# City of Largo
Engineering Design and Construction Standards
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## General Notes

General Notes

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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 WHERE 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 SOURCES 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, BURLAY 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 erosive soil material.
8. STONE- COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

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DUST CONTROL NOTES

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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. MAINTENANCE OF THESE DEVICES SHALL BE AS DIRECTED BY THE CITY ENGINEER.

6. THE LIFE CYCLE OF SILT SCREEN AND HAY BALES IS LIMITED. SILT SCREENS 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, ETC. 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, BERM, 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 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).
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 owner’s 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, etc.) 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.
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 INTO 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:
FOOT 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 trailered equipment "cutting corners" where gravel meets the roadway. Sweep the paved road daily for sediments and stones.
DIVERSION RIDGE REQUIRED WHERE GRADE EXCEEDS 2% OR GREATER

FILTER FABRIC—NOTE:

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

SECTION A-A

SUPPLY WATER TO WASH WHEELS IF NECESSARY

CUT 6" AND FILL WITH STONE. MUST BE COMPACTED

A

DIVERSION RIDGE

50' MIN.

IF POSSIBLE OR AS DIRECTED BY THE CITY ENGINEER

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.
NOTE:
SYNTHETIC HAY BALES MUST BE USED.
ANCHOR BALES WITH TWO(2) 2" x 2" x 4' STAKES PER BALE.

TYPE 1

NOTE:
ANCHOR LOWER BALES WITH TWO(2) 2" x 2" x 4' STAKES PER BALE. 
#5 OR LARGER REBAR IS ACCEPTABLE.
ANCHOR TOP BALES TO LOWER BALES WITH TWO(2) 2" x 2" x 4' STAKES PER BALE.

TYPE 2
OPEN RISER

PARTIAL INLET
MUST BE STACKED WITH WOOD OR REBAR

SIDEWALK

COMPLETED INLET

DITCH BOTTOM INLET
NOTE: SYNTHETIC HAY BALES MUST BE USED
2" x 2" x 4' WOOD STAKES OR REBAR
2 PER BALE
SYNTHETIC
HAY BALES

SECTION

2' (MIN.)

ANGLE FIRST STAKE
TOWARD PREVIOUS
LAID BALE

BALE BUTTED
TIGHTLY TOGETHER

ELEVATION

FLOW
FLOW

PLAN
DOWN SLOPE

*IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.*
PRE ASSEMBLED SILT FENCE

WIRE WRAP

TOP VIEW

FLOW

FLOW

SIDE VIEW

TRENCHED AND BACK FILLED

CUT OFF STAKES AT BOTTOM OF FABRIC ACROSS DRIVE

DRIVE ENTRANCE

DRIVE ENTRANCE

"GATE" TO BE CLOSED WHEN ACCESS IS NOT REQUIRED

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)
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.
PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE

ROTATE BOTH POST AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL

DIRECTION OF RUNOFF WATER

DRIVE BOTH POSTS ABOUT 10 INCHES INTO THE GROUND AND BURY FLAP
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.
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 UPRIGHT POSTS. 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, WITH FASTENERS A MAXIMUM OF 8 INCHES APART. BARRIERS SHALL EXTEND AT LEAST ONE FOOT BEYOND THE DRIPLINE OF ALL PROTECTED TREES ON THE PROPERTY AND SHALL BE AT LEAST THREE FEET HIGH.
24" MIN

MIN 4" WIDE SPACE BRICK TO ALLOW OVERFLOW

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

1. GEOHAY OR APPROVED EQUAL.
EMBED BALE 6" MIN INTO SOIL

NOTE:
1. GEOHAY OR APPROVED EQUAL.
2. IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.
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.
CITY OF LARGO DRAINAGE MANHOLE RING AND COVER
PER DU-02
TWO RINGS OF RAM-NECK
SOLID BRICK
6" MIN., 12" MAX.

1/2" MORTAR PAD FOR PRECAST SLAB
2 RINGS OF RAM-NECK (TYPICAL)
MONOLITHIC BASE AND WALL POUR
(PRECAST CONCRETE TYPE II - 4000 P.S.I.)
STUCCO "D" BRICK IN MORTAR OR SOLID GROUT
STD. HOOKS TIED UNDER BASE STEEL

SEE STANDARD BEDDING DETAIL DD-10

ASPHALT

GROUND

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<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
<th>&quot;C&quot;</th>
<th>&quot;D&quot;</th>
<th>&quot;E&quot;</th>
<th>&quot;F&quot;</th>
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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

November 18, 2008
NOTES:

1. FRAME AND COVER SHALL BE EASTJORDAN 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.
SOLID COVER

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.

FRAME
FILTER
FABRIC

PERIMETER OF AGGREGATE TO BE FULLY WRAPPED WITH NON-DEGRADING FIBROUS FILTER TYPE MATERIAL. MIRAFI 140 N OR APPROVED EQUAL

OVERLAP FILTER MATERIAL 18" ACROSS TOP OF AGGREGATE

BETWEEN BACK OF CURB

VARIES 30" MIN.

AGGREGATE
FILTER FABRIC

UNDERDRAIN PIPE SHALL BE 6" MIN. DIAMETER, P.V.C., SDR 35, PER A.S.T.M. D 3033 WITH PERFORATIONS DOWN. [SEE DETAIL BELOW]

AGGREGATE

6" 6" 6" 6" 6"

PERFORATIONS ARE TO BE PER MANUFACTURERS SPECIFICATIONS

7° TO 13°
(TYP)

90° TO 120°
(TYP)

NOTES:

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.
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.
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
NOTES

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

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

SECTION B-B

( VIEW THROUGH INLET BOX AND WING TRANSITION)
TO BE PAID FOR AS CURB AND GUTTER

SECTION F-F

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

ADDITIONAL # 5 BAR ALONG ENTIRE LENGTH OF NOSING

NOSING DETAIL

KEY DETAIL

See Sections DD-06 Through DD-07 and DD-09 Through DD-11
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 $f' = 3000$ PSI (MIN). ($f' = 4000$ 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
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 Fc' = 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
CONSTRUCTION JOINT PERMITTED INLET BOX OR RISER INLET TOP:
No. 4 TOP BARS @ 6" O.C.
No. 4 BOTTOM BARS @ 6" O.C.

N.T.S.
SECTION A-A

(CONCRETE COVER SHOWN)

SLOPE TO MATCH ADJACENT CURB WITH 2" TOP RADIUS AND 3/4" BOTTOM CHAMFER OR 1 1/2" RADIUS

BAX
SLOBLEET

(16) No. 4 BARS @ 8" O.C. (MAX) TYP.
No. 4 STIRRUPS @ 8" O.C.

2" COVER (TYP)

3/4" CHAMFER

2" RADIUS

No. 4 BENT BAR @ 8" O.C.
No. 4 BARS @ 6" CTRS.

1/2" MANHOLE ACCESS

2'-0" MANHOLE ACCESS

2'-0" INLET TOP

6" INLET TOP:
No. 4 TOP BARS @ 6" O.C.
No. 4 BOTTOM BARS @ 6" O.C.

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
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 CASES 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 BITUMATIC 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 INFLOW 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 INFLOW LINE INVERT SHALL BE A MINIMUM WITH A TAPERED BOTTOM TO AVOID SLUDGE DEPOSITS. INFLOW 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 BITUMATIC 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 - 7/2 AMP BATTERY

HATCH COVERS
HATCH COVERS TO BE ALUMINUM WITH 316 STAINLESS STEEL HARDWARE HASP ARRANGEMENT FOR PA Lock. 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 FYLG 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 CONTRAST 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 DOWEL TAIL GROOVE OF MOVEABLE 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

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 FYLG, 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 NORMALIY 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.
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 WALE 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 FLAMES AND MOISTURE. SUPPORT CABLES WITH P.V.C. STRAIN RELIEF CONNECTORS.
2. CONDUITS TO F.P.C. SERVICE POINT SHALL BE RIGID GALVANIZED P.V.C. 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 MEQHMS OR MORE TO GROUND.
4. OPERATE PUMPS, CHECK DIRECTION, RECORD VOLTAGE AND AMPERAGE WITH EACH AND BOTH RUNNING. ALL WORK TO BE COMPLETED WITH SUPPLIERS 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 REVIVAL.
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.
6' HIGH CHAIN LINK FENCE COMMERCIAL GRADE MESH 9 GAUGE OR BETTER COLOR SLATS TO MATCH EXISTING AREA COLOR CODE AS REQUIRED (SEE WRITTEN SPECIFICATIONS)

LIGHT POLE WITH PHOTO SENSOR

VALVE VAULT

P-TRAP

CHECK VALVES

GATE VALVES

3' MIN. SEPARATION

ISOLATION GATE VALVE

WALK THRU GATE

BY-PASS GATE VALVE

D.I.P. FORCE MAIN

3/4" WATER SERVICE

R.P.Z. BACKFLOW ASSEMBLY (TYPICAL LOCATION)

TWO 6' WIDE GATES (CENTERED ON WET WELL) PLUS ONE WALK THRU GATE

ANTENNA

HINGES (TYP)

CONTROL PANEL WITH RTU MIN. 36" FRONT OF PANEL TO WETWELL

3/4" WATER SERVICE

DAVIT IF DIRECTED BY OWNER

12' WIDE BASE COMPACTED TO 98% OF MAXIMUM DENSITY WITH 8" CONCRETE ACCESS ROAD

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. INFILTRANT LINE ENTRY LOCATION.
4. HINGE LOCATION.
5. SLOW POWER SERVICE FEED (WITH "AS BULTS").
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. INFIL TRANT MAN SHALL BE CLEAR OF PANEL AND VAULT.
10. WHERE UNDERGROUND ELECTRIC SERVICE SPECIFIES, CONTRACTOR TO SUPPLY POLE AND LIGHT FIXTURE.
CHECK VALVE, FLANGED, WITH OUTSIDE WEIGHT AND LEVER.
DEZURIK, KENNEDY, CLOW, VAL-MATIC, OR AS APPROVED
BY THE ENGINEER, TYPICAL

SEE NOTES 1 AND 2 BELOW

GATE VALVE, FLANGED, (TYPICAL)

SLOPE TO DRAIN COVER OPEN

SLOPE TO DRAIN COVER OPEN

3' MIN. CLEARANCE BETWEEN PUMPS & ACCESS DOOR FRAME

SEE NOTES 1 AND 2 BELOW

ISOLATION GATE VALVE WITH 90° BEND ABOVE GROUND

BY-PASS GATE VALVE (CAM LOCK WITH CAP)

CON LOCK W/CAP

FM

RISER

90°

TEE

36"-42"

CONTROL PANEL

LOCKING MECHANISMS

ALUMINUM USF T.P.D. 150 OR APPROVED EQUAL
MINIMUM 60"x60" WELD COVER MAY BE USED ON SMALLER WET WELLS

WET WELL COVER ALUMINUM USF T.P.D. 150 OR APPROVED EQUAL
MINIMUM 30"x48" SINGLE DOOR WELL COVER MAY BE USED ON SMALLER WET WELLS

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.
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 MAN-HOLE 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 300W, 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 Ø 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 AVAILABLE.
10. WET WELL EXTERIOR AND VALVE BOX INTERIOR AND EXTERIOR SHALL BE COATED WITH BITUMATIC.
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 RECEPTACLES 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.
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 reset 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
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 UNDERWRITERS' 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 telemeter 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 AC 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/LIGHTNING 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, POLYPROPYLENE 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 SWEET 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 WIRE NUMBERED TERMINALS. ALL WIRING SHALL BE FRONT ACCESSIBLE. ALL RELAY BASES TO BE FRONT-MOUNTED AND WIRE 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: IMPPELLER NUMBER AND SIZE: DESIGN GPM AND TDH.

P. ALL SERVICE ENTRANCE CONDUITs 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 RESSET. (HIGH VOLTAGE CONTROL, LOW VOLTAGE CONTROL PANEL LAYOUT).

U. THERMALS AND SEAL FAIL SHALL NOT INTERFERENCE WITH STATION OPERATION.

R.T.U. BREAKER AND CONTROL BREAKER SHALL BE ON THE SAME PHASE TO AVOID A POSSIBLE DEAD SHORT CONDITION.
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 BS38 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 (SCH 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. C.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 BS1N.
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 ARRESTER (TYPE DITEK ® TK-120/240 H01HL) 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 GROUND 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.
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 OF 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 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. THE RTU SHALL BE ENCLOSURED IN A NEMA 4X STAINLESS STEEL ENCLOSURE PAINTED WHITE. THE RTU 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 TRANSMISSION OF MORE THAN TEN SECONDS THIS MODULE SHALL SHUT DOWN THE TRANSMITTER. THIS PROTECTION FUNCTION SHALL BE IMPLEMENTED IN HARDWARE. THE IMPLEMENTATION WILL NOT BE ACCEPTABLE. THE RADIO INTERFACE MODULE SHALL HAVE A SERVICE PORT TO PROVIDE A COMMUNICATIONS LINK TO MONITOR THE SERVICE PORT AND/OR CONTROL EACH MODULE IN THE TERMINAL UNIT'S INTERFACE MODULE UTILIZED AT THE REMOTE TERMINAL UNITS SHALL BE INTERCHANGEABLE WITH THE RADIO INTERFACE MODULE AT THE CENTRAL SITE. THE TERMINAL UNIT BE CapABLE OF UTILIZING UP TO 256 RADIO INTERFACE MODULES PER COMMUNICATIONS LINK AND UP TO 15 FUNCTION MODULES PER RADIO INTERFACE MODULE. ALL COMMUNICATIONS SHALL BE IN ASCII AND UTILIZE AN ERROR DETECTING AND CORRECTING DATA TRANSMIT 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 TWO TRANSCIEVERS MOUNTED TO IT. THE RADIO SHALL BE AN FM TRANSCIEVER 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 DB MAX |
| HARMONIC OUTPUT: | -50 DB MAX |
| FREQ. STABILITY: | +/- 5 PPM |
| MODULAR DEVIATION: | ADJUSTABLE TO 5 KHZ |
| FREQUENCY RESPONSE: | FLAT +/- 2.0 DB FROM 50 KHZ TO 10 KHZ |
| 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: | -48 DBM TYPICAL THIRD ORDER INTERCEPT |
| IF SELECTIVITY: | 6 DB BW /-7.5 KHZ MIN. |
| 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 VOLS AC OR DC SHALL BE ACCOMMODATED WITH THE USE OF AN IN-LINE 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 Recorder BY THE CENTRAL SITE COMPUTER. THE DIGITAL MONITOR MODULE SHALL NOT REQUIRE INTERFACING RELAYS TO MONITOR 24 V 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 TO 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 CONTROLLING AMMETERS UP TO 280V AC. WITH IN-RUSH 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 ON A POWER LOSS SHUTDOWN. AN INDEPENDENT CONTROL POINT SHALL HAVE THE CAPABILITY OF BEING AUTOMATICALLY CONTROLLED BY THE SAME RTU OR ANY OTHER RTU SHUTDOWN. 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.
1.1.4 PUMP CONTROL MODULE (IF REQUIRED)

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

1. LOCAL AUTOMATIC CONTROLS FROM FLOAT OR BUBBLER INPUTS.
2. FLOATS MUST BE SHUT DOWN WHEN 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 PUMPS.
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 PUMPS.
8. THE PHASE MONITOR FUNCTIONS SHALL:
   a) PROVIDE TRANSFORMER ISOLATION
   b) DETECT LOSS OF PHASE, PHASE REVERSAL, AND LOW LEG PHASE PROBLEMS.
   c) PROVIDE AUTO- 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. FLOAT ALARM PROVIDING 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. ALARM TIMING 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 TIMES REPORTED BACK TO THE CENTRAL SITE COMPUTER. PUMP RUN TIMES RECORDS WITH 1-SECOND ACCURACY.
16. RTU POWER STATUS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER.
17. LED INDICATORS SHALL BE PROVIDED:
   a) RTU POWER
   b) ALARM BEL
   c) USER-DOWNED INPUT
   d) MODULE POWER
   e) TRANSIT AND RECEIVE DATA
   f) PHASE ALARM/CALIBRATION
   g) PROTOCOL 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.


1.3 BATTERIES

THE REMOTE TERMINAL SHALL HAVE THE UNINTERUPTABLE POWER SOURCE FUNCTION BUILT IN. THE POWER SUPPLY WILL KEEP THE BATTERIES AT A FLOATING 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 CATV CABLE UTILIZED SHALL BE THE TYPE THAT UTILIZES AN INSERT SEMI-LIQUID COMPOUND TO FLOOD THE COPPER Braid. THE CATV CABLE SHALL MEET OR EXCEED THE QUALITY, RELIABILITY AND PERFORMANCE OF THAT MANUFACTURED BY D.B. PRODUCTS, INC. OF DALLAS, TEXAS.

1.4 ENCLOSURE

RTU shall be enclosed in NEMA 4X 316 STAINLESS STEEL ENCLOSURES, which are DIP-PANGERED 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.
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.
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

LEGEND

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

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

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

Panel Requirement:
230V/1PH with VFD's
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

AH - ALARM HORN
AL - ALARM LIGHT
ASB - ALARM SILENCE BUTTON
CCB - CONTROL CIRCUIT BREAKER
DPDT - DOUBLE POLE DOUBLE THROW
DRB - DUPLEX RECEPTACLE BREAKER
ETM - ELAPSED TIME METER
F - FUSE
FB - FUSE BLOCK
FL - FLASHER
FR - FLOAT REGULATOR
GFDR - GROUND FAULT DUPLEX RECEPTACLE
GND - GROUND
GR - GENERATOR RECEPTACLE
HOA - HAND-OFF-AUTO SELECTOR SWITCH
MB - MOTOR BREAKER

MCB - MAIN CIRCUIT BREAKER
MS - MOTOR STARTER
OL - OVERLOAD
PB - PUSH BUTTON
PDB - POWER DISTRIBUTION BLOCK
PCU - PUMP CONTROL MODULE
PL - PILOT LIGHT
PM - PHASE MONITOR
R - RELAY
RL - RUNNING LIGHT
RTU - REMOTE TELEMETRY UNIT
T - TERMINAL
TB - TERMINAL BLOCK
TLS - TROUBLE LIGHT SWITCH
TTS - THERMAL TERMINAL STRIP
XDUCE - TRANSDUCER
XFMR - TRANSFORMER

TERMINAL LEGEND
□ - TTS
○ - TERMINAL BLOCK *3
○ - TERMINAL BLOCK *2
(TO RTU)
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

FUSED S.S. DISCONNECT

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

AH  ALARM HORN
AL  ALARM LIGHT
ASB ALARM SILENCE BUTTON
CCB CONTROL CIRCUIT BREAKER
DPDT DOUBLE POLE DOUBLE THROW
DBR DUPLEX RECEPTACLE BREAKER
ETM ELAPSED TIME METER
F  FUSE
FB  FUSE BLOCK
FL  FLASHER
FR  FLOAT REGULATOR
GFDR GROUND FAULT DUPLEX RECEPTACLE
GND GROUND
GR  GENERATOR RECEPTACLE
HOA HAND-OFF-AUTO SELECTOR SWITCH
MB  MOTOR BREAKER

MCB  MAIN CIRCUIT BREAKER
MS  MOTOR STARTER
OL  OVERLOAD
PB  PUSH BUTTON
PDB POWER DISTRIBUTION BLOCK
PCU PUMP CONTROL MODULE
PL  PILOT LIGHT
PM  PHASE MONITOR
R  RELAY
RL  RUNNING LIGHT
RTU REMOTE TELEMETRY UNIT
T  TERMINAL
TB  TERMINAL BLOCK
TLS TROUBLE LIGHT SWITCH
TTS THERMAL TERMINAL STRIP
XDOCEB TRANSUDER
XFMR TRANSFORMER

City of Largo
Public Works Department
Engineering Services Division
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Title: Engineering Design and Construction Standards
230V/3PH RTU System

PUBLIC WORKS DIRECTOR  CITY ENGINEER
CHRIS A. KUBALA  MICHAEL J. STAFFOPoulos
PUBLICATION DATE: JUNE 1, 2000
DRAWING SCALE: NOT TO SCALE
INDEX NUMBER: LS-11-D
NOTES:
1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
2) RTU BY OTHERS
3) CONTROL WIRE TO BE AWC 14 MIN.
4) WIRE MARKER

LEGEND

AH  - ALARM HORN
AL  - ALARM LIGHT
ASB - ALARM SILENCE BUTTON
CCB - CONTROL CIRCUIT BREAKER
DPDT - DOUBLE POLE DOUBLE THROW
DRB - DUPLEX RECEPTACLE BREAKER
ETM - ELAPSED TIME METER
F   - FUSE
FB  - FUSE BLOCK
FL  - FLASHER
FR  - FLOAT REGULATOR
GFDR - GROUND FAULT DUPLEX RECEPTACLE
GND - GROUND
GR  - GENERATOR RECEPTACLE
HOA - HAND-OFF-AUTO SELECTOR SWITCH
MB  - MOTOR BREAKER

MCB - MAIN CIRCUIT BREAKER
MS  - MOTOR STARTER
OL  - OVERLOAD
PB  - PUSH BUTTON
PDB - POWER DISTRIBUTION BLOCK
PCU - PUMP CONTROL MODULE
PL  - PILOT LIGHT
PM  - PHASE MONITOR
R   - RELAY
RL  - RUNNING LIGHT
RTU - REMOTE TELEMETRY UNIT
T   - TERMINAL
TB  - TERMINAL BLOCK
TLS - TROUBLE LIGHT SWITCH
TTS - THERMAL TERMINAL STRIP
XDUCER - TRANSDUCER
XFMR  - TRANSFORMER

TERMINAL LEGEND
☐ - TTS
☐ - TERMINAL BLOCK #3
☐ - TERMINAL BLOCK #2
(TO RTU)
NOTES:
1) PUMP ALTERNATION IS TO BE CONTROLLED BY RTU
2) RTU BY OTHERS
3) CONTROL WIRE TO BE AWG 14 MIN.
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

LEGEND

AH - ALARM HORN
AL - ALARM LIGHT
ASB - ALARM SILENCE BUTTON
CCB - CONTROL CIRCUIT BREAKER
DPDT - DOUBLE POLE DOUBLE THROW
DRB - DUPLEX RECEPTACLE BREAKER
ETM - ELAPSED TIME METER
F - FUSE
FB - FUSE BLOCK
FL - FLASHER
FR - FLOAT REGULATOR
GFDR - GROUND FAULT DUPLEX RECEPTACLE
GND - GROUND
GR - GENERATOR RECEPTACLE
HDA - HAND-OFF-AUTO SELECTOR SWITCH
MB - MOTOR BREAKER

MCB - MAIN CIRCUIT BREAKER
MS - MOTOR STARTER
OL - OVERLOAD
PB - PUSH BUTTON
PDB - POWER DISTRIBUTION BLOCK
PCU - PUMP CONTROL MODULE
PL - PILOT LIGHT
PM - PHASE MONITOR
R - RELAY
RL - RUNNING LIGHT
RTU - REMOTE TELEMETRY UNIT
T - TERMINAL
TB - TERMINAL BLOCK
TLS - TROUBLE LIGHT SWITCH
TTS - THERMAL TERMINAL STRIP
XBDUCER - TRANSDUCER
XFMR - TRANSFORMER

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

<table>
<thead>
<tr>
<th>Layer</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wearing Surface</strong></td>
<td>1 1/2&quot; Type S-III (Two 3/4&quot; Lifts)</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>8&quot; 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 Foot Standards.</td>
</tr>
<tr>
<td><strong>Subgrade</strong></td>
<td>12&quot; Stabilized (40 LBR) and compacted to 98% max. density per A.A.S.H.T.O. T-180.</td>
</tr>
</tbody>
</table>

**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. Underdrain requirements may be reduced or waived as approved by the City Engineer.
NOTES:

1. PARKWAY SHALL BE ROUGH GRADE PRIOR TO WATER METER INSTALLATION.
2. DISTANCE MAY REQUIRE ADJUSTMENT IF SUBSURFACE DRAINS ARE REQUIRED.
NOTES:
1. CUL-DE-SAC STREET LENGTH SHALL NOT EXCEED 600 LINEAR FEET FROM CENTER OF CUL-DE-SAC TO CENTER-LINE OF INTERSECTING ROADWAY.
2. ALTERNATIVE TURNAROUNDS WILL BE CONSIDERED ON A CASE-BY-CASE BASIS, AS APPROVED BY THE CITY ENGINEER.
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.
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.
NOTES:

1. REPLACEMENT BASE MATERIAL OVER DITCH SHALL BE AT MINIMUM 16" THICK OR TWICE THE THICKNESS OF THE EXISTING BASE, WHICHER 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 BASE MATERIAL.

4. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED AND ALL SURFACES TACK COATED.

5. SURFACE MATERIAL SHALL BE FOOT TYPE S-III(PC-III), ASPHALTIC CONCRETE (MIN. THICKNESS 1 1/2 ”)

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. PLEASE REFER TO MOST RECENT VERSION OF CITY OF LARGO RESURFACING PROGRAM INDEX MAP (LARGO PAVING).
EXISTING GROUND

REMAINING BACK FILL PLACED AND COMPACTED PER APPROPRIATE SPECIFICATIONS. (SEE NOTE 5 BELOW)
6" MAX. AGGREGATE SIZE
12" MAX. LIFT.

CRANULAR BACK FILL PLACED AND COMPACTED TO 98% DENSITY PER A.A.S.H.T.O. T-180
7/8" MAX AGGREGATE SIZE
6" MAX. LIFT.

IF DISTURBED, BEDDING MATERIAL COMPACTED TO 98% DENSITY PER A.A.S.H.T.O. T-180.

NOTES:

1. BEDDING SHALL CONSIST OF WASHED AND GRADED ROCK 3/8"-7/8" SIZING. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGE ROCKS SHALL BE REMOVED.
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.
BRICK PAVEMENT TRENCH REPAIR

1. BRICK PAVEMENT TRENCH REPAIR SHALL BE PAID FOR "PER LINEAR FOOT" AS MEASURED ALONG CENTERLINE OF PROPOSED PIPE.
2. CONTRACTOR SHALL ENDEAVOUR TO KEEP TRENCHING DISTURBANCE TO A MINIMUM IN BRICK PAVEMENT AREAS.
3. REPLACED BRICKS TO MATCH EXISTING PATTERN, SLOPE AND ELEVATION.
4. RESETTING OF BRICKS, SAND BEDDING AND FLOWABLE FILL REPLACEMENT BASE SHALL BE PAID FOR UNDER "BRICK PAVEMENT TRENCH REPAIR" PAY ITEM.
5. THIS DETAIL SHALL BE UTILIZED IN AREAS WHERE EXISTING BRICK STREETS WILL REQUIRE TRENCHING, BUT NO FULL WIDTH STREET RECONSTRUCTION IS PROPOSED.

NOTES:
DIA. VARIES (SEE PLANS)

SPREAD A MIX OF 3 PARTS FDOT SILICA SAND TO 1 PART GROUT OVER REPLACEMENT AREA. ROLL W/ STEEL WHEEL ROLLER.

REMOVE & RESET BRICKS AS REQUIRED (SEE NOTE 4)

12" FLOWABLE FILL REPLACEMENT BASE (SEE NOTE 4)

SEE TYPICAL TRENCH DETAIL FOR COMPACTION REQUIREMENTS. (WORK TO BE INCLUDED IN PIPE COSTS).

2" FDOT SILICA SAND BED (SEE NOTE 4)

EXIST. BRICK STREET

12" DIA.

12"
BEDDING DEPTH (SEE NOTE 1)

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.

NOTES:

3/4" ROCK BEDDING
FLOWABLE FILL MIX

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
FLOWS 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.
NOTE:

1. ALL MILLINGS REMAIN THE PROPERTY OF THE CITY UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
CONCRETE CURB AND GUTTER

NOTES:
1. ROADWAY SUBGRADE 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.
TABLE OF SIDEWALK THICKNESS - "T"

<table>
<thead>
<tr>
<th>RESIDENTIAL AREAS</th>
<th>4&quot;</th>
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</thead>
<tbody>
<tr>
<td>WITHIN 10' OF CROSS-STREETS, AT DRIVEWAYS &amp; OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

TABLE OF SIDEWALK WIDTHS - "W"

<table>
<thead>
<tr>
<th>RESIDENTIAL ROADS</th>
<th>5'</th>
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<tbody>
<tr>
<td>ARTERIAL AND COLLECTOR ROADS</td>
<td>5'</td>
</tr>
<tr>
<td>OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER</td>
<td></td>
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</tbody>
</table>

SECTION A-A

MEET GRADE UNLESS OTHERWISE SHOWN

NEW SIDEWALK

EXISTING SIDEWALK

R/W LINE

TABLE OF SIDEWALK JOINTS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>LOCATION</th>
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</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>P.C. AND P.T. OF CURVES JUNCTION OF EXISTING AND NEW SIDEWALKS AND EVERY 50' FOR 5' WIDE</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>WIDTH OF SIDEWALK CENTER TO CENTER ON SIDEWALKS SCORED DURING PLACEMENT WITHIN 24 HOURS OF PLACEMENT.</td>
</tr>
<tr>
<td>&quot;A&quot;</td>
<td>WHERE SIDEWALK ABUTS CONCRETE CURBS, DRIVEWAYS, AND SIMILAR STRUCTURES.</td>
</tr>
</tbody>
</table>

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

Engineering Design and Construction Standards

Sidelong Standards

November 18, 2008

RT-14
NOTE:
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 TRUNCATED DOME MAT, IN CONFORMANCE WITH REQUIREMENTS OF F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS, INDEX 304, LATEST EDITION.
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, LATEST ED.
3. SEE PAVEMENT MARKING SPECIFICATIONS FOR FURTHER DETAILS.
STANDARD CROSSWALK

NOTES:
- 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.
- SIGNING REQUIRED AT MID-BLOCK PEDESTRIAN CROSSWALKS.

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 INDEX 17344.
1. **ALL ROAD PAVEMENT MARKINGS SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS OF THIS STANDARD DETAIL, AND SHALL CONFORM TO THE REQUIREMENTS OF FLORIDA DEPARTMENT OF TRANSPORTATION (F.D.O.T.) ROADWAY AND TRAFFIC DESIGN STANDARDS 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. **ALTERNATE PERMANENT MARKINGS MATERIAL:**
   - Stay Mark marking tape, or equivalent may be used, as approved or directed by the city engineer.

7. **PERMANENT MARKINGS LAYOUT:**
   - Layout shall be made prior to installation. It is recommended that marking layout be inspected by the city engineer prior to the placement of final markings.

8. **ALL PAVEMENT MARKINGS:**
   - All paved surfaces shall be properly marked prior to the hours of darkness.

9. **RAISED PAVEMENT MARKERS (R.P.M.S.):**
   - R.P.M.S. shall be installed on all lane lines and centerlines, spaced at 20' or 40', per FDOT Index No. 17352. R.P.M.S. shall be a 4" x 4" 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.

10. **TEMPORARY PAVEMENT MARKINGS:**
    - Temporary markings may be used only as specified in this standard detail, or as approved and/or directed by the city engineer.

11. **FINAL PAVEMENT SURFACE:**
    - Only foil backed marking tape is allowed.
    - All tape shall be totally removed concurrent with permanent marking placement.

12. **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.

13. **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.
NOTES:

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.
GENERAL SPECIFICATIONS:

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

- **LETTERS**: NAME 4" SERIES "B" HIGH INTENSITY (SILVER)
  SUFFIX 2" SERIES "B" HIGH INTENSITY (SILVER)

  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 IS TO BE LESS THAN 90° OR MORE THAN 135° APART.

**NOTES:**

1. PLACEMENT OF SIGN ON THE RIGHT-OF-WAY SHALL CONFORM TO THE CITY TRAFFIC SIGN STANDARD (RT-19).
PARALLEL PARKING

90° PARKING

45° AND 60° PARKING

HANDICAP SPACES - 12.0'

C or C'

Curb stop at ninety (90) degrees to side strip

STANDARD  90°

<table>
<thead>
<tr>
<th>T</th>
<th>THROAT DEPTH</th>
<th>50.0'</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>AISLE</td>
<td>24.0'</td>
</tr>
<tr>
<td>S</td>
<td>STALL WIDTH</td>
<td>9.0'</td>
</tr>
<tr>
<td>D</td>
<td>STALL DEPTH</td>
<td>18.0'</td>
</tr>
<tr>
<td>W</td>
<td>MODULE WIDTH</td>
<td>60.0'</td>
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HANDICAP SPACES - 12.0'
WHERE FEASIBLE

STANDARD  80°  45°

<table>
<thead>
<tr>
<th>A</th>
<th>AISLE</th>
<th>18.0'</th>
<th>14.0'</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>DOUBLE SPACE LENGTH</td>
<td>36.0'</td>
<td>32.0'</td>
</tr>
<tr>
<td>C</td>
<td>STALL SPACING</td>
<td>10.5'</td>
<td>12.75'</td>
</tr>
<tr>
<td>C'</td>
<td>STALL SPACING</td>
<td>14.0'</td>
<td>17.0'</td>
</tr>
<tr>
<td>S</td>
<td>STALL WIDTH</td>
<td>9.0'</td>
<td>9.0'</td>
</tr>
<tr>
<td>D</td>
<td>STALL DEPTH</td>
<td>20.0'</td>
<td>19.0'</td>
</tr>
<tr>
<td>W</td>
<td>MODULE WIDTH</td>
<td>58.0'</td>
<td>52.0'</td>
</tr>
</tbody>
</table>

HANDICAP SPACES - 12.0'
HANDICAP SPACES - USE C'

PARALLEL PARKING

STANDARD  PP

<table>
<thead>
<tr>
<th>C</th>
<th>STALL LENGTH</th>
<th>22.0'</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>STALL WIDTH</td>
<td>8.0'</td>
</tr>
</tbody>
</table>
NOTES:

1. PARKING LOTS SHALL HAVE, WHEEL STOPS FOR ALL PARKING SPACES EXCEPT FOR PARALLEL PARKING SPACES.

2. HANDICAP SIGNS SHALL BE MOUNTED AT 7' (PAVEMENT TO BOTTOM OF SIGN).
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.

NOTES:
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 BY CITY ENGINEER.
MIX 3 PARTS FLORIDA DOT SILICA SAND TO 1 PART GROUT AND ROLL WITH A STEEL WHEEL ROLLER

BRICKS

EXISTING BRICK STREET

2" FLORIDA DOT SILICA SAND

FLOWABLE FILL (VARIES)

BEDDING MATERIAL COMPACTED TO TOP OF PIPE AT 98% DENSITY PER AASHTO T-180. (SEE TYPICAL TRENCH DETAIL)

NOTE:

1. REPLACED BRICKS TO MATCH EXISTING PATTERN, SLOPE, AND ELEVATION.
**NOTES:**

1. **ALL GRANITE CURB TO REMAIN IN PLACE.**
2. **BRICKS SHALL BE HAND REMOVED AND CLEANED PRIOR TO RESETTING. ADDITIONAL BRICKS REQUIRED SHALL BE PROVIDED BY THE CITY OF LARGO.**
3. **EXISTING SAND BASED SHALL BE REMOVED AND REPLACED WITH AN 8" CRUSHED CONCRETE BASE AND 1" TO 2" SAND BEDDING.**
4. **AFTER BRICKS ARE LAD AND ROLLED, A MIXTURE OF 3 PARTS SILICA SAND AND 1 PART PORTLAND CEMENT GROUT SHALL BE BROOM SWEEP OVER BRICK PAVEMENT AND INTO BRICK JOINTS.**
5. **CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE OF TRAFFIC DURING THE PROJECT.**
NOTE:

SIDEWALK (ONLY CONCRETE ALLOWED):
All sidewalk to be in accordance to RT-14.
Concrete sidewalk to be 6" thick within limits of driveway.
Sidewalk must run continuously through driveways.
Max. cross slope to be 2% or 1/4" per ft.

DRIVEWAYS:
All driveway aprons are to be concrete, brick or pavers.
10' minimum to 24' maximum width.
Concrete to be 6" thick within R.O.W. (property line to curb or edge of pavement).
5' minimum setback from property line.
Concrete sidewalk must run continuously through driveways.
Pavers in R.O.W. must be installed on 6" compacted crushed concrete base and thin set and with 6"x6" header curb.

CURB CUTS INCLUDING CIRCULAR DRIVEWAYS:
Total width not to exceed 35% of front linear measurement.
Circular driveway construction requires engineering review and approval.
Total impervious surface ratio of lot shall not exceed 50%.
Corner lot curb cuts shall be on street with lowest functional classification.

DRAINAGE (IF APPLICABLE):
Drainage pipes under driveways must be RCP, 15" min. dia. or 12"x15" ERCP with mitered end and 1' min. setback from edge of driveway.

STRUCTURAL REINFORCEMENT:
Fiber mesh mixed in concrete (3,000 psi min.)

COMPACT SIDEWALK SUBGRADE TO 98% OF MAX DENSITY AS PER AASHTO T-99.

SIDEWALK CROSSECTION A-A

2' CLEAR ZONE MIN.

SIDEWALK CROSSECTION B-B

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

DRIVEWAYS - CONCRETE APRON:

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

COMPACT SIDEWALK SUBGRADE TO 98% OF MAX DENSITY AS PER AASHTO T-99.
Any tree removal requires a permit.

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 the FDOT Index No. 515 and No. 304.
3. Power poles shall be moved as needed.
4. Trees shall be trimmed to maintain vertical clearance (following ANSI 300 Standards).
5. Nine (9') feet for sidewalks and eighteen (18') feet for roads.
7. Remove tree roots within ten inches (10") of proposed grade. Roots shall be root pruned prior to removal, coordinate with city staff.
8. Apply detail to accommodate manhole conflicts. Manhole covers to be replaced as required to maintain flush surface and pattern.
9. All sidewalk sections shall be placed no closer than 4' from existing trees.
10. All curves shall be smooth, with no sharp corners or edges.
11. 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 zones 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.
12. Any damage to trees by the contractor will result in fines or replacement by the contractor. Fine will be the city standard fee.
When building has planter against sidewalk:

- Building
- Planter
- 6' wide curb
- 2% grade
- Handicap loading zone
- Truncated domes mat

Ramps at handicap parking:

- Building
- 2% grade
- Handicap loading zone
- Truncated domes mat

When building abuts sidewalk:

- Building
- 2% grade
- Handicap loading zone
- Truncated domes mat

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
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 RT-32.
<table>
<thead>
<tr>
<th>MPH</th>
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<th>DR (FT)</th>
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1. **2 LANE UNDIVIDED**

2. **2 LANE WITH CENTER TURN LANE OR 4 LANE UNDIVIDED**

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3. **4 LANE UNDIVIDED WITH CENTER TURN LANE**

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<td>45</td>
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4. **4 LANE DIVIDED - MEDIAN < 22'**

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5. **6 LANE DIVIDED - MEDIAN < 22'**

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<td>100</td>
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<tr>
<td>45</td>
<td>440</td>
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</tbody>
</table>
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.
RECLAIMED WATER MAIN

MECHANICAL JOINT VALVE

RESTRAINING JOINT

ADJUSTABLE VALVE BOX

WHEN VALVE IS PLACED IN ROADWAY, SET BASE ON 10-COMMON BRICK

TYPICAL VALVE SETTING

DEPT OF COVER FOR MAINS

36" MIN

GRADE

D E P T H
SECTION A-A

CONCRETE ALL AROUND
CENTERING PLATE
(316 STAINLESS STEEL)

RECLAIMED WATER MAIN

MATCH EXISTING GRADE

1 4" EACH SIDE

SHEAR PIN

COUPLING

SEE STANDARD DETAIL RW-07 FOR COVER SPECIFICATIONS

SEE STANDARD DETAIL RW-07 FOR RISER PIPE SPECIFICATIONS

PROVIDE EXTENSION SHAFT TO TOP 8" OF VALVE BOX

BRASS INDICATOR PLATE
TO INCLUDE THE FOLLOWING INFORMATION.
1. MANUFACTURER'S NAME
2. NO. OF TURNS
3. SIZE & CLASS
4. SERIAL NO. ___________

SEE STANDARD PRODUCT LIST FOR APPROVED VALVE MANUFACTURER

1 #4 EACH SIDE

RECLAIMED WATER MAIN

VARIES
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.

RECLAIMED WATER
Valve Setting with Riser
PERMANENT BLOWOFF DETAIL

BLOW-OFF ASSY., INCLUDING LOCKABLE CAST IRON BOX

2" BRASS CAP

90° BEND

2" BRASS BALL VALVE

90° BEND

RECLAIMED WATER MAIN

RESTRAINER PLUG
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.
NOTES:
1. 4000 P.S.I. Type II-Concrete
2. Vault shall be precast or poured in place concrete with steel reinforcing.
3. Air release valve shall be APCO Model 200AB or equal.
4. All openings shall be sealed with waterproof non-shrinking grout.
5. Other vault and cover designs may be used upon submittal and approval of shop drawings.
6. Bedding to conform to the requirements of Section 125, F.D.O.T. Standard Specifications.
7. Corporation stop to be Mueller H9968, or Ford FB500.
8. Hatch cover to be labeled "City of Largo" and "Reclaimed Water" and shall be painted purple.
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.
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 slip joint 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.

Values to be verified by contractor according to specific site conditions.

---

**Table:**

| Nom. Pipe Size | Elbows (deg.) | Valve Tees | Valve Tees |
|----------------|---------------|------------|
| 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         |

L - Minimum length to be restrained on each side of fitting (ft.)

---

Ebba 1500 Series (Typ.)

Megalug Restrainer (Typ.)

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TEL: (727) 587-6713  FAX: (727) 586-7413
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Engineering Design and Construction Standards
Reclaimed Water PVC Pipe Thrust Restraint

CAROL STRICKLIN A.I.C.P.
LELAND E. DICUS, P.E.
November 18, 2008
RW-11

NOT TO SCALE
REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION

PLAN VIEW

MIN. SPECIFICATION COVER

18" MIN.

HORIZONTAL CLEARANCE

10' MIN.

VARIES ± 4'

HORIZONTAL CLEARANCE

SEE NOTES PAGE RW-13
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 APRART 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.
1. ALL PIPE BETWEEN CITY MAIN AND LAST BEND TO BE DUCTILE IRON PIPE.
2. ALL JOINTS ABOVE GROUND SHALL BE FLANGED.
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.
THE INTIMIDATOR HYDRANT-LOCK DETAIL

5 1/4" - 3 WAY FIRE HYDRANT

DISTANCE VARIES

OPERATING WRENCH

HYDRANT LOCK

PLUG AND KEY

THE INTIMIDATOR HYDRANT-LOCK (SEE DETAIL)

TOP OF VALVE BOX TO BE FLUSH WITH FINISH GRADE OF PAVEMENT, BOX SHALL BE SQUARE WITH THE LID MARKED "LARGO RECLAIMED WATER"

POUR CONCRETE COLLAR FOR PAVED SURFACES

BASE

6" MIN

PAVED SURFACE

ANCHORING COUPLING OR ANCHORING PIPE

VARIES 1" TO 10'

ADJUSTABLE VALVE BOX WITH GATE VALVE

RESILIENT WEDGE CONTROL VALVE (M.J.)

ANCHORING TEE

HYDRANT LOCKING PLUG AND KEY

HYDRANT

BASE

6" MIN

36" MIN

ANCHORING COUPLING OR ANCHORING PIPE

VARIES 1" TO 10'

RESILIENT WEDGE CONTROL VALVE (M.J.)

ANCHORING TEE
NO JOINTS BETWEEN FITTINGS

CONFLICT PIPE

DUCTILE IRON OR C-900 PVC PRESSURE PIPE

MECALUGS OR EQUAL REQUIRED (TYP.)

FINISHED GRADE

CONFLICT PIPE

22 1/2\(^\circ\) (PREFERRED) OR 45\(^\circ\) ELBOWS

10'-0" MIN

NO JOINTS BETWEEN FITTINGS

CENTER A FULL LENGTH OF PIPE AT POINT OF CROSSING.

SEE NOTE NO. 6 FOR ACCEPTABLE DEFLECTION. (D.I.P. SHOWN)

FITTING TYPE

DEFLECTION TYPE

SLOPE UP TO MIN. COVER.

Ductile Iron or C-900 PVC Pressure Pipe

Megalugs or Equal Required (Typ.)

Reclaimed Water Main Pipe Crossing Conflict
RECLAIMED WATER CROSSING CONFLICT

NOTES:


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 DEFORMATION 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:

<table>
<thead>
<tr>
<th>P.V.C. PIPE SIZE</th>
<th>MIN. ALLOWED RADIUS (FT.)</th>
<th>MAX. DEFLECTION (IN INCHES) PER 20' OF LENGTH</th>
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<tbody>
<tr>
<td>6&quot;</td>
<td>300'</td>
<td>8&quot;</td>
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<tr>
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<tr>
<td>10&quot;</td>
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<td>4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>800'</td>
<td>4&quot;</td>
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7. ALL EXPOSED TIE STEEL SHALL BE COATED WITH COAL-TAR EPOXY.

8. RECLAIMED WATER SYSTEM PIPE SHALL BE IDENTIFIED AS REQUIRED.
NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON OR PREFABRICATED STEEL WITH FLANGE FITTINGS. RETAINER GLANDS AND UNIFLANGED 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 FILLED WITH EPOXY CEMENT.
10. RECLAIMED WATER SYSTEM PIPE SHALL BE PAINTED AS SPECIFIED IN THE APPROVED RECLAIMED WATER SYSTEM MATERIAL LIST.
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.
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.
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 "Sparkling Water Program - Reclaimed Water Policies and Regulations" of the City of Largo, Florida, latest edition.

4. All PVC 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. Contact the City of Largo. The chlorination of the installed reclaimed water main must be performed 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 encasement.
   - Plastic pipe: shall be identified by wrapping all plastic pipes with 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 purple.

13. Reclaimed water PVC 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 sand or 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.

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.
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 (brass). Compound and displacement meters are not acceptable.
7. The following reclaimed water meters have been approved by the City of Largo:
   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.
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" in size, 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 counterclockwise 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 wrenches 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".
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 ENCLOSURED 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.
DOUBLE-WIDTH DUMPSTER ENCLOSURE

MINIMUM INTERIOR DIMENSIONS

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

LOCK PIN DETAIL
SEE DETAIL "A"

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

LOCK PIN DETAIL
SEE DETAIL "A"

SINGLE-WIDTH DUMPSTER ENCLOSURE

FOR PAD SIZE SEE NOTES SW-03

CONCRETE DUMPSTER PAD
(MINIMUM 8" THICK).

LOCK PIN DETAIL
SEE DETAIL "A"

CONCRETE DUMPSTER PAD
(MINIMUM 8" THICK).

MINIMUM INTERIOR DIMENSIONS

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

DOUBLE-WIDTH DUMPSTER ENCLOSURE

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

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
DOUBLE-WIDTH DUMPSTER ENCLOSURE

MINIMUM INTERIOR DIMENSIONS

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

10' MIN. ENCLOSURE HEIGHT

MINIMUM INTERIOR DIMENSIONS

MINIMUM INTERIOR DIMENSIONS

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

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

SINGLE-WIDTH DUMPSTER ENCLOSURE WITH DRAIN
FOR PAD SIZE SEE NOTES SW-03

CONC. BOLLARD
SEE DETAIL SW-06

TYPICAL CROSS SECTION
CONCRETE PAD

1/4" 1/2 SLOPE
SANITARY SEWER GRATE

CONC. BOLLARD
SEE DETAIL 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 TOP OF THE POND OUTFALL STRUCTURE.

SW-02

DOUBLE-WIDTH DUMPSTER ENCLOSURE
WITH DRAIN

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

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.
CONCRETE COMPACTOR PAD
(MINIMUM 8" THICK)

SELF CONTAINED WASTE COMPACTOR ENCLOSURE

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.
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 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. Dumpsters 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. Dumpsters enclosures are not to be used for storing items.

9. Dumpsters 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 without 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.

CLOSERD AND OPEN-TOP COMPACTOR REQUIREMENTS

1. A closed-top compactors 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 compactors.

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 compactors 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 compactors 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 compactors 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 may 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. 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.
CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

DUMPSTER ENCLOSURE GATE ELEVATION

CANE BOLTS (STANLEY 1010-18", OR EQUAL) 1 PAIR

6" DIA. FILLED WITH CONCRETE

GATE LEAF VINYL WITH ALUMINUM OR WOOD PICKETS (NO CHAIN LINK AND SLATS)

GATE LEAF METAL FRAMES

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK). (OPTIMAL)

PROVIDE SPRING HUNG ROLLER UNDER EACH GATE LEAF TO ALLOW FOR STEADY CONTROLLED OPERATION OF EACH GATE (OPTIMAL IF CONDITIONS ALLOW)

GATE POST DETAIL

1/2" DIA x 2" LONG CONDUIT SLEEVES IN SLAB

GATE LEAF VINYL WITH ALUMINUM OR WOOD PICKETS (NO CHAIN LINK AND SLATS)

GATE LEAF METAL FRAMES

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK). (OPTIMAL)

PROVIDE SPRING HUNG ROLLER UNDER EACH GATE LEAF TO ALLOW FOR STEADY CONTROLLED OPERATION OF EACH GATE (OPTIMAL IF CONDITIONS ALLOW)
MINIMUM INTERIOR DIMENSIONS

MIN. ENCLOSURE HEIGHT

MINIMUM INTERIOR DIMENSIONS

MIN. ENCLOSURE HEIGHT

MINIMUM INTERIOR DIMENSIONS

MINIMUM INTERIOR DIMENSIONS

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

SINGLE-WIDTH DUMPSTER ENCLOSURE FOR RECYCLING
FOR PAD SIZE SEE NOTES SW-03

CONCRETE DUMPSTER PAD (MINIMUM 8" THICK).

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

LOCK PIN DETAIL
SEE DETAIL "A"

DOUBLE-WIDTH DUMPSTER ENCLOSURE FOR RECYCLING

FOR MORE DETAILS SEE PAGES SW-04, SW-05.
**Title:**

SINGLE-WIDTH DUMPSTER ENCLOSURE
FOR RECYCLING WITH DRAIN

NO. 135 LOCK PIN HOLE WHEN OPEN

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.

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

MINIMUM THICKNESS:

CONCRETE COMPACTOR PAD (MINIMUM 8" THICK)

SELF CONTAINED WASTE COMPACTOR ENCLOSURE
SOLID WASTE AND RECYCLING COMPACTORS

CASE OPENINGS FOR DROP OR CHUTE ACCESS
MINIMUM OF 4' DOOR

DOOR MUST PROVIDE SUPPORT WHEEL WITH SPRING ON DOOR

RIGID WHEEL STOP DEVICE
(REQUIRED FOR EACH WHEEL FOR ALL WASTE COMPACTORS)
SEE SW-04 FOR DETAILS

CONCRETE BOLLARD
SEE DETAIL SW-06

MINIMUM CLEARANCE

November 18, 2008

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

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

4" 4" 6" 24" 48"
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-Neck 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.
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 HOPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFUENT 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 HOPE THERMAL PLASTIC LINER, FIBERGLASS LINER
   OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS.
   THE HOPE 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.
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 INFLOW 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-932 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.
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 HOPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLENT 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.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C-478, LATEST STANDARD, UNLESS OTHERWISE DIRECTED BY OWNER.
NOTES:

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

SANITARY/STORM SEWER MAIN

CLAS 52 DUCTILE IRON PIPE OR C-900

PLANT VIEW

SANITARY/STORM SEWER MAIN

WATER MAIN (DIP OR PVC)

RECLAIMED WATER

SEWER GRAVITY MAIN

HORIZONTAL CLEARANCE

MIN. SPECIFICATION COVER

10' MIN. HORIZONTAL CLEARANCE

VARYING 4' MIN.

SEE NOTES PAGE WW-12

City of Largo
Community Development Department
Engineering Services Division
221 Highland Avenue, Largo, FL 33770-4612
TEL: (727) 587-6713 FAX: (727) 586-7413
WWW: http://www.largo.com

Title: Water Main and Sanitary Sewer Line Conflict

Drawing Scale: NOT TO SCALE

November 18, 2008

Project Number: WW-11

ENGINEERING DESIGN AND CONSTRUCTION STANDARDS

Community Development Director
CAROL STRICKLIN A.I.C.P.

City Engineer
LELAND E. DICUS, P.E.
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 FIFTY (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.
Bedding Depth (See Note 1)

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 FDOT Specification Section 985.

NOTES:
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.
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 19' onto adjacent properties and at 19' 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 create excessive runoff onto adjacent properties.
8.) Rear swales shall drain to side swales and to streets on each lot and shall function independently from all adjoining lots.

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Residential Grading
Type "A"

Engineering Design and Construction Standards

City Engineer:
CAROL STRICKLIN, A.I.C.P.
LELAND E. DICUS P.E.

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NOT TO SCALE
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 100-year 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 18" 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 independently from all adjoining lots.
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 WALL DESIGN MUST BE DONE BY A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.
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.