GENERAL NOTES

G-1. THE CONTRACTOR SHALL NOTIFY CITY OF RICHMOND (REFERRED TO AS THE "CITY") DIRECTOR OF PUBLIC WORKS AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK AT (281) 342-0559. CONTRACTOR SHALL ATTEND A PRECONSTRUCTION MEETING WITH CITY AND THE PROJECT ENGINEER PRIOR TO INITIATING CONSTRUCTION. PRECONSTRUCTION MEETINGS SHALL BE HELD AT 600 MORTON STREET OR AT A LOCATION APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

G-2. ALL PUBLIC INFRASTRUCTURE SHALL BE INSPECTED BY PUBLIC WORKS INSPECTOR(S) OR AUTHORIZED AGENTS(S). THE CONTRACTOR SHALL GIVE 24-HOUR ADVANCE NOTIFICATION TO THE PUBLIC WORKS DEPARTMENT FOR INSPECTION OR WORK COMPLETED WORK WILL NOT BE COVERED WITHOUT APPROVAL OF THE CITY.

G-3. CONTRACTOR MUST OBTAIN ALL PERMITS AND SUPPLY ALL BONDS REQUIRED BY THE CITY, PRIOR TO BEGINNING CONSTRUCTION.

G-4. UPON COMPLETION OF A PROJECT, THE CONTRACTOR AND/OR PROJECT ENGINEER SHALL PROVIDE THE DIRECTOR OF PUBLIC WORKS AND CITY ENGINEER DETAILED, "RECORD DRAWINGS" IN REPRODUCTIVE AND ELECTRONIC FORMAT.

G-5. THE CONTRACTOR SHALL FURNISH ALL MATERIALS, EQUIPMENT AND LABOR FOR EXCAVATION, INSTALLATION AND BACKFILLING OF WATER, SANITARY AND STORM SEWER LINES AND RELATED APPURTENANCES AS SHOWN ON THE PLANS AND/OR DESCRIBED IN THE SPECIFICATIONS.

G-6. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (2004) AND REVISIONS THERETO.

G-7. ALL WORK PERFORMED SHALL COMPLY WITH CURRENT NATIONAL SPECIFICATIONS AND STANDARD PRACTICES, APPROVED PROJECT PLANS AND SPECIFICATIONS AND ALL APPLICABLE CITY STANDARDS, CODES AND ORDINANCES.

G-8. ALL CONSTRUCTION TRAFFIC CONTROL IN THE PROJECT AREA SHALL MEET THE REQUIREMENTS OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND SHALL BE APPROVED BY THE CITY FOR ALL PROJECTS WITHIN THE CITY LIMITS.

G-9. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN THE AREA PRIOR TO COMMENCING WORK IN ANY RIGHT-OF-WAY OR EXISTING EASEMENT. A VERIFICATION NUMBER FROM THE ONE-CALL UTILITY COORDINATING COMMITTEE IS REQUIRED.

G-10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO EXCAVATION AND UNCOVER EXISTING UTILITIES AT ALL "POINTS OF CROSSING" TO DETERMINE IF CONFLICTS EXIST PRIOR TO COMMENCING ANY CONSTRUCTION. NOTIFY THE PROJECT ENGINEER, CITY ENGINEER AND DIRECTOR OF PUBLIC WORKS IMMEDIATELY OF ANY CONFLICT.

G-11. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SUCH UNDERGROUND FEATURES SUFFICIENTLY IN ADVANCE OF OPERATIONS TO PRECLUDE DAMAGE IN THE EVENT THAT UNDERGROUND FACILITIES NOT SHOWN ON THE DRAWINGS ARE ENCOUNTERED.

G-12. IN THE EVENT OF DAMAGE TO UNDERGROUND FACILITIES, WHETHER OR NOT IT IS SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL MAKE THE NECESSARY REPAIRS TO REPLACE THE FACILITY BACK IN SERVICE. ALL SUCH REPAIRS SHALL CONFORM TO THE REQUIREMENTS OF THE OWNER OF THE FACILITY.

G-13. THE CONTRACTOR SHALL PROVIDE SHEETING, SHORING AND BRACING NECESSARY TO PROTECT WORKMEN AND EXISTING UTILITIES DURING ALL PHASES OF CONSTRUCTION AS MAY BE REQUIRED BY O.S.H.A, FEDERAL, STATE AND LOCAL LAWS, CODES AND ORDINANCES.

G-14. CONTRACTOR SHALL COVER OPEN EXCAVATIONS WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS ALONG EXISTING ROADWAYS AND WITHIN TRAFFIC AREAS.

G-15. ALL TESTING FOR THIS PROJECT SHALL CONFORM TO THE CITY REQUIREMENTS. SHOULD ANY TEST RESULTS NOT MEET THE TESTING REQUIREMENTS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE OR REPLACE SUCH MATERIALS AND INSTALLATIONS, SO THAT THE TESTING REQUIREMENTS ARE MET.

G-16. THE LOADING, UNLOADING AND HANDLING OF ALL PIPE, VALVES, HYDRANTS, FITTINGS, MANHOLES AND OTHER MATERIALS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PRACTICES AND SHALL BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIALS. THE CONTRACTOR SHALL LOCATE AND PROVIDE THE NECESSARY STORAGE AREAS FOR MATERIALS AND EQUIPMENT.

G-17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING AND PROTECTING ALL MATERIAL AND EQUIPMENT STORED ON THE JOB SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STORAGE OF MATERIALS IN A SAFE AND WORKMANLIKE MANNER TO PREVENT INJURIES, DURING AND AFTER WORKING HOURS, UNTIL PROJECT COMPLETION.

G-18. THE CONTRACTOR SHALL NOT UNLOAD ANY TRACK-TYPE CONSTRUCTION MACHINERY ON ANY EXISTING PAVEMENT OR CROSS OVER ANY EXISTING PAVEMENT OR CURB DURING ANY PROJECT.

G-19. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUPERVISE AND COORDINATE ALL WORK TO INSURE THE PROPER EXECUTION. ALL WORK IS TO BE ACCOMPLISHED IN A NEAT, WORKMANLIKE MANNER, AND ALL EXCESS MATERIALS, TRASH AND DEBRIS, ETC., SHALL BE REMOVED FROM THE JOB BY THE CONTRACTOR, AT HIS EXPENSE.

G-20. CONTRACTOR SHALL REMOVE DIRT AND/OR DEBRIS DEPOSITED ON EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY ON A DAILY BASIS. ALL EQUIPMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AT THE END OF THE PROJECT.

G-21. EXISTING ROADS, RIGHT-OF-WAYS, EASEMENTS AND PROPERTY DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AS GOOD OR BETTER THAN THE CONDITION PRIOR TO STARTING THE WORK.

G-22. UNLESS OTHERWISE REQUIRED, ALL DISTURBED AREAS SHALL BE SEEDED WITH HYDROMULCH SEEDING AND PROVIDE WATERING UNTIL VEGETATION IS ESTABLISHED.

G-23. ALL EXCESS AND/OR UNSUITABLE SOIL, AND DEBRIS AND/OR WASTE MATERIALS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.

G-24. ADJUST MANHOLES, INLETS, FLUSHING VALVES AND WATER VALVE BOXES TO MATCH FINAL GRADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY.

G-25. UTILITY SERVICE LINES

1) ALL UTILITY SERVICE LINES ARE NOT SHOWN ON THE DRAWINGS. CONTRACTORS SHALL ANTICIPATE THAT SUCH SERVICE LINES EXIST AND REPAIR THEM IF DAMAGED DURING CONSTRUCTION. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE OWNERS OF SUCH UTILITIES PRIOR TO WORKING IN THE AREA TO CONFIRM THEIR EXACT LOCATIONS AND/OR DEPTHS, AND TO DETERMINE WHETHER ANY ADDITIONAL UTILITIES OTHER THAN THOSE SHOWN ON THESE PLANS MAY BE PRESENT. THE CONTRACTOR SHALL DETERMINE IF ANY OF THESE UTILITIES ARE CLEAR, AND SHALL PRESERVE AND PROTECT ALL OF THESE UTILITIES SHOWN OR FOUND. IF CONFLICTS ARISE REGARDING PUBLIC UTILITIES, THE CONTRACTOR SHOULD IMMEDIATELY NOTIFY THE PROJECT ENGINEER.

2) UTILITY RELOCATIONS REQUIRED BY CONSTRUCTION SHALL BE PERFORMED BY THE APPROPRIATE UTILITY COMPANY. ANY RELOCATIONS OR TEMPORARY BRACING NOT DEEMED NECESSARY BY THE ENGINEER, BUT DESIRED FOR CONVENIENCE BY THE CONTRACTOR, SHALL BE PERFORMED BY THE APPROPRIATE UTILITY COMPANY AT THE CONTRACTOR'S EXPENSE.

3) TEXAS ONE CALL	1-800-245-4545
4) CENTERPOINT ENERGY-GAS	281-342-8881
5) CENTERPOINT ENERGY-ELECTRIC	281-341-4930
6) SOUTHWESTERN BELL TELEPHONE	281-341-4312
7) TIME WARNER CABLE	713-462-1900
8) CITY OF RICHMOND	281-342-0559

G-26. SOUTHWESTERN BELL TELEPHONE

1) THE CONTRACTOR SHALL DETERMINE THE ACTUAL LOCATION OF UTILITIES BY CALLING TEXAS ONE-CALL SYSTEM AT LEAST 72 HOURS BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THE UNDERGROUND UTILITIES.

2) CONTRACTOR SHALL HAND DIG WITHIN ONE (1) FOOT OF SBC UNDERGROUND CONDUIT OR CABLE SYSTEMS.

G-27. CENTERPOINT ENERGY (ELECTRIC)

1. OVERHEAD LINES EXIST ON THE PROPERTY AND APPROXIMATE LOCATIONS ARE SHOWN ON THE DRAWINGS. CONTRACTOR SHALL VERIFY THEIR LOCATION PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTOR IS LEGALLY RESPONSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED AND LOCATE EXISTING UNDERGROUND UTILITIES, CALL CENTERPOINT ENERGY AT LEAST 72 HOURS BEFORE COMMENCING WORK.

2. CONSTRUCTION THAT WILL REQUIRE EXCAVATION CLOSER THAN THREE (3) FEET TO CENTERPOINT FACILITIES SHALL BE BORED AND JACKED WITH THE WRITTEN APPROVAL FROM CENTERPOINT.

3. CONTRACTOR SHALL HAND DIG WITHIN ONE (1) FOOT OF CENTERPOINT ENERGY UNDERGROUND CONDUIT OR AS OTHERWISE REQUIRED BY CENTERPOINT.

G-28. CENTERPOINT ENERGY (GAS)

1. THE CONTRACTOR SHALL NOTIFY THE PROJECT COORDINATOR FOR CENTERPOINT-GAS TO LOCATE EXISTING UNDERGROUND CENTERPOINT ENERGY GAS LINES.

2. CONTRACTOR SHALL HAND DIG WITHIN ONE (1) FOOT OF CENTERPOINT ENERGY UNDERGROUND GAS LINE.

3. CONTRACTOR SHALL CONTACT CENTERPOINT ENERGY AT LEAST 72 HOURS PRIOR TO ANY WORK BEING STARTED IN THE CONSTRUCTION AREA TO VERIFY ACTUAL LOCATIONS AND DEPTHS OF GAS MAINS OR SERVICE LINES. IF REQUIRED, ADJUSTMENTS TO EXISTING GAS MAINS AND SERVICE LINES SHALL BE COMPLETED AS APPROVED BY CENTERPOINT.

G-29. TIME WARNER CABLE – THE CONTRACTOR SHALL NOTIFY TIME WARNER AT LEAST 72 HOURS BEFORE COMMENCING WORK LOCATE EXISTING UNDERGROUND CABLE.

G-30. ALL PIPE AND REINFORCEMENT STEEL SHALL BE KEPT FREE OF DIRT AND DEBRIS. ANY DAMAGE TO THE COATINGS OF THE VARIOUS MATERIALS MUST BE REPAIRED OR REPLACED BY THE CONTRACTOR WITH APPROVAL BY THE CITY.

G-31. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE AND POSITIVE DRAINAGE AT ALL TIMES DURING CONSTRUCTION.

G-32. NO CONNECTIONS SHALL BE MADE TO THE EXISTING WATER LINES OR SANITARY SEWERS UNTIL ALL PROPOSED LINES HAVE BEEN THOROUGHLY CLEANED, TESTED AND APPROVED BY THE CITY.

G-33. CONTRACTOR SHALL VERIFY PUBLIC INFRASTRUCTURE ALIGNMENT, CENTERLINE CURVE DATA AND STATIONING WITH APPROVED SUBDIVISION PLAT AND APPROVED PLANS.

G-34. ALL BEDDING AND BACKFILL (INCLUDING CEMENT STABILIZED SAND) SHALL BE PLACED IN LIFTS THAT DO NOT EXCEED 8" (LOOSE), SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY AND BE TESTED BY A CERTIFIED TESTING LABORATORY.

G-35. ALL TRENCH BACKFILL SHALL BE TESTED AT A MINIMUM RATE OF ONE DENSITY TEST PER THREE LIFTS OF TRENCH BACKFILL PER 300 FEET OF TRENCH. TESTS SHALL BE TAKEN AT RANDOM LOCATION SELECTED BY THE LAB OR AS AS OTHERWISE REQUESTED BY THE CITY.

G-36. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL POLLUTION CONTROLS FOR THE DURATION OF THE PROJECT.

WATER DISTRIBUTION NOTES

W-1. EXCEPT AS OTHERWISE REQUIRED, WATER MAINS SHALL BE PVC, AWWA C900 OR C905, MINIMUM THICKNESS DR-18, CLASS 200 FOR WATER MAINS LESS THAN SIX INCHES (6"); CLASS 150 FOR WATER MAINS SIX INCHES (6") AND LARGER. WATER MAINS LESS THAN 4 INCHES (4") DIAMETER SHALL BE PVC, ASTM D-2241, SDR-21 (PR-200), WITH RUBBER GASKET JOINTS OR APPROVED EQUAL. ALL POTABLE WATER PIPE USED IN THE PROJECT MUST MEET THE REQUIREMENTS OF AMERICAN NATIONAL STANDARDS INSTITUTE/NATIONAL SANITATION FOUNDATION STANDARD 61 (ANSI/NSF61). PIPE SHALL BE CERTIFIED TO CONFORM TO ANSI/NSF-61 AND SHALL BE MARKED "NSF-PW".

W-2. ALTERNATIVE WATER MAIN PIPE MATERIAL (WITH APPROVAL OF THE CITY):

A) STEEL: AWWA C200, 150 PSI FOR LINES 4-INCHES TO 12-INCHES, 235 PSI FOR LINES GREATER THAN 12-INCHES. ALL PIPE COATINGS SHALL BE IN ACCORDANCE WITH AWWA C210. ALL NUTS AND BOLTS SHALL BE EPOXY COATED.

B) DUCTILE IRON: AWWA C151 (ANSI A21.51) FOR LINES 4-INCHES TO 54-INCHES. PIPE SHALL BE LINED IN ACCORDANCE WITH AWWA C104 (ANSI A21.4).

W-3. INSTALLATION OF WATER MAINS SHALL BE IN ACCORDANCE WITH CURRENT AWWA APPROVED METHODS, STANDARDS AND MATERIALS, TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (T.C.E.Q.) REGULATIONS AND CITY STANDARDS, CODES AND ORDINANCES.

W-4. ALL WATER MAINS SHALL HAVE A MINIMUM 3.5 FEET AND A MAXIMUM 5 FEET OF COVER WHEN CONSTRUCTED IN STREET RIGHTS-OF-WAY OR EASEMENTS, UNLESS APPROVED BY THE CITY.

W-5. FIRE HYDRANTS SHALL BE SET BEHIND BACK OF CURB AT APPROVED LOCATIONS. CENTER LINE OF FIRE HYDRANTS SHALL BE THREE (3) FEET FROM BACK OF CURB OF THE STREET UNLESS OTHERWISE REQUIRED IN THE PLANS. FIRE HYDRANTS SHALL BE INSTALLED A MINIMUM OF TEN (10) FEET FROM ALL SANITARY SEWERS AND APPURTENANCES. FIRE HYDRANTS SHALL BE LOCATED OPPOSITE PROPERTY LINES OR RIGHT-OF-WAY LINE EXTENSIONS, UNLESS OTHERWISE APPROVED BY THE CITY.

W-6. GATE VALVES, FIRE HYDRANTS AND BLOWOFFS SHALL BE COUNTER-CLOCKWISE OPENING.

W-7. ALL FITTINGS, VALVES AND FIRE HYDRANTS SHALL BE CAST IRON MECHANICAL JOINT TYPE UNLESS APPROVED IN WRITING BY THE CITY. ALL MECHANICAL JOINTS SHALL BE INSTALLED WITH MECHANICAL RESTRAINED JOINTS (EBAA IRON, INC., SERIES 2000PV OR EQUAL). NIPPLES FROM FITTING TO FITTING AT GATE VALVES SHALL BE 18" IN LENGTH.

W-8. A MINIMUM HORIZONTAL CLEARANCE OF NINE FEET (9') BETWEEN WATER MAINS AND SANITARY SEWER LINES SHALL BE MAINTAINED BY THE CONTRACTOR, EXCEPT AS APPROVED BY THE CITY.

W-9. THE CONTRACTOR SHALL PROVIDE FOR A MINIMUM OF SIX INCHES (6") CLEARANCE AT STORM SEWER AND WATER LINE CROSSINGS AND TWENTY-FOUR INCHES (24") MINIMUM CLEARANCE AT SANITARY SEWER AND WATER LINE CROSSINGS. WATER LINES SHALL BE LOCATED AT A HIGHER ELEVATION THAN THE SEWER WHEREVER POSSIBLE. WHEN NOT POSSIBLE, T.C.E.Q., "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS", ARTICLE 290.44 WILL TAKE PRECEDENCE. IF A CONFLICT EXISTS, THE CONTRACTOR SHALL ADVISE THE DIRECTOR OF PUBLIC WORKS AND WATER SUPERINTENDENT IMMEDIATELY AND SHALL NOT CONTINUE FURTHER CONSTRUCTION WITHOUT CITY APPROVAL.

W-10. ABANDONMENT OF EXISTING WATER LINES SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH APPROVED PLANS OR WHEN APPROVAL FROM THE CITY PUBLIC WORKS DIRECTOR OR WATER SUPERINTENDENT IS OBTAINED IN WRITING.

W-11. TAPPING SLEEVE & VALVES ON THE EXISTING CITY WATER SYSTEM WILL BE INSTALLED BY A CITY APPROVED TAPPING CONTRACTOR.

W-12. NO CONNECTION SHALL BE MADE TO ANY EXISTING WATER LINES UNTIL THE NEW WATER LINES HAVE BEEN THOROUGHLY STERILIZED, CLEANED AND TESTED AND FINAL APPROVAL FROM THE CITY'S AUTHORIZED AGENT HAS BEEN OBTAINED IN WRITING.

W-13. ALL VALVES AND HYDRANTS SHALL BE STORED SO THAT THEY ARE PROTECTED FROM FREEZING.

W-14. ALL PRESSURE PIPE INSTALLATIONS SHALL BE TESTED FOR LEAKAGE. TEST PRESSURE SHALL BE 1.5 TIMES THE MAXIMUM DESIGN PRESSURE OR 150 PSIG, WHICHEVER IS GREATER. THE TEST SHALL HAVE A MINIMUM DURATION OF FOUR HOURS AND SHALL BE OBSERVED BY THE AUTHORIZED REPRESENTATIVE OF THE CITY PUBLIC WORKS DEPARTMENT.

W-15. STERILIZATION OF NEW WATER LINES SHALL BE DONE IN ACCORDANCE WITH AWWA C-651, LATEST EDITION. A MINIMUM OF ONE SAMPLE PER 1000 FEET OF WATER MAIN OR ONE SAMPLE PER SEPARATION SECTION OF WATER MAIN SHALL BE COLLECTED. IF THE SAMPLES FAIL TO MEET THE T.C.E.Q. DRINKING WATER STANDARD REQUIREMENTS, THE FLUSHING AND TESTING PROCESS SHALL BE REPEATED.

W-16. WATER LINES SHALL HAVE SAND EMBEDMENT TO SIX (6) INCHES ABOVE THE TOP OF PIPE.

W-17. WATER LINE TRENCHES UNDER PAVEMENT OR WITHIN THREE (3) FEET FROM EDGE OF PAVEMENT TO BE BACKFILLED WITH CEMENT STABILIZED SAND (1.5 SACKS PER CUBIC YARD) FROM THE TOP OF THE EMBEDMENT TO THE BASE OF PROPOSED BASE OF PROPOSED PAVING SUBGRADE LESS 6 INCHES.

W-18. ALL WATER LINE CONSTRUCTION CROSSING EXISTING ASPHALT AND/OR CONCRETE STREETS SHALL BE BORED AND JACKED, UNLESS OTHERWISE APPROVED BY THE PROJECT ENGINEER AND THE CITY.

W-19. TRENCH SAFETY SYSTEM IS REQUIRED FOR ALL WATER MAIN CONSTRUCTION.

W-20. CONCRETE THRUST BLOCKING IS REQUIRED FOR ALL VALVES, FIRE HYDRANTS AND FITTINGS.

SANITARY SEWER CONSTRUCTION NOTES

S-1. SANITARY SEWERS SHALL BE CONSTRUCTED ACCORDING TO THESE PLANS AND SPECIFICATIONS AND THE CITY AND THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (T.C.E.Q.) RULES AND REGULATIONS.

S-2. ALL MANHOLES SHALL BE PRECAST IN ACCORDANCE WITH DETAILS INCLUDING THE INTERIOR COATING. BRICK MANHOLES ARE NOT ALLOWED. ALL SANITARY MANHOLES SHALL BE INSTALLED WITH INFLOW PROTECTORS.

S-3. ALLOWABLE SANITARY SEWER PIPE MATERIAL:

A) GRAVITY LINES

1. POLYVINYL CHLORIDE (PVC), PIPE AND FITTINGS MEETING THE REQUIREMENTS OF ASTM D2241 (SDR 26; PR160), ASTM D1784, ASTM D3212 AND ASTM F477. FOR DEPTH LESS THAN 4 FEET AND GREATER THAN 20 FEET, INSTALL ASTM D2241 (SDR21, PR200).

2. DUCTILE IRON (D.I.P.), AWWA C-151, AWWA C-111, STANDARD CLASS 150, WITH BELL AND SPIGOT PUSH-ON JOINTS, ALL PIPE SHALL HAVE AN INTERIOR POLYETHYLENE COATING OF 40-MILS AND AN EXTERIOR POLYETHYLENE WRAP OF 8-MILS.

B) FORCE MAINS

1. PVC, 4-INCH TO 12-INCH, AWWA C900, DR18, CLASS 150, ASTM D3139, ASTM F477.

S-4. ALL D.I.P. SANITARY SEWER PIPES SHALL BE INSTALLED WITH CATHODIC PROTECTION.

S-5. THE CONTRACTOR SHALL NOTIFY THE CITY PUBLIC WORKS DEPARTMENT AT LEAST 24 HOURS PRIOR TO PRESSURE AND DEFLECTION TESTS ON ALL GRAVITY SANITARY SEWERS. ALL TESTS SHALL BE MONITORED BY AN AUTHORIZED AGENT OF THE CITY.

S-6. ALL GRAVITY SANITARY SEWER PIPE SHALL BE LOW PRESSURE AIR TESTED AND MANHOLES VACUUM TESTED IN ACCORDANCE WITH T.C.E.Q. REQUIREMENTS. FORCE MAINS SHALL BE HYDROSTATIC TESTED AT A MINIMUM OF 150 PSI.

S-7. DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID PIPE. THE CITY MAY REQUIRE SERVICE LEADS TO BE RANDOMLY TESTED. DEFLECTION TESTS SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. THE TEST SHALL BE CONDUCTED USING A MANDREL HAVING AN OUTSIDE DIAMETER EQUAL TO 95% OF THE AVERAGE INSIDE DIAMETER OF THE PIPE. THE MANDREL SHALL HAVE A MINIMUM OF 9 RUNNERS WITH THE CONTACT LENGTH OF EACH RUNNER EQUAL TO OR GREATER THAN THE PIPE'S NOMINAL DIAMETER. THE TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES.

S-8. SANITARY SEWER MANHOLE RIMS, EXCEPT IN PAVED AREAS, SHALL BE SET 4-INCHES ABOVE FINISHED GRADE WITHIN STREET RIGHT-OF-WAY, AND 6-INCHES ABOVE FINISHED LOT GRADES WITHIN EASEMENTS. CLEAN FILL MAY BE PLACED ADJOINING THE MANHOLE AND GRADED AWAY FROM THE RIM FOR SURFACE WATER DRAINAGE.

S-9. SANITARY MANHOLES BELOW THE 100-YEAR FLOOD PLAIN (OR WHERE OTHERWISE REQUIRED) SHALL BE WATERPROOFED USING A NEOPRENE GASKET. ONLY STAINLESS STEEL SCREWS OR NUTS & BOLTS CAN BE USED TO HOLD DOWN THE COVER. A VENT PIPE EXTENDING ONE FOOT ABOVE THE FLOODPLAIN ELEVATION SHALL BE PROVIDED, UNLESS OTHERWISE APPROVED.

S-10. SANITARY LINES AND MANHOLES PARALLEL TO WATER LINES SHALL BE INSTALLED WITH AT LEAST A 9-FOOT HORIZONTAL SEPARATION (OUTSIDE TO OUTSIDE). SANITARY SEWERS INSTALLED CROSSING UNDER WATER MAIN SHALL COMPLY WITH T.C.E.Q. REQUIREMENTS.

S-11. ALL SANITARY SEWERS SHALL BE CONSTRUCTED ON A STRAIGHT ALIGNMENT AND ON A UNIFORM GRADE. GRAVITY SEWERS SHALL BE CONSTRUCTED WITH THE PIPE BELL FACING UPSTREAM. ALL 6-INCH SANITARY SERVICE LEADS SHALL BE LAID WITH A MINIMUM GRADE OF 0.70%

S-12. ALL SEWER LEADS AND STUBOUTS SHALL BE MARKED IN ACCORDANCE WITH THE DETAILS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MARKERS IN GOOD AND PLUMB CONDITION WITH A VERTICAL ALIGNMENT. IF DAMAGED, THE CONTRACTOR SHALL REPLACE THE MARKER.

S-13. ALL SEWER LINES (INCLUDING SERVICE LEADS) ENTERING A MANHOLE AT AN ELEVATION GREATER THAN 30-INCHES ABOVE THE MANHOLE INVERT MUST BE CONSTRUCTED WITH AN EXTERIOR DROP PIPE IN ACCORDANCE WITH THE DETAILS.

S-14. STEPS IN MANHOLES ARE PROHIBITED.

S-15. CONTRACTOR SHALL PROVIDE ADEQUATE CONCRETE THRUST BLOCKING AT ALL FORCE MAIN BENDS.

S-16. AT ALL LOTS WHERE TOP OF PIPE IS GREATER THAN 8-FEET BELOW FINISHED GRADE, PROVIDE A 6-INCH SANITARY SEWER STACK OR RISER. STACKS AND RISERS SHALL BE EXTENDED TO WITHIN 6 FEET OF FINISHED GRADE. STACKS SHALL BE MARKED FOR LOCATION AS INDICATED ON THE DETAILS.

STORM SEWER NOTES

ST-1. ALL STORM SEWERS SHALL MEET THE REQUIREMENTS OF THE CITY, FORT BEND COUNTY AND FORT BEND COUNTY DRAINAGE DISTRICT (WHEN APPLICABLE).

ST-2. ALL STORM SEWER MANHOLE AND INLET COVERS SHALL BE LABELED "STORM SEWER" IN ACCORDANCE WITH THE DETAILS.

ST-3. ALL STORM SEWER PIPE SHALL BE REINFORCED CONCRETE PIPE, A.S.T.M. C-76, CLASS III (MINIMUM) INSTALLED, BEDDED AND BACKFILLED IN ACCORDANCE WITH THE CITY DETAILS AND FORT BEND COUNTY DRAINAGE DISTRICT CRITERIA. ALL REINFORCED CONCRETE PIPE 42-INCH DIAMETER AND GREATER SHALL HAVE WATER-TIGHT RUBBER GASKET JOINTS. CONTRACTOR MAY USE TAL-COAT OR EQUAL FOR PIPE JOINTS WITH PIPE LESS THAN 42" DIAMETER. ALL STORM SEWER SHALL BE BACKFILLED WITH SELECT FILL MATERIAL COMPACTED TO 95% STANDARD PROCTOR COMPACTION, ASTM D-698, IN ACCORDANCE WITH THE DETAILS. CONTRACTOR SHALL USE MECHANICAL ROLLER OR MECHANICAL TAMPER IN COMPACTING ALL BACKFILL FOR PROJECT.

ST-4. ALL STORM SEWER STRUCTURES SUCH AS MANHOLES AND INLETS SHALL BE BACKFILLED WITH CEMENT STABILIZED SAND. CEMENT STABILIZED SAND BACKFILL SHALL EXTEND A MINIMUM OF TWENTY-FOUR INCHES (24") FROM THE OUTSIDE WALL OF ALL STRUCTURES. (1-1/2 SACKS OF CEMENT PER CUBIC YARD.)

ST-5. AREAS ADJACENT TO THE PAVEMENT SHALL BE GRADED TO POSITIVELY DRAIN TOWARD INLETS, CONCRETE CURB AND/OR ROAD DITCHES IF DISTURBED DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE MATERIALS, LABOR AND EQUIPMENT TO PERFORM ALL GRADING OPERATIONS.

ST-6. CONTRACTOR SHALL ADJUST EXISTING WATER LINE MAINS AND WATER LINE SERVICES IN CONFLICT WITH A STORM SEWER. CONTRACTOR SHALL COORDINATE THE DISRUPTION OF WATER SERVICE DURING THE WATER LINE LOWERING OPERATION WITH THE CITY PUBLIC WORKS DEPARTMENT.

ST-7. ADJUST ALL STORM SEWER MANHOLE COVERS TO MATCH FINISHED GRADE ELEVATIONS.

ST-8. ALL PRECAST CONCRETE STRUCTURES SHALL BE REINFORCED AND SHALL BE DESIGNED TO WITHSTAND AASHTO H-20 LOADINGS.

STREET AND PAVING CONSTRUCTION NOTES

P-1. ALL PAVING SHALL BE CONSTRUCTED WITH THE PLANS AND SPECIFICATIONS AND CITY REQUIREMENTS.

P-2. THE CONTRACTOR SHALL NOTIFY CITY PUBLIC WORKS DEPARTMENT AT LEAST 48 HOURS PRIOR TO ANY AND ALL SUBGRADE TESTING AND CONCRETE POURS.

P-3. ALL TEMPORARY AND PERMANENT SIGNAGE MUST COMPLY WITH THE LATEST REVISION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

P-4. CONTRACTOR SHALL PROTECT ALL UTILITIES, SIDEWALKS, PAVEMENT, ETC. AND SHALL REPAIR OR REPLACE ANY FACILITIES DAMAGED DURING PAVING OR GRADING OPERATIONS.

P-5. EXISTING PAVEMENTS, CURBS, SIDEWALKS DRIVEWAYS, ETC., DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO THE CITY STANDARDS.

P-6. ALL DISTURBED AREAS WITHIN STREET RIGHT-OF-WAY AND EASEMENTS NOT COVERED BY PAVEMENT OR STRUCTURE SHALL BE HYDRO-MULCHED AND WATERED UNTIL VEGETATION ESTABLISHMENT.

P-7. AREAS TO BE FILLED SHALL BE CLEARED AND GRUBBED, SCARIFIED AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (+/- 2% OF OPTIMUM MOISTURE) PER ASTM D-698, TO A DEPTH OF 6" PRIOR TO FILL PLACEMENT. FILL MATERIAL SHALL BE PLACED IN MAXIMUM 8" THICK LIFTS (MEASURED LOOSE) AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (+/- 2% OF OPTIMUM MOISTURE) PER ASTM D-698. FILL SHALL BE CLEAN EARTH AND BE FREE FROM TRASH, VEGETATION AND LARGE STONES. TEST REPORTS INDICATING COMPLIANCE WITH DENSITY REQUIREMENTS SHALL BE SUBMITTED TO THE CITY PRIOR TO PLACEMENT OF PAVEMENT.

P-8. THE 6-INCH SUBGRADE IS TO BE SCARIFIED AND COMPACTED TO 95% STANDARD PROCTOR DENSITY (+/- 2% OF OPTIMUM MOISTURE) PER ASTM D-698. THE 6-INCH SUBGRADE SHALL BE STABILIZED WITH A MINIMUM SIX PERCENT (6%) LIME BY WEIGHT OR AS REQUIRED TO ACHIEVE A STABILIZED SOIL P.I. OF 20 OR LESS. LIME REQUIREMENTS SUBGRADE SHALL EXTEND A MINIMUM OF 2-FEET BEHIND THE BACK OF ALL CURB AND BEYOND THE EDGE OF PAVEMENT.

P-9. TESTING OF FILL, SUBGRADE AND PAVEMENT TO DOCUMENT COMPLIANCE WITH THE CITY REQUIREMENTS SHALL BE COMPLETED BY A CERTIFIED (REFERENCE: THE ASSOCIATION FOR LABORATORY ACCREDITATION) TESTING LABORATORY APPROVED BY THE CITY. A COPY OF ALL TEST RESULTS SHALL BE SUBMITTED TO THE CITY PUBLIC WORKS DIRECTOR.

P-10. ALL INTERSECTION EDGE RETURN RADII SHALL BE 25 FEET AND ALL CUL-DE-SAC RETURN RADII SHALL BE 35 FEET UNLESS NOTED OTHERWISE. MINIMUM GRADES AT INTERSECTIONS AND IN CUL-DE-SACS SHALL BE 1.00%. MINIMUM GRADE ON CURB AND GUTTER STREETS SHALL BE 0.030%.

P-11. PAVING JOINTS (TRANSVERSE AND LONGITUDINAL) SHALL BE IN ACCORDANCE WITH THE DETAILS.

P-12. WHEN A THICKER PAVEMENT ROADWAY INTERSECTS WITH A THINNER PAVEMENT ROADWAY, THE THICKER PAVEMENT SHALL BE CONSTRUCTED FOR THE ENTIRE INTERSECTION TO THE CURB RETURNS ON ALL INTERSECTING STREETS.

P-13. WHERE PROPOSED PAVEMENT IS TO CONNECT TO EXISTING CONCRETE PAVEMENT, THE CONNECTION SHALL BE COMPLETED IN ACCORDANCE WITH THE PAVEMENT UNDERCUT DETAIL.

P-14. SIDEWALKS SHALL BE LOCATED AS SHOWN ON THE PLANS. SIDEWALK RAMP CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE TEXAS ACCESSIBILITY STANDARDS (T.A.S.) AND CITY REQUIREMENTS.

P-15. ALL INTERSECTIONS SHALL BE CONSTRUCTED WITH SIDEWALK RAMPS IN ACCORDANCE WITH THE TEXAS ACCESSIBILITY STANDARDS, THE AMERICAN DISABILITIES ACT AND THE CITY REQUIREMENTS.

P-16. CONCRETE SHALL CONTAIN A MINIMUM 5-1/2 SACKS OF PORTLAND CEMENT PER CUBIC YARD OF CONCRETE WITH A MINIMUM 3500 PSI COMPRESSIVE STRENGTH AT 28 DAYS. CONCRETE SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES AND AN AIR CONTENT OF 4.5 PERCENT. AIR ENTRAINMENT ADMIXTURES SHALL CONFORM TO ASTM C260. FLYASH IS NOT ALLOWED.

P-17. CONCRETE PAVEMENT THICKNESSES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS. REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60. A MINIMUM OF 15" LAPS SHALL BE PROVIDED. ALL REINFORCING STEEL SHALL BE SECURELY TIED AND SUPPORTED WITH BAR CHAIRS IN ACCORDANCE WITH ACI STANDARDS. SPACING FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

1. 7" CONCRETE PAVEMENT – #4 BAR ON 18" CENTER EACH WAY.

2. 6" CONCRETE PAVEMENT AND DRIVEWAYS – #4 BAR ON 18" CENTER EACH WAY.

3. SIDEWALKS AND CONCRETE SLOPE PAVEMENT – MINIMUM 4-1/2" THICK CONCRETE – #3 BAR ON 24" CENTER EACH WAY.

P-18. CONCRETE SHALL NOT BE PLACED WHEN THE AMBIENT TEMPERATURE IS 40 DEGREES FAHRENHEIT AND FALLING. CONCRETE MAY BE PLACED IF THE AMBIENT TEMPERATURE IS 35 DEGREES AND RISING. CONTRACTOR SHALL PROVIDE AN APPROVED COVERING MATERIAL (COTTON MATS, POLYETHYLENE SHEETING, ETC.) IN THE EVENT TEMPERATURE SHOULD FALL BELOW 32 DEGREES FAHRENHEIT WITHIN 72 HOURS OF PLACING CONCRETE. NO SALT OR OTHER CHEMICALS SHALL BE ADDED TO CONCRETE TO PREVENT FREEZING. NO CONCRETE SHALL BE PLACED THE MIXTURE TEMPERATURE IS ABOVE 95 DEGREES FAHRENHEIT. CONCRETE SHALL BE PLACED WITHIN 60 MINUTES OF THE BATCH TIME.

P-19. ALL CONCRETE PLACED SHALL BE UNIFORMLY SPRAYED WITH A MEMBRANE CURING COMPOUND (TXDOT DMS-4650, TYPE 2, WHITE). CURING COMPOUND SHALL BE APPLIED IN ACCORDANCE WITH TXDOT STANDARD SPECIFICATIONS.

P-20. CONCRETE SAMPLES: CYLINDERS (SET OF 4), SLUMP AND AIR ENTRAINMENT TESTS ARE REQUIRED FOR EACH 100 CUBIC YARDS AND EACH FRACTION THEREOF. A MINIMUM OF ONE SET OF SAMPLES IS REQUIRED PER CONCRETE POUR. THE CITY RESERVES THE RIGHT TO REQUEST ADDITIONAL TESTS.

P-21. CORE SAMPLE FOR CONCRETE PAVEMENT TO CONSIST OF ONE CORE TAKEN FOR EACH 1,000 SQUARE YARDS OF FINISHED PAVEMENT (MINIMUM ONE CORE PER STREET). EACH CORE SHALL BE MEASURED FOR THICKNESS.

P-22. PROPER TESTING AND LABORATORY DOCUMENTATION IS REQUIRED. FAILURE TO MEET THE MINIMUM PAVEMENT REQUIREMENTS WILL RESULT IN THE REJECTION OF PAVEMENT. IMMEDIATE REMOVAL AND REPLACEMENT OF SUBSTANDARD PAVEMENT SECTIONS WILL BE NECESSARY TO SATISFY THESE REQUIREMENTS.

P-23. CRACKS 1/16 INCH OR LARGER ARE NOT ACCEPTABLE IN NEW PAVEMENT. CRACKS 1/16 INCH OR LESS WILL BE ADDRESSED AN INDIVIDUAL BASIS, SUBJECT TO APPROVAL OR REJECTION.

P-24. STREET NAME SIGNS SHALL BE LOCATED AT ALL INTERSECTIONS. CONTRACTOR SHALL VERIFY STREET NAME WITH RECORDED PLAT. STOP SIGNS AND OTHER TRAFFIC SIGNAGE SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

P-25. A DOUBLE-REFLECTORIZED BLUE TRAFFIC MARKER SHALL BE PLACED ONE FOOT OFFSET OF THE PAVEMENT CENTERLINE ON FIRE HYDRANT SIDE, AT ALL FIRE HYDRANT LOCATIONS, BY THE PAVING CONTRACTOR. FIRE HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A MARKER PLACED ON EACH STREET.

P-26. ALL STRIPING SHALL BE REFLECTORIZED, PERMANENT PREFABRICATED PAVEMENT MARKINGS MEETING THE MINIMUM REQUIREMENTS OF TxDOT, DMS-8240, TYPE A OR B, INSTALLED IN ACCORDANCE WITH TxDOT STANDARD SPECIFICATION ITEM 668. CENTERLINE STRIPES, STOP BARS AND MISCELLANEOUS MARKINGS SHALL HAVE A MINIMUM THICKNESS OF 90 MILS. LANE DELINEATION AND ROAD EDGE STRIPES SHALL HAVE A MINIMUM THICKNESS OF 60 MILS. ALL STRIPING SHALL BE INSTALLED WITH DOUBLE ADHESIVE AS REQUIRED BY THE CITY. OUTSIDE THE CITY (IN THE ETJ) COMPLY WITH FORT BEND COUNTY REQUIREMENTS.

P-27. ALL DRIVEWAYS SHALL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

NO.	DATE	REVISIONS	APP.

CITY OF RICHMOND
APPROVALS

LENERT KURTZ, DIRECTOR OF PUBLIC WORKS	DATE
GARREN SCHMIDT, WATER SUPERINTENDENT	DATE
JIM SEBESTA, WASTEWATER SUPERINTENDENT	DATE
JIM WHITEHEAD, STREET SUPERINTENDENT	DATE
DWAYNE PRICE, PARKS SUPERINTENDENT	DATE

CITY OF RICHMOND
STANDARD CONSTRUCTION DETAILS

NOTES

SCALE		
HORIZONTAL	1" = NTS	DESIGNED BY: RWS
VERTICAL	1" = NTS	DRAWN BY: DCB
		CHECKED BY: KRK
		DATE: OCTOBER 24, 2005
		JOB NO:
		DWG. NO:

Sheet: R-1
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