

# **Design and Construction Standards**

## **City of Round Rock, Texas General Guidelines Design and Construction Standards (DACCS)**

**January, 2005**

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## **DESIGN CRITERIA MANUALS**

### **SPECIFIC DESIGN CRITERIA:**

The design engineer shall prepare construction drawings not only in conformance to City requirements and accepted engineering practice, but also with consideration of future maintenance and operational concerns.

The following are specific criteria the design engineer shall use in his/her design. Where conflict exists between State or Federal codes and City criteria, the more restrictive shall govern. The criteria below and following checklists are intended as a guide for the design engineer and are not intended to be an exhaustive list. All items may not apply in all cases.

### **DESIGN CRITERIA MANUALS**

The following Manuals are included as if copied at length herein and shall govern design and construction of all public improvements. Where there is any conflict between any of the criteria in the Manuals listed below and other criteria contained herein, whichever imposes the more stringent restrictions shall prevail.

1. City of Round Rock Standard Specifications Manual
2. City of Round Rock Drainage Criteria Manual
3. City of Round Rock Transportation Criteria Manual
4. City of Round Rock Utilities Criteria Manual

## **CONSTRUCTION PLAN CRITERIA AND CHECKLIST**

**GENERAL:**

1. Plans shall be sealed and signed in accordance with the Texas Engineering Practice Act and accompanying Board Rules, by the professional engineer licensed in the state of Texas who prepared them.
2. The following statement shall be included (usually on the cover sheet) on each set of plans:

“All responsibility for the adequacy of these plans remains with the engineer who prepared them. In accepting these plans, the City of Round Rock must rely upon the adequacy of the work of the design engineer”.

3. An acceptance block shall be provided (usually on the cover sheet) on each set of plans in the following form:

ACCEPTED FOR CONSTRUCTION:

CITY OF ROUND ROCK, TEXAS	DATE
ENGINEERING AND DEVELOPMENT SERVICES DEPARTMENT	

4. The following statement shall be included (usually on the cover sheet) on each set of plans:

STATE OF TEXAS

COUNTY OF WILLIAMSON

I, (Licensed Professional Engineer), do hereby certify that the Public Works and Drainage Improvements described herein have been designed in compliance with the subdivision and building regulation ordinances and stormwater drainage policy adopted by the City of Round Rock, Texas.

(Seal & Signature of Professional Engineer)

DATE

5. Each cover sheet shall clearly indicate the project name, legal description, location, owner's name and the type of plans included.
6. Each cover sheet shall have a legible index listing the included drawings.

7. All City of Round Rock construction plan notes shall be included on the plans. All notes may not be appropriate in all cases and the Engineer should consult with Engineering and Developments Services Department regarding specific deletions.
8. A copy of the final plat shall be included in each set of drawings. A copy of the recorded plat shall be substituted upon submission of "As-built" plans prior to acceptance by the City for maintenance.

**Street, Drainage and Grading Improvements Plans shall address the following general aspects of the project. Specific guidelines are listed on the checklist included at the end of this section.**

1. Erosion and sedimentation control.
2. Overall drainage and grading.
3. Street plan and profiles.
4. Storm sewer plan and profiles.
5. Channel plan and profiles.
6. Standard details.

**Water and Wastewater Improvement Plans shall address the following general aspects of the project. Specific guidelines are listed on the checklist included at the end of this section.**

1. Erosion and sedimentation control (if not addressed with streets, drainage or grading plans).
2. Water layout.
3. Water main profiles.
4. Wastewater layout.
5. Wastewater main profiles.
6. Standard details.

## **CHECKLIST**

### **Erosion and Sedimentation Control (E&S):**

- Min scale 1"=100'
- Existing contours
- Proposed contours
- Project boundaries
- Existing drainage facilities
- Proposed streets and drainage facilities
- Location / limits of E&S facilities
- Street names
- North arrow
- Legend

### **Overall Drainage:**

- Min. scale 1"=100'
- Existing contours
- Proposed contours (as appropriate)
- Existing and proposed drainage structures and facilities
- Project boundaries
- Street names
- Legend
- Inlet calculations
- North arrow
- Drainage area boundaries & data:
  - Areas in acres
  - Time of concentration
  - C 25
  - C 100
  - I 25
  - I 100
  - Q 25
  - Q 100
  - Flow Arrows

Note: For major channels or culverts, it may be appropriate to submit drainage data (calculations, hydrographs, etc.) separately (ie. on 8½ x 11 sheets) that are sealed and signed by the design engineer. Synopsis of pertinent data shall be included on the plans.



### **Street Plan and Profiles:**

- Min. scale 1"=50'H, 1"=5'V
- Street name
- Street curb lines, center lines and widths
- ROW lines and widths
- Lot lines
- Lot numbers
- Block letters
- Inlet locations with stationing
- Stationing of all points of curvature/tangency
- Concrete valley gutters
- Flow arrows
- Horizontal curve data
- Existing ground profiles
- Top of curb profiles with grades (Elevations every 50' max.)
- Vertical curve data
- Legend and North Arrow
- Match lines with stationing

### **Storm Sewer Plan and Profiles:**

Note: Storm sewer plan and profiles may be included on street plan and profiles.

- Alignment/Assignment
- Horizontal curve data
- Inlets (w/top elevations in profile)
- Junction boxes
- Manholes
- Headwalls/endwalls
- Pipe sizes
- Pipe lengths
- Pipe grades (Elevations every 50' max.)
- Line designations
- Subgrade and ground profiles
- Water/wastewater crossings
- Design flows
- 25-year HGL's/100-year HGL's if storm sewer sized to contain 100-year
- North Arrow and Legend
- Street names
- Street curb lines
- ROW lines
- Lot Numbers
- Block letters

### **Channel Plan and Profiles:**

- Min scale 1"=50', 1"=5'V
- Channel cross-sections
- Existing ground profiles
- Flow line profile
- Top of bank profiles
- Design flows
- 25-year HGL
- 100-year HGL
- Culvert crossing details
- Ramp details
- Easements
- Concrete trickle channel as required

### **Grading Plans:**

- Min. scale 1"=50'
- Existing contours and lot corner elevations
- Proposed contours and lot corner elevations
- Proposed top of curb elevations opposite lot corners
- Proposed swales and typical cross sections
- Ultimate 25-year and 100-year flood plains
- Drainage area boundaries from overall drainage plan
- North arrow
- Street names
- Flow arrows
- Legend
- Fill specifications

### **Standard Details (Streets & Drainage):**

- Street cross-sections
- Curb and gutter
- Manholes
- Inlets
- E&S controls
- Barricades
- Sidewalk and curb ramps
- Concrete valley gutters
- Storm sewer bedding
- Junction boxes
- Headwalls/endwalls
- Driveway

### **Water Layout Plan:**

- Min. scale 1"=100'
- ROW lines and dimensions
- Lot lines
- Lot numbers
- Block letters
- Street names
- North Arrow
- Existing mains
- Proposed mains
- Main sizes and materials
- Valves
- Fittings
- Fire hydrants
- Services
- Taps/connections
- Easements and widths
- Main designations with stationing
- Curve data
- Design velocities at maximum day plus fire flow for peak hour
- Design maximum and minimum pressure
- Culverts, bridges, retaining walls and other structures
- Assignments
- Stubs for future areas
- Wastewater and storm sewer layouts in light lines
- Services
- Special utility crossing details

### **Water Main Profiles:**

- All mains larger than 8"
- Min. scale 1"=50' H, 1"=5'V
- Existing ground at the centerline of the main
- Proposed ground/subgrade at the centerline of the main
- Wastewater/storm sewer crossings with stations and elevations
- Main stationing, sizes and grades (w/stationing and elevations of all starting/ending points, intersections, valves, hydrants, etc. and, intermediate elevations every 50' max.)
- Culverts, bridges, retaining walls with stations and elevations

### **Wastewater Layout:**

- Min. scale 1"=100'
- ROW lines
- Lot lines

- Lot numbers
- Block letters
- Street names
- Existing mains
- Proposed mains w/stationing and line designations
- Manholes
- Cleanouts
- Existing contours
- Services
- Assignments
- Easements
- Stubs for future areas
- Water and storm sewer layouts in light lines

**Wastewater Main Profiles:**

- All mains
- Min. scale 1"=50' H, 1"=5'V
- Existing ground (as appropriate)
- Proposed ground/subgrade/top of curb
- Main sizes
- Main grades & lengths
- Manholes
- Cleanouts
- Water/storm sewer crossings
- Stationing and Manhole numbers
- Limits of concrete cap or pressure rated pipe where applicable

**Standard Details (Water & Wastewater):**

- Water/wastewater bedding
- Water service
- Wastewater service
- Manhole
- Drop manhole
- Cleanout
- Blocking
- Fire hydrant installation
- Valve installation
- Water service casing
- Valve box assembly

## **CONSTRUCTION PLAN NOTES**

## **GENERAL NOTES:**

1. All construction shall be in accordance with the City of Round Rock Standard Specifications Manual.
2. Any existing utilities, pavement, curbs, sidewalks, structures, trees, etc., not planned for destruction or removal that are damaged or removed shall be repaired or replaced at his expense.
3. The Contractor shall verify all depths and locations of existing utilities prior to any construction. Any discrepancies with the construction plans found in the field shall be brought immediately to the attention of the Engineer who shall be responsible for revising the plans are appropriate.
4. Manhole frames, covers, valves, cleanouts, etc. shall be raised to finished grade prior to final paving construction.
5. The Contractor shall give the City of Round Rock 48 hours notice before beginning each phase of construction. Telephone 218-5555 (Engineering and Development Services Department).
6. All areas disturbed or exposed during construction shall be revegetated in accordance with the plans and specifications. Revegetation of all disturbed or exposed areas shall consist of sodding or seeding, at the Contractor's option. However, the type of revegetation must equal or exceed the type of vegetation present before construction.
7. Prior to any construction, the Engineer shall convene a preconstruction conference between the City of Round Rock, himself, the Contractor, other utility companies, any affected parties and any other entity the City or Engineer may require.
8. The Contractor and the Engineer shall keep accurate records of all construction that deviates from the plans. The Engineer shall furnish the City of Round Rock accurate "As-Built" drawings following completion of all construction. These "As-Built" drawings shall meet with the satisfaction of the Engineering and Development Services Department prior to final acceptance.
9. The Round Rock City Council shall not be petitioned for acceptance until all necessary easement documents have been signed and recorded.
10. When construction is being carried out within easements, the Contractor shall confine his work to within the permanent and any temporary easements. Prior to final acceptance, the Contractor shall be responsible for removing all trash and debris within the permanent and temporary easements. Clean-up shall be to the

satisfaction of the City Engineer.

11. Prior to any construction, the Contractor shall apply for and secure all proper permits from the appropriate authorities.
12. Available benchmarks (City of Round Rock Datum) that may be utilized for the construction of this project are described as follows:

**TRENCH SAFETY NOTES:**

1. In accordance with the Laws of the State of Texas and the U. S. Occupational Safety and Health Administration regulations, all trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, shored, sheeted, braced or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project (will be provided by the contractor; are on sheet \_\_\_\_\_, etc.).
2. In accordance with the U. S. Occupational Safety and Health Administration regulations, when persons are in trenches 4-feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.
3. If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth and during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the Engineer notified immediately. Construction shall not resume until appropriate trench safety system details, as designed by a professional engineer, are retained and copies submitted to the City of Round Rock.

**STREET AND DRAINAGE NOTES:**

1. All testing shall be done by an independent laboratory at the Owner's expense. Any retesting shall be paid for by the Contractor. A City inspector shall be present during all tests. Testing shall be coordinated with the City inspector and he shall be given a minimum of 24 hours notice prior to any testing. Telephone 218-5555 (Inspections).
2. Backfill behind the curb shall be compacted to obtain a minimum of 95% maximum density to within 3" of top of curb. Material used shall be primarily granular with no rocks larger than 6" in the greatest dimension. The remaining 3" shall be clean topsoil free from all clods and suitable for sustaining plant life.

3. Depth of cover for all crossings under pavement including gas, electric, telephone, cable tv, water services, etc., shall be a minimum of 30" below subgrade.
4. Street rights-of-way shall be graded at a slope of 1/4" per foot toward the curb unless otherwise indicated. However, in no case shall the width of right-of-way at 1/4" per foot slope be less than 10 feet unless a specific request for an alternate grading scheme is made to and accepted by the City of Round Rock Engineering and Development Services Department.
5. Barricades built to City of Round Rock standards shall be constructed on all dead-end streets and as necessary during construction to maintain job and public safety.
6. All R.C.P. shall be minimum class III.
7. The subgrade material for the streets shown herein was tested by \_\_\_\_\_ and the paving sections designed in accordance with the current City of Round Rock design criteria. The paving sections are to be constructed as follows:

<u>Street</u>	<u>Station</u>	<u>Flex. Base Thickness</u>	<u>HMAC Thickness</u>	<u>Lime Stab. Thickness</u>
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The Geotechnical Engineer shall inspect the subgrade for compliance with the design assumptions made during preparation of the Soils Report. Any adjustments that are required shall be made through revision of the construction plans.

8. Where PI's are over 20, subgrades must be stabilized utilizing a method acceptable to the City Engineer. The Geotechnical Engineer shall recommend an appropriate subgrade stabilization if sulfates are determined to be present.

**WATER AND WASTEWATER NOTES:**

1. Pipe material for water mains shall be PVC (AWWA C-900, min. class 200), or Ductile Iron (AWWA C-100, min. class 200). Water services (2" or less) shall be polyethylene tubing (black, 200 psi, DR 9).
2. Pipe material for pressure wastewater mains shall be PVC (AWWA C-900, min. class 150), or Ductile Iron (AWWA C-100, min. class 200). Pipe material for gravity wastewater mains shall be PVC (ASTM D2241 or D3034, max. DR-26), Ductile Iron (AWWA C-100, min. class 200).



3. Unless otherwise accepted by the City Engineer, depth of cover for all lines out of the pavement shall be 42" min., and depth of cover for all lines under pavement shall be a min. of 30" below subgrade.
4. All fire hydrant leads shall be ductile iron pipe (AWWA C-100, min. class 200).
5. All iron pipe and fittings shall be wrapped with minimum 8-mil polyethylene and sealed with duct tape or equal accepted by the City Engineer.
6. The Contractor shall contact the City Inspector at 218-5555 to coordinate utility tie-ins and notify him at least 48 hours prior to connecting to existing lines.
7. All manholes shall be concrete with cast iron ring and cover. All manholes located outside of the pavement shall have bolted covers. Tapping of fiberglass manholes shall not be allowed.
8. The Contractor must obtain a bulk water permit or purchase and install a water meter for all water used during construction. A copy of this permit must be carried at all times by all who use water.
9. Line flushing or any activity using a large quantity of water must be scheduled with the water & wastewater superintendent, telephone 218-5555.
10. The Contractor, at his expense, shall perform sterilization of all potable water lines constructed and shall provide all equipment (including test gauges), supplies (including concentrated chlorine disinfecting material), and necessary labor required for the sterilization procedure. The sterilization procedure shall be monitored by City of Round Rock personnel. Water samples will be collected by the City of Round Rock to verify each treated line has attained an initial chlorine concentration of 50 ppm. Where means of flushing is necessary, the Contractor, at his expense, shall provide flushing devices and remove said devices prior to final acceptance by the City of Round Rock.
11. Sampling taps shall be brought up to 3 feet above grade and shall be easily accessible for City personnel. At the Contractor's request, and in his presence, samples for bacteriological testing will be collected by the City of Round Rock not less than 24 hours after the treated line has been flushed of the concentrated chlorine solution and charged with water approved by the City. The Contractor shall supply a check or money order, payable to the City of Round Rock, to cover the fee charged for testing each water sample. City of Round Rock fee amounts may be obtained by calling the Engineering and Development Services Department at 218-5555.
12. The Contractor, at his expense, shall perform quality testing for all wastewater pipe installed and pressure pipe hydrostatic testing of all water lines constructed and shall provide all equipment (including pumps and gauges), supplies and

labor necessary to perform the tests. Quality and pressure testing shall be monitored by City of Round Rock personnel.

13. The Contractor shall coordinate testing with the City of Inspector and provide no less than 24 hours notice prior to performing sterilization, quality testing or pressure testing.
14. The Contractor shall not open or close any valves unless authorized by the City of Round Rock.
15. All valve boxes and covers shall be cast iron.
16. All water service, wastewater service and valve locations shall be appropriately marked as follows:

water service	"W" on top of curb
wastewater service	"S" on top of curb
valve	"V" on face of curb

Tools for marking the curb shall be provided by the Contractor. Other appropriate means of marking service and valve locations shall be provided in areas without curbs. Such means of marking shall be as specified by the Engineer and accepted by the City of Round Rock.

17. Contact City of Round Rock Engineering and Development Services Department at 218-5555 for assistance in obtaining existing water and wastewater locations.
18. The City of Round Rock Fire Department shall be notified 48 hours prior to testing of any building sprinkler piping in order that the Fire Department may monitor such testing.
19. Sand, as described in Specification item 510 pipe, shall not be used as bedding for water and wastewater lines. Acceptable bedding materials are pipe bedding stone, pea gravel and in lieu of sand, a naturally occurring or manufactured stone material conforming to ASTM C33 for stone quality and meeting the following gradation specification:

<u>Sieve Size</u>	<u>Percent Retained By Weight</u>
1/2"	0
3/8"	0-2
#4	40-85
#10	95-100

20. The Contractor is hereby notified that connecting to, shutting down, or terminating existing utility lines may have to occur at off-peak hours. Such hours

are usually outside normal working hours and possibly between 12 a.m. and 6 a.m.

21. All wastewater construction shall be in accordance with the Texas Commission on Environmental Quality (TCEQ) Regulations, 30 TAC Chapter 213 and 317, as applicable. Whenever TCEQ and City of Round Rock Specifications conflict, the more stringent shall apply.

#### **TRAFFIC MARKING NOTES:**

1. Any methods, street markings and signage necessary for warning motorists, warning pedestrians or diverting traffic during construction shall conform to the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.
2. All pavement markings, markers, paint, traffic buttons, traffic controls and signs shall be installed in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges and, the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest editions.

#### **EROSION AND SEDIMENTATION CONTROL NOTES:**

1. Erosion control measures, site work and restoration work shall be in accordance with the City of Round Rock Erosion and Sedimentation Control Ordinance.
2. All slopes shall be sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.
3. Silt fences, rock berms, sedimentation basins and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Such installation shall be regularly inspected by the City of Round Rock for effectiveness. Additional measures may be required if, in the opinion of the City Engineer, they are warranted.
4. All temporary erosion control measures shall not be removed until final inspection and approval of the project by the Engineer. It shall be the responsibility of the Contractor to maintain all temporary erosion control structures and to remove each structure as approved by the Engineer.
5. All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.