESCRIPTION:  
 480V/3PH  
 RTU System

PUBLIC WORKS DIRECTOR:  
 CHRIS A. KUBALA  
 CITY ENGINEER:  
 MICHAEL J. STAFFOPOULOS

PUBLICATION DATE:  
 JUNE 1, 2000  
 DRAWING SCALE:  
 NOT TO SCALE

INDEX NUMBER:  
 LS-12-A



**NOTES:**

- 1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
- 2) RTU BY OTHERS
- 3) CONTROL WIRE TO BE AWG 14 MIN.
- 4) WIRE MARKER

**LEGEND**

- |   |   |
|---|---|
| <p>AH - ALARM HORN<br/>         AL - ALARM LIGHT<br/>         ASB - ALARM SILENCE BUTTON<br/>         CCB - CONTROL CIRCUIT BREAKER<br/>         DPDT - DOUBLE POLE DOUBLE THROW<br/>         DRB - DUPLEX RECEPTACLE BREAKER<br/>         ETM - ELAPSED TIME METER<br/>         F - FUSE<br/>         FB - FUSE BLOCK<br/>         FL - FLASHER<br/>         FR - FLOAT REGULATOR<br/>         GFDR - GROUND FAULT DUPLEX RECEPTACLE<br/>         GND - GROUND<br/>         GR - GENERATOR RECEPTACLE<br/>         HOA - HAND-OFF-AUTO SELECTOR SWITCH<br/>         MB - MOTOR BREAKER</p> | <p>MCB - MAIN CIRCUIT BREAKER<br/>         MS - MOTOR STARTER<br/>         OL - OVERLOAD<br/>         PB - PUSH BUTTON<br/>         PDB - POWER DISTRIBUTION BLOCK<br/>         PCU - PUMP CONTROL MODULE<br/>         PL - PILOT LIGHT<br/>         PM - PHASE MONITOR<br/>         R - RELAY<br/>         RL - RUNNING LIGHT<br/>         RTU - REMOTE TELEMETRY UNIT<br/>         T - TERMINAL<br/>         TB - TERMINAL BLOCK<br/>         TLS - TROUBLE LIGHT SWITCH<br/>         TTS - THERMAL TERMINAL STRIP<br/>         XDUCER - TRANSDUCER<br/>         XFMR - TRANSFORMER</p> |
|---|---|

**TERMINAL LEGEND**

- ⊠ - TTS
- ⊞ - TERMINAL BLOCK #3
- ◇ - TERMINAL BLOCK #2 (TO RTU)



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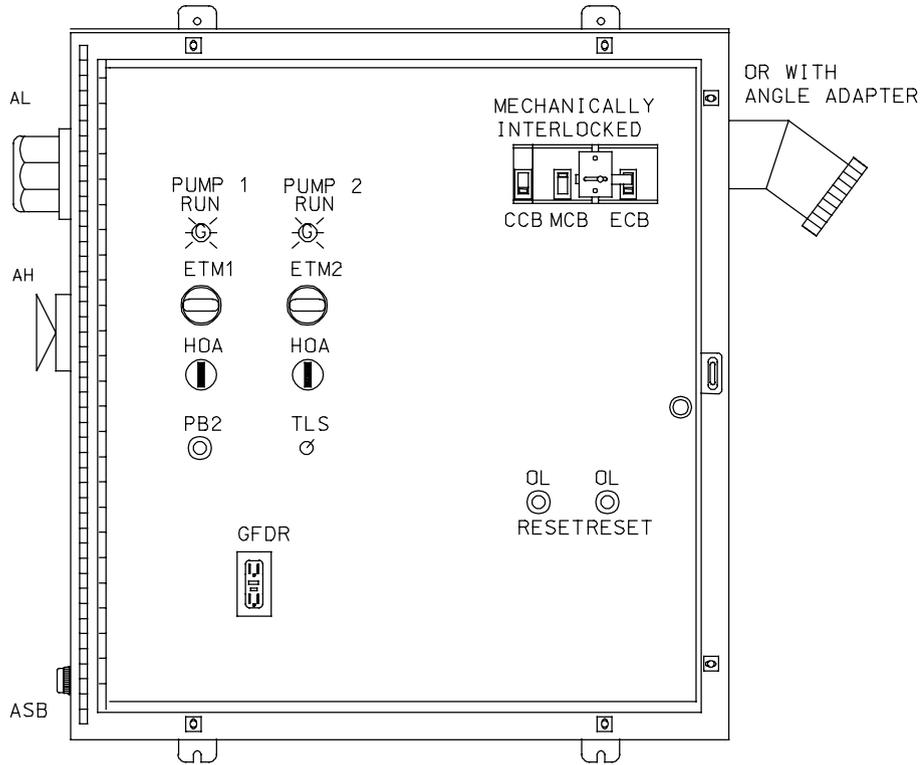
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PUBLIC WORKS DIRECTOR:  
**CHRIS A. KUBALA**  
 CITY ENGINEER:  
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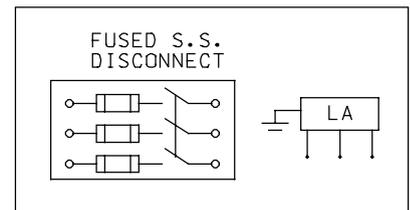
PUBLICATION DATE:  
**JUNE 1, 2000**  
 DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**LS-12-B**



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT  
 NEMA TYPE 3R 316 S.S. ENCLOSURE WITH CONT. HINGE  
 ALL ENCLOSURE HARDWARE STAINLESS STEEL  
 TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER  
 3-POINT LATCH (NOT SHOWN)

SHIPPED AS PARTS



**NOTES:**

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TITLE:  
 Engineering Design and  
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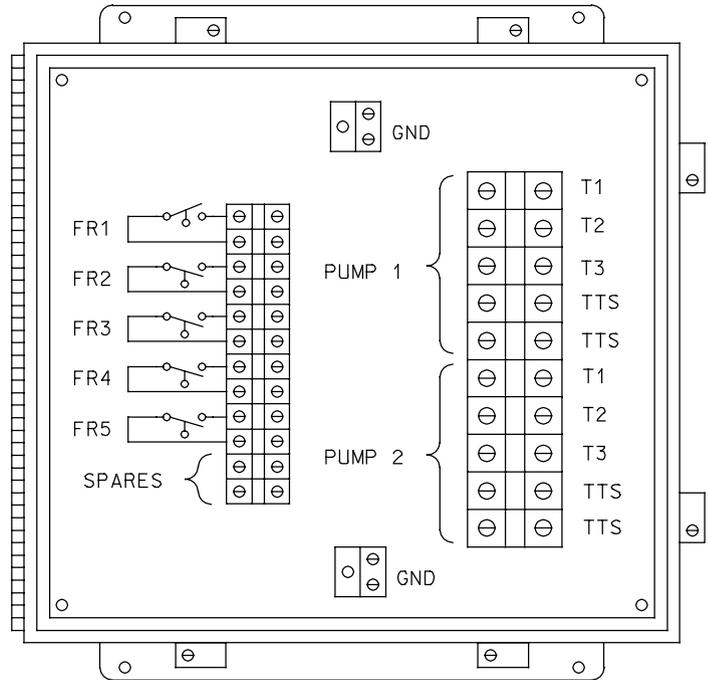
PUBLIC WORKS DIRECTOR:  
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 CITY ENGINEER:  
**MICHAEL J. STAFFOPOULOS**

PUBLICATION DATE:  
**JUNE 1, 2000**  
 DRAWING SCALE:  
**NOT TO SCALE**

INDEX NUMBER:  
**LS-12-C**

RTU TERMINAL STRIP (TB2)

- T1 ◇ PHASE A
- T2 ◇ PHASE B
- T3 ◇ PHASE C
- T4 ◇ M1 INPUT LEAD
- T5 ◇ M2 INPUT LEAD
- T6 ◇ M1 START
- T7 ◇ M2 START
- T8 ◇ MS POWER
- T9 ◇ ALARM SILENCE
- T10 ◇ ALARM POWER
- T11 ◇ ALARM HORN
- T12 ◇ ALARM LIGHT
- T13 ◇
- T14 ◇
- T15 ◇
- T16 ◇
- T17 ◇
- T18 ◇ 24Vac POWER
- T19 ◇ 24Vac NEUTRAL
- T20 ◇ HIGH LEVEL
- T21 ◇ LAG PUMP ON
- T22 ◇ LEAD PUMP ON
- T23 ◇ PUMPS OFF



JUNCTION BOX, NEMA 4X S.S.  
(DOOR REMOVED TO SHOW INSIDE LAYOUT)

LEGEND

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>AH - ALARM HORN</li> <li>AL - ALARM LIGHT</li> <li>ASB - ALARM SILENCE BUTTON</li> <li>CCB - CONTROL CIRCUIT BREAKER</li> <li>DPDT - DOUBLE POLE DOUBLE THROW</li> <li>DRB - DUPLEX RECEPTACLE BREAKER</li> <li>ETM - ELAPSED TIME METER</li> <li>F - FUSE</li> <li>FB - FUSE BLOCK</li> <li>FL - FLASHER</li> <li>FR - FLOAT REGULATOR</li> <li>GFDR - GROUND FAULT DUPLEX RECEPTACLE</li> <li>GND - GROUND</li> <li>GR - GENERATOR RECEPTACLE</li> <li>HOA - HAND-OFF-AUTO SELECTOR SWITCH</li> <li>MB - MOTOR BREAKER</li> </ul> | <ul style="list-style-type: none"> <li>MCB - MAIN CIRCUIT BREAKER</li> <li>MS - MOTOR STARTER</li> <li>OL - OVERLOAD</li> <li>PB - PUSH BUTTON</li> <li>PDB - POWER DISTRIBUTION BLOCK</li> <li>PCU - PUMP CONTROL MODULE</li> <li>PL - PILOT LIGHT</li> <li>PM - PHASE MONITOR</li> <li>R - RELAY</li> <li>RL - RUNNING LIGHT</li> <li>RTU - REMOTE TELEMETRY UNIT</li> <li>T - TERMINAL</li> <li>TB - TERMINAL BLOCK</li> <li>TLS - TROUBLE LIGHT SWITCH</li> <li>TTS - THERMAL TERMINAL STRIP</li> <li>XDUCER - TRANSDUCER</li> <li>XFMR - TRANSFORMER</li> </ul> |
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DESCRIPTION:

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PUBLIC WORKS DIRECTOR:

**CHRIS A. KUBALA**

PUBLICATION DATE:

**JUNE 1, 2000**

INDEX NUMBER:

**LS-12-D**

CITY ENGINEER:

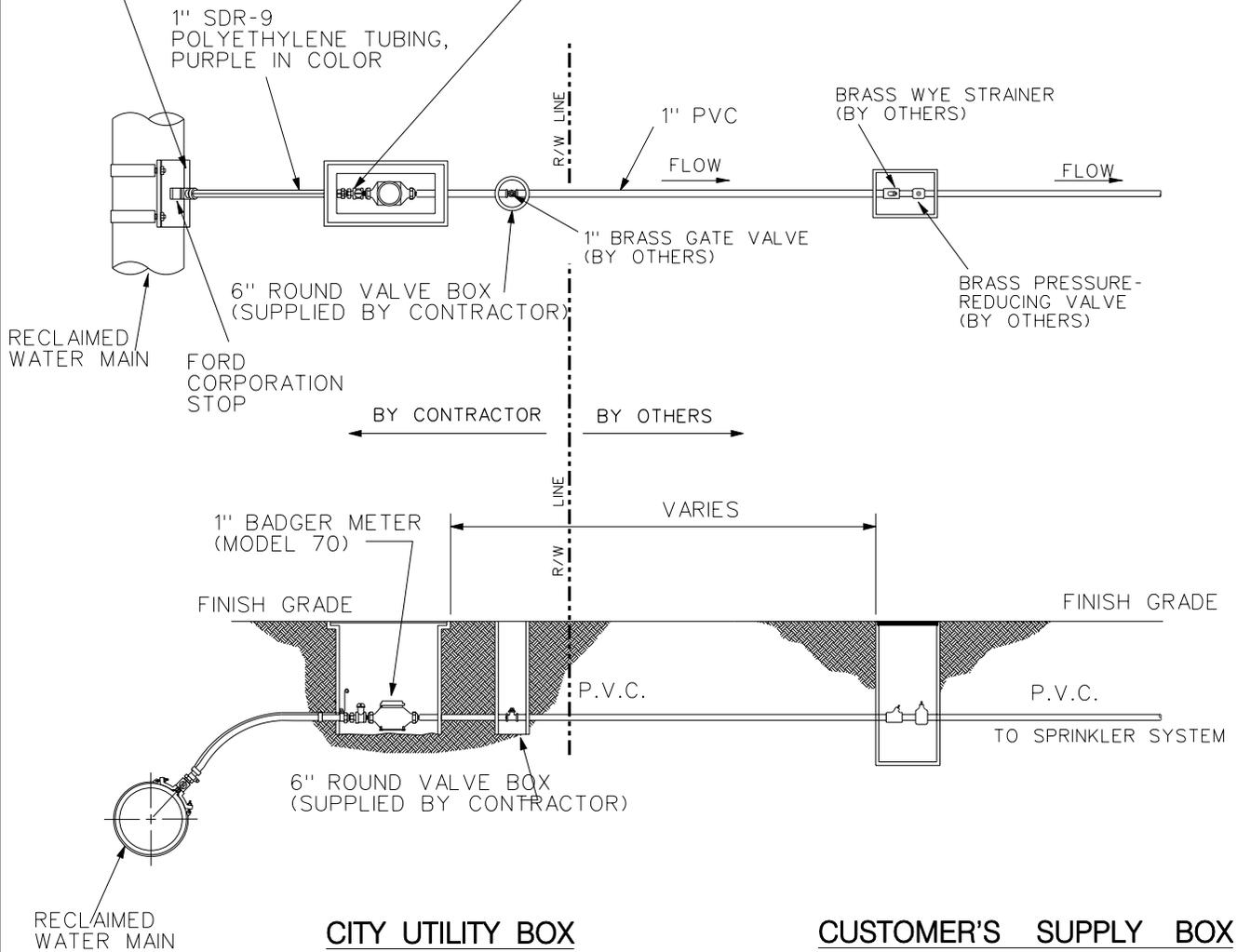
**MICHAEL J. STAFFOPOULOS**

DRAWING SCALE:

**NOT TO SCALE**

DOUBLE STRAP BRASS SADDLE WITH 1" PT. OPENING MIPT. x COMP. FITTING McDONALD CAT. NO. 4704B-22 "RECLAIMED WATER" STAMPED ON TOP.

1" BRASS FORD BALL VALVE WITH LOCKABLE WING AND "RECLAIMED WATER" STAMPED ON TOP. CAT. NO. B43-444W (BARREL LOCKS SUPPLIED BY THE CITY INSTALLED BY CONTRACTOR).



**CITY UTILITY BOX**

PURPLE RECLAIMED WATER UTILITY BOX, LABELED "CITY OF LARGO", AND "RECLAIMED WATER" ( FURNISHED AND INSTALLED ) BY CONTRACTOR

**CUSTOMER'S SUPPLY BOX**

PURPLE IN COLOR ( FURNISHED AND INSTALLED ) BY CUSTOMER OR OTHERS

**PROFILE**

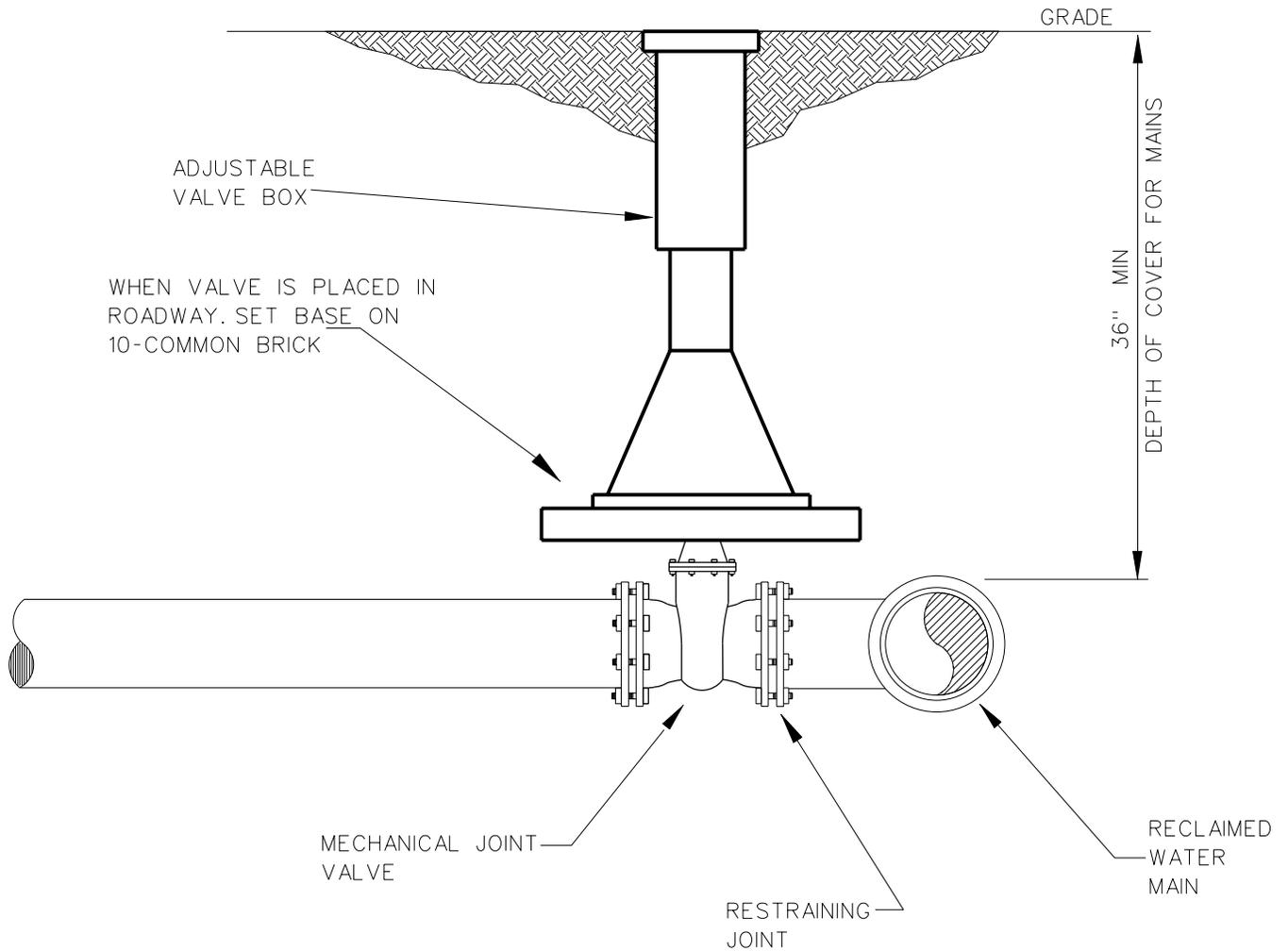
**NOTES:**

1. ALL EQUIPMENT FROM MAIN TO ROUND VALVE BOX FURNISHED AND INSTALLED BY CONTRACTOR.
2. CUSTOMER SUPPLY BOX AND ALL ASSOCIATED ITEMS ARE OPTIONAL. THESE ITEMS ARE RECOMMENDED TO REDUCE PRESSURE FROM THE CITY'S MAIN, TO A PRESSURE THAT IS COMPATIBLE WITH THE SPRINKLER SYSTEM.



**City of Largo**  
 Community Development Department  
 Engineering Services Division  
 201 Highland Avenue, Largo, FL, 33770-2512  
 TEL: (727) 587-6713 FAX: (727) 586-7413  
 WWW: <http://www.largo.com>

TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Reclaimed Water Service Lay-Out</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-01</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



TYPICAL VALVE SETTING



**City of Largo**  
 Community Development Department  
 Engineering Services Division  
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 TEL: (727) 587-6713 FAX: (727) 586-7413  
 WWW: <http://www.largo.com>

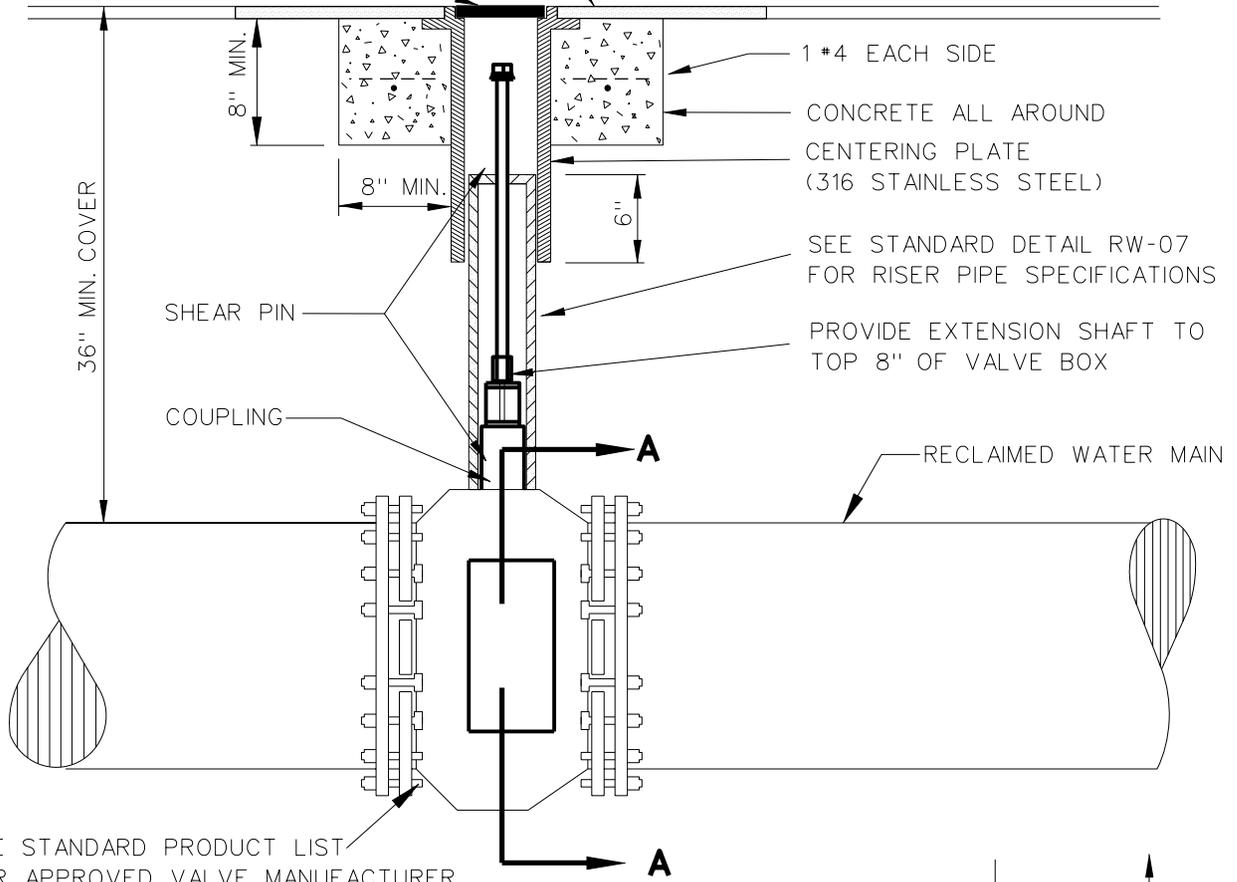
TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Valve Setting	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-02	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS, P.E.	NOT TO SCALE		

SEE STANDARD DETAIL  
RW-07 FOR COVER  
SPECIFICATIONS

MATCH EXISTING  
GRADE

BRASS INDICATOR PLATE  
TO INCLUDE THE FOLLOWING  
INFORMATION.

1. MANUFACTURER'S NAME
2. NO. OF TURNS
3. SIZE & CLASS
4. SERIAL NO. \_\_\_\_\_

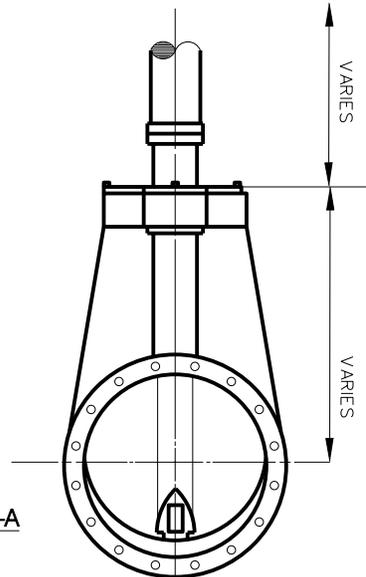


1 #4 EACH SIDE  
CONCRETE ALL AROUND  
CENTERING PLATE  
(316 STAINLESS STEEL)

SEE STANDARD DETAIL RW-07  
FOR RISER PIPE SPECIFICATIONS

PROVIDE EXTENSION SHAFT TO  
TOP 8" OF VALVE BOX

SEE STANDARD PRODUCT LIST  
FOR APPROVED VALVE MANUFACTURER



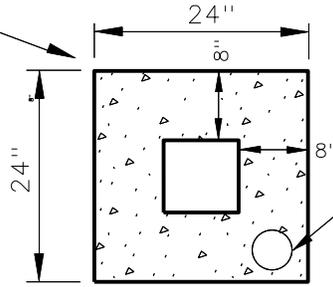
SECTION A-A



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Community Development Department  
Engineering Services Division  
201 Highland Avenue, Largo, FL, 33770-2512  
TEL: (727) 587-6713 FAX: (727) 586-7413  
WWW: <http://www.largo.com>

TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Gate Valve Setting</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-03</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

CONCRETE COLLAR  
( 3000 P.S.I. )



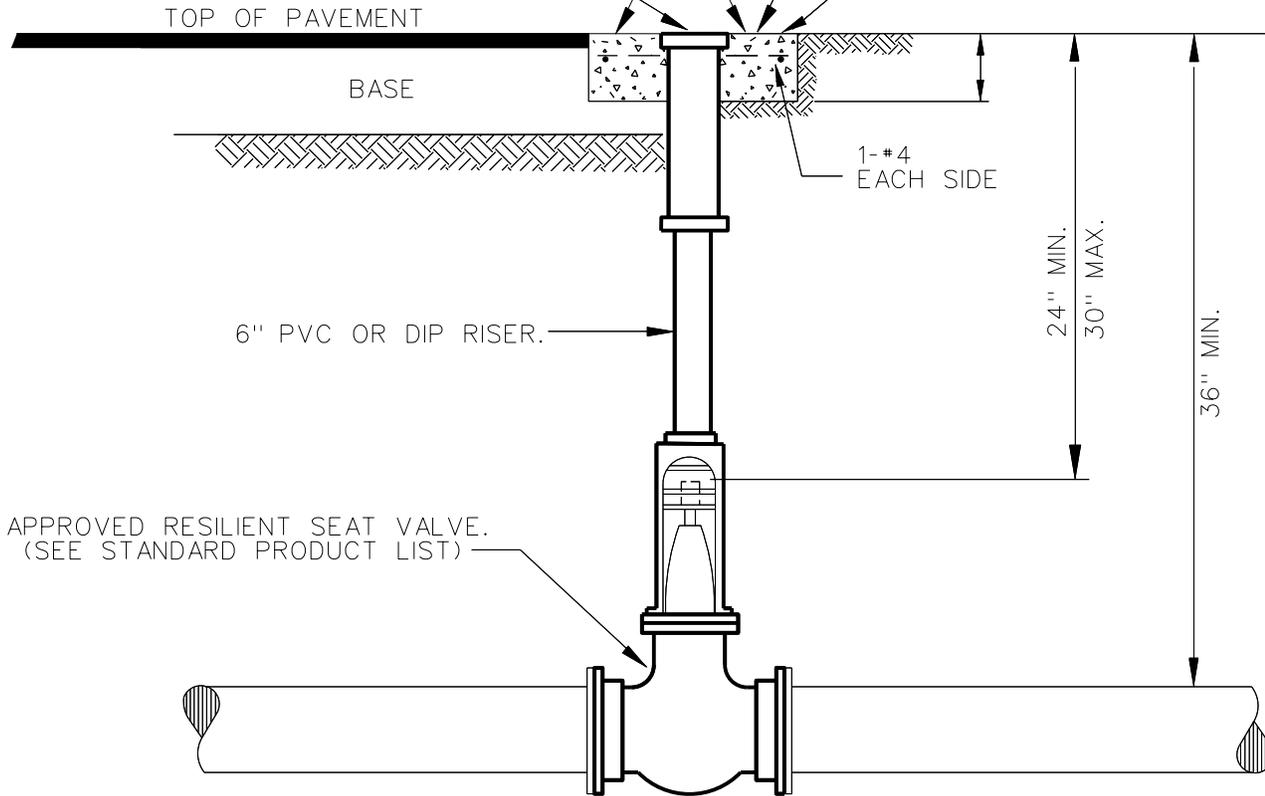
STAINLESS STEEL  
INDICATOR PLATE TO  
INCLUDE THE FOLLOWING  
INFORMATION.  
1. MANUFACTURER'S NAME  
2. NO. OF TURNS  
3. SIZE AND CLASS  
4. SERIAL NO.

**COLLAR**

SEE STANDARD DETAIL  
RW-07 COVER  
SPECIFICATION

ASPHALT OR GREEN  
AREA NEEDS  
COLLAR

POUR CONCRETE TO GRADE  
IN SODDED AREAS.



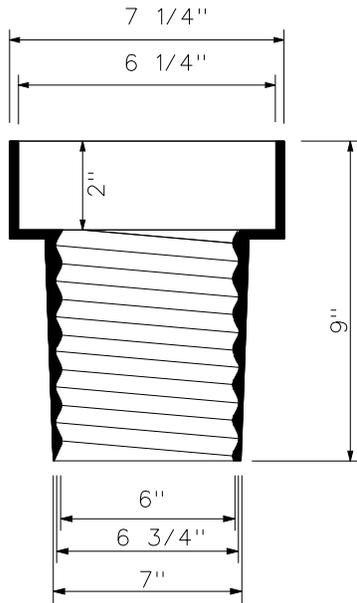
**NOTES:**

1. WHEN VALVE IS DEEPER THAN 36" AN EXTENSION WITH UNIVERSAL JOINT WILL BE REQUIRED TO BRING OPERATING NUT 24"-30" BELOW FINISHED GRADE EXTENSION BOLTS & NUTS ARE TO BE 316 STAINLESS STEEL. A 316 STAINLESS STEEL CENTERING PLATE IS ALSO REQUIRED.

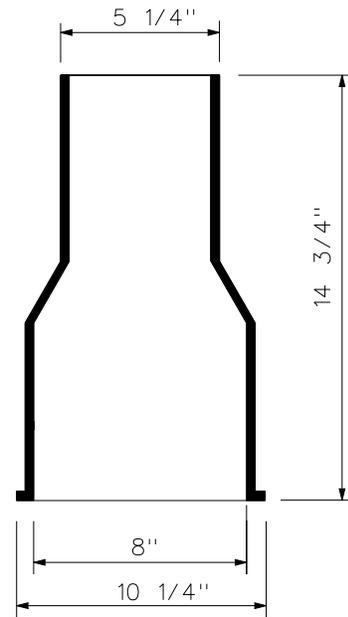


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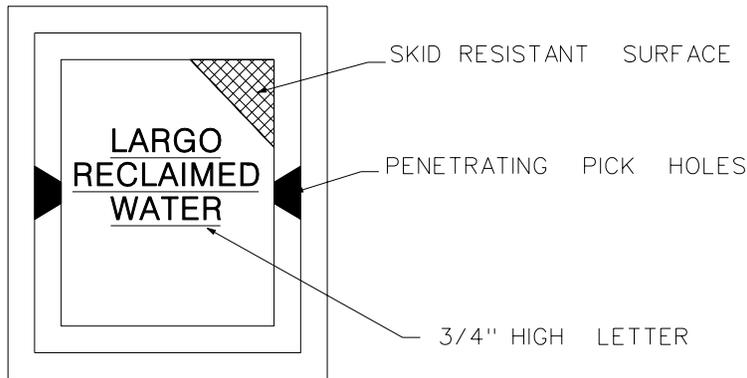
TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Valve Setting with Riser	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RW-04	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		



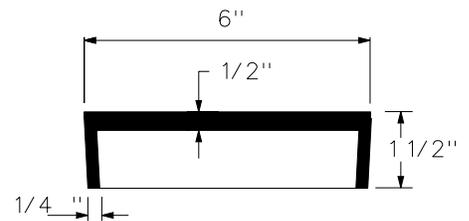
TOP SECTION



BOTTOM SECTION



COVER

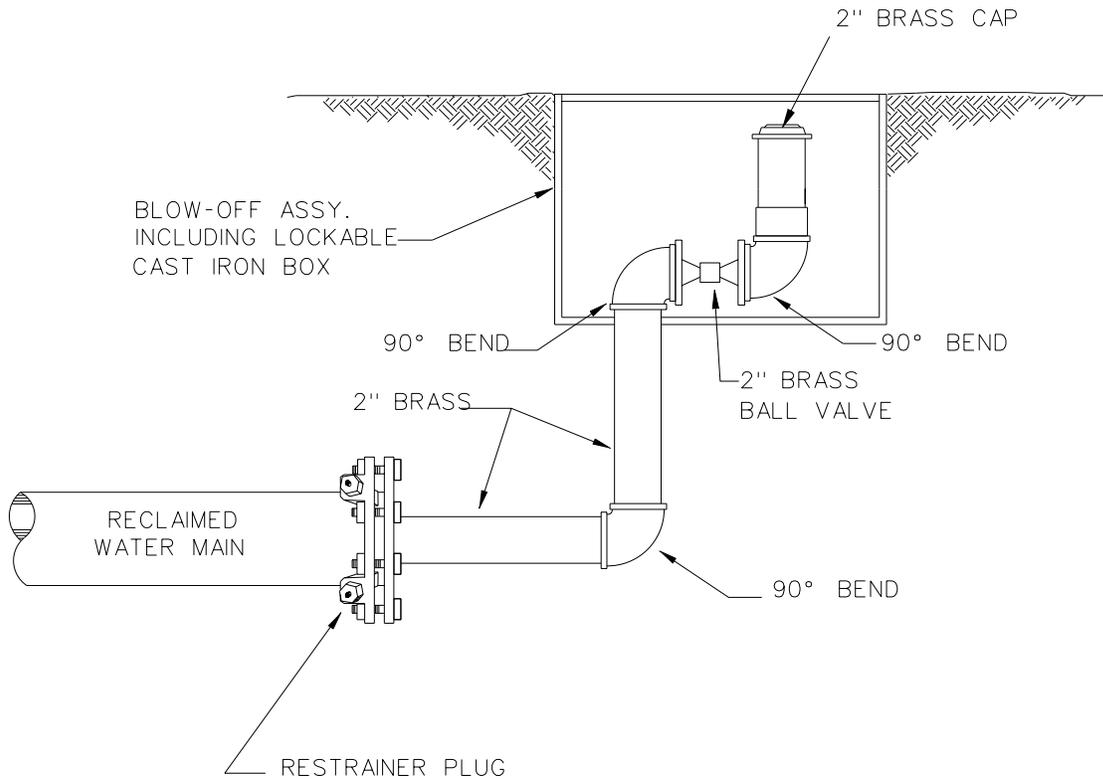


LID



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Valve Box	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>RW-05</b>	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

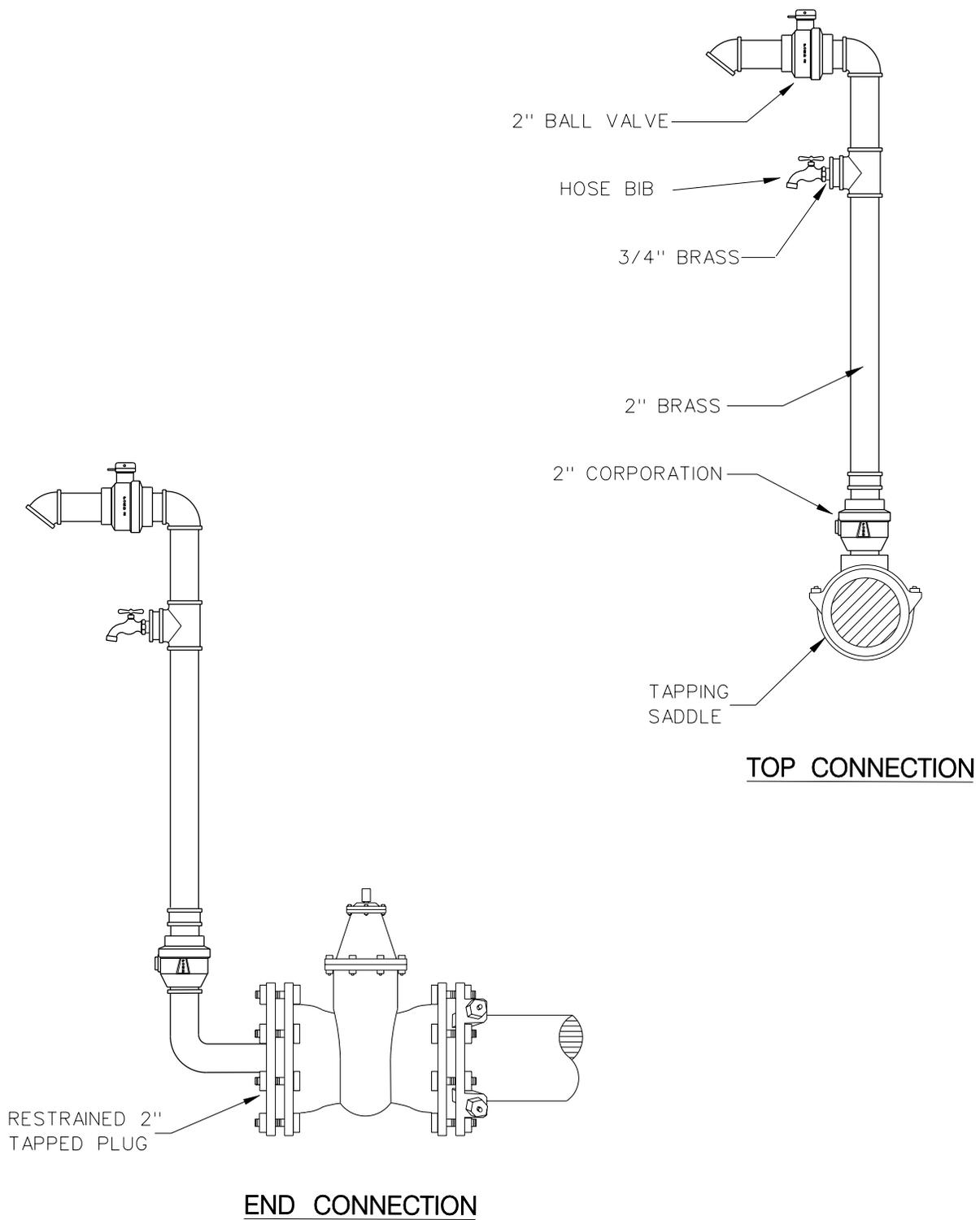


PERMANENT BLOWOFF DETAIL



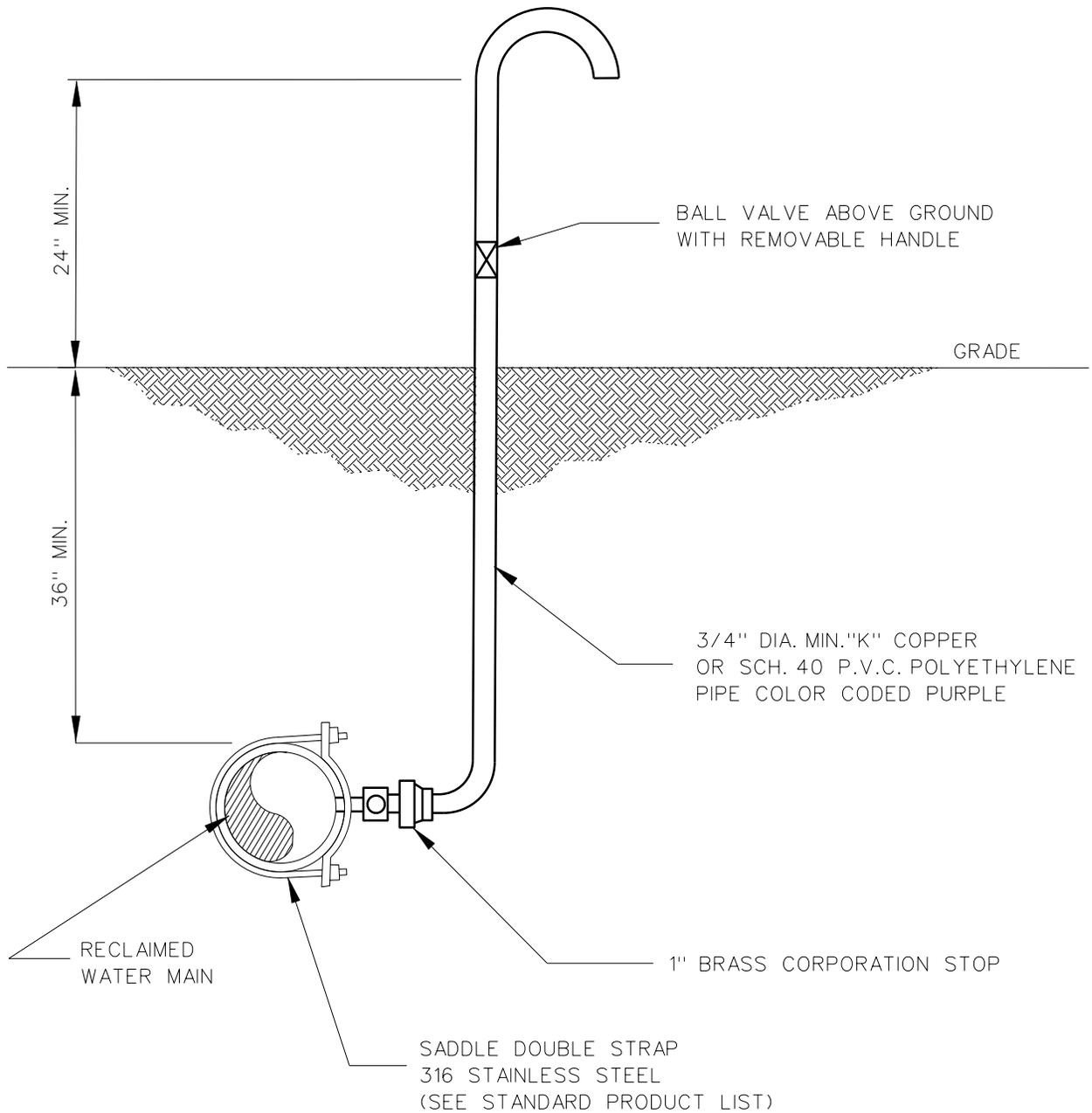
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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Permanent Reclaimed Water Blow-Off Assembly</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-06</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Temporary Blow-Off and Tap Assembly	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-07	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS, P.E.	NOT TO SCALE		



**NOTES:**

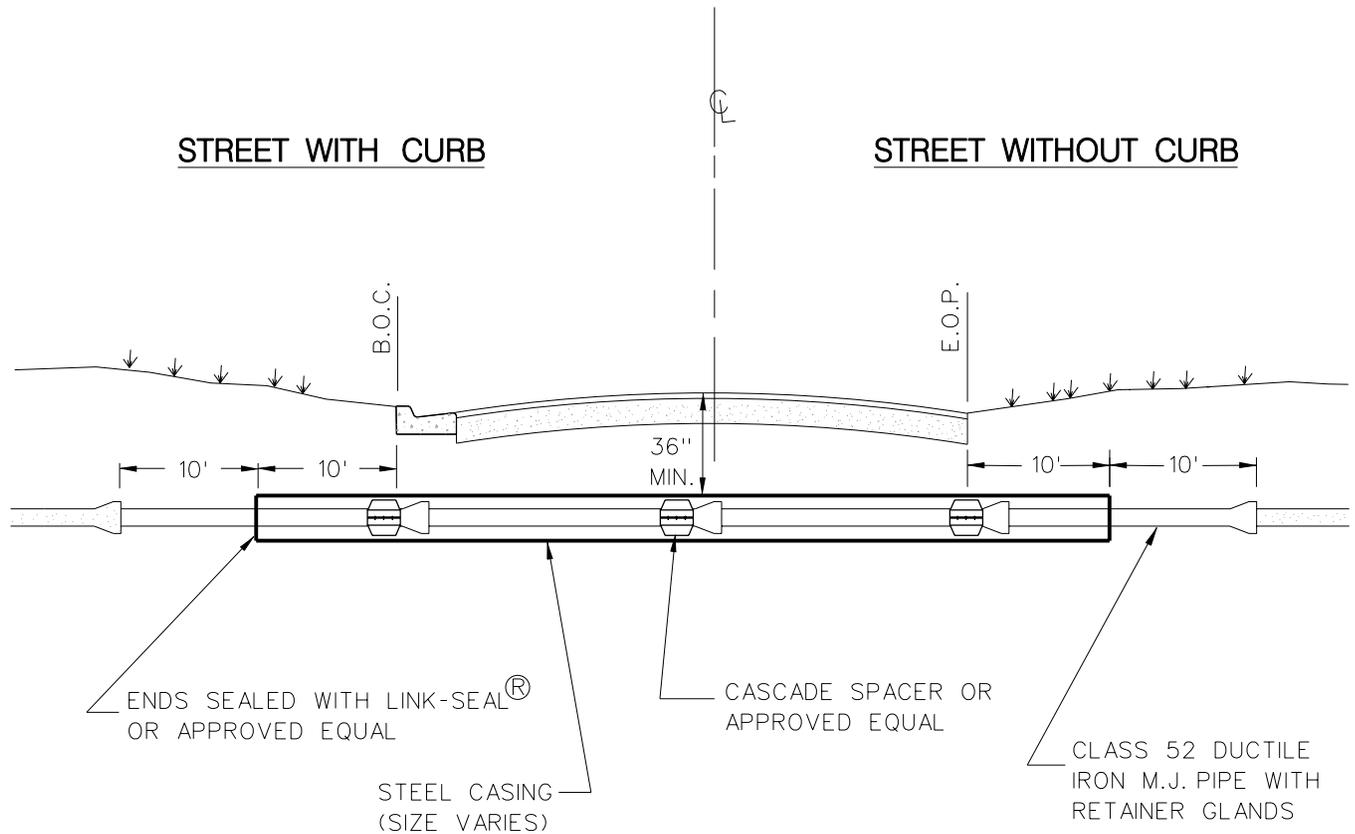
1. SAMPLE POINT SHOULD BE A SERVICE LINE OR FIRE HYDRANT IF POSSIBLE.
2. IF SAMPLE POINT IS NOT A SERVICE LINE OR FIRE HYDRANT, CORP STOP SHALL BE SHUT OFF AT MAIN AND ALL TUBING SHALL BE REMOVED AFTER SATISFACTORY BACTERIOLOGICAL TESTING.
3. IN NO CASE SHALL ANY SAMPLE POINT BE LOCATED IN A TRAFFIC AREA.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Reclaimed Water Sample Point</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-08</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		





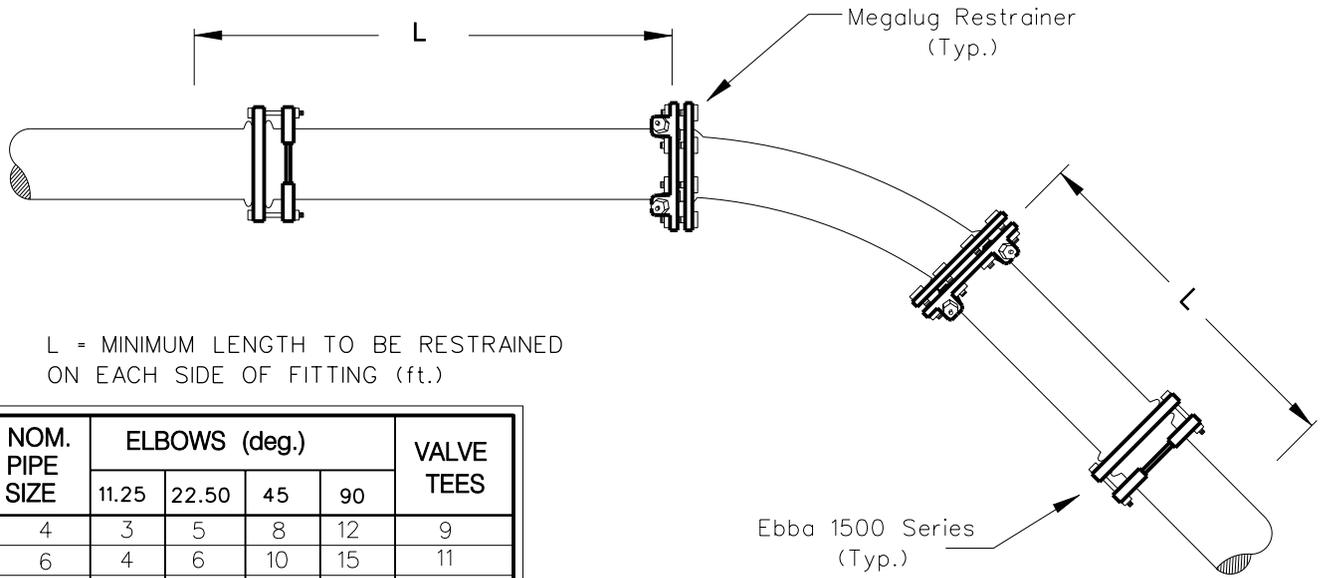
**NOTES:**

1. DUCTILE IRON PIPE TO EXTEND 10' BEYOND CASING.
2. STEEL CASING TO EXTEND 10' BEYOND PAVEMENT OR CURB.
3. SPACERS TO BE CASCADE OR EQUAL. SPACING TO BE PER MANUFACTURERS RECOMMENDATION.
4. ALL JOINTS TO BE FIELD LOCKED INSIDE CASING.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Reclaimed Water Jack and Bore Requirements</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-10</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



L = MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (ft.)

NOM. PIPE SIZE	ELBOWS (deg.)				VALVE TEES
	11.25	22.50	45	90	
4	3	5	8	12	9
6	4	6	10	15	11
8	4	7	13	20	14
10	5	9	15	25	18
12	6	10	17	29	21

VALUES TO BE VERIFIED BY CONTRACTOR ACCORDING TO SPECIFIC SITE CONDITIONS

THE FOLLOWING JOINTS MUST BE RESTRAINED IN ALL APPLICATIONS:

1. BEND - INLET AND OUTLET
2. TEE - OUTLET BRANCH
3. OFFSETS - INLET AND OUTLET
4. CAPS
5. PLUGS
6. LAST TWO(2) JOINTS ON A DEAD END RUN (min. 36')
7. LAST TWO(2) JOINTS ON A HYDRANT RUNOUT (min. 36')

### PIPE RESTRAINT

NOTE:

D.I.P.

SHALL BE U.S. PIPE FIELD LOCK GASKETS FOR TYTON JOINT PIPE or AMERICAN FAST-GRIP GASKETS FOR AMERICAN FASTITE PIPE. THRUST RESTRAINT ON DUCTILE IRON FITTINGS AND MECHANICAL JOINT FITTINGS. THRUST RESTRAINT ON SLIPJOINT DUCTILE IRON PIPE SHALL BE PROVIDED BY THE USE OF MEGALUG RESTRAINERS

P.V.C.

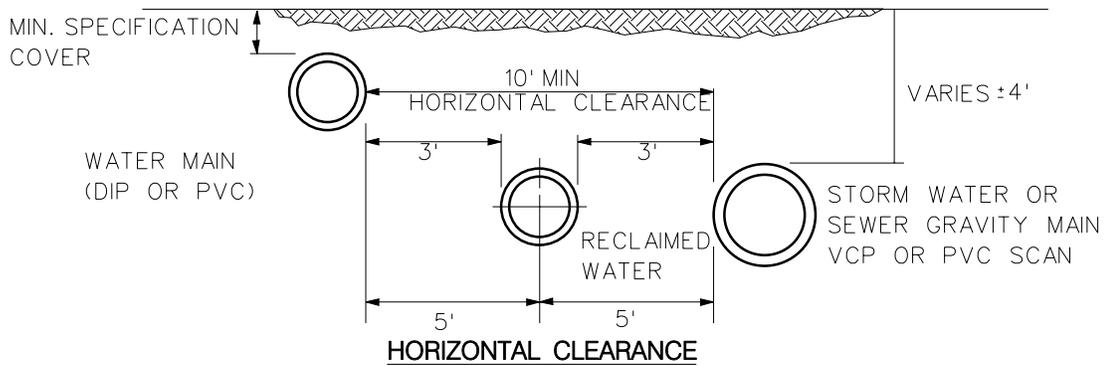
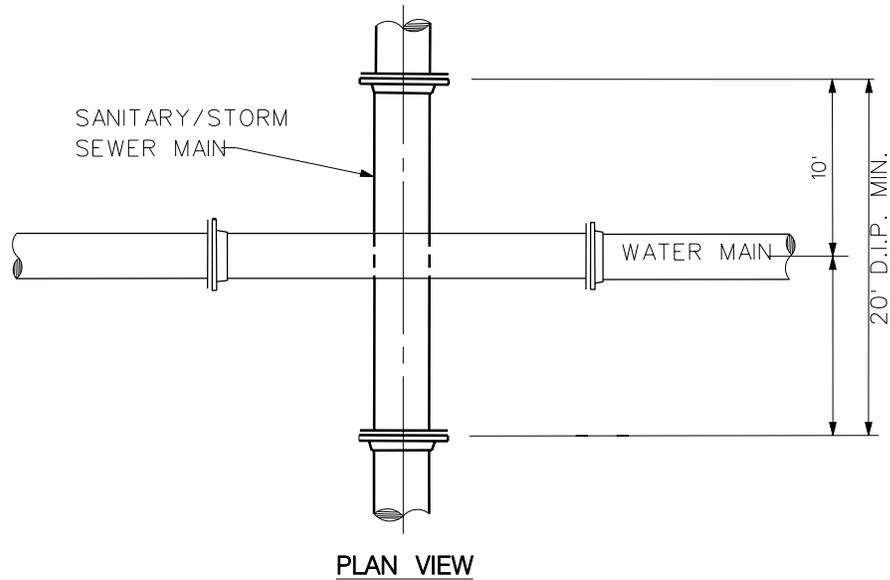
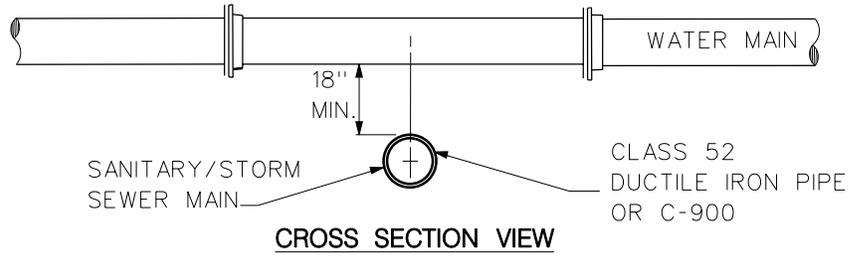
THRUST RESTRAINT AT FITTINGS AND VALVES SHALL BE BY USE OF EBBA IRON MEGALUG RESTRAINERS. THRUST RESTRAINT BETWEEN PIPE JOINTS SHALL BE BY EBBA IRON SERIES 1500 RESTRAINERS



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water PVC Pipe Thrust Restraint	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RW-11	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

**REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION**



SEE NOTES PAGE RW-13



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Reclaimed Water Main and Sanitary Sewer Line Conflict</b>
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>RW-12</b>
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

# REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION NOTES

## PARALLEL INSTALLATION

1. POTABLE WATER, WASTEWATER GRAVITY/FORCE, OR RECLAIMED WATER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A MINIMUM OF HORIZONTAL DISTANCE 10' SHALL BE MAINTAINED BETWEEN POTABLE WATER AND ANY TYPE OF WASTEWATER LINE WHENEVER POSSIBLE. THE DISTANCE SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN-FOOT SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE WASTEWATER LINE AND AT AN ELEVATION SO THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE WASTEWATER LINE.
2. IF IT IS IMPOSSIBLE TO MAINTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE, THE WATER SHALL BE CONSTRUCTED OF D.I.P. AND THE WASTEWATER LINE SHALL BE C900 P.V.C. AND PRESSURE TESTED TO ONE-HUNDRED AND FIFTEY (150) P.S.I. TO INSURE WATER TIGHTNESS BEFORE BACK FILLING. THE PIPELINE JOINTS SHALL BE STAGGERED SO THAT THE WATER MAIN JOINTS SHALL BE AS FAR APART AS POSSIBLE FROM THE JOINTS ON THE WASTEWATER LINE
3. A MINIMUM HORIZONTAL SEPARATION OF FIVE (5) FEET CENTER TO CENTER THREE (3) FEET OUTSIDE EDGE TO OUTSIDE EDGE SHALL BE MAINTAINED BETWEEN RECLAIMED WATER MAINS AND POTABLE WATER OR WASTEWATER GRAVITY OR FORCE MAINS.

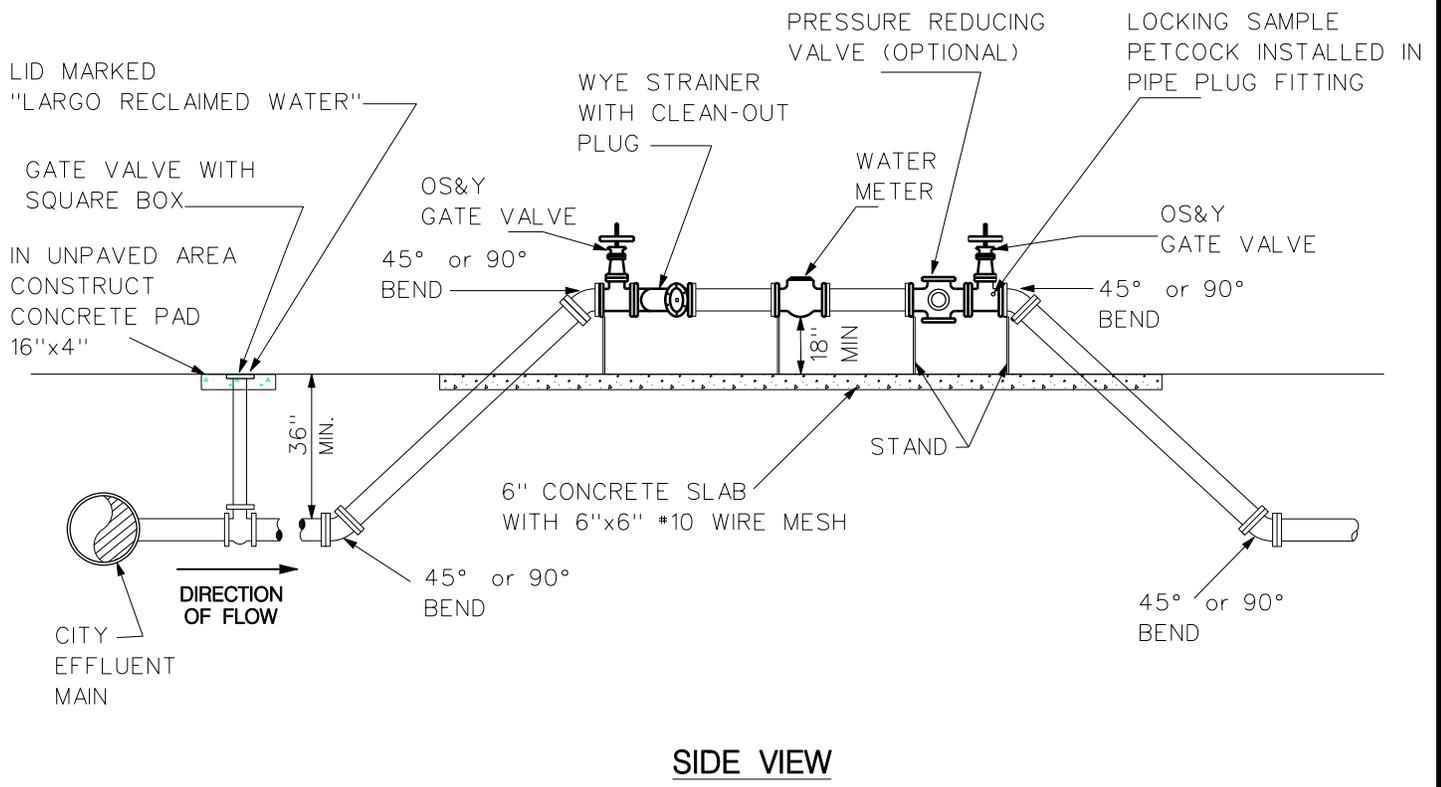
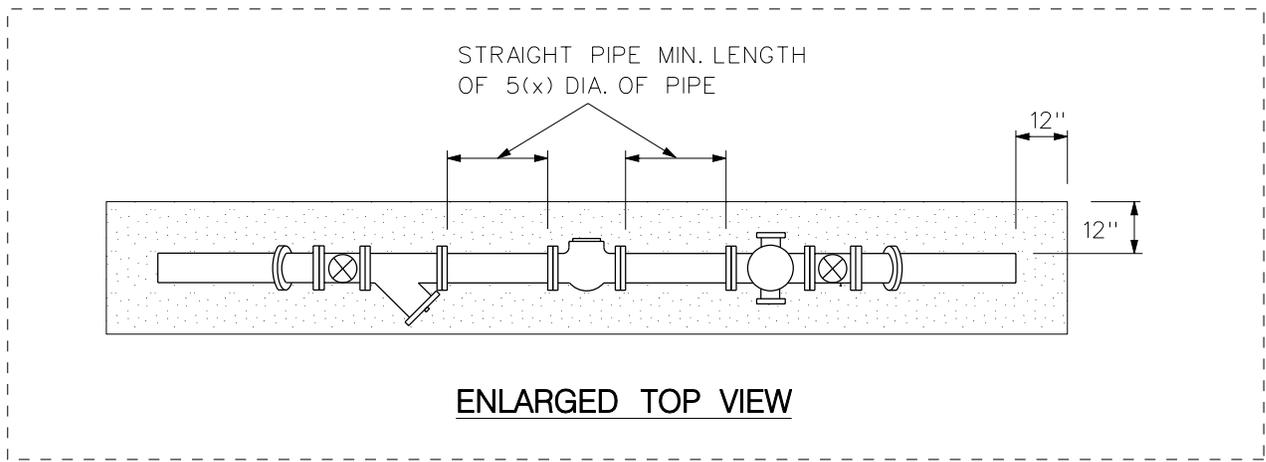
## CROSSINGS

1. WASTEWATER MAINS SHALL CROSS UNDER RECLAIMED WATER MAINS. WASTEWATER AND RECLAIMED MAINS SHALL CROSS UNDER POTABLE WATER MAINS, WHEREVER POSSIBLE. THE MINIMUM VERTICAL DISTANCE BETWEEN MAINS AT A CROSSING IS EIGHTEEN (18) INCHES. THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER/RECLAIMED MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
2. WHERE WASTEWATER OR RECLAIMED MAINS MUST CROSS A WATER MAIN WITH LESS THAN EIGHTEEN (18) INCHES OF VERTICAL CLEARANCE, THE RECLAIMED AND POTABLE WATER MAIN MUST BE CONSTRUCTED OF DUCTILE IRON PIPE AT THE CROSSING. A WASTEWATER GRAVITY OR FORCE MAIN SHALL BE CONSTRUCTED WITH C900 P.V.C. AT THE CROSSING. ALTERNATIVELY, ONE OF THE CROSSING MAINS SHALL BE ENCLOSED WITHIN A TWENTY (20) FOOT LONG STEEL OR P.V.C. CASING CENTERED ON THE CROSSING.
3. WHERE A WATER MAIN MUST CROSS UNDER A WASTEWATER GRAVITY MAIN, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE GRAVITY MAIN TO MAINTAIN LINE AND GRADE



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Main and Sanitary Sewer Line Conflict	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-13	
CITY ENGINEER:	DRAWING SCALE:		
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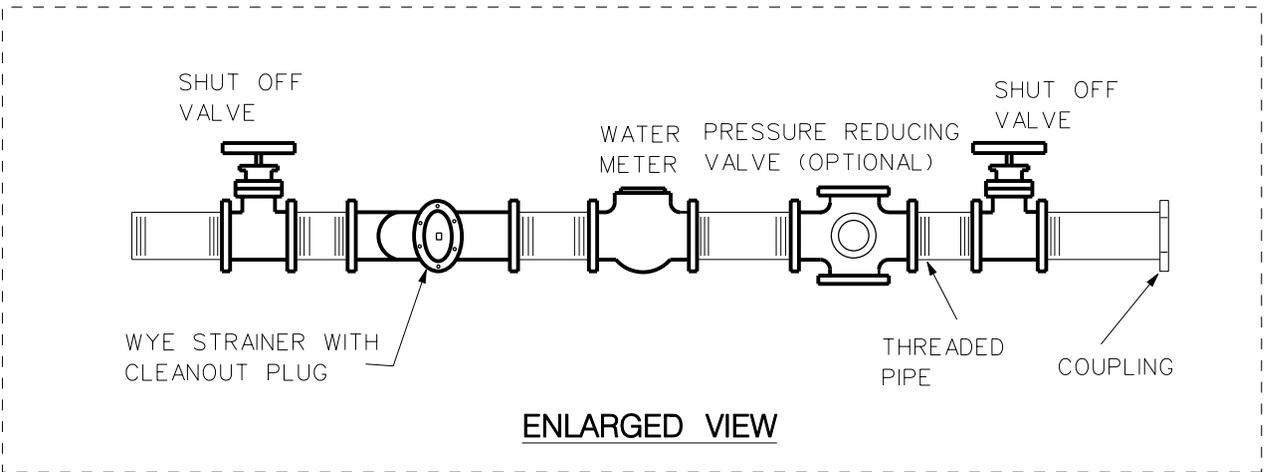
**NOTE:**

1. ALL PIPE BETWEEN CITY MAIN AND LAST BEND TO BE DUCTILE IRON PIPE.
2. ALL JOINTS ABOVE GROUND SHALL BE FLANGED.

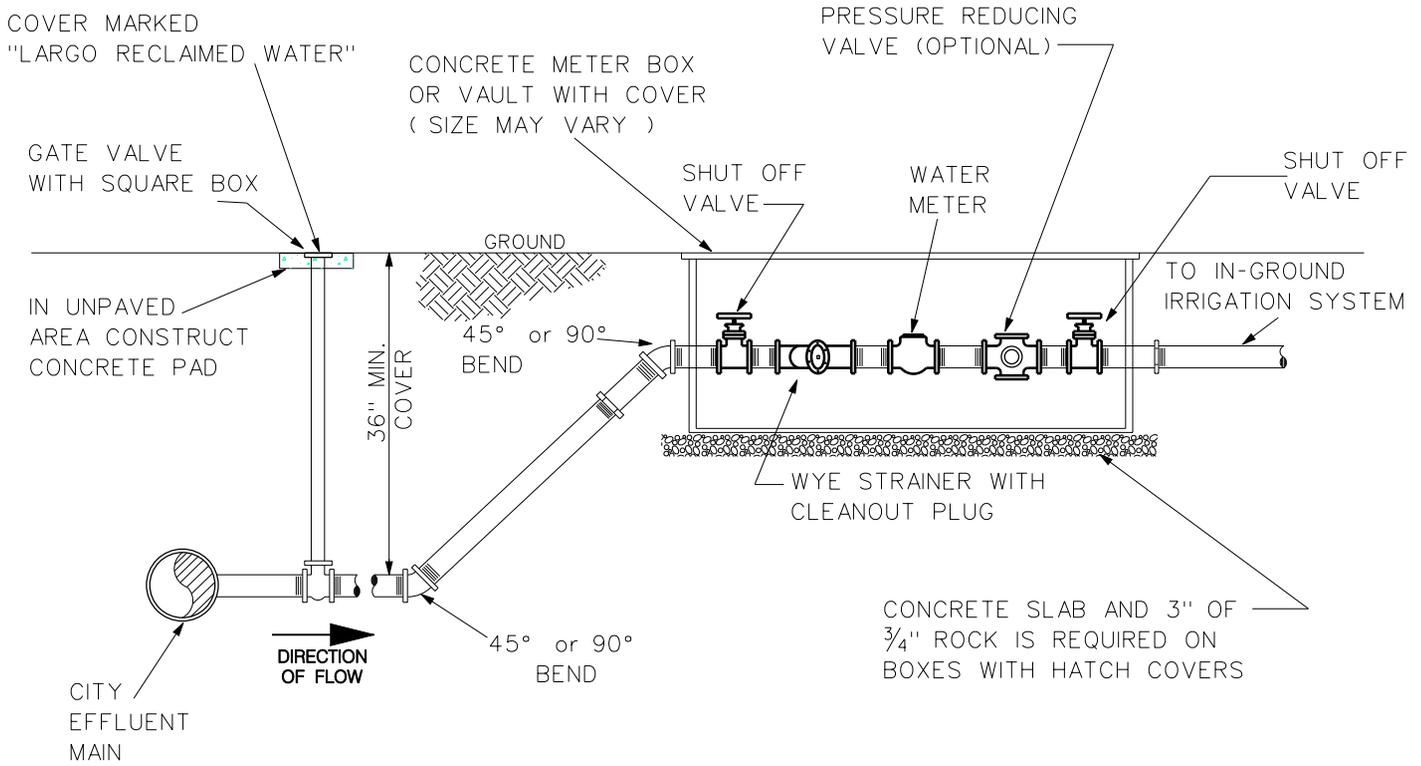


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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Above Ground Reclaimed Water Meter Detail	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-14	
CITY ENGINEER:	DRAWING SCALE:		
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**ENLARGED VIEW**



**SIDE VIEW**

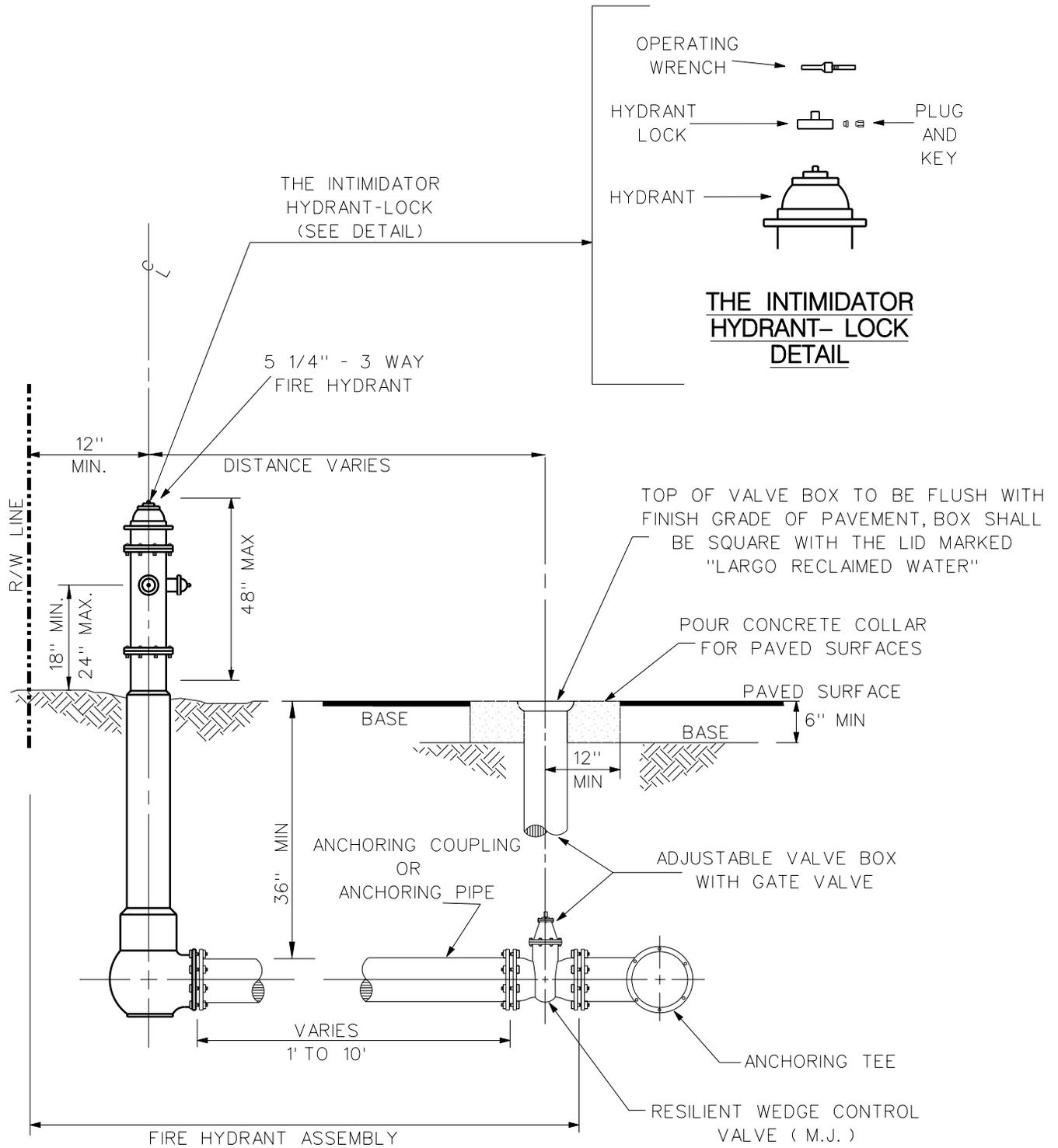
**NOTE:**

1. ALL FITTINGS BETWEEN CITY MAIN AND LAST GATE VALVE MUST BE DUCTILE IRON OR BRASS
2. IN ORDER TO ENCLOSE THE WATER METER AND ALL RELATED HARDWARE, TWO METER BOXES MAY BE REQUIRED.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Below Ground Reclaimed Water Meter Detail</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-15</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



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TITLE:  
**Engineering Design and  
 Construction Standards**

DESCRIPTION:  
**Reclaimed Water  
 Fire Hydrant**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

PUBLICATION DATE:  
**November 18, 2008**

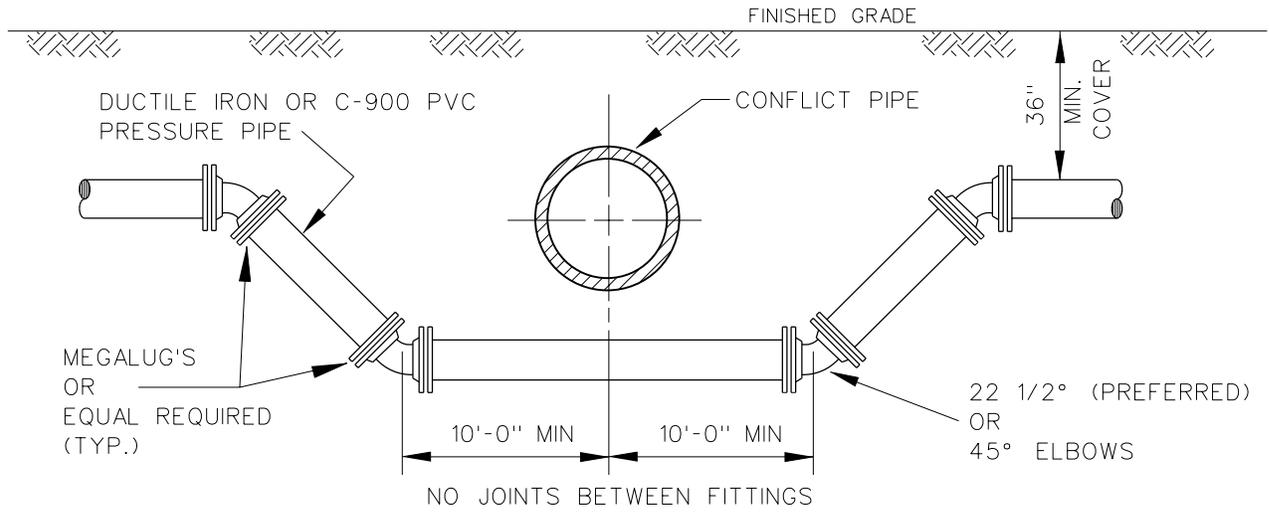
INDEX NUMBER:

CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

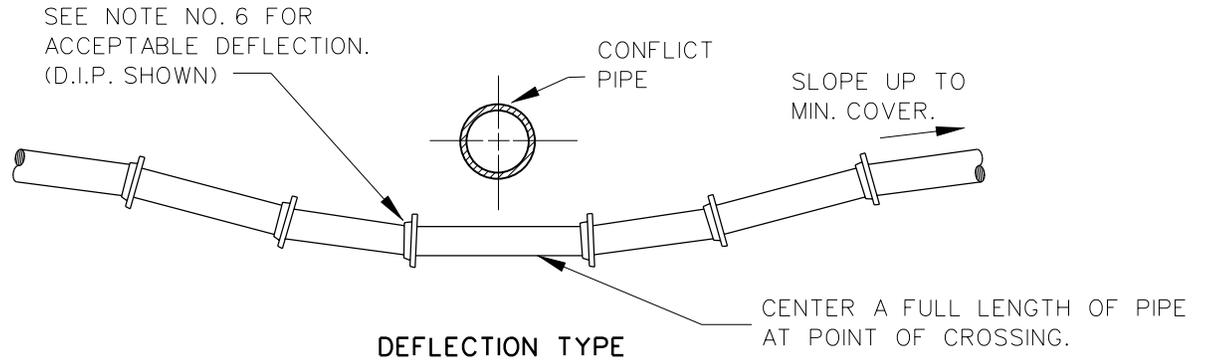
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**RW-16**

# RECLAIMED WATER CROSSING CONFLICT



### FITTING TYPE



### DEFLECTION TYPE



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Main Pipe Crossing Conflict	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>RW-17</b>	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

## RECLAIMED WATER CROSSING CONFLICT

NOTES:

1. STORM SEWER, GRAVITY WASTEWATER AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE STORM/WASTEWATER/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN 10' BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6". WHERE THERE IS NO ALTERNATIVE TO STORM WATER, WASTEWATER, RECLAIMED WATER PIPES CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM SEPARATION BETWEEN LINES AND JOINTS IN THE ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.
2. MAINTAIN MIN. 10' HORIZONTAL DISTANCE BETWEEN POTABLE WATER MAIN AND STORM SEWER, WASTEWATER MAIN, OR FORCE MAIN. MAINTAIN MIN. 3' HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN RECLAIMED WATER MAIN AND POTABLE WATER MAIN, STORM SEWER, WASTEWATER GRAVITY MAIN OR FORCE MAIN.
3. FORCE MAIN CROSSING POTABLE WATER MAIN OR RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE OUTSIDE OF THE FORCE MAIN AND OUTSIDE OF THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN WITH THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN CROSSING OVER THE FORCE MAIN.
4. FITTINGS SHALL BE RESTRAINED WITH MEGALUGS OR EQUAL AND THRUST BLOCKS.
5. THE DEFLECTION TYPE CROSSING IS PREFERRED.
6. DO NOT EXCEED 75% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION FOR DUCTILE IRON PIPE. NO DEFLECTION AT THE JOINT IS ALLOWED FOR P.V.C. PIPE. BENDING OF P.V.C. PIPE SHALL NOT EXCEED THE FOLLOWING PARAMETERS:

P.V.C. PIPE SIZE	MIN. ALLOWED RADIUS (FT.)	MAX. DEFLECTION (IN INCHES) PER 20' OF LENGTH
6"	300'	8"
8"	400'	6"
10"	600'	4"
12"	800'	4"

7. ALL EXPOSED TIE STEEL SHALL BE COATED WITH COAL-TAR EPOXY.
8. RECLAIMED WATER SYSTEM PIPE SHALL BE IDENTIFIED AS REQUIRED.



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TITLE:  
**Engineering Design and  
 Construction Standards**

DESCRIPTION:  
**Reclaimed Water Main  
 Pipe Crossing Conflict**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

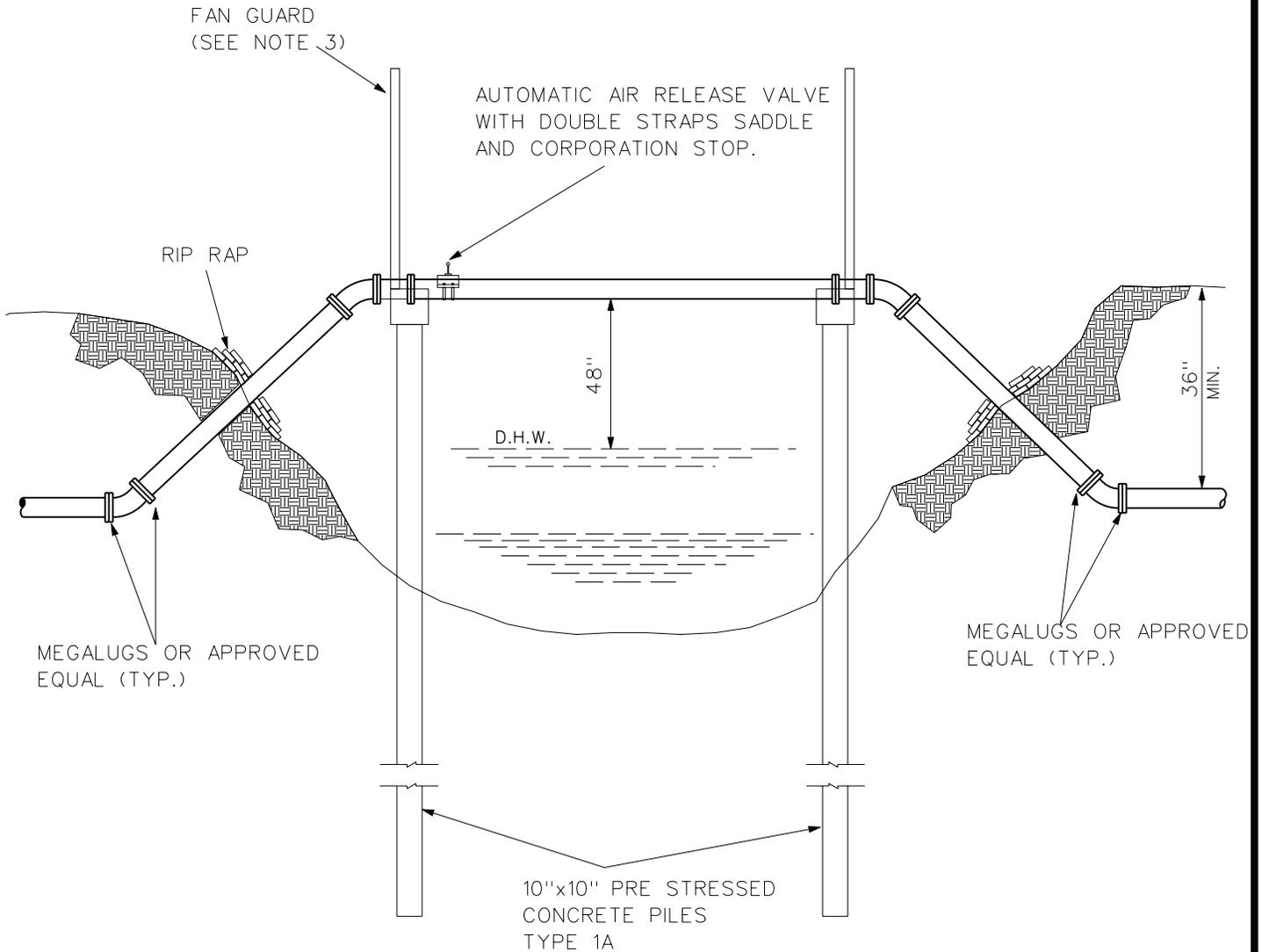
PUBLICATION DATE:  
**November 18, 2008**

INDEX NUMBER:

**RW-18**

CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

DRAWING SCALE:  
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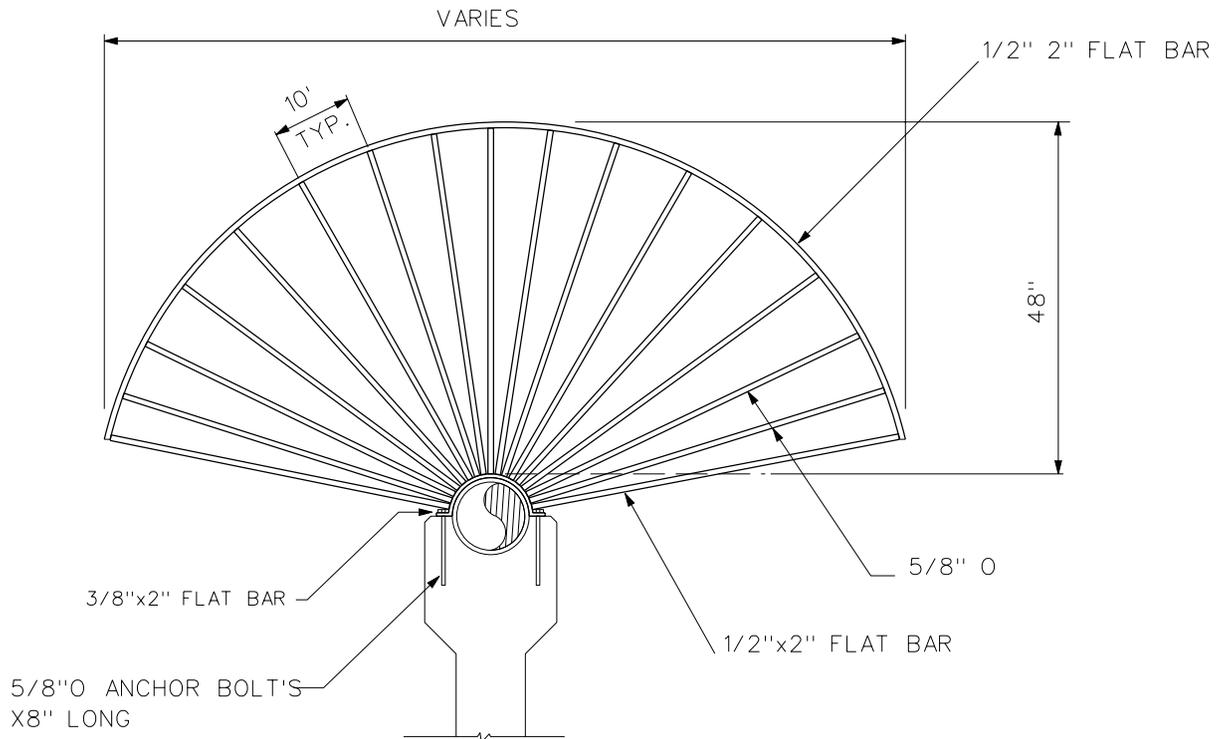
**NOTES:**

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON OR PREFABRICATED STEEL WITH FLANGE FITTINGS. RETAINER GLANDS AND UNFLANGED TYPE FITTING ARE NOT TO BE SUBSTITUTED FOR FLANGED FITTING.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY.
3. FAN GUARDS ARE REQUIRED. SEE DETAIL.
4. ALL HARDWARE SHALL BE PAINTED WITH COAL TAR EPOXY.
5. PIPE SHALL BE CRADLED ON FELT (80 LB MIN.) OR NEOPRENE.
6. TIE-DOWN STRAPS MUST PROPERTY FIT AND SECURE PIPE IN CRADLE.
7. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE. (SEE FAN GUARD DETAIL)
8. SHOW ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCE ON THIS DETAIL.
9. PILE LIFT CABLE SHALL BE REMOVED BELOW SURFACE; HOLE SHALL BE FILED WITH EPOXY CEMENT.
10. RECLAIMED WATER SYSTEM PIPE SHALL BE PAINTED AS SPECIFIED IN THE APPROVED RECLAIMED WATER SYSTEM MATERIAL LIST.

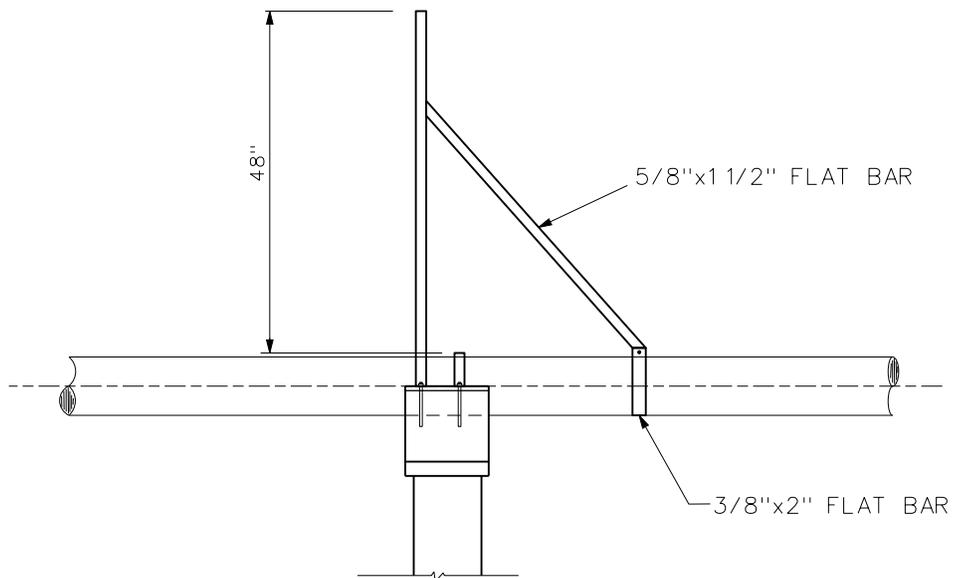


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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Reclaimed Water Main Typical Canal Crossing</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>RW-19</b>	
CITY ENGINEER: <b>LELAND E. DICUS, P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**FRONT VIEW**



**SIDE VIEW**

**NOTES:**

1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND HARDWARE SHALL BE PAINTED WITH COAL TAR EPOXY.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Fan Guard	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RW-20	
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE		

**PRESSURE PIPE NOTES**

1. THERE SHALL BE 36" MINIMUM COVER FROM FINISHED GRADE TO TOP OF PIPE.
2. DUCTILE IRON PIPE (D.I.P.) FOR RECLAIMED WATER MAINS SHALL BE CLASS 52 IN ACCORDANCE WITH A.W.W.A. C-151 (A.N.S.I. A21.51), AND SHALL HAVE AN INTERNAL LINING OF CEMENT MORTAR IN ACCORDANCE WITH A.W.W.A. C-104/ A21.4.
3. C-900 PRESSURE PIPE MAY BE USED. ALL OTHER PVC PRESSURE PIPE SHALL NOT BE USED, UNLESS APPROVED BY THE CITY DURING DESIGN.
4. ALL FITTINGS SHALL BE CLASS 52 DUCTILE IRON WITH MECHANICAL JOINTS AND EPOXY LINING
5. RECLAIMED WATER MAIN VALVES 12 INCHES AND SMALLER SHALL BE RESILIENT WEDGE GATE VALVES, IN ACCORDANCE WITH A.W.W.A. C-509.
6. ALL TRENCHING, PIPE-LAYING, BACK FILL, PRESSURE TESTING, AND DISINFECTION MUST COMPLY WITH CITY, STATE AND HEALTH DEPARTMENT STANDARDS.
7. RECLAIMED WATER AND FORCE MAINS SHALL BE PIGGED, AS WELL AS PRESSURE TESTED, FOR A PERIOD OF NO LESS THAN TWO HOURS AT 150 P.S.I. (SEE STANDARD R.W.-12-B), IN ACCORDANCE WITH A.N.S.I./A.W.W.A. C-600 LATEST STANDARDS. NO LEAKAGE SHALL BE ALLOWED.
8. MECHANICAL RESTRAINTS SHALL BE PROVIDED AT ALL BENDS, UNLESS NOTED OTHERWISE ON PLANS. MECHANICAL RESTRAINTS SHALL BE INSTALLED IN ACCORDANCE WITH THE DESIGN STANDARDS SPECIFIED BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (D.I.P.R.A.), LATEST EDITION.



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<small>TITLE:</small>		<small>DESCRIPTION:</small>	
Engineering Design and Construction Standards		Reclaimed Water Pressure Pipe Notes	
<small>COMMUNITY DEVELOPMENT DIRECTOR:</small> CAROL STRICKLIN A.I.C.P.	<small>PUBLICATION DATE:</small> November 18, 2008	<small>INDEX NUMBER:</small> RW-21	
<small>CITY ENGINEER:</small> LELAND E. DICUS, P.E.	<small>DRAWING SCALE:</small> NOT TO SCALE		

**RECLAIMED WATER MAIN REQUIREMENTS**

1. THE CONTRACTOR SHALL PROVIDE AT LEAST 48 HOURS NOTICE TO THE UTILITY COMPANIES IN ORDER TO PERMIT THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES IN ADVANCE OF CONSTRUCTION, BY CALLING SUNSHINE STATE ONE-CALL, AT 1-800-432-4770.
2. THE PROPOSED RECLAIMED WATER MAIN SHALL HAVE A MINIMUM COVER OF 36", UNLESS OTHERWISE SPECIFIED. IN ANY INSTANCE WHERE THE COVER IS LESS THAN 36", DUCTILE IRON PIPE MUST BE INSTALLED.
3. ANY PROPOSED CONSTRUCTION OF RECLAIMED WATER MAINS SHALL BE IN ACCORDANCE WITH THE "SPARKING WATER PROGRAM - RECLAIMED WATER POLICIES AND REGULATIONS" OF THE CITY OF LARGO, FLORIDA, LATEST EDITION.
4. ALL P.V.C. PIPING PUSH-ON JOINTS, MEETING ALL REQUIREMENTS OF A.W.W.A. C-900, AND SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR-CODING. ALL DUCTILE IRON PIPING SHALL BE CLASS 52, AND SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR-CODING, AND INSTALL WITH TRACER TAPE 12" BELOW GRADE.
5. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL, AND SHALL BE PLACED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS", LATEST EDITION.
6. THE CONTRACTOR SHALL REPLACE ALL LAWN AND/OR LANDSCAPED AREAS THAT HAVE BEEN REMOVED OR DAMAGED DUE TO THE CONSTRUCTION OF RECLAIMED WATER MAINS. THE QUALITY OF WORKMANSHIP AND THE MATERIALS TO BE USED IN THE RESTORATION PROCESS SHALL PRODUCE AN END PRODUCT WHICH SHALL BE EQUAL TO, OR BETTER THAN, THE CONDITION OF THE AREAS PRIOR TO THE BEGINNING OF WORK IN THAT AREA.
7. ALL RECLAIMED WATER MAINS WHICH ARE INSTALLED MUST BE POLY-PIG CLEANED PRIOR TO THE CHLORINATION PROCESS (PLEASE CONTACT THE CITY OF LARGO). THE CHLORINATION OF THE INSTALLED RECLAIMED WATER MAIN MUST BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS AS SET FORTH BY THE CITY OF LARGO, FLORIDA. IN ADDITION, THE CHLORINATION OF THE RECLAIMED WATER MAIN MUST BE WITNESSED BY A CERTIFIED REPRESENTATIVE FROM THE CITY OF LARGO, FLORIDA. (PLEASE CONTACT THE CITY OF LARGO)
8. UPON COMPLETION OF THE CONSTRUCTION OF A PROPOSED RECLAIMED WATER MAIN, A PRESSURE TEST SHALL BE PERFORMED AND WITNESSED BY A CERTIFIED REPRESENTATIVE FROM THE CITY OF LARGO, FLORIDA. (PLEASE CONTACT THE CITY OF LARGO). THE MINIMUM REQUIREMENTS OF THIS PRESSURE TEST ARE 150 P.S.I. FOR A DURATION OF TWO HOURS. NO LEAKAGE SHALL BE ALLOWED.
9. AIR PRESSURE RELEASE VALVE SHALL BE INSTALLED AS DIRECTED BY ENGINEER.
10. THE STANDARD OPERATING PRESSURE AND WATER SUPPLY VOLUME OF THE LARGO RECLAIMED WATER SYSTEM MAY FLUCTUATE DUE TO MANY VARIABLES, INCLUDING, BUT NOT LIMITED TO, LOCATION, DEMAND, WEATHER CONDITIONS, ELEVATION CHANGES, PIPE FRICTION LOSS, AND OTHERS. THEREFORE, IT IS THE RESPONSIBILITY OF THE CUSTOMER AND/OR THE PROPERTY OWNER TO DETERMINE IF THERE IS EITHER ADEQUATE PRESSURE AND/OR VOLUME AVAILABLE AT THE RECLAIMED WATER SERVICE CONNECTION FOR CUSTOMER. IF REQUIRED, A PRESSURE- REDUCING VALVE SHALL BE INSTALLED AT THE SITE SERVICE CONNECTION TO REDUCE THE OPERATING PRESSURE OF THE SYSTEM TO A LEVEL THAT IS COMPATIBLE WITH THE EXISTING IRRIGATION SYSTEM. APPROVED PRESSURE REDUCING VALVES ARE: WATTS SERIES 1, 15 OR 223, OR AN APPROVED EQUIVALENT REPLACEMENT.
11. ALL RECLAIMED WATER SYSTEM EQUIPMENT, INCLUDING PIPING, METER BOXES, VALVE BOXES, AND ANY APPURTENANCES SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR-CODING. THE APPROVED IDENTIFICATION STANDARDS FOR THE FOLLOWING TYPES OF PIPE MATERIAL ARE:  
 DUCTILE IRON PIPE: SHALL BE IDENTIFIED BY WRAPPING ALL DUCTILE IRON PIPES WITH A PURPLE COLORED, POLYETHYLENE ENCASUREMENT.  
 PLASTIC PIPE: SHALL BE IDENTIFIED BY A PURPLE COLOR THAT HAS BEEN ADDED DURING THE MANUFACTURING OF THE PIPE BY THE INTRODUCTION OF A COLORING AGENT.
12. ALL RECLAIMED WATER VALVES AND OUTLETS SHALL BE APPROPRIATELY TAGGED OR LABELED TO WARN THE PUBLIC AND EMPLOYEES THAT THE WATER IS NOT INTENDED FOR DRINKING. ALL PIPING, PIPELINES, VALVES, AND OUTLETS SHALL BE COLOR -CODED, OR OTHERWISE MARKED, TO DIFFERENTIATE RECLAIMED WATER FROM DOMESTIC OR OTHER WATER. ALL VALVE BOX COVERS SHALL BE SQUARE, MARKED "LARGO RECLAIMED WATER", AND SHALL BE PAINTED PURPLE.
13. RECLAIMED WATER P.V.C. MAINS SHALL BE STRAPPED EVERY 10', OR SPIRAL -WRAPPED WITH TWO (2) NO. 14 GAUGE PURPLE IRRIGATION WIRES FOR FUTURE LOCATION PURPOSES. THE WIRES SHALL BE STUBBED OUT AT EACH VALVE BOX AND BLOW-OFF. THE TRACER WIRE SHALL BE TESTED BY THE CONTRACTOR, AND MUST BE APPROVED BY A CITY ENGINEERING REPRESENTATIVE.
14. NO SERVICE CONNECTIONS, WYES, SERVICES, OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS, EXCEPT UPON APPROVAL OF THE CITY ENGINEER.
15. TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER ON UNDISTURBED SOIL. IF UNSUITABLE SUBSURFACE MATERIAL IS ENCOUNTERED, EXCAVATE AN EXTRA 6" AND BACK FILL WITH 3/4" GRAVEL.
16. BACKFILL MATERIAL FOR THE RECLAIMED WATER MAIN AND SERVICE LINES SHALL BE NON-COHESIVE, NON-PLASTIC MATERIAL FREE OF ALL DEBRIS, LUMPS AND ORGANIC MATTER. BACK FILL MATERIAL PLACED WITHIN ONE 1' OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN TWO 2" IN DIAMETER (1" FOR P.V.C. PIPE), AND NO STONE LARGER THAN 6" IN DIAMETER WILL BE PERMITTED IN ANY BACK FILL MATERIAL.
17. ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACK FILLED AND STABILIZED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO THE CONTRACTOR LEAVING THE CONSTRUCTION SITE.
18. COMPLETE "AS-BUILT" INFORMATION RELATIVE TO VALVES, SERVICES, FITTINGS, PIPE LENGTHS, ELEVATIONS AND SLOPES SHALL BE ACCURATELY RECORDED AND SUBMITTED TO THE CITY, AND MUST BE SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR.
19. PURPLE, 3" WIDE DETECT-A-TAPE LABELED " CAUTION RECLAIMED WATER BURIED BELOW" SHALL BE INSTALLED 12" BELOW FINISHED GRADE ABOVE ALL EFFLUENT REUSE MAINS INSTALLED.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaim Water Main General Specifications	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RW-22	
CITY ENGINEER: LELAND E. DICUS	DRAWING SCALE: NOT TO SCALE		

## RECLAIMED WATER METER REQUIREMENTS

1. ALL RECLAIMED WATER VALVE BOXES, METER BOX COVERS, AND ALL ABOVE GROUND FITTINGS AND EQUIPMENT SHALL BE PAINTED PURPLE IN COLOR.
2. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL.
3. ALL RECLAIMED WATER METERS, SIZED LARGER THAN 2", SHALL BE INSTALLED ABOVE GROUND.
4. THE RECLAIMED WATER METER, AND ALL RELATED HARDWARE, SHALL BE ENCLOSED IN A METER BOX. IF DEEMED NECESSARY, TWO METER BOXES MAY BE USED.
5. ALL PIPE FITTINGS SHALL BE FLANGED.
6. ALL RECLAIMED WATER METER CASES SHALL BE MANUFACTURED FROM COPPER ALLOY (BRONZE). COMPOUND AND DISPLACEMENT METERS ARE NOT ACCEPTABLE.
7. THE FOLLOWING RECLAIMED WATER METERS HAVE BEEN APPROVED BY THE CITY OF LARGO:
  - TURBINE TYPE - CLASS II, SIZES: 1.5", 2", 3", 4", 6", 8", 10", 12"
    - a) HERSEY MHR
    - b) NEPTUNE TRIDENT
    - c) BTR-ROCKWELL TURBO
    - d) BADGER, MODEL T-III
    - e) KENT, MODEL T-3000
    - f) OR A SUITABLE APPROVED EQUIVALENT REPLACEMENT

A SUITABLE ALTERNATIVE REPLACEMENT FOR A PROPOSED RECLAIMED WATER METER MUST BE APPROVED BY THE CITY OF LARGO PRIOR TO INSTALLATION. IN ORDER TO APPLY FOR AN ALTERNATIVE REPLACEMENT THE DEVELOPER AND/OR CONTRACTOR MUST SUBMIT ENGINEERING DRAWINGS, WHICH DEPICT THE INSTALLATION DETAILS OF THE WATER METER, ENGINEERING AND DESIGN DATA, AND ANY RELEVANT CALCULATIONS THEREUNTO APPERTAINING. ALL WATER METERS AND ANY APPURTENANCES SHALL BE INSTALLED IN A DEDICATED PUBLIC RIGHT-OF-WAY, OR A DEDICATED PUBLIC UTILITY EASEMENT.



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Main General Specifications	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-23	
CITY ENGINEER:	DRAWING SCALE:		
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**RECLAIMED WATER FIRE HYDRANT GENERAL SPECIFICATIONS**

1. ALL RECLAIMED WATER FIRE HYDRANTS SHALL BE OF THE COMPRESSION TYPE, AND SHALL CONFORM TO A.W.W.A. STANDARD C-502, AND SHALL BE THE MANUFACTURER'S LATEST AND BEST DESIGN. ALL FIRE HYDRANTS SHALL BE 5.25", AND SHALL BE DESIGNED FOR A WORKING PRESSURE OF 150 P.S.I., AND A HYDROSTATIC TEST PRESSURE OF 300 P.S.I. THE FIRE HYDRANT VALVE SHALL CLOSE WITH WATER PRESSURE. IN ADDITION, THE FIRE HYDRANT SHALL BE DESIGNED IN SUCH A MANNER SO THAT ALL OPERATING PARTS SHALL BE SIMPLE AND ECONOMICAL TO INSTALL AND MAINTAIN, AND SHALL BE REMOVABLE THROUGH THE BARREL WITHOUT EXCAVATION. ALL FIRE HYDRANTS SHALL HAVE "O" RING PACKING AND THE MAIN VALVE SEAT SHALL BE MADE OF A RUBBER COMPOUND SUCH AS NEOPRENE OR SOME OTHER SYNTHETIC RUBBER MATERIAL. ALL FIRE HYDRANT INLET CONNECTIONS SHALL BE A 6" MECHANICAL JOINT. ALL FIRE HYDRANTS SHALL HAVE AN APPROVED A.W.W.A. BREAKAWAY FEATURE OF THE "BREAK FLANGE" TYPE, IN ORDER TO MINIMIZE TRAFFIC IMPACT DAMAGE, AND SHALL BE OF THE THREE- WAY DESIGN, WITH ONE (1) 4.5" PUMPER CONNECTION, AND TWO (2) 2.5" HOSE CONNECTIONS. ALL CONNECTIONS SHALL BE AMERICAN NATIONAL STANDARD HOSE THREADS. THE OPERATING NUT SHALL BE A 1.5" PENTAGONAL POINT-TO-FLAT NUT, WITH A COUNTER- CLOCKWISE OPENING. ALL DRAIN HOLES SHALL BE PLUGGED WITH BRASS PLUGS, OR SHALL BE ELIMINATED DURING THE MANUFACTURING PROCESS. ALL SET SCREWS AND PINS SHALL BE CONSTRUCTED OF STAINLESS STEEL. IN ADDITION, ALL RECLAIMED WATER FIRE HYDRANTS SHALL HAVE A WEATHER CAP. APPROVED PRODUCTS ARE: AMERICAN DARLING, MODEL B-62-B; CLOW, TYPE F2500; DRESSER, TYPE 929; KENNEDY, MODEL K-81A; MUELLER, TYPE A-423.
2. ALL RECLAIMED WATER FIRE HYDRANTS SHALL BE SET PLUMB, AND THE NOZZLE CAP SHALL BE AT LEAST 18" ABOVE THE FINISHED GRADE. THE FIRE HYDRANT CONTROL VALVE SHALL BE CONNECTED TO THE MAIN BY A STANDARD FIRE HYDRANT TEE, OR ANOTHER APPROVED METHOD OF RESTRAINT. THE FIRE HYDRANT SHALL NOT BE TIED TO THE TEE, BUT SHALL BE RESTRAINED BETWEEN THE CONTROL VALVE AND THE FIRE HYDRANT BY MEANS OF RESTRAINED JOINTS.
3. ALL RECLAIMED WATER FIRE HYDRANTS, VALVE BOXES, AND ANY ABOVE-GROUND APPURTENANCES SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR CODING.
4. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL, AND SHALL BE PLACED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING MINIMUM CONSTRUCTION AND DESIGN STANDARDS". PLEASE REFER TO THE LATEST EDITION.
5. ALL RECLAIMED WATER FIRE HYDRANTS INSTALLED ON THE RECLAIMED WATER SYSTEM SHALL BE PROTECTED BY AN APPROVED FIRE HYDRANT LOCK. TWO (2) HYDRANT LOCK OPERATING WRENCHS SHALL BE SUPPLIED TO THE CITY OF LARGO FOR EACH FIRE HYDRANT LOCK WHICH IS INSTALLED. AN APPROVED PRODUCT IS: THE MCGARD "INTIMIDATOR"
6. ALL PIPING SHALL BE OF THE CLASS 52 TYPE, AND SHALL BE INSTALLED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING DESIGN STANDARDS"



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TITLE:		DESCRIPTION:	
Engineering Design and Construction Standards		Reclaimed Water Fire Hydrant General Specifications	
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CAROL STRICKLIN A.I.C.P.	November 18, 2008	RW-24	
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COMMERCIAL RECLAIMED WATER METER GENERAL SPECIFICATIONS

1. ALL RECLAIMED WATER VALVE BOXES, METER BOX COVERS, AND ALL ABOVE GROUND FITTINGS AND EQUIPMENT SHALL BE PAINTED PURPLE IN COLOR.
2. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL.
3. ALL RECLAIMED WATER METERS, SIZED LARGER THAN 2", SHALL BE INSTALLED ABOVE GROUND.
4. THE RECLAIMED WATER METER, AND ALL RELATED HARDWARE, SHALL BE ENCLOSED IN A METER BOX. IF DEEMED NECESSARY, TWO METER BOXES MAY BE USED.
5. ALL PIPE FITTINGS SHALL BE FLANGED.
6. ALL RECLAIMED WATER METER CASES SHALL BE MANUFACTURED FROM COPPER ALLOY (BRONZE). COMPOUND METERS ARE NOT ACCEPTABLE.
7. THE FOLLOWING RECLAIMED WATER METERS HAVE BEEN APPROVED BY THE CITY OF LARGO:
  - I. DISPLACEMENT TYPE - MAGNETICALLY DRIVEN, SIZES: 0.625" x 0.750", 1.000"
    - a. NEPTUNE TRIDENT, MODEL T-10
    - b. BTR-ROCKWELL, SR-II
    - c. KENT, MODEL C-700
    - d. BADGER, MODELS 25, 70, 120
    - e. OR, A SUITABLE APPROVED EQUIVALENT REPLACEMENT
  - II. TURBINE TYPE - CLASS II, SIZES: 1.5", 2", 3", 4", 6", 8", 10", 12"
    - a. HERSEY MHR
    - b. NEPTUNE TRIDENT
    - c. BTR-ROCKWELL TURBO
    - d. BADGER, MODEL T-III
    - e. KENT, MODEL T-3000

NOTE:

1. A SUITABLE ALTERNATIVE REPLACEMENT FOR A PROPOSED RECLAIMED WATER METER MUST BE APPROVED BY THE CITY OF LARGO PRIOR TO INSTALLATION. IN ORDER TO APPLY FOR AN ALTERNATIVE REPLACEMENT THE DEVELOPER / CONTRACTOR MUST SUBMIT ENGINEERING DRAWINGS DEPICTING THE INSTALLATION DETAILS OF THE WATER METER, ENGINEERING AND DESIGN DATA, AND ANY RELEVANT CALCULATIONS THEREUNTO APPERTAINING. ALL WATER METERS AND ANY APPURTENANCES SHALL BE INSTALLED IN A DEDICATED PUBLIC RIGHT-OF-WAY, OR A DEDICATED PUBLIC UTILITY EASEMENT.



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TITLE:		DESCRIPTION:	
<b>Engineering Design and Construction Standards</b>		<b>Commercial Reclaimed Water Meter General Specifications</b>	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	<b>RW-25</b>	
CITY ENGINEER:	DRAWING SCALE:		
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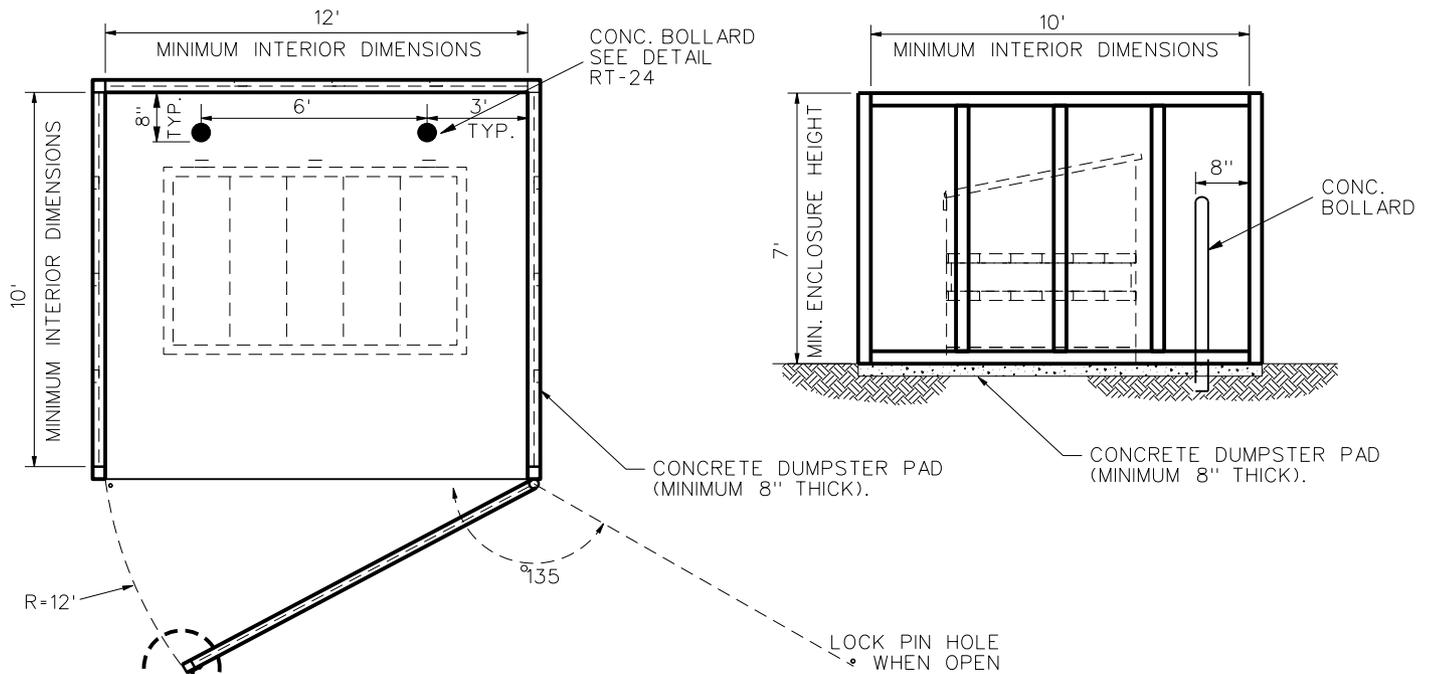
GENERAL POTABLE WATER NOTES

1. LARGO ENGINEERING SERVICES WILL WITNESS ALL PRESSURE TESTING OF ON SITE POTABLE WATER PIPING ONLY. TESTING OF SITE PIPING WILL BE FROM THE END OF THE PINELLAS COUNTY'S JURISDICTION, AT THE WATER METER AND BACK FLOW PREVENTOR, TO THE START OF CITY OF LARGO'S BUILDING DEPARTMENT INSPECTION AT THE BUILDING TIE-IN.
2. ALL PAPERWORK OR FORMS TO BE SIGNED BY THE INSPECTOR WILL BE PROVIDED BY THE CONTRACTOR.
3. ALL LINES, REGARDLESS OF DIAMETER OR LENGTH, WILL BE TESTED AT ONE- HUNDRED AND FIFTY (150) PSI FOR THE PERIOD OF ONE (1) HOUR
- .4. STANDARD ALLOWABLE LOSS LEAKAGE FORMULA WILL BE USED, IF PROVIDED BY CONTRACTOR. IF NOT PROVIDED, NO LOSS WILL BE ALLOWED.
5. FOR PRESSURE TESTING PURPOSES, AN INLINE GATE VALVE SHALL BE PROVIDED AT BACK FLOW PREVENTER (BFP).
6. ANY LINE NOT PASSING WILL BE "RED TAGGED." RETESTING WILL NOT BE CONDUCTED UNTIL "RED TAG" FEE HAS BEEN PAID.



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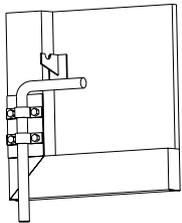
<small>TITLE:</small> <b>Engineering Design and Construction Standards</b>		<small>DESCRIPTION:</small> <b>General Potable Water Notes</b>	
<small>COMMUNITY DEVELOPMENT DIRECTOR:</small> CAROL STRICKLIN A.I.C.P.		<small>PUBLICATION DATE:</small> November 18, 2008	
<small>CITY ENGINEER:</small> LELAND E. DICUS, P.E.		<small>DRAWING SCALE:</small> NOT TO SCALE	
		<b>PW-01</b>	



**SINGLE-WIDTH DUMPSTER ENCLOSURE**

FOR PAD SIZE SEE NOTES SW-03

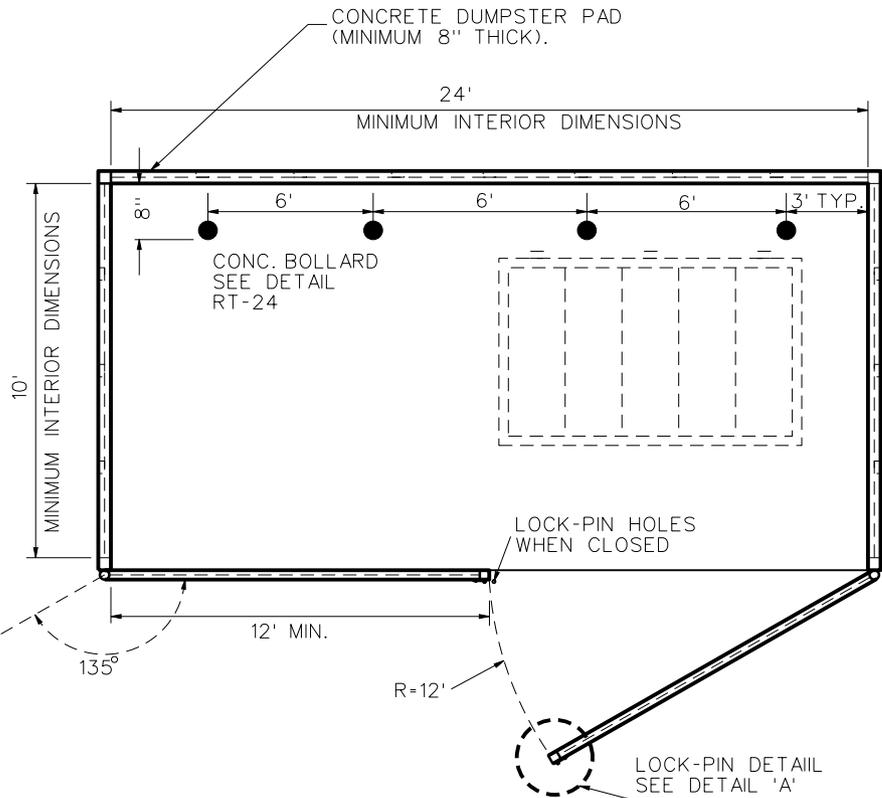
LOCK-PIN DETAIL  
SEE DETAIL 'A'



**LOCK PIN DETAIL**

**DETAIL "A"**  
LOCK PIN TO  
BE ON OUTSIDE OF  
DUMPSTER DOOR

LOCK PIN HOLE  
WHEN OPEN



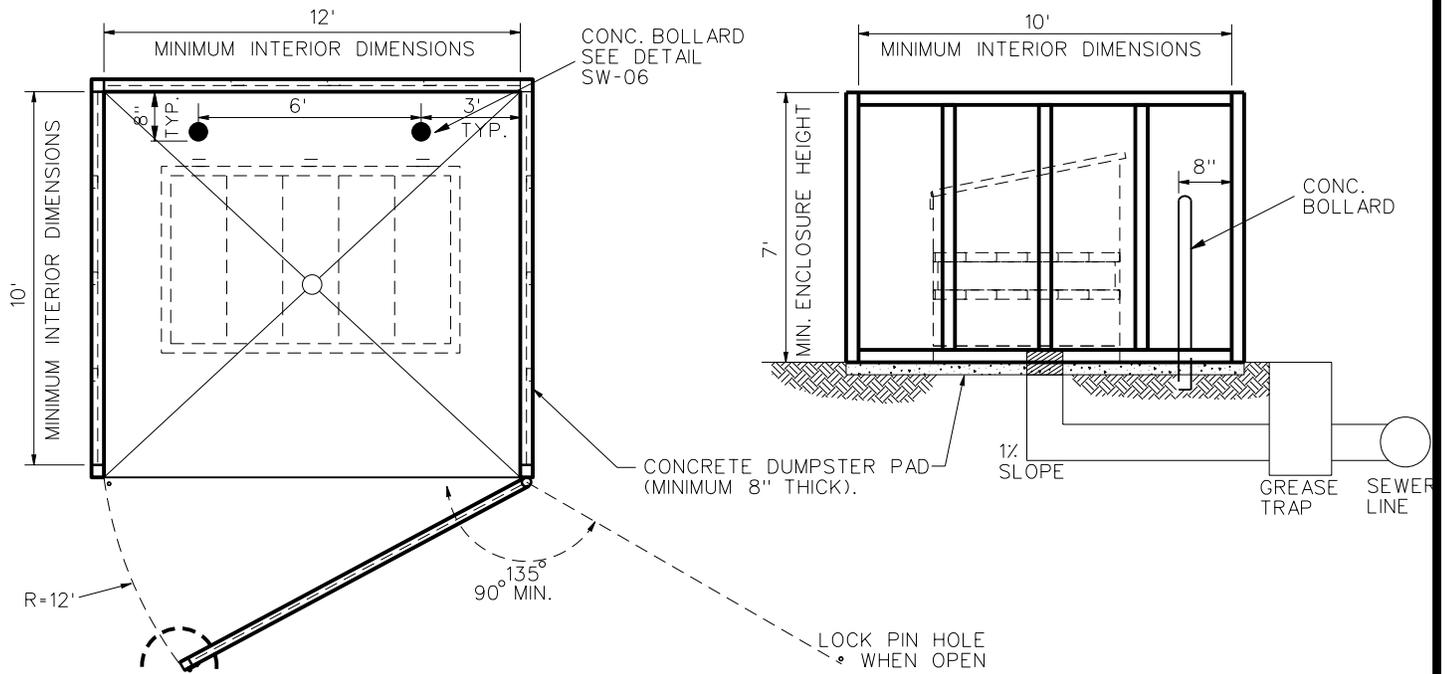
**DOUBLE-WIDTH DUMPSTER ENCLOSURE**

FOR MORE DETAILS SEE PAGES SW-04, SW-05.



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TITLE: Engineering Design and Construction Standards		DESCRIPTION: Dumpster Pads and Enclosures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: <b>SW-01</b>	
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE		

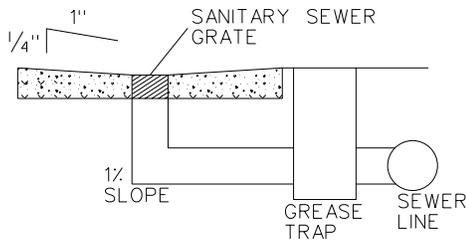


### SINGLE-WIDTH DUMPSTER ENCLOSURE WITH DRAIN

FOR PAD SIZE SEE NOTES SW-03

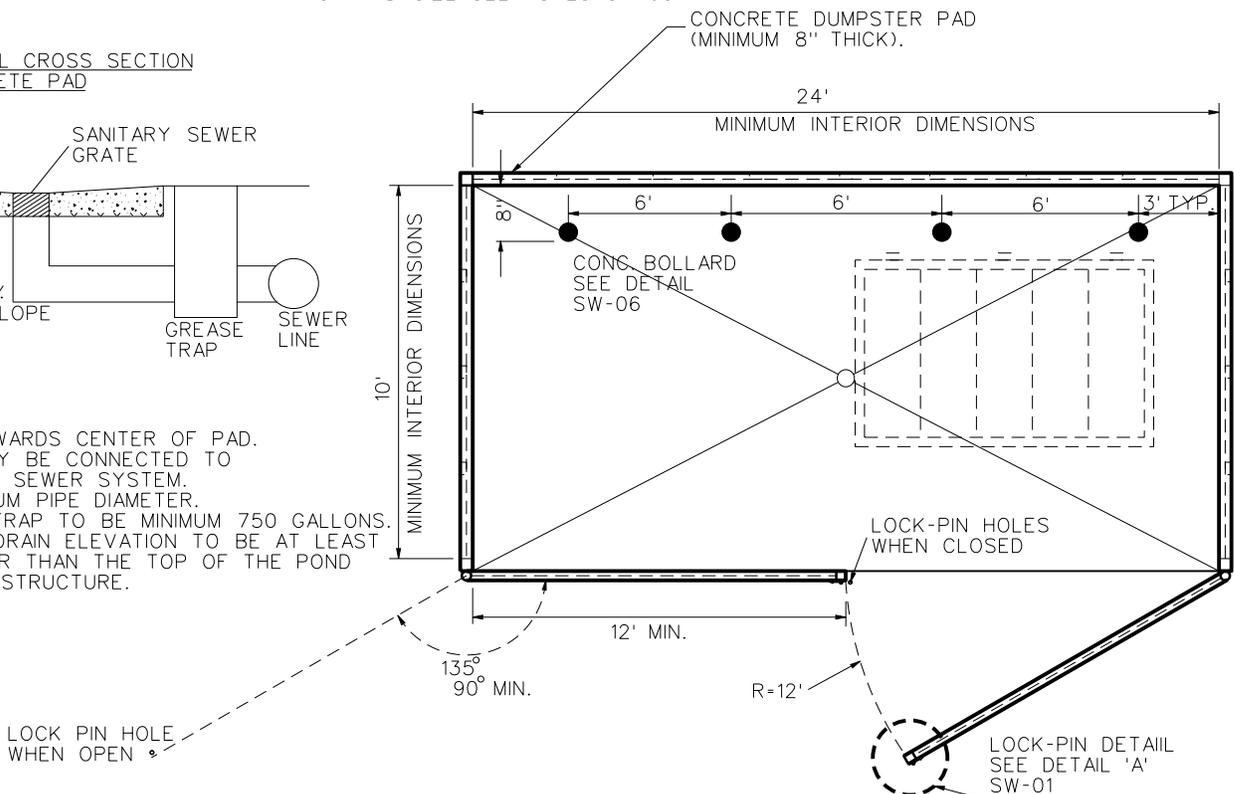
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SEE DETAIL 'A'  
SW-01

TYPICAL CROSS SECTION  
CONCRETE PAD



#### NOTES:

1. DRAIN TOWARDS CENTER OF PAD.
2. DRAIN MAY BE CONNECTED TO SANITARY SEWER SYSTEM.
3. 4" MAXIMUM PIPE DIAMETER.
4. GREASE TRAP TO BE MINIMUM 750 GALLONS.
5. TOP OF DRAIN ELEVATION TO BE AT LEAST 12" HIGHER THAN THE TOP OF THE POND OUTFALL STRUCTURE.



### DOUBLE-WIDTH DUMPSTER ENCLOSURE

WITH DRAIN

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.



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TITLE:

Engineering Design and  
Construction Standards

DESCRIPTION:

Dumpster Pads and  
Enclosures With Drains

COMMUNITY DEVELOPMENT DIRECTOR:  
CAROL STRICKLIN A.I.C.P.

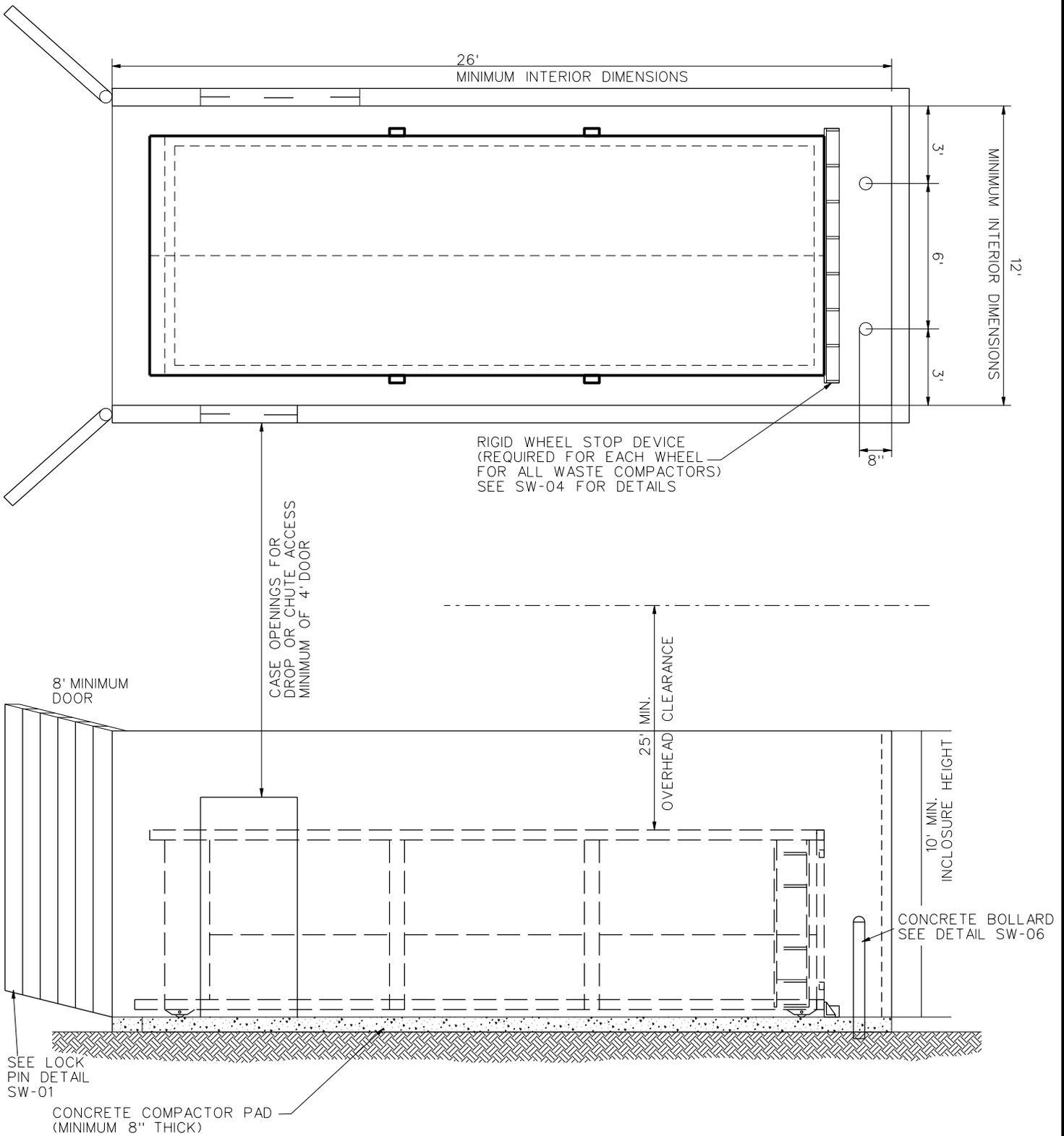
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SW-02

CITY ENGINEER:  
LELAND E. DICUS P.E.

DRAWING SCALE:  
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**SELF CONTAINED WASTE COMPACTOR ENCLOSURE**

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.



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TITLE: <b>Engineering Design and Construction Standards</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>

DESCRIPTION: <b>Self-Contained Waste Compactors Pad and Enclosure</b>
INDEX NUMBER: <b>SW-03</b>

## DUMPSTER PAD AND ENCLOSURE

1. ALL SIDES OF THE DUMPSTER SHALL BE ENCLOSED BY AN OPAQUE FENCE, I.E: WOODEN, PVC OR MASONRY BLOCK. NO CHAIN LINK, EVEN SLATTED WILL BE NOT ALLOWED. A MINIMUM 12' WIDE OPENING FOR SINGLE- WIDTH ENCLOSURES, AND 24' WIDE OPENING FOR DOUBLE- WIDTH ENCLOSURES, MUST BE PROVIDED. THE HEIGHT OF THE ENCLOSURE SHALL BE NO LESS THAN 7'.
2. A SINGLE- WIDTH DUMPSTER PAD SHALL MEASURE A MINIMUM OF 12' WIDE X 10' DEEP, AND SHALL BE CONSTRUCTED OF SLOPING TOWARDS GATE AT 2%, 8" THICK CONCRETE. A DOUBLE-WIDTH DUMPSTER PAD SHALL MEASURE A MINIMUM OF 24' WIDE X 10' DEEP, AND SHALL BE CONSTRUCTED OF SLOPING TOWARDS GATE AT 2 %, 8" THICK CONCRETE.
3. A FOUR-SIDED ENCLOSURE SHALL HAVE A 12' OPENING INSIDE OF THE GATE. DOUBLE- WIDTH DUMPSTER OPENINGS SHALL MEASURE 24' WIDE FROM INSIDE THE GATE(S). HOLDING PINS ATTACHED TO THE GATE MUST BE PROVIDED TO HOLD THE GATE OPEN WHILE BEING SERVICED. A DOUBLE-GATE ON A DOUBLE-WIDTH PAD NECESSITATES USING TWICE THE SINGLE-WIDTH STANDARD FOR A DUMPSTER GATE. WHEN A SLIDING GATE IS TO BE USED TO ENCLOSE A DOUBLE-WIDTH PAD, THE DOUBLE-WIDTH STANDARD SHALL BE USED (SEE SW-01 OR SW-02.)
4. IF RECYCLING CONTAINERS ARE TO BE INCLUDED INSIDE THE SOLID WASTE ENCLOSURE, THE ENCLOSURE WILL BE MINIMUM WIDTH OF 15' FOR A SINGLE AND 30' MINIMUM FOR A DOUBLE. IF THE DOOR IS >15', THE DOOR WILL BE REQUIRED TO HAVE A SUPPORT WHEEL WITH A SPRING. THE WHEEL MUST CONTACT THE GROUND AT ALL TIMES.
5. A DUMPSTER SHALL NOT BE LOCATED WITHIN THE MINIMUM PRESCRIBED BUFFER DISTANCE FOR THE PROPOSED DEVELOPMENT (REFER TO THE CITY OF LARGO COMPREHENSIVE DEVELOPMENT CODE, SECTION 5500).
6. A DUMPSTER SHALL NOT BE LOCATED WITHIN THE MINIMUM REQUIRED SETBACK AS MEASURED FROM THE CENTERLINE OF AN ABUTTING RIGHT-OF-WAY.
7. DUMPSTER'S SHALL BE LOCATED TO PROVIDE SAFE AND CONVENIENT ACCESS BY CITY SOLID WASTE VEHICLES FROM THE INTERIOR OF THE DEVELOPMENT. THE VEHICLES REQUIRE A MINIMUM VERTICAL CLEARANCE OF 25'. IN NO INSTANCE SHALL DUMPSTER LOCATIONS CAUSE BLOCKING OF THE RIGHT-OF-WAY BY SOLID WASTE VEHICLES DURING PICK -UP.
8. DUMPSTER ENCLOSURES ARE NOT TO BE USED FOR STORING ITEMS.
9. DUMPSTER'S SHALL NOT BE LOCATED WITHIN THE PROXIMITY OF ANY STORM WATER UTILITY OR DRAINAGE SYSTEM.
10. PROPOSED DUMPSTER LOCATIONS SHALL BE APPROVED BY THE SOLID WASTE MANAGER AND THE CITY ENGINEER ANY VARIATION TO THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS" MUST BE APPROVED BY THE SOLID WASTE MANAGER AND THE CITY ENGINEER. DRAINAGE FROM DUMPSTER AREA SHALL NOT IMPACT STORM WATER SYSTEM.
11. GATES SHALL HAVE "CANE" STYLE LOCKING PINS AND MUST LOCK OPEN AT 135 DEGREES IF POSSIBLE. IF NOT POSSIBLE 90 DEGREES MINIMUM WILL BE ACCEPTED AND MUST LOCK CLOSED.
12. LOCATION OF DUMPSTER ENCLOSURE WILL BE DEPICTED ON SIGNED AND STAMPED CIVIL DRAWINGS. NO CHANGES WILL BE MADE WITH OUT RE -SUBMITTING PLANS. ANY DIFFERENT OR CONFLICTING INFO, OR LOCATION ON ANY OTHER PRINT, SUCH AS ARCHITECTURAL'S, WILL NOT BE VALID.
13. IF THE ENCLOSURE IS TO BE C.M.U. (CONCRETE BLOCK WALL) THEN A STAMPED ARCHITECTURAL PRINT SHOWING FOOTERS, STEEL, ETC SHALL BE PROVIDED BY ENGINEER OF RECORD.

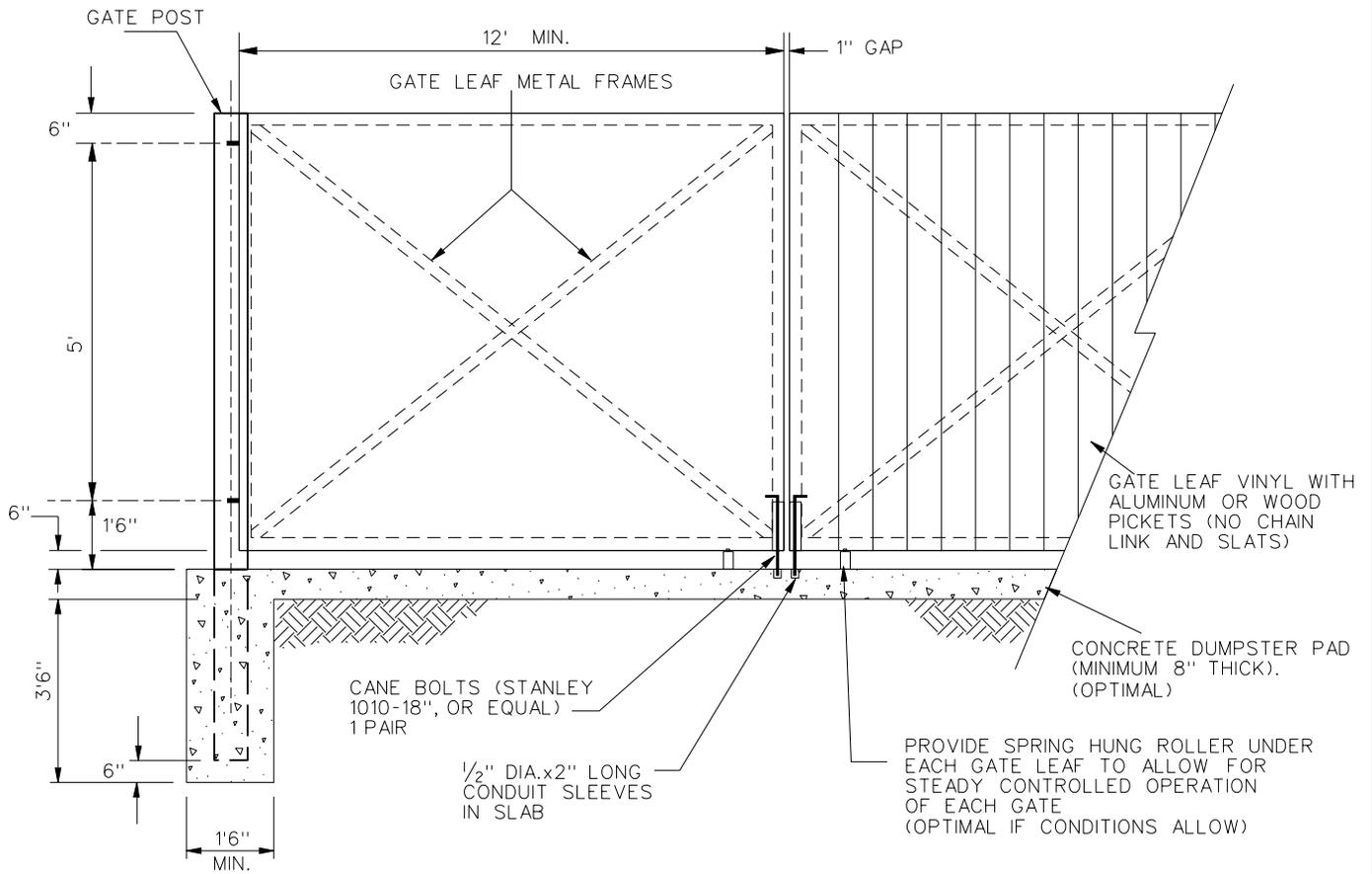
### CLOSED AND OPEN-TOP COMPACTOR REQUIREMENTS

1. A CLOSED-TOP COMPACTOR PAD SHALL MEASURE A MINIMUM OF 12' WIDE X 26' DEEP, AND SHALL BE CONSTRUCTED OF LEVEL, 8" THICK CONCRETE.
2. METAL (OR LIKE SUBSTANCE) STOPPERS MUST BE PLANTED INTO PAD TO STOP EACH WHEEL OF THE COMPACTOR.
3. IF A COMPACTING RECYCLING CONTAINER IS TO BE INCLUDED ON SITE, THE MINIMUM WIDTH FOR THE DUMPSTER PAD WILL BE 24' WITH TWO SWING DOORS OR A ROLLER GATE. THE DOOR(S) ARE REQUIRED TO HAVE A WHEEL WITH A SPRING. THE WHEEL MUST CONTACT THE GROUND AT ALL TIMES.
4. BREAKAWAY BOXES ARE REQUIRED TO HAVE A GUIDE RAIL INSTALLED ON THE CONCRETE PAD FOR REALIGNING THE BOXES TO THE COMPACTOR AFTER THE BOX IS RETURNED.
5. BREAKAWAY BOXES ARE NOT TO BE USED WITH PUTRESCIBLE GARBAGE. THESE COMPACTORS MUST BE SELF-CONTAINED.
6. PRIOR TO INSTALLATION, THE DUMPSTER PAD AND COMPACTOR SITE MUST BE INSPECTED BY A LARGO SOLID WASTE OFFICIAL TO MAKE SURE ALL REQUIREMENTS ARE MET.
7. THE PROPERTY ON SITE IS RESPONSIBLE FOR MAINTAINING CLEANLINESS IN THE COMPACTOR AREA.
8. COMPACTOR MUST BE ENCLOSED ON 3 SIDES BY A CEMENTITIOUS WALL (C.M.U. OR CAST) A MINIMUM 10' HIGH. THE WALL WILL MEET ALL APPLICABLE BUILDING CODES.
9. THE OPEN SIDE WILL BE GATED FOR ACCESSIBILITY. GATES MY BE WOODEN STOCKADE A MINIMUM OF 8' HIGH AND HAVE CANE PINS TO PIN BOTH OPEN AND CLOSED. OPEN MUST BE 135 DEGREES IF POSSIBLE, AND 90 DEGREES MINIMUM.
- 10.2 CASE OPENINGS WILL BE ALLOWED IN SIDEWALLS FOR USER ACCESS TO CHUTES, ETC FOR DROP OFFS.
11. A MINIMUM OF 25' OVERHEAD AND 40' FORWARD FROM THE GATES, FOR CLEARANCE WILL BE PROVIDED AND MAINTAINED AT ALL TIMES.
12. ANY VARIATIONS OR DEVIATIONS FROM THESE STANDARDS MUST BE SUBMITTED TO AND APPROVED BY BOTH THE SOLID WASTE DIVISION AND THE ENGINEERING DIVISION.

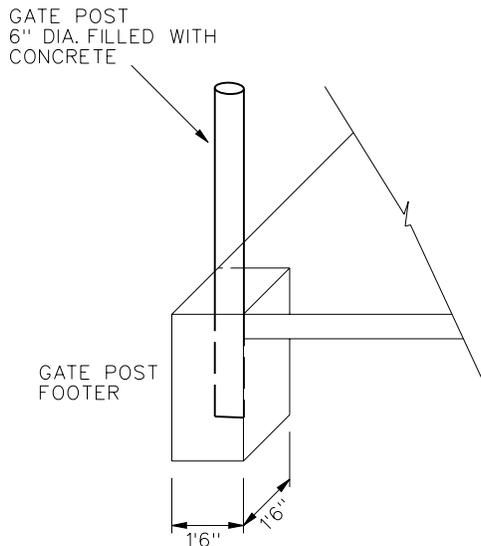


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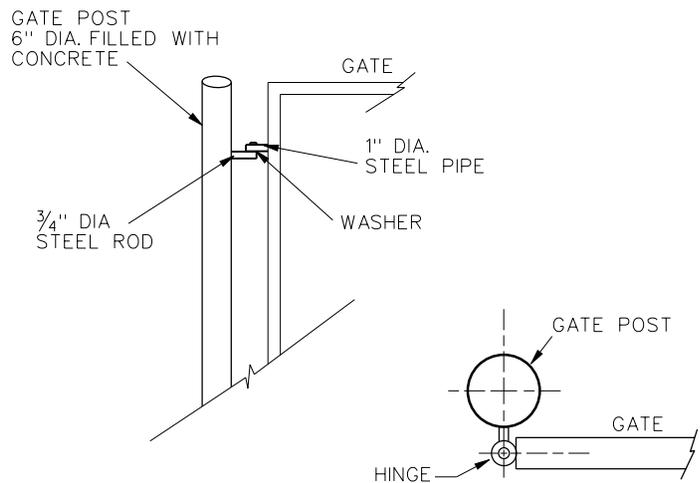
TITLE:		DESCRIPTION:	
<b>Engineering Design and Construction Standards</b>		<b>Dumpster Pads, Compactor and Enclosures Requirements</b>	
COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:	
CAROL STRICKLIN A.I.C.P.	November 18, 2008	<b>SW-04</b>	
CITY ENGINEER:	DRAWING SCALE:		
LELAND E. DICUS P.E.	NOT TO SCALE		



### DUMPSTER ENCLOSURE GATE ELEVATION



GATE POST DETAIL



HINGE DETAIL



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TITLE:  
**Engineering Design and  
 Construction Standards**

DESCRIPTION:  
**Dumpster Pads  
 and Enclosures**

COMMUNITY DEVELOPMENT DIRECTOR:  
**CAROL STRICKLIN A.I.C.P.**

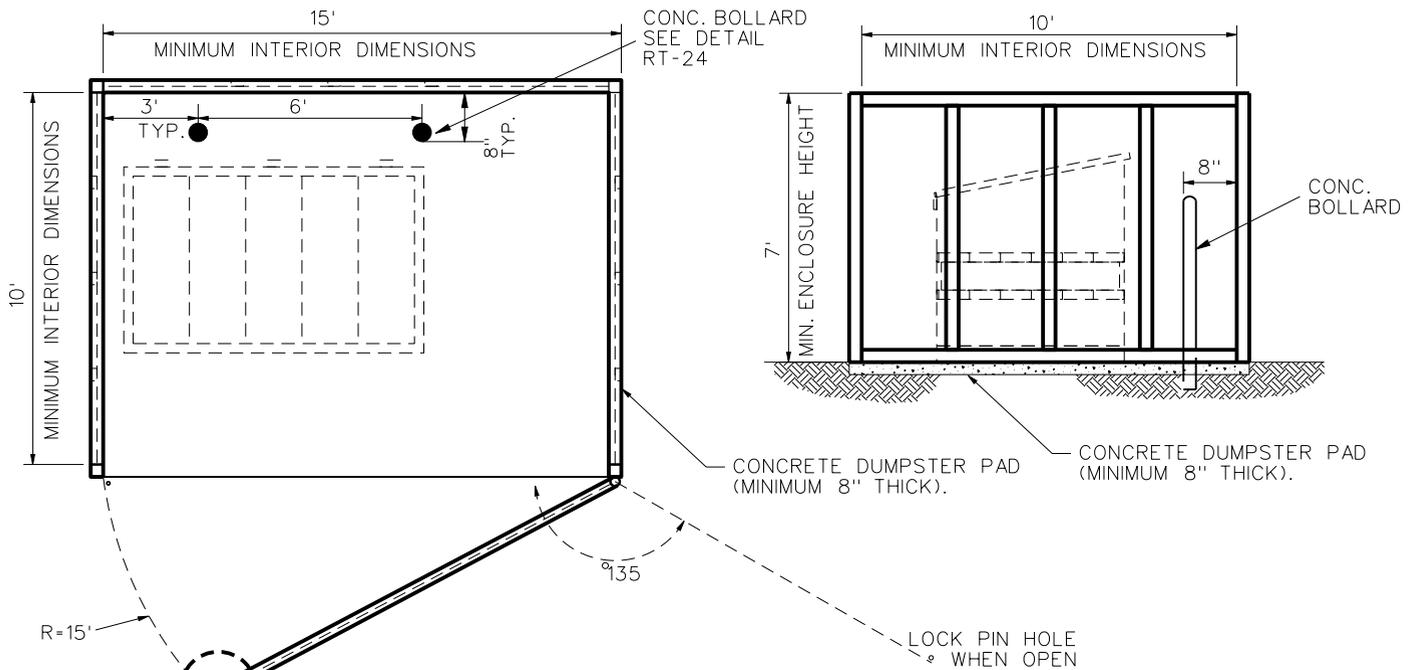
PUBLICATION DATE:  
**November 18, 2008**

INDEX NUMBER:

CITY ENGINEER:  
**LELAND E. DICUS, P.E.**

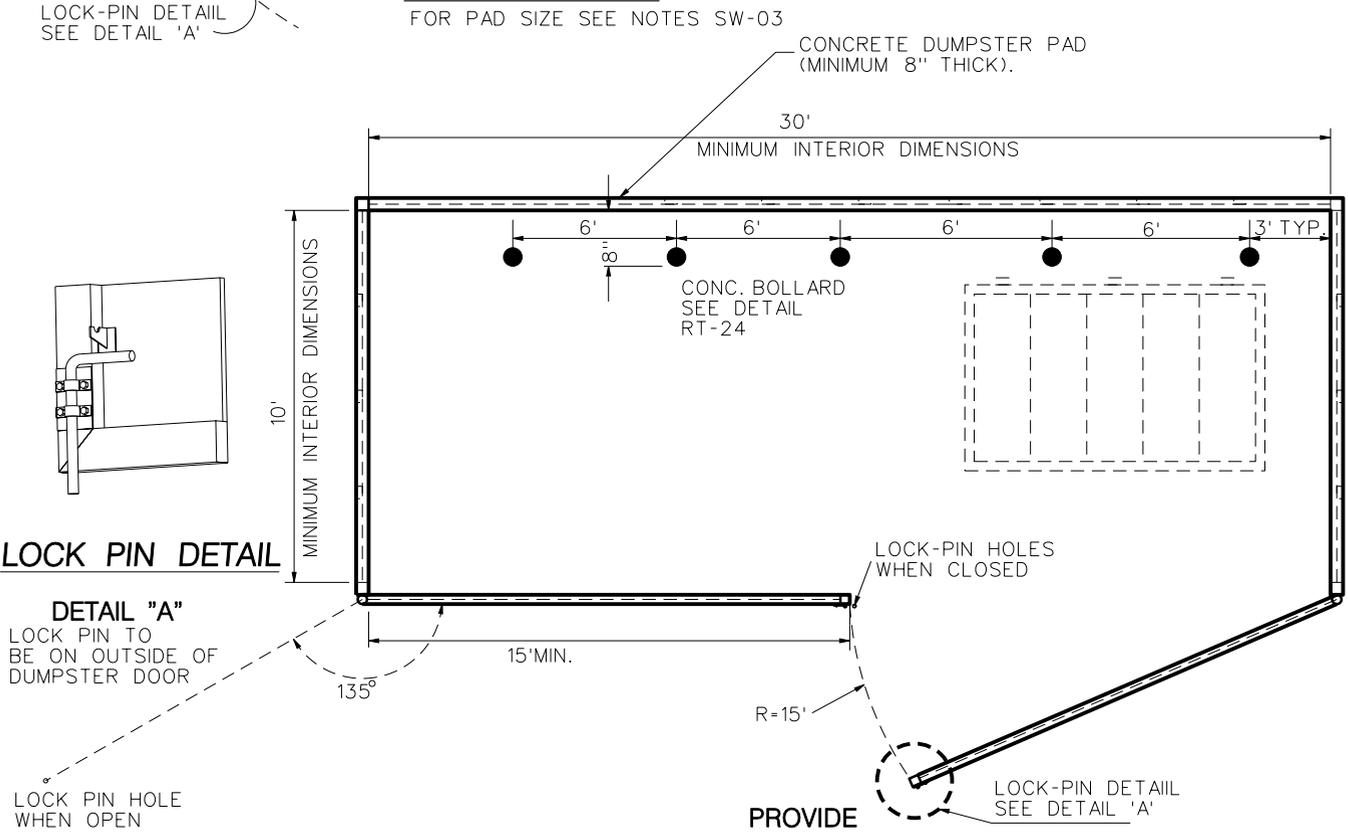
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**NOT TO SCALE**

**SW-05**



**SINGLE-WIDTH DUMPSTER ENCLOSURE  
FOR RECYCLING**

FOR PAD SIZE SEE NOTES SW-03



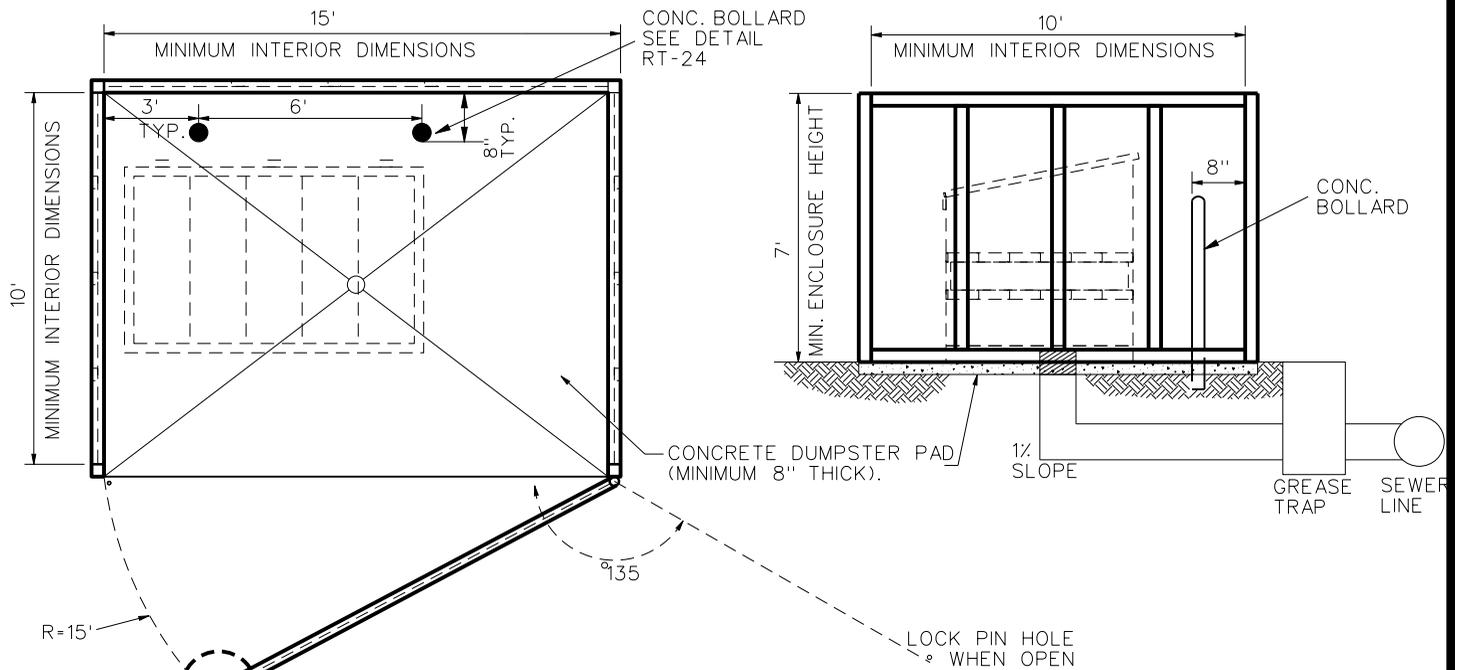
**DOUBLE-WIDTH DUMPSTER ENCLOSURE  
FOR RECYCLING**

FOR MORE DETAILS SEE PAGES SW-04, SW-05.



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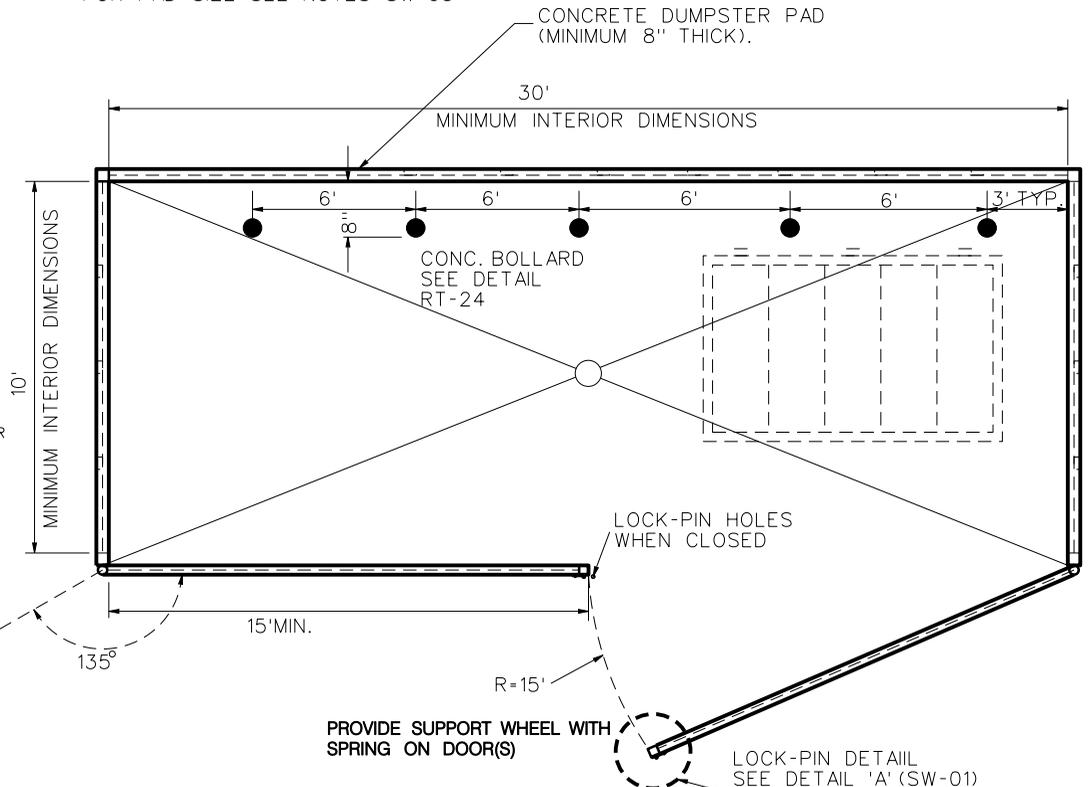
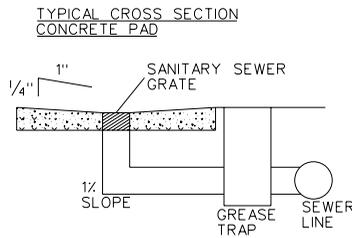
TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Recycle Dumpster Pads and Enclosures</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SW-06</b>	
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**SINGLE-WIDTH DUMPSTER ENCLOSURE  
FOR RECYCLING WITH DRAIN**

FOR PAD SIZE SEE NOTES SW-03

LOCK-PIN DETAIL  
SEE DETAIL 'A'  
(SW-01)



**DOUBLE-WIDTH DUMPSTER ENCLOSURE  
FOR RECYCLING WITH DRAIN**

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.

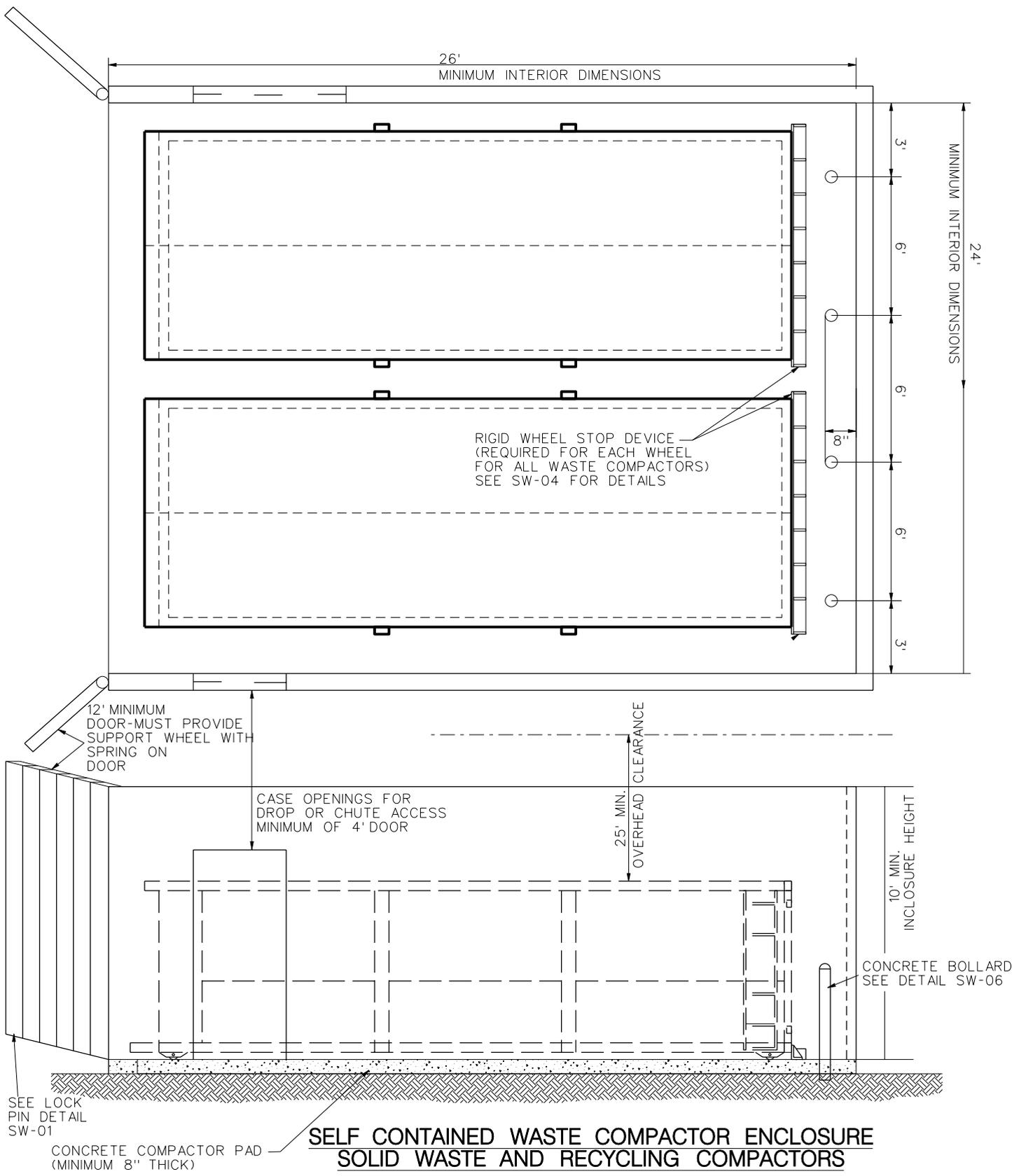
**NOTES:**

1. DRAIN TOWARDS CENTER OF PAD.
2. DRAIN MAY BE CONNECTED TO SANITARY SEWER SYSTEM.
3. 4" MAXIMUM PIPE DIAMETER.
4. GREASE TRAP TO BE MINIMUM 750 GALLONS.
5. TOP OF DRAIN ELEVATION TO BE AT LEAST 12" HIGHER THAN THE PONDS OUTFALL STRUCTURE.
6. DUMPSTER ENCLOSURE WITH DRAINS MUST BE LOCATED OR ELEVATED SO THAT SURROUNDING AREA RUNOFF FLOWS AWAY FROM THE DUMPSTER ENCLOSURE.



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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Dumpster Pads and Enclosures With Drains</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SW-07</b>	
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		



**SELF CONTAINED WASTE COMPACTOR ENCLOSURE  
SOLID WASTE AND RECYCLING COMPACTORS**

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.



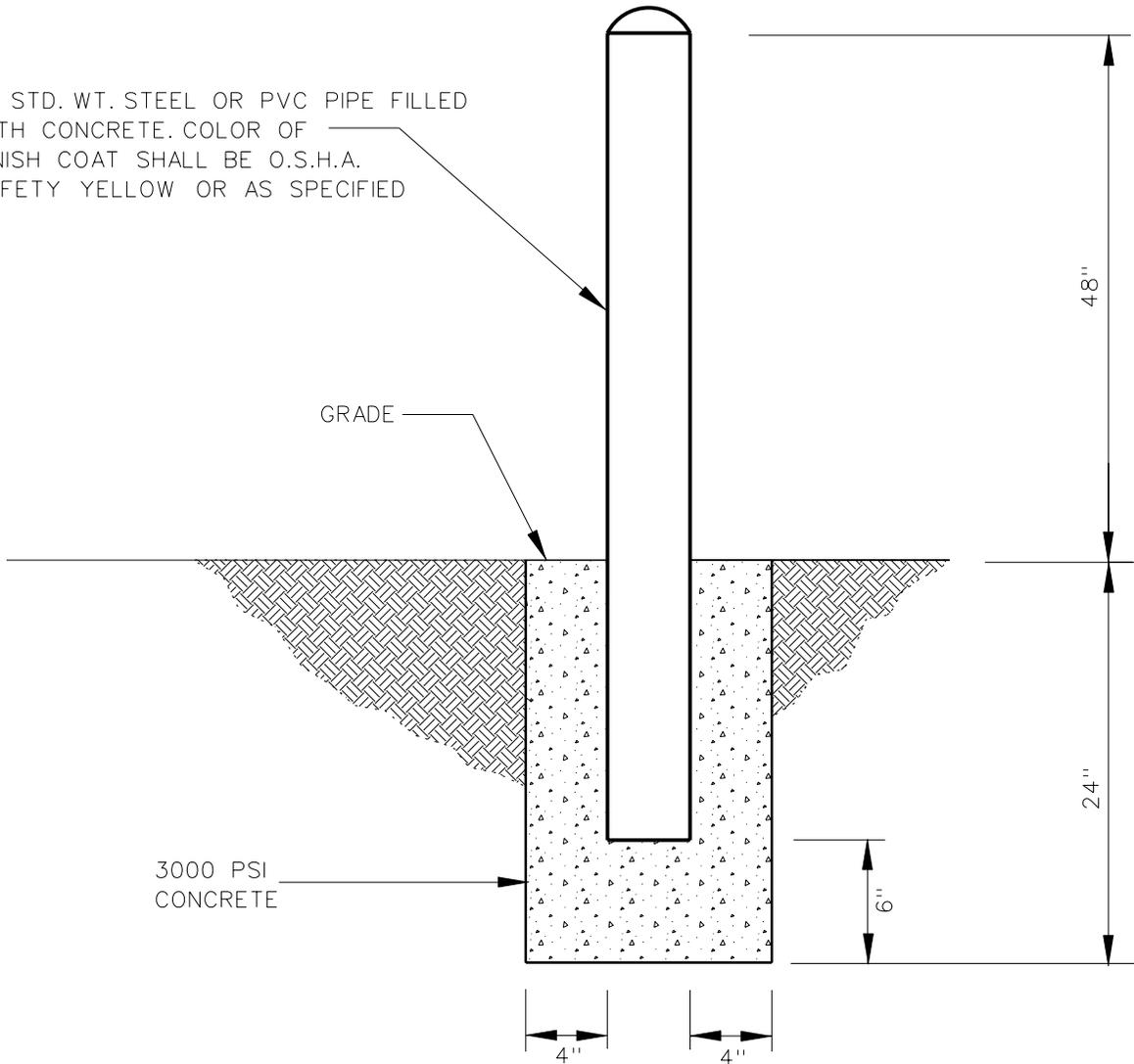
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TITLE: <b>Engineering Design and Construction Standards</b>		DESCRIPTION: <b>Self-Contained Waste Compactors Pad and Enclosure</b>	
COMMUNITY DEVELOPMENT DIRECTOR: <b>CAROL STRICKLIN A.I.C.P.</b>	PUBLICATION DATE: <b>November 18, 2008</b>	INDEX NUMBER: <b>SW-08</b>	
CITY ENGINEER: <b>LELAND E. DICUS P.E.</b>	DRAWING SCALE: <b>NOT TO SCALE</b>		

4" STD. WT. STEEL OR PVC PIPE FILLED WITH CONCRETE. COLOR OF FINISH COAT SHALL BE O.S.H.A. SAFETY YELLOW OR AS SPECIFIED

GRADE

3000 PSI CONCRETE



BOLLARD DETAIL



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TITLE:

Engineering Design and  
 Construction Standards

DESCRIPTION:

Bollard Detail

COMMUNITY DEVELOPMENT DIRECTOR:

CAROL STRICKLIN A.I.C.P.

PUBLICATION DATE:

November 18, 2008

INDEX NUMBER:

SW-09

CITY ENGINEER:

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