

# Plan Submittal Requirements

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## **PLAN SUBMITTAL REQUIREMENTS**

Site development plan review is an integral component in the City’s administrative process that enforces standards and regulations on private development and land use. Depending on your plans, development review can comprise several separate approval processes and can involve as many as ten different City Departments. This step by step guide discusses the plans and supporting documents required for concept and detail plans, specific use permits, and preliminary and final plats. Construction plan setup requirements are also discussed. Eight appendixes are provided with supporting documents you may need.

This guide is not intended to provide every technical detail. Always check with the appropriate staff member and review the Development Guide before you begin. If anything in this guide is in conflict with any code, regulation or other requirement, code, regulation or other legal requirement, it supersedes the information presented herein.

### **1.1 Concept Plan**

When an exhibit is provided with a request include a vicinity map, locate and label rights of way, easements, street names, proposed access points, flood plains, and notable site features.

### **1.2 Specific Use Permit and Site Plan**

Specific Use Permit request typically require a site plan. Staff site plan reviews focus on the land use, arrangement of improvements, relationship with adjoining properties, delivery of city services, site drainage and construction issues. Site plans to be used in construction of public and private improvements must be accurately and legibly drawn to scale with dimensions of existing and proposed features including but not limited to:

- rights of way, easements, property lines,
  - paving, sidewalks,
  - on- and offsite improvements,
  - ground mounted equipment and structures
  - flood plains, detention ponds,
  - grading and drainage improvements with exact points of connection to the public system,
- and
- public water and sanitary sewer lines indicating exact points of connection.

Standardization facilitates quicker reviews and approvals. Please include all applicable site plan elements identified in the [Site Plan Elements Checklist](#) in Appendix 1 on your site plan to be used for construction.

### **1.3 Planned Development District / Detail Plan**

Most Planned Development Districts also require a Detail Plan. When required, it becomes part of the ordinance with specific conditions and stipulations approved by Plan Commission and City Council. It is important that the Detail Plan identify and locate existing and proposed rights of way, drainage facilities, flood plains, landscape buffers, utility lines and easements, since these features have a strong influence and often dictate the placement of structures, parking, and other permanent site improvements.

In order to properly evaluate the Detail Plan, schematic utility and drainage drawings are required. Basically, the schematic shows the project can work with the existing infrastructure or if it can't, it identifies any needed on- or offsite improvements. The schematics, while not to the level of detail of construction drawings, allows staff the means to assess the project's potential impact on surrounding properties, infrastructure and flood plains. The importance of these plans cannot be overemphasized. Frequently, inadequate schematics are detrimental to all succeeding project phases.

Staff may waive the need for certain aspects of the schematic plans. This occurs when a development's impact on surrounding infrastructure and other properties are minimal; or when the adequacy of existing infrastructure is not in question.

Submit 4 complete sets of schematic plans to the Engineering Department at least one week prior to submitting an application to the Planning Department.

#### **1.3.1 Schematic Plan General Requirements**

Plans must be accurately drawn to an Engineer's scale with a minimum text height of 0.10 of an inch. Plan sheets shall be 24"x36" bordered sheets. Provide a title block in the lower right corner of the sheet showing subdivision name, lot / block, Engineers name, phone number, address, email, and scale. Plan layout, graphics and notes must be presented in a clear and uncluttered manner acceptable to the Engineering Department.

All schematic plans shall include:

- A case number and vicinity map, including north arrow, clearly showing the project location.
- Provide a legend on all plan sheets and/or identify symbols on all plan sheets used on the drawing.
- Locate and label landscape buffers, property boundaries, ownership, right of way, common areas and maintenance entity, and topography on and within 50 feet of the project. Two foot contour interval topographic maps are available from the Engineering Department Records Division for a small fee.
- Locate and label existing and proposed water, storm, and sanitary sewer lines on and within 50 feet of the project. Identify sizes, alignments, easements with recording information, appurtenances, all non-city utility line alignments and easements with recording information; note

conflicts. Locate and label offsite drainage and utility lines with proposed easements that will be required to service the development.

- Locate and label future streets, water lines, and storm and sanitary sewer improvements near the development as defined in the City's current Capital Improvement Program, Major Thoroughfare and Master Utility Plans.
- Development requiring phasing, indicate how each phase can exist as a stable independent unit consistent with Code provisions for providing safe access and City services.

Usually record drawings are needed to properly complete this phase, the Engineering Department has these and two foot contour interval topographic maps, along with locators for existing water, sewer, and storm sewer lines. These are available from 8 am to 5 p.m. on a walk-in basis at our office at 800 Main Street on the 3<sup>rd</sup> floor. There is a small fee for printing each record drawing, topographic map and locator. Plans are not pulled ahead of time; an Engineering technician will assist the Developer's Engineer with copying drawings.

### **1.3.2 Water and Sewer Capacity Analysis**

Capacity analysis for water systems shall define the development's peak hourly demand in gallons per day and fire flow requirements. State the source of the domestic and fire flow quoted, such as the latest edition of the International Building and Fire Codes, industry specific historical data, or other authoritative source. Contact the Water Manager at 972-205-3209 to set up fire hydrant flow test.

In the absence of historical and existing flow data, all capacity analyses shall use the daily wastewater flow – gallons per person and other generally accepted parameters established by the Texas Commission on Environmental Quality. The analysis must verify that the existing trunk lines can handle the increased demand generated by the proposed development.

Include a service area map of the trunk line(s) servicing the development. Define on the service area map the peaking factor, infiltration/inflow contribution and fully developed population used. Determine and define on the service area map the average daily and peak domestic flow in gallons per day in the trunk main and projected contribution generated by the development. Note and provide supporting exhibits and references for variables assumed and used. Identify any existing or projected major commercial / retail, industrial, and institutional contributors if present or proposed within the service area. Capacity and velocity calculations ( $\geq 2$  fps) shall be based on the sewer flowing half full for line segments less than 12-inch in diameter, and two-thirds full for larger lines.

Indicate on the service area map any improvements to be made by the Developer that may be necessary to existing facilities that are affected by the proposed development. Proposed Developer installed utility lines shall be designed using fully developed conditions and the City's Master Utility Plans.

### **1.3.3 Schematic Drainage Plan and Capacity Analysis**

- Include an engineer-scaled drawing showing the topography of the property on and within 50 feet of the development, along with all other applicable information defined in this section. Two foot contour interval topographic maps are available from the Engineering Department's Records Division for a small fee.

- Provide a drainage area map for pre- and post-developed conditions; where applicable include offsite contributing areas.
- Locate and identify existing and proposed drainage patterns, storm sewer layout, sizes, inlets, retaining walls, total additional imperviousness, 100-year runoff entering and leaving the site and disposition of the stormwater runoff before and after development. Where applicable label public and private storm sewer segments.
- Be advised, the Code of Ordinances stipulates that building finish floors must be a minimum of 2 feet above the top of curb at the lowest point of primary drainage. The analysis must show that the development will be reasonably safe from flooding during the 100-year storm.
- Define how the existing system will function under the new loading.
- Where required, show the location and preliminary sizing of offsite improvement required to connect to the public drainage system, including any easement needs.
- Locate and label any amenity, retention and detention pond(s), easement(s), and outlet structure(s), include preliminary sizing calculations. Define water quality enhancement feature and probable location; provide dimensional control from property lines.
- Plot and label the FEMA effective 100-year flood plain, reclamation areas, ditches, creeks, ponds, wetlands, and mitigation areas on and within 100 feet of the development. For development along Rowlett and Spring Creek, use the 100-year fully developed flood plain per the 1988 Rowlett and Spring Creek Flood Plain Management Study.
- If flood plain reclamation is proposed provide bound copies and a compact disk of the effective, pre- and post-project computer models along with all supporting information such as cross sections, profiles, and work maps.
- The City of Garland requires changes to the effective FIRM maps and FIS documents if any of the following occurs as a result of proposed work in a designated 100-year flood plain:
  1. A change in water surface elevation
  2. A change in the floodplain boundaries
  3. A physical change to the hydraulic model (e.g., fill or excavation, roadway, structures).

The Developer is solely responsible for obtaining any necessary conditional letter of map revision (CLOMR), letter of map revision (LOMR), and/or letter of map amendment (LOMA) approval from FEMA. FEMA charges a review fee for processing these requests. Contact FEMA for current rates and submittal requirements.

### **1.3.4 Environmental Feature Assessment**

Environmental feature assessments shall include a delineation of onsite flood plains, creeks, seeps, springs, steep slopes, significant tree clusters, landfills, underground storage tanks, archaeological features, wetlands and Waters of the U.S. This information does not need to be on a separate sheet.

Keep in mind, State and Federal permits may be required when developing property particularly when development occurs within the floodplain, along Waters of the U.S. or on property containing wetlands. Define whether State or Federal permits are expected. It is critically important that you contact State and Federal agencies early in the process so their requirements

can be incorporated into your development plan and schedule. While staff will attempt to inform you what permits may be required it is your responsibility to comply with all State and Federal regulations.

### **1.3.5 Traffic Impacts/Major Thoroughfare**

Indicate the location of local, collector and arterial streets within and adjacent to the development, define right of way widths, access points to abutting streets and site visibility triangles. Identify proposed right of way dedications required by the Major Thoroughfare Plan.

### **1.4 Permitted Use**

A project on land that is already platted and the use is permitted may submit plans for Site and/or Building permit construction plan review. Generally, these projects fall into four main categories;

1. Less than 5,000 square feet land disturbance, with no new utility connection;
2. Less than 5,000 square feet land disturbance, with new water, sanitary sewer, or storm sewer connections in public rights of way or easements;
3. Greater than 5,000 square feet but less than one acre land disturbance, with no new utility connection; and
4. Greater than 5,000 square feet land disturbance with new water, sanitary sewer, or storm sewer connections in public rights of way or easements.

Category 1 and 3 projects are permitted through the Building Inspection Department. Category 3 projects require a [stormwater pollution prevention plan](#), see Appendix 1 for guidance. These projects are routed to the Engineering and Stormwater Departments from the Building Inspection Department for stormwater and grading plan reviews. Submit Category 2 and 4 projects directly to the Engineering Department for interdepartmental construction plan review for Site Permit. Review pre-submittal notes and chapter 4 for the information to include in your initial submittal.

### **1.5 Preliminary / Final Plats**

Platting allows for the subdivision of land and allows public infrastructure to be planned in a comprehensive manner. A plat is a legal document, complete with a drawing and written description of property boundaries, easements, owner's certificate, approval statements and signatures. Dedication language for public improvements is shown. It becomes part of the public record through recordation in the Dallas County Clerk's office. Consult the Planning Department and City Surveyor checklist for plat submittal requirements and schedules.

Properties must be platted in order to obtain a Site or Building Permit in the City of Garland. When these permits are required submit five complete sets of public works and site engineering construction drawings to the Engineering Department at least one week prior to submitting a platting application to the Planning Department.

Final approval of construction plans is not necessary in order for a plat to be considered for placement on the Plan Commission Agenda for approval, but the exact alignment and dimensions for all rights of way, utility and drainage easements to be dedicated must be established and approved by all development review departments. The construction plans must clearly demonstrate that the site has access to a public right of way and water, sanitary sewer and drainage infrastructure are adequately sized to serve the project. In addition the plans must show that the proposed project will not create adverse impacts on adjacent properties, flood plains, and existing public infrastructure.

When an offsite improvement and easement are required provide exhibits, metes and bounds description with your initial plan submittal. Plan ahead, securing and coordinating approval of offsite easements takes time. Plats are not allowed on the Plan Commission agenda without recording information for offsite easements. The same goes for abandonment's, utility release letters are required and, where applicable, City Council abandonment resolution number must be shown on the plat.

Since the plat is a legal document, revising it is not easy. Accuracy is critical, double-check all metes and bounds descriptions. The Developer's Surveyor/Engineer is responsible for ensuring that the plat matches the proposed easements shown on the public works and site engineering construction plans. Compare utility, drainage and street construction plans with the plat and make sure all easements are properly reflected. Double check platting checklists and insure all requirements of the City surveyor are met.

Sidewalk escrow and right of way and easement abandonment are processed in conjunction with or prior to platting, the Engineering Department handles these items.

### **1.5.1 Sidewalk Escrow**

Section 31.28 of the Code requires that in instances where a request for sidewalk waiver is approved by Plan Commission, that the applicant pay the City an amount equal to the estimated cost of constructing a standard width sidewalk on straight and level terrain equal to the linear footage waived. The Engineering Department uses the unit cost from the City's annual concrete contract to calculate sidewalk escrow. Sidewalk escrow must be paid prior to approval of a plat.

### **1.5.2 Right of Way and Easement Abandonment**

Public right of way and easement abandonment is the process by which the City gives up the public interest in rights of way or easements. All abandonment requires a pre-submittal meeting to initiate the process and is subject to a public hearing before City Council. Rights of way and easements are dedicated to the City and are City property. Only the City Council can formally abandon City of Garland right of way or easements. State law requires that a fair market value is received for abandoned rights of way and easements.

Documents required for easement or right of way abandonment are:

1. Letter to the Director of Engineering requesting abandonment of City right of way or easement, reference case number on all correspondences and submittals.
2. Include a plat or boundary survey showing the area requested for abandonment and all contiguous lots, recorded owners and any easements or public facilities contained in the area for which abandonment is requested.
3. After review of the request, the Director may direct the applicant to complete the Application for the Vacation / Abandonment of Right of Way or Easement form in [Appendix 8](#). The application shall include but not limited to a metes and bounds description of the area to be abandoned signed and sealed by a registered professional land surveyor in the state of Texas, defining all existing easements. When necessary, provide a separate drawing locating and labeling on the ground locations of all contiguous and intersecting public and private utility lines, structures etcetera within the abandonment area.
4. Letters of consent from all public utility companies.
5. Consent from all abutting and impacted property owners when applicable.

Rights of way or easements may have been obtained using different methods, including by plat, deed, and separate instruments. In some instances, easements can be abandoned by platting or re-platting. Typically this occurs when easements have been granted for public infrastructure but never installed or accepted by the City. In these instances, the applicant simply follows the platting procedure as required by the Planning Department.

Sometimes, a license agreement may be more appropriate, if the request only involves minor encroachments, see [Appendix 5](#) for more information.

## **2 CONSTRUCTION PLAN SET UP REQUIREMENTS**

The Engineering Department is the custodian of all public works and private subdivision improvement plans in perpetuity. As the City moves to archiving plans digitally it is important that some degree of uniformity is maintained. The objective of the plan set up requirements is to provide uniformity and standardization of plan submittals while allowing the design engineer flexibility on how information is presented. Standardization of information along with uniformity in setup allows the review process to occur in a more orderly and timely fashion leading to quicker plan approvals.

Public works and site engineering construction plans shall be digitally drawn. North should be to the top or right of the sheet, and stationing left to right unless the sheet orientation with respect to North will not permit. Where modifications to existing roads and utilities are proposed, “screened or ghost lined” existing features. Use heavy bold lines to indicated new improvements with appropriate notes and symbols. Located and label the type, size, and location of all underground utilities along with easement alignment, dimension and description.

Use the level list and line types below in all CAD files. For projects with extensive public infrastructure improvements, our preference is to have separate files for sanitary sewer, water and storm sewer systems.

### **2.1 CAD Layer / Level List**

Name	Layer Name	Level	Line Type
ROW	Right of Way	14	Property
Property Line	Property Line	13	Property
Lot Number	Lot No	5	Continuous
Block Number	Block No	6	Continuous
Bdry Text	Boundary Text	4	Continuous
Alley ROW	Alley Right of Way	1	Property
Street Text	Street Text	3	Property
Storm Esmt	Storm Easement	45	Hidden
Util Esmt	Utility Easement	10	Hidden
Sew Esmt	Sewer Easement	37	Hidden
Wtr Esmt	Water Easement	27	Hidden
Dimensions	Dimensions	7	Continuous
Hatching	Hatch	50	Patterns
General Notes	Notes	8	Continuous
Ctr Line ROW	Center Line ROW	11	Continuous

### **Utilities**

Name	Layer Name	Level	Line Type
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WTRLINE	Water Line	1	Solid
WTRTXT	Water Text	31	Solid
WTRFH	Water Fire Hydrant	3	Solid
WTRMTR	Water Meter	10	Solid
WTRVAL	Water Valve	2	Solid
WTRTEE	Water Tee	5	Solid
WTRSRV	Water Service	4	Solid
SSLINE	Sanitary Sewer Line	1	Solid
SSTXT	Sanitary Sewer Text	31	Solid
SSMH	Sanitary Sewer Manhole	2	Solid
SSCO	Sanitary Sewer Cleanout	3	Solid
SSSRV	Sanitary Sewer Service	4	Solid
STMLINE	Storm Sewer Line	1	Solid
STMTXT	Storm Sewer Text	31	Solid
STMMH	Storm Sewer Manhole	2	Solid
STMINLET	Storm Sewer Inlet	3	Solid
STMLAT	Storm Sewer Lateral	10	Solid
STMSTRU	Storm Sewer Structures	22	Solid

## **2.2 Sheet Size and Cover Sheet**

All construction plans for the extension of City of Garland water, sanitary sewer, street and storm sewer shall be legible and neatly drawn on either 22" x 34" or 24"x36" bordered sheets. The plan shall state the size of the sheets in lower right corner. Include a cover sheet with a project name, case number, owner / Developer and engineering firm name, address, email, phone number, vicinity map, sheet index and [standard general notes](#) (Appendix 2). On the vicinity map relate the project to streets and other prominent geographic features. A sheet index is required when plans have two or more sheets. Blacklines work best.

## **2.3 Drawing Scales**

Use commonly used scales on drawings such as **1" = 10', 20', 30', 40', 50', 60', 100', and 200'**. Do not use drawing scales such as 1", 1/8", 1/16", etc. Drawing scales are typically 1 inch = 40 feet horizontal for plan views and profiles 1 inch = 4 feet vertical. Schematic utility plans and drainage area maps can be at a larger scale.

## **2.4 Text Size and Line Weights**

All text including labels, dimensions, instructions, spot elevations, and notes shall be a minimum height of 0.10 inches. Lettering must be in sharp contrast to the background on the original. Detail titles are recommended to have bold type font with a height of 0.20 inches or larger. Eliminate and/or minimize overlapping text. Instructions and notes must be legible when plans are reduced by 50%. Shading and hatching is allowed only if the design intent, instructions, notes, and details are able to be seen beneath. Maximum solid shading should be less than or equal to 20%.

## **2.5 Title Blocks**

Locate in the lower right hand corner of all sheets except the cover sheet; indicate sheet title, project / subdivision name, lot, block, case number, Developer and engineering firm name, address, and phone number, sheet number, scale and date. Revision block and email address are optional.

## **2.6 Benchmarks**

A primary and secondary onsite benchmark shall be shown on all plan sheets with elevation information. Contact the [City Surveyor](#) prior to beginning topographic work for a list of available benchmarks. Benchmark/Geodetic Control information is also available on the NGS website and City of Garland websites, [www.ngs.noaa.gov/cgi-bin/datasheet.prl](http://www.ngs.noaa.gov/cgi-bin/datasheet.prl) and [www.ci.garland.tx.us](http://www.ci.garland.tx.us). All benchmarks shall be tied to National Geodetic Survey (NGS) or City of Garland geodetic monuments. Include metadata in descriptions, NAVD88 or (NGVD29 – with conversion to NAVD88 shown) datum with monument identifier when available.

## **2.7 Record Drawings Request**

The Engineering Department has record drawings and two foot contour interval topographic maps, along with locators for existing water, sewer, and storm sewer lines. These are available from 8 am to 5 p.m. on a walk-in basis at our office at 800 Main Street on the 3<sup>rd</sup> floor. There is a small fee for printing each record drawing, topographic map and locator. Plans are not pulled ahead of time; an Engineering technician will assist the Developer's Engineer with copying drawings.

## **2.8 Seal/Signature**

Refer to the Texas Engineering Practice Act and Board Rules, 1001.401, Use of Seals, regarding sealing requirements for engineering work. All plans released for Site Permit shall be sealed with the wet signature and date of the licensed state of Texas Professional Engineer under whose direction the plans were designed. The Engineer affixing his/her seal to the construction plans attest that they have reviewed and elect to use the City of Garland Standard Construction Details and specifications and they are applicable for the project and site conditions.

## **2.9 Reports**

Reports shall be typed, legible, and prepared on 8 ½ inch by 11 inch paper. Each submitted report must be complete onto itself with all supporting calculations, figures, maps, and tables included. Staple or bound all sheets and exhibits comprising the report. Loose-leaf three ring binders are not acceptable. Provide a table of contents with page numbers for lengthy reports having more than 10 pages. Re-submittals shall include the most recent redlined report with the design professional's written response referenced to the comment and page number in the report.

## **3 CONSTRUCTION PLAN REQUIREMENTS FOR SITE PERMIT**

This chapter describes minimum requirements for public works and site engineering construction plans for Site Permit.

ALL PLANS MUST be to a level of detail sufficient to show that the site has:

- Adequate fire protection;
- Adequate ingress / egress to a public right of way;
- Water and sanitary sewer service can be provided;
- Existing and proposed drainage and grading defined;

- Existing and proposed utility and drainage easements defined;
- Traffic circulation and right of way dedications defined; and
- Provisions for stormwater detention where required.

The proposed project must be designed to minimize exposure of the subdivision and surrounding property to flood damage and provide adequate utility service as required by Chapter 31 of the Code. Although staff reviews plans for these issues, the project Engineer is ultimately responsible for the accuracy, completeness and conformance with City ordinances, policies and standards. The City's review is limited to the facts as presented on the submitted plans. The City has no project engineering responsibility and will not provide any specific design instructions. The Engineer sealing the plans is responsible for the accuracy and completeness of the documents submitted for review. The City reserves the right to require corrections for actual field conditions which are found to be different or information omitted on the plans.

**Submit 5 sets of private development plans for interdepartmental routing directly to the Engineering Department at 800 Main Street, on the 3<sup>rd</sup> Floor. Include all applicable sheets below stapled together with your first and all subsequent submittals.** Subsequent submittals may require additional plans and details where warranted. In order to avoid common errors and omissions use the [Plan Completeness Checklist \(Appendix 1\)](#) and the Top 20 list of Repetitive Comments provided at your Presubmittal meeting prior to making a submittal, hyperlinks are provided to the specific sections of the checklist.

- Cover Sheet, [see Section 2.2](#) and [standard cover general notes, Appendix 2](#) for items to include.
- Plat or working version thereof showing all land reserved or dedicated for future public use including all easements and street right of way. See the Planning Department and Sections 31.03 through 31.06 of the Code for specific information to be shown.
- For nonresidential developments - provide Site / Dimensional Control Plan showing existing and proposed items in the [Site Plan Element Checklist](#). On small to medium sized projects, it is common to have the paving plan on the site plan. If so specify fire lane and parking pavement thickness, reinforcement, and subgrade treatment.
- [Paving plans](#) – provide plan and profile for all proposed public and private streets and alleys with typical sections. Specific requirements can be found in Code section's 31.25 and 31.26 and in Chapter 33, Transportation Article V VI and VII. Sidewalks are required unless waived by the Plan Commission see section 31.28.

Street profiles shall include centerline elevations at least at every 50 feet; vertical curve information including station and elevations at PVC's, PVI's, PVT's, crest / sag station and elevation.

- [Water](#) and [sanitary sewer](#) plans are reviewed for compliance with Chapter 31 of the Code Article III and Article IV and Texas Commission on Environmental Quality (TCEQ) regulations and the Public Works Design Guidelines. Locate and label all known existing and proposed public and private utilities with appurtenances, ground mounted equipment, poles, signs, fences, and walls, etcetera located on and within 15 feet of the project that may affect construction.

Define meter usage whether domestic or irrigation and where applicable, locate and label backflow prevention devices and Fire Department connections. All public sanitary sewers must

be profiled showing direction of flow, grades, diameters, manhole station(s), rim and pipe invert elevations, and any other information relevant to the design. Provide profile for private sanitary sewers when crossing a public water or storm sewer line, profile water mains 12-inch and larger.

Where good planning dictates water and sewer lines are required to be stubbed out to the subdivision extremities to facilitate future extensions as described in Code section 31.59.

❑ [Grading](#) plans shall be of sufficient clarity to fully indicate the extent of the work proposed and shall show in detail, work conforms to all applicable standards and regulations. A licensed Professional Engineer in the State of Texas shall provide and seal grading plans. Ideally, grading plans will have 1-foot contours and show existing and proposed contours, including those on adjacent properties within 50 feet of the project site sufficient to show existing and proposed drainage patterns, finish floors, and pad elevations tied to the City of Garland/FEMA benchmark network. Grading and drainage plans may be combined for flatland one and two family developments. Refer to section 31.24(B) of the Code for further information. Contact the [City Surveyor](#) for benchmark information.

❑ [Drainage](#) plan design shall demonstrate that the stormwater run-off from the property will not create an adverse impact to existing public storm sewers or neighboring properties. The design must demonstrate how and the means by which post development surface water runoff is disposed of to a point of legal outfall. The Engineering Department's long-standing policy is to require storm sewer systems to capture and convey the 100-year event's surface water runoff using the rainfall intensity duration frequency curves and "c" values shown in the Public Works Design Guidelines. Provide a drainage area map including offsite contributing areas. Locate and label existing and proposed topography and drainage features on and within 50 feet from the property. Provide / show runoff, inlet and pipe calculations using standard area, inlet, and pipe calculation charts.

Storm sewer profiles are required for all public lines; provide private line profiles when crossing public water and sanitary sewer lines.

❑ [Stormwater Pollution Prevention Plan \(SWPPP\)](#). EPA Region 6 has endorsed and the City has adopted North Central Texas Council of Governments manual titled "Stormwater Quality Best Management Practices (BMP) for Construction Activities" which provides technical guidance and design methodologies to assist applicants in determining appropriate structural and non-structural BMP's to comply with current regulations. Call 817-640-3300 to order a BMP manual. Include all NCTCOG SW3P details that are applicable to the project. These are available at <http://www.dfwstormwater.com/construction/>.

For developments between 5,000 square feet and 1 acre disturbed area, complete and include City of Garland standard Erosion Control Sheets 1 through 3. For sites that have a disturbed area of one acre or more, complete and include City of Garland standard SWPPP sheets 1 through 5. Any project 5.0 acres and larger requires a Notice of Intent (NOI) to be sent to the Texas Commission on Environmental Quality (TCEQ) by the owner and general contractor. Provide copies of each NOI to the Engineering Department.

Please be advised that pre-construction meetings will not be scheduled if the SW3P sheets are not properly completed and signed. Direct questions concerning erosion control plans to the Stormwater Management Department at (972) 205-2189.

[Detention](#) is required per the Code section 31.36 when a downstream storm sewer system is not adequately sized to convey the increased runoff generated by a private development using current design criteria and in areas abutting the Spring Creek Forest Preserve and its ecological boundary, north of Spring Creek. Section 31.36 contains design and maintenance requirements for detention basins in the City.

The modified rational method can be used to size detention ponds for contributing drainage areas up to 25 acres. The unit hydrograph method must be used above 25 acres. A multi-staged orifice, weir and/or combination of outlet types shall be provided at the detention pond outlet to release the pre-development 10- and 100-year runoff generated by the site. Provide a stage storage table for the pond and a stage discharge table for the outlet structure.

All detention basins must include provisions to improve stormwater quality. Water quality enhancement measure shall be designed using the 1-year, 6-hour duration storm with an intensity of 0.35 inches per hour as defined in *"iSWM Design Manual for Site Development, Appendix A"*, January 2006. Industry standards have determined holding the first 1 inch of rainfall over a 24 hour period is the minimum time necessary to permit settlement of the suspended solid particles 100 microns or larger. Consult the excerpt in [Appendix 4](#) from the *"North Central Texas Council of Governments Residential/Commercial BMP manual"*, Section 5 Treatment Controls for accepted methods.

An Operation and Maintenance Manual is required for all ponds including amenity ponds (see example in Appendix 5). Plans must include the Detention Basin General Notes provided in Appendix 5. The criteria established by the State of Texas for dam safety and impoundment of state waters shall apply where required by the state, and where the Engineering Department deems necessary due to potential hazards.

Dam Safety, State regulations:

A Dam is defined as any barrier that impounds liquid and has a height greater than 6 feet. *This includes detention structures.* The height is measured from the downstream toe to the lowest top of the dam. In order to build a dam TCEQ requires plans, notification to TCEQ upon start of construction, certificate of completion, and monthly progress reports. While there is no State permit for a dam there is a required permit for water use. If water is impounded in Texas there must be a water impoundment permit. This permit is not easy or quick. Allow a year for approval. Dams must be designed to consider the Probable Maximum Flood (PMF). The PMF is the flood that can be expected from the most critical combinations of meteorological and hydrologic conditions that are reasonably possible for a given watershed. A guidance document is available on the TCEQ website.

For nonresidential developments, provide an [Impervious Area Status Sheet](#), Appendix 3.

Special detail sheets are required for any construction items not found in the City's Standard Construction Details.

Include the following plans and reports when applicable:

Tree Survey and Tree Preservation Management Plan.

❑ Landscape and Irrigation plan, at a minimum locate and label existing and proposed easements and rights of way; denote and dimension landscape buffer, interior landscape areas, visibility triangles and detention pond where applicable.

No trees, posts, columns, fences or other features are allowed within City utility easements. However, it is generally understood these may cross utility lines in a perpendicular manner.

❑ Screening wall plan, denote and locate screen walls, entryways, and live screening in relation to rights of way and easement. Specify column and post placement. Define visibility triangles and easements where applicable.

❑ Retaining wall details for walls exceeding 48-inches.

❑ Left and right turn lane paving and lane marking plan with traffic control and construction sequencing on a separate sheet.

❑ Traffic control and construction sequencing when an open cut is proposed in an existing public street. Comply with the latest Texas Manual of Uniform Traffic Control Devices.

❑ Offsite utility plans and easements. The minimum width of a drainage easement is 20 feet and the minimum width of a utility easement is 15 feet. Additional easements may be required for deep lines.

❑ Backwater analysis when development abuts an open channel. Modifications to the Federal Emergency Management Agency (FEMA) flood plain are forwarded to FEMA, complete the [Flood Plain Development permit form](#) number 1, 2, and 3 in Appendix 8 per Article VIII of the Code. The analysis and letter report must be bound and sealed by a licensed Engineer in the State of Texas, include effective and post-project Flood Insurance Rate Map, pre- and post project floodway and backwater models with the 10, 50, 100 and 500-year flood profiles, cross section plots, comparison tables, and flood plain work map with delineation of the pre and post project flood plain and floodway. Contact Nathan D. Meier Engineering at (214) 739-4741 for existing hydraulic models within the City of Garland.

Developments along Rowlett and Spring Creek flood plains must use the 100-year fully developed discharge as computed in the 1988 Rowlett and Spring Creek Flood Plain Management Study. No increase in the 100-year fully developed water surface elevation or decrease in flood plain valley storage of more than 15% is allowed along Rowlett and Spring Creek.

The City of Garland requires that changes be made to effective Flood Insurance Rate Maps (FIRM) maps and Flood Insurance Study (FIS) documents if any of the following will occur as a result of the proposed work in a designated 100-year flood plain:

1. A change in water surface elevation
2. A change in the 100-year flood plain or floodway boundaries
3. A physical change to the flood plain and effective hydraulic model. (e.g., fill or excavation, roadway, structures)

Where a floodway is being impacted, the applicant must submit and obtain approval from [FEMA](#) for a conditional Letter of Map Revision prior to construction in the floodway.

The Developer is solely responsible for obtaining the necessary CLOMR, LOMR, and/or LOMA. FEMA charges a review fee for processing these requests. Contact FEMA for current rates and submittal requirements. Plan ahead, flood study approvals from FEMA can take three to nine months after the City approves the study.

Geotechnical Report with first submittal, verifying the use of the City's standard paving and subgrade specifications for the given site conditions. Construction plans should indicate where special construction is required because of unfavorable subsoil conditions.

### **3.1 Special Details**

The City of Garland Engineering Department standard details must be referenced for typical construction items. Where special construction procedures or structures are required, special detail drawings are required.

1. All detail drawings shall be drawn to scale in order to allow the ability to see spatial relationships of the various elements in the detail.
2. Special detail drawings shall contain adequate dimensions, sections, views, notes, and instructions to construct the structure, or permit preparation of detailed shop drawings by a fabricator when necessary.

## 4.1 Appendix 1 - Plan Completeness Checklist

The intent of this checklist is to minimize redline comments on plans submitted for Site Permitting and to maintain consistency amongst plan reviewers. The checklist is not meant to be totally inclusive of all possible items that may be needed for proper review and approval, but depicts ordinance requirements and other commonly requested items. Plan approval, and ultimately issuing of the Site Permit depends on compliance with the comments made on the check prints and this checklist. The Engineer or record shall satisfy themselves of the completeness and accuracy of the design. The City may use a modified form of this checklist to indicate where submittals are inadequate rather than providing a detailed redline plan.

<u>Project Name</u>	<u>CASE No.</u>
(X) Required	(√) OK (N/A) Not Applicable

### 4.1.1 General Information

- Recommended sheet layout: 1. Cover w/general notes 2. Plat, 3. Site Plan / dimension control, 4. Paving, 5. Grading, 6. Drainage 7. Water & sewer, 8. Stormwater pollution prevention, 9. Special details.
- Provide cover sheet w/ plans having two or more sheets w/ recorded subdivision name (lot/blk) prominently shown, case number, sheet index, vicinity map, north arrow, graphic scale, owner, design firm and general notes.
- Standard sheet size, 24"x36", with north arrow, graphic scale, title block defining project / sheet name, name of subdivision lot/block, design firm, owner, contact information, case number.
- Identify benchmarks used including primary and secondary/onsite.
- Include legend w/ drawing symbols used with explanations.
- Are improvement plans presented in an uncluttered manner with clear instructions and notes? Plans depict:
  1. Where improvements go and how they fit in w/ existing conditions and how each piece is built.
  2. Fully indicating the extent of work necessary to create the desired finished product.
  3. Plans show in detail, work conforms to the City's standard construction details with accurate dimensions, and computations to support the issuance of Site Permit.
  4. Prepared at a legible scale and readable at 50% reduction clearly displaying the Engineer's seal.
- Look at the Big Picture, identify and insure design addresses the following questions:
  1. Any foreseeable hazards / adverse conditions affecting end user's safety impairing use and enjoyment of property?
  2. Is Right of Way (ROW) construction subject to cause public interruption and inconvenience?
  3. Are future extensions of water and sanitary, and storm sewers possible?
  4. Identify any conflicts w/ other utilities? Are adjustments required? If so reflect and provide instructions on plans.
  5. Will the project create drainage problems downstream and upstream?
- Provide special details for construction items not covered in the City's standard construction details.
- Is site adjacent to imminent TXDOT, County or City project? Identify if so.
- Plan Revisions 1.Cloud change area 2.Triangle w/ revision number 3. Provide explanation in lower right corner

#### 4.1.2 Site Plan (include w/ non-residential submittals)

##### Property / Right of Way (ROW) Details

- Use heavy line weight for property lines, label bearings, distances, radii, and area in acres or sq ft
- Provide distance from the center of nearest street intersection to property corner
- Indicate adjacent ownership and /or recorded property information, subdivision name, lot and block
- Show existing improvements on and w/in 15 feet of property line, structures, paving, signs, fences, etc.
- Identify adjoining railroad, alley and street with name, ROW width, pavement, type, curb, and curb cuts on both sides of the street, medians and openings
- Access to divided streets must indicate existing and proposed median openings, 70-ft wide minimum.
- Identify existing driveway widths and radii
- Locate and label existing public/private drainage, utility, pedestrian, traffic control, visibility and common access easements with recording information
- Note location of electric transformers, transmission structures, towers, antennas, etc
- Note location of monitoring and water wells, underground storage tanks, and graveyards
- Plot 100 year flood plain, floodway, wetlands, detention ponds, and jurisdictional US waters

##### **Site Improvement Details (locate and label all applicable information)**

- Identify propose driveway widths and radii, provide instruction install to standard driveway per city details and barrier free ramps
- Identify additional right of way, pedestrian, utility, traffic control, visibility, and/or common access easement as required by the project or Major Thoroughfare Plan
- Locate and fully indicate extent of ROW improvements, such as inlet relocation, left and right turn lanes, pavement and sidewalk removal and replacement, etc, provide dimension to clarify limits
- Locate and label proposed public and private sidewalks specify widths and ADA ramps
- Locate proposed off street parking layout with easily identifiable standard, compact, and handicap spaces defined, typical 90 degree stall, 9-ft wide by 18-ft deep with 24-ft aisle.
- Include pavement specifications if used as paving plan (**see 9.2.3.1**)
- Minimum parking lot paving thickness = 5-inches, reinforced concrete over engineered subbase.
- Define dimensions of parking spaces, islands, aisles, drives, review internal circulation
- Provide dimension of improvements from property line
- Verify bumper overhang is a minimum of 2 ft from property line or landscape buffer.
- Raised curbing required to separate parking areas from areas not intended for vehicle movement.
- Identify and label existing and proposed fire lanes and turnarounds ( maximum 10% shading)
- Locate, label and dimension loading, service and dock areas w/ screening check w/ Planning, typically required for retail, commercial, industrial use, structures > 5000 SF<25000 SF requires 1- 10 ft x 25 ft area, additional spaces required at 45000 SF
- Specify loading & fire lane paving, as Class "C" concrete w/ reinforcement specs equal city street.
- Identify refuse facilities w/ enclosure, provide 12-foot wide and 16-foot long 6-inch thick concrete pad
- Locate and label light standards, benches, utility poles and other ground mounted structures
- Locate and label landscape buffer width, interior parking lot landscape areas and protected tree clusters. Include prominently displayed note stating: **"No landscaping such as trees, hedges, above and underground structures shall be located within existing or proposed utility easements and right of way."**
- Provide landscape & irrigation plans on a separate sheet, don't show landscaping on Site Plan
- Locate, label, and dimension screening walls, fences and retaining walls. When adjacent to ROW, provide note to construct per City Standard Construction Details or equal
- Define signage location, orientation and width in relation to ROW and utility and drainage easements
- Define existing and proposed structure footprint with square footage noted, tied to property lines

- Indicate additions w/ square footage to existing structures and / or portions to remain or remove
- Indicate front door location on building footprint for addressing
- Show proposed building overhangs / canopies, no encroachment allowed in City easement
- Check driveway intersections for possible hazards, obstructed site distance, danger to pedestrians.
- At aisle intersections, minimum sight triangle 8 ft x 8 ft, with no obstruction > 3.9 ft above surface
- Are circulation / maneuvering areas design to accommodate vehicles normally using the site?

## Fire

- Provide exact locations of existing and proposed Fire lanes, hydrants and Fire Department Connection, located out of collapse zone.

## Utility Elements

- Locate, label and dimension existing and proposed utility easements with recording information
- Locate and define size of existing water & sanitary sewer lines with flow direction arrow to be connected to
- Locate valves, reducers, meters, manholes, cleanouts, grease traps, etc.
- Locate and label of franchise utilities ground mounted equipment, above grade utility cabinets and easements for gas, cable TV, electric, telecommunication, etc
- Provide a separate utility plan or define on the site plan** the exact location and size of sanitary sewer and water service connections.
- Show water service location from the main to within 5 feet of the structure.
- Where applicable, locate and label fire line tap and backflow device and show line within 5-feet of the structure and from sprinkler room to Fire Department Connection.
- Locate and label domestic and irrigation water service and meter w/in utility easement and backflow devices out of easement.
- Define finish floor elevation; each lot must have an independent sanitary sewer service, show exact service tap location and lateral location from the main to the structure.
- Define / show and dimension any offsite water / sanitary sewer extension / utility easement (15ft min).
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling drainage easement.

## Drainage Elements

- Show contours and flow arrows on and within 50 feet of property line for plans w/o separate D.A.M.
- Locate and label natural and man-made channels, existing and proposed detention ponds and drainage easements.
- Locate and label existing and proposed private storm sewer systems and inlets w/sizes and tie-ins to public system, indicate Q into each inlet and bypass flow if any, limit runoff into to public ROW.
- Locate and label beginning and end, top and bottom elevations of all existing and proposed walls.
- Define finish floor elevation, plan must show runoff is directed away from structure or show on D.A.M.
- Define pre- and post-project imperviousness.
- Define / show and dimension any offsite storm sewer extension and drainage easement (20ft min.).
- Provide drainage easement on creeks for the area below 100-year + 1-foot + 10 to 15-foot access.
- Indicate source of flood data, reference effective Flood Insurance Rate Map (FIRM) where applicable.
- Where grade adjustments are proposed along adjacent properties or ROW, provide typical cross section detailing the relationship of the improvements and adjacent property.
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling drainage easement.
- When detention ponds are proposed, verify site / paving plan includes note detention pond must be operational prior to paving.

### 4.1.3 Paving

#### 4.1.3.1 Driveways

Show existing and proposed ROW, pavement type, access width, radii.

Driveway widths:	Min (ft)	Max (ft)	R min (ft)	R max (ft)
Single family	10	25	5	10
Multi-family	20	30	15	30
Office / Retail	24	30	15	30
Service Stations	24	40	15	30
Industrial	30	45	25	50
One Way	20	25	15 out	30 out

8 % maximum retail/office driveway grade, 10% maximum industrial.

Driveways aligned w/ median openings, minimum 40-ft wide back to back with 20-ft radius.

Verify longitudinal butt joint called out when proposed paving connects to existing.

Verify driveway grades provide for maximum 2% cross fall walkway per ADA requirements.

Sec. 33.65 Steps, fences, walls, buttresses, projections, etc., prohibited in streets and alleys.

Sec. 33.70 (B) Driveways shall not be constructed w/in curb return of street

(F) Public parkway shall not be used at any time for parking.

(G) Entrances/exits on street right of way shall be confined within property frontage.

(I) Common driveways may be approved w/ permanent access easement filed for record w/ Dallas County. If used, submit access easement with first plan submittal.

(J) All driveway approaches shall be constructed in accordance w/ City of Garland specifications.

Verify note provided on plans

(M) Vehicular access to nonresidential uses shall not be permitted from alley.

Check driveway culvert verify w/ D.A.M. Provide station, offset, size, min 21-inch RCP in ROW, fit to conditions, install 6:1 TXDOT headwall.

Sec. 31.132 requires the property owner to construct curb when / at abandoned driveway.

#### **Sidewalks (General)**

Sidewalk width is based on zoning, residential 4 ft, and other zoning districts 6 ft.

Verify barrier free ADA conforming ramps are present at driveways & street intersections.

Are corner clips required for barrier free ADA conforming ramps at street intersections?

31.28F Sidewalks waived by Plan Commission require escrow payment to the City, equal to cost of sidewalk.

#### **Residential Sidewalks**

Residential subdivisions, developer is required to construct sidewalks at 1) non-buildable lots or 2) along streets abutting subdivision's screen wall.

Include and verify that standard verbiage regarding sidewalk construction is on all paving sheets:  
The Developer will install sidewalks and barrier ramps along all non-buildable lots in accordance w/ current American w/ Disability Act rules and regulations. All other intersections w/in the subdivision will have lay down curbs to facilitate the construction of barrier free ramps by homebuilders.

### 4.1.3.2 Street Paving

Provide plan and profile for dedicated streets and alleys defining:

<input type="checkbox"/> Centerline stations	<input type="checkbox"/> Typ. street cross section	<input type="checkbox"/> Property information	<input type="checkbox"/> Proposed sidewalks
<input type="checkbox"/> ROW dimension	<input type="checkbox"/> Exist. & propose top of curb elevations @ begin /end of project and other critical points of interest	<input type="checkbox"/> Manholes & fire hydrants	<input type="checkbox"/> Barrier free ramps
<input type="checkbox"/> Tangent length & bearings	<input type="checkbox"/> Utility/drainage easement intersecting & adjacent to	<input type="checkbox"/> Ditch/gutter spot elev	<input type="checkbox"/> Utility poles/structures
<input type="checkbox"/> PC, PRC &, PT's	<input type="checkbox"/> Sight visibility easements	<input type="checkbox"/> Flow direction arrows	<input type="checkbox"/> Fences & manholes
<input type="checkbox"/> Horizontal curve data		<input type="checkbox"/> Existing & prop. curb	<input type="checkbox"/> Inlets & ditches
<input type="checkbox"/> Benchmark		<input type="checkbox"/> Ex & prop driveways	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Street Name(s)		<input type="checkbox"/> Existing sidewalk	

1. Show /provide details where required to clarify beginning and end project, intersections and intersecting street w/ flow arrows, provide instructions regarding conflicts.
  2. Provide instructions to install longitudinal butt joint when proposed paving connects to existing.
  3. Each paving sheet has the proper detail for the type of street / arterial to be constructed.
  4. Show sufficient area to clarify drainage transitions, use flow arrows, flow paths should be clear.
  5. Retaining walls adjacent to right of way are required to reference City standard construction details and / or provide equal detail.
  6. Residential sidewalks 4ft wide placed 1ft from property line, non-residential sidewalks – 6 feet.
  7. Opposite each inlet label per D.A.M., w/ type, size, paving station, top of curb & flowline elevation.
  8. Valley gutters cross lower classified street.
- Min local street radius = 250 ft residential, 350 ft commercial / industrial, minimum grade = 0.50%, desired maximum 7.0%, maximum local street grade =10.0%, within 100 ft of intersection 5%.
- Cul da Sac >300 ft min paving radius of 61 ft plus 10' PUE, <300 ft, 50ft ROW, 5ft P.U.E. and 45 ft paving radius.
- Type "F" 60 ft ROW 37 b-b 6" thick pavement, local
  - Type "G" 50 ft ROW 27 b-b 5" thick pavement
  - Type "E" 80 ft ROW 45ft b-b 7" thick pavement
- Include vegetation note for all ROW areas:  
PUBLIC RIGHT OF WAY, EASEMENTS, AND COMMON AREAS MUST BE STABILIZED W/ PERENNIAL VEGETATION COVER, FULLY ESTABLISHED W/ 100% COVERAGE, OR OTHER APPROVED STABILIZATION METHOD.
- City streets – provide instruction: Install 2-type III barricades until street acceptance by City.
  - Show existing driveway widths and define type of paving, remove approach no longer used, install curb / gutter / sidewalk.
  - Verify propose street conforms to Thoroughfare Plan, and reasonable extension of existing streets.
  - Intersect cross streets < 1200 ft w/ 50 ft min ROW and 80 to 100° intersection angle (31.25).
  - At street stubs, show positive drainage grading on plan and profile, provide typical cross section w/ Q, v, d, slope (1% minimum), and erosion control measures.
  - Verify placement of pavement headers on all street and alleys stubs.
  - Check for utility conflicts between water/sanitary/storm sewers/ other utilities & structures.
  - Check cul da sac grades in relation to undeveloped adjacent properties. Does grade match?
  - Check / verify paving grade of streets and around cul da sac bulb are ≥ 0.5%.
  - Check for vertical and horizontal sight distance conflicts, provide visibility easement where required.
  - Check centerline stationing on plan view with curve table information and critical points.

- Compare elevations on plan versus profile views, especially at intersections and low points.
- Compare / verify flow arrows in plan view to profile on both sides of grade breaks.
- Verify low point inlets labeled w/ positive overflow easement, coordinate w/ plat D.A.M.

**Intersections**

- Type A & B intersection provide additional ROW - future right turn lane (11 ft), typically 19 ft.
- Type C, D, or E streets provide additional ROW - right turn lane at Type E's and above intersections.
- Dedicate add ROW or P.U.E. for minimum parkway, measured from curb face - Type A, B, C-20 ft, Type D-15 ft.
- Intersection of Local Street w/ Type A, B, C, or D, typically requires additional ROW or easement and construction of Type F collector extending 75 ft w/ 5 ft P.U.E.
- Intersection radius – 25ft local to local-arterial, 30ft collector-to-collector and arterial.
- Maximum / Minimum street intersection angle 100/80°. (31.25).
- Check visibility triangle-length along each projected curb line for streets, 45ft, and alleys-25 ft.
- Check cross slopes, investigate need for drainage inlets where finish grade <2%.

**Alleys**

- Residential subdivision lots shall be served by alleys at the rear w/ minimum 20ft ROW (31.27 (A)).
- Provide /show additional two feet of alley paving at alley intersections and curves per City details.
- At street intersections, verify 16- to 10-ft paving flare is properly shown within 20-ft.
- Curb required at alleys adjacent to unimproved roadway or drainage way.
- Compare / verify plan versus profile elevations, verify alley invert elevations at approaches.
- If alley slopes to ROW, then 0.50ft difference in gutter elevation to invert elevation at ROW.
- If alley slopes away from ROW, 0.75ft difference in gutter elevation to invert elevation at ROW.

**Profiles**

Profiles show:

<input type="checkbox"/> Left / right top of curb	<input type="checkbox"/> Begin/end project grades	<input type="checkbox"/> PVC, PVI, PVT	<input type="checkbox"/> Manholes
<input type="checkbox"/> Existing ground at ROW	<input type="checkbox"/> Critical points of interest	<input type="checkbox"/> Compacted Fill 95% Std. Proctor Density	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Proposed ground at ROW	<input type="checkbox"/> Intersecting utility grade	<input type="checkbox"/> Hatch fill	
<input type="checkbox"/> Grades @ every 100 ft, intersections & PI's	<input type="checkbox"/> Intersecting storm grade	<input type="checkbox"/> Benchmark	
<input type="checkbox"/> Curb return grades	<input type="checkbox"/> Vertical curve	<input type="checkbox"/>	
	<input type="checkbox"/> high/low point station, k		

- Compare all elevations from profile to plan view, check for unequal curbs, drainage complications.
- Is there a change in existing road grade? Are existing driveway profiles needed to reflect adjustments within ROW? Review /check parkway and access grade, drainage issues
- Verify vertical curves provided, at grade difference > 1%, minimum length = 100 ft, 4% maximum change at intersections.
- Check sag inlets, does it correspond to low point station? Check for any locations where water may pond. Minimum K values:

	Crest	Sag
Alley (20ft ROW, 8"-5"-8", 10ft wide)	10	20
Residential Collector (60ft ROW, 6", 37ftb-b)	30	40
Commercial Collector (7" 45b-b)	50	50

### Divided Streets / Collectors

- Cross sections required for divided thoroughfares and collectors, use same inside top of curb.
- Review top of curb / ground elevation at ROW. Will improvement create future access problem?
- Street lights and bases check with GP&L and TXU for requirements.
- Buttoning, barricading, signalization and conduit requirements refer to Transportation Dept.
- Check w/ Parks Department if water service required to medians.

### Left/Right Turn Lane

<input type="checkbox"/> Typical section thickness / subgrade	<input type="checkbox"/> Positive drainage	<input type="checkbox"/> Longitudinal butt joint instructions	<input type="checkbox"/> Irrigation system & conduit
<input type="checkbox"/> Street lights	<input type="checkbox"/> Monolithic concrete median nose	<input type="checkbox"/> Existing trees	<input type="checkbox"/> Transition & storage
<input type="checkbox"/> Pull box & traffic loops	<input type="checkbox"/> Traffic signals	<input type="checkbox"/> Proposed trees	<input type="checkbox"/> Buttons

- Reference standard barricading detail.
- Left turn lane configuration conforms to standard details w/ 10' pavement.
- Right turn lanes configuration conforms to standard details w/ 11' pavement.
- Along divided street, verify access to median opening provided for each platted lot, easement?
- Verify w/ Parks need for water service and conduit through crossover at medians.

### 4.1.4 Grading

Fundamentals:

1. Provide suitable access from and to abutting street,
2. Immediate diversion of surface water away from buildings and off of site,
3. Avoid concentrating runoff onto neighboring properties,
4. Minimize disruption to adjacent properties, erosion and ponding.

- Provide grading / drainage plans for other than 1 to 2 family residential (31.24 (A)).
- Grading plan show contours on and w/in 50 ft of property, including the following applicable on- and offsite features:

<input type="checkbox"/> Inlets & grates w/ size	<input type="checkbox"/> Flow arrows	<input type="checkbox"/> Structure locations	<input type="checkbox"/> Street layout
<input type="checkbox"/> Offsite drainage areas	<input type="checkbox"/> Sag & on grade inlets	<input type="checkbox"/> Paving, curbs, streets	<input type="checkbox"/> Street names
<input type="checkbox"/> Spot elevations at high points intersections, and sags.	<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Sidewalks, & pathways	<input type="checkbox"/> Right of way
<input type="checkbox"/> 100-year flood plain	<input type="checkbox"/> Proposed & existing utilities & easements	<input type="checkbox"/> Driveways & fences	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Trees	<input type="checkbox"/> Landscape buffers	<input type="checkbox"/> Detention & amenity ponds	<input type="checkbox"/> Property lines

- Indicate north, and provide numeric and graphic scale and if warranted Legend.
- Indicate source of base contours if not City topography.
- Locate protected trees and/or outline perimeter of wooded areas per Tree Preservation Plan.
- Show existing topography minimum 2 ft contour interval, and proposed contours using distinctly different line type, supplement w/ finish grade spot elevations, preferably shown in boxes.
- Connect proposed to existing contours. Show existing and proposed finish floors ((31.24 (A) (1)).
- Provide flow direction arrows indicating primary flow paths on, adjacent to and through the property.
- Show all onsite building footprints and / or buildings on and w/in 15 feet of property line.
- Show and verify flow arrows are provided to depict existing / proposed drainage patterns.
- Plan demonstrates how positive runoff of surface waters is accomplished and means of ultimate runoff disposal to public right of way or easement.
- Show and provide cut/fill toe and top of slope grades, and easement limits defined.
- On all dead end streets and alleys, show grade out at 1.0% min, provide erosion control measures, and specify type and dimensions, etc.
- Check grading w/ paving plan and D.A.M. verify locations coordinated at

<input type="checkbox"/> Inlet	<input type="checkbox"/> positive overflows	<input type="checkbox"/> divides	<input type="checkbox"/> flow directions.
<input type="checkbox"/> Sags	<input type="checkbox"/> easements	<input type="checkbox"/> swales	<input type="checkbox"/> property lines

- Verify lot minimum finish floor elevation, 1)2 ft above 100-year flood plain or 2)2 ft above lowest curb when draining primarily to front, and/or 3) if to the rear 2 ft above lowest alley (31.24B(2)(b)).
- Verify design ensures drainage protects structures and prevents adjacent property damage (31.24(A) (1)).
- Maintain positive drainage around and away from pad and sidewalks, minimum pad elevation = 0.3' above swale, verify usable yard no slope exceeding 3:1.
- At sags trace overflow path, check and verify adjacent lot finish pad and floor are > low point.
- Check / verify grades at property line? Matches existing / Cut / Fill? How is transition made at property line? Retaining wall, slope to/or away?
- Verify no offsite grading, lot-to-lot drainage, diversion, obstruction or constriction of adjacent surface water flow patterns is created w/out an agreement or easement.
- Verify 1.0% minimum grade for grass swale, lesser slopes used paved swale minimum 0.5%.
- Compare with paving plans / verify same top of curb shown at ROW.
- Check access drive maximum grades residential < 12%, non-res 10%. Provide grade transitions at steep drives.
- Residential - Verify lots at alley T's are higher than alley ROW.

## Walls

- >4 feet – structural engineered plan required, showing type, reinforcement, expansion/construction joint spacing, backfill, % compaction, and drainage specs, weep hole diameter and spacing.
- Define beginning, end, length and top/bottom elevations. Include detail showing high side swale and where applicable property line or adjacent utilities and easements.
- Show and provide details for all walls adjacent to ROW or provide reference to construct per City standard construction details.
- Walls greater than 2.5 feet adjacent to public space require fence or 42" high railing.
- Verify walls are not w/in and paralleling City utility or drainage easements.
- Is there adequate room to construct footing / wall? Identify any special maintenance requirements?

## 4.1.5 Drainage

### General

- Is drainage coming in or going out? How is it handled? Are public drainage easements needed?
- Is it shown that all site runoff leaves in public ROW, easement, storm sewer, natural or manmade channel?
- Review and verify receiving system capacity and adequacy to carry the design discharge.
- Is detention or offsite improvements required? *See detention for additional requirements.*
- Check perimeter of project, verify project does not cause damage, increase erosion, divert, constrict, and impound runoff or other unforeseen problems.
- Check zoning for ultimate land use; insure storm sewers sized for fully developed conditions.
- Check for encroachments into and paralleling drainage easement such as walls, signs, poles, private lines, structures, etc.
- Compare plat versus storm sewer plans; insure storm pipe center line is a minimum 10-foot from the edge of right of way or easement.
- Verify future extension stub out sized for ultimate condition w/ public drainage easement.
- Verify drainage easement adequacy, minimum 20-feet, provide extra width for deep lines.

- Grade to drain points verify adjacent grades above WSEL, provide typical cross section with Q, slope, depth, velocity and drainage easement defined.
- Check need for Flood Plain Development permit when work is adjacent to FIRM designated creeks.
- Any significant changes to the FIRM designated flood plains must have a flood study included with first submittal and subject to submittal to FEMA for a Conditional Letter of Map Revision.
- Provide special details for all structures not in City's standard details.

### Drainage Area Map (D.A.M.)

- Identify north, graphic scale, minimum 2-ft contour interval, provide legend where necessary. Locate and label:

<input type="checkbox"/> Existing storm sewers(dash)	<input type="checkbox"/> Inlets & grates w/ size, designations, Q100 and Q bypass	<input type="checkbox"/> Intersection flow arrows	<input type="checkbox"/> Street names
<input type="checkbox"/> Proposed storm (solid)	<input type="checkbox"/> 100-yr flood plain	<input type="checkbox"/> Flow arrows	<input type="checkbox"/> Street layout
<input type="checkbox"/> Size & line designation	<input type="checkbox"/> Detention and amenity ponds	<input type="checkbox"/> Crests & sags,	<input type="checkbox"/> Right of way
<input type="checkbox"/> Subareas and divides		<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Offsite drainage areas		<input type="checkbox"/> Stock tanks & lakes	<input type="checkbox"/> Property lines
			<input type="checkbox"/> Points of concentration

- Clearly identify and label natural and / or man made drainage facilities located w/in 50 ft of site affecting stormwater flow such as lakes, ponds, creeks, etc.

- Indicate runoff for all subareas including:

<input type="checkbox"/> Alleys	<input type="checkbox"/> dead end street stubs	<input type="checkbox"/> offsite drainage areas	<input type="checkbox"/> onto adjacent properties	<input type="checkbox"/> points of flow concentration
<input type="checkbox"/> streets				

- Compare D.A.M. divides to lot grading and paving plan, check / verify crest, sags and valley gutter locations.
- Verify offsite drainage area/topography extends to a point where crest can be clearly identified.
- Verify all subareas are picked up. Does D.A.M. and storm sewer plans agree?
- For residential subdivisions, Check and Verify
  1. Flow crosses minor street, No flow through major intersections
  2. Runoff versus street capacity, Ensure flow does not exceed right of way.
  3. No street drainage enters alley, and
  4. Review need for curb at steep alley "T" intersections or flattening of steep advancing grades.
- Provide subarea inlet table with designations and  $Q=CaCIA$  variables defined,  $Ca=1.25$  for  $C<0.7$ ,  $Ca=1.0$  for  $C>0.7$ .
- Verify design based on projected ultimate watershed development w/ zoning map (31.30 (C)).
- C for Parks, 0.15-0.35; Residential 0.45-0.60; Multi-family 0.60-0.85; Industrial, Commercial (I/C) (light) 0.50-0.80, I/C (heavy) 0.75-0.90. Show composite C calc's church 0.80, school 0.70.
- Residential minimum time of concentration  $TC=15$  min, Non- residential minimum  $TC =10$ min.
- Check time of concentration calculations if greater than minimums, state / review assumptions, show existing and proposed flow paths on DAM, review travel time equation and variables
- Check cumulative runoff calculations, verify capacity and adequacy of downstream system,
- When connecting to existing sewers, review record drawing D.A.M. for allowable discharge from outside ROW such as for a parking lot.
- Check depth & spread of flow in street & alley, ensure flow in ROW and one dry lane on arterial.
- Check size and position of inlets such that drainage doesn't cross over street crown. Avoid flow concentrations across City sidewalks except at driveways.

### Inlets

#### Curb inlet on constant street grade capacities

<input type="checkbox"/> 1.0% = 1cfs/ft	<input type="checkbox"/> 1%-2% = 0.85cfs/ft	<input type="checkbox"/> 2-4% = 0.70 cfs/ft	<input type="checkbox"/> 4.0-7.0% = 0.6 cfs/ft	<input type="checkbox"/> >7%=0.5cfs
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- Standard curb inlets are 5-, 10-, 15-, & 20- ft wide and between 4- and 4.5 feet deep.
- Size and position on grade curb inlets so runoff does not exceed street capacity or interfere w/ pedestrians. Check gutter spread and depth.
- Locate upstream of pedestrian crossings, intersections & prior to alley approach when added alley Q exceeds street capacity.
- Locate inlets at sags, 10 feet from street curb returns (unless site constraints dictate otherwise).
- On paving plan, opposite each public inlet provide station, size, type, D.A.M. designation, top of curb / flowline elevation, and Q100 to and bypass.
- Avoid junction box inlets and inlets located on curves near intersections, place upstream of intersection.
- Grate and combination inlets are not allowed on the City system w/o prior consent from the Street and Engineering Department
- Provide recessed inlets on divided roadways & collectors, where parking is not expected.
- Provide Y inlet in ditches and for undeveloped areas, locate min 20 ft from street, insure grading allows runoff to get to inlet.
- Provide 10-ft curb on both sides alley inlet include note "Warp alley pavement to inlet throat".
- Check alley inlet placement avoid future driveway conflicts, placement on property line is best.
- Compare and verify D.A.M. inlet locations and sizes w/ inlet sizing chart and grading plan.
- Check sizing chart Insure 100% collection at sags, on grade capacities conform to criteria and all flow is accounted for.
- Private systems check curb and grate inlet capacities against D.A.M. subarea flow. Insure flow doesn't enter / bypass to public right of way and structures, verify blockage accounted for in design.
- Check properties opposite steep streets and alleys, verify finish pad above TC.
- At sags verify inlets / overflow at low point and placement of concrete flume are w/in easement.

### Storm Sewers

- Provide plan / profile for all connections to and from public storm sewers. Show:

<input type="checkbox"/> Existing storm sewers(dash)	<input type="checkbox"/> Stationing & 100ft tick marks	<input type="checkbox"/> Right of way	<input type="checkbox"/> Easement(s)
<input type="checkbox"/> Proposed storm (solid)	<input type="checkbox"/> PC, PT & curve data	<input type="checkbox"/> Fences & manholes,	<input type="checkbox"/> Street names & layout
<input type="checkbox"/> Diameters & line designation	<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Sprinkler systems	<input type="checkbox"/> Pavement & curbs
<input type="checkbox"/> Water/sewer lines	<input type="checkbox"/> 100-yr flood plain	<input type="checkbox"/> Valves & meters	<input type="checkbox"/> Driveways
<input type="checkbox"/> Other existing utilities	<input type="checkbox"/> Detention / retention	<input type="checkbox"/> Back flow devices	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Inlets & grates w/ size & designations	<input type="checkbox"/> Label private lines	<input type="checkbox"/> Above ground features w/in ROW	<input type="checkbox"/> Property lines
<input type="checkbox"/> Q100 & Q bypass	<input type="checkbox"/> Trees & signs,		<input type="checkbox"/> Water & sanitary sewer lines

- Provide pipe calculation chart for all sewers connecting to public system.
- Minimum 21-inch Class III RCP required in ROW, specify Class IV RCP when crown w/in 2 foot from top of pavement and at RR crossing.
- Provide details for connections using different pipe materials.
- Avoid bends unless site conditions warrant, use radius < 48" point connections and outfalls downstream.
- Intersect laterals w/ factory 60 degree wye connection for pipe sizes  $\leq$  48" diameter.
- Specify rim elevation at junction boxes
- At flumes indicate paving station and elevation, size, Q100, and drainage easement width.
- At sags verify positive overflow is at low point, adjacent lot minimum finish floor elevations and easement width.
- At grade to drains, provide swale/ditch cross section, Q, n, velocity, depth and slope, 1 % minimum required for grass lined swales.
- Check plan view and grades with as-built / record drawing.

- Check placement w/in right of way or easement and verify 10-ft minimum from centerline alignment.
- Check stationing by scale from know PT and PC, review curve data.
- Compare inlet locations and sizes to D.A.M. for accuracy.
- Check / verify paving station opposite each inlet, define size, type, D.A.M. designation, TC / FL elevation, Q100 to and bypass.
- Check top of curb elevation at inlets against paving plan/profile, verify standard inlet depth used.
- Minimum 20 foot drainage easement required for public lines, verify NO retaining walls, post, signs, private lines, structures, etc allowed w/in easement.
- Verify system extends to and captures offsite contributing drainage area.
- Check outfall flowline, point downstream, and grading coordinated w/ drainage easement.
- Specify / Verify headwall types are per City standard details, Type A, B, 42-inch handrail at outfalls > 30" drop near rights of way.
  - 1) For velocities > 8 fps, provide downstream erosion protection for riprap specify diameter and pad dimensions, check gradation spec's, specify thickness of blanket and filter fabric.
  - 2) Verify downstream easement sized to convey fully developed flow.

## Profiles

- Storm sewer profiles line up directly under plan view (1"=40ft > h, 1"=4ft > v).
- Show existing and proposed ground at storm sewer centerline, utility crossing station / elevation.
- Provide station / elevation at every 100 ft, size and grade change, manholes in/out flowlines.
- Where connections are made to existing system storm drain, match soffits, indicate starting hydraulic grade line, reference and verify source of information or assumptions made.
- Note to install concrete collars at proposed to existing pipe connection locations.
- Where sewer outfalls to creeks, indicate and verify 100-year water surface elevation used.
- For each segment indicate pipe diameter, % grade, class and hydraulics between interception points Q100, Q cap, S (ft/ft), V, V2/2G, elevations to 0.01 at minimum 100' intervals.
- For full flow, define hydraulic grade line elevations at size / grade changes, laterals and junctions.
- Define start and end of partial flow provide pipe hydraulic data / Check v partial at outfalls.
- Fill areas - show hatching and specify minimum 95% compaction, standard proctor density.
- Specify / verify Type A or B headwalls located at outfalls, check / review grades and grading.
- Verify outfall pipe and swale bottom elevations are coordinated, place outfalls maximum 2 feet above creek flowline or onto stable rock.
- Velocities > 8fps, verify riprap diameter and dimensions are adequate, check gradation spec's, specify thickness of blanket and filter fabric.
- Verify outfall easement and grading / elevation is sized to convey fully developed flow.
- Use TXDOT 6:1 sloped end headwalls on driveway culvert in City ROW.
- Compare plan/profile stations, elevations, pipe sizes, designations, and utility locations.
- Compare/ verify pipe segment hydraulic data, Q100, Q cap, S, V, V2/2G on profile is same as storm sewer sizing chart, headloss calc's, TC at interception points, and Q100 along sewer.
- Verify HGL, 2 ft below top of curb at inlets, check 1.5V2/2g for full flow laterals.
- Verify profile shows lateral size, station and elevation, w/ centerline to centerline connection.

## Laterals

- On plan, indicate designation, length, % slope, slopes > 33% requires flowable backfill in ROW.
- Lateral profiles required for full flow and/or crossing City utility.
- Lateral profiles required for partial flow laterals when crossing City utility.
- Insure collection of stormwater at full pipe flow; verify HGL min 2 ft below curb check 1.5V2/2g.

## Creeks

- Provide paved ramps w/ driveway and bollards at end of each major segment 31.29(D).
- Development adjacent to Creek – Is it on a previously studied creek? Is a study needed? >600ac requires Unit Hydrograph method.
- Creek study sealed by PE and include
  - hydrology parameters
  - assumptions
  - methodology
  - HEC-1 & 2 digital file
- Submit computer files and other programs used to develop discharges with first plan submittal.
- Work along FEMA floodplains requires a Flood Plain Dev. Permit. Is a 404 permit needed?
- Review offsite drainage work or points of flow concentration point in excess of pre-project conditions. Is an easement necessary?
- Easement sized to convey fully developed flow, provide metes / bounds to City surveyor.
- Check topography and cross-sections of man made channels and swales.
- Review / check capacity, slope, depth, velocity calculations, easement, maintenance requirements, and adequacy of erosion protection.
- Include note on plan: PRIOR TO CITY ACCEPTANCE CLEAR UNDER BRUSH, DEBRIS AND PLACE IN MAINTAINABLE CONDITION. PRIOR TO CITY ACCEPTANCE DETENTION / RETENTION FACILITIES, CHANNELS, DRAINAGE WAYS, AND OUTFALLS SHALL HAVE ESTABLISHED PERENNIAL VEGETATION W/ 100% COVERAGE.
- Curb alleys adjacent to creeks and open bodies of water.
- Verify creek w/in easement per plat w/access width, typical 100yr+1ft+10 horizontal if creek bank is 4:1 or flatter, 15ft if creek bank is 3:1 or steeper 31.29 (C) 4. If 100-year is less than bank full place easement at top of bank + sufficient horizontal access.
- Verify lot and rights of way are outside erosion hazard area, 4:1 projection from toe of slope.
- Spring & Rowlett Ck -use fully developed WSEL per 1989Rowlett and Spring Creek FPM Study.
- Spring Creek Forest Preserve criteria: 1 / no alteration/channelization within ecological boundary. 2/ maintain by +/- 10% adjoining surface drainage patterns volume and velocity 3/ Runoff rates approximate predevelopment use detention.4/ Use pre-determined utility corridors per Master Plan for utility construction.

### 4.1.6 Detention Basins

- Required for contributing sites > 0.95 acres or in areas of known flooding and inadequate downstream drainage systems.
- Provide standard detention pond general notes on plans.
- Include note on plan: Prior to City acceptance DETENTION/RETENTION FACILITIES, CHANNELS, DRAINAGE WAYS, AND OUTFALLS SHALL HAVE ESTABLISHED PERENNIAL VEGETATION W/ 100% COVERAGE.
- Side slopes no steeper than 4:1, unusual height or poor soil requires slope stability study by P.E.
- Provide / check paved low flow flume minimum 0.5% between inlet / outlet and at point discharges to pond bottom.
- Provide all-weather access to ROW, 15ft wide minimum, 20% maximum slope.
- Provide pond typical cross section(s), showing emergency spillway, outlet structure, excavated side slopes (4:1 or flatter), level access path with width specified, pond bottom slope and low flow swale.
- Define / verify benchmark number, location and elevation.
- Show / review detention pond grading and layout of outlet structure w/ respect to property lines and easement shown.
- Verify location, elevation, adequacy of emergency overflow spillway Bottom width=  $0.36Q - 0.7ZD / D^{3/2}$  (Dallas).
- Check / insure outfall pipe and swale bottom elevations are coordinated.
- Are offsite flows entering the site? If so, have provisions been made to bypass flows?

- Review / verify pre- and post-project composite c values, time of concentration calculations, review assumptions, show existing and proposed flow paths on D.A.M., review travel time equation and variables
- Show / verify detention storage calculation, use modified rational method up to 25 ac, > 25 ac unit hydrograph method.
- Define / check site pre-project 10- and 100-yr runoff and/or available downstream capacity = allowable release rate.
- Define outlet structure location / dimensions, horizontal control from property line, provide trash rack and low flow dewatering device 4-inch minimum diameter.
- Define top of lid or grate and invert elevations of all pipes, structures, inlets, and manholes.
- Provide / Verify 10-foot minimum unobstructed access around pond. Can outlet structure be reasonably accessed for maintenance? Check drainage easement.
- Provide restrictor hydraulic calculations, design, orifice diameter or weir length, elevation, details.
- Define / verify maximum design WSEL for 10 and 100-year and the first 1-inch of rainfall.
- Provide minimum one (1) foot of freeboard above the design 100-year water surface elevation.
- Provide outlet detail for restrictor / weir and elevation versus discharge table on plans.
- Review elevation versus storage table and check dimensions / area / depth / volume.
- Verify design includes water quality features, detains first flush volume = (0.08 ft) c (A) or storm screening device used.
- When storm water screening device used, provide plan and details.
- When using perforated riser for water quality, spec number, spacing and diameter of perforations per NCTCOG. Verify water quality feature design used 1yr, 6-hr intensity of 0.35 in/hr (*iSMM*).
- Define outfall pipe flowlines, diameter, velocity, length, and slope.
- Does tail water effect pond? Is an anti-seepage collar needed? If so provide design.
- Provide structural details and calculations for any item not in City standard construction details.
- Landscaping and irrigation are required, landscaping subject to the approval of the Planning Dept.

#### 4.1.7 Water

- Provide overall layout of existing / proposed water and sanitary sewer, w/ sufficient street and lot including:

<ul style="list-style-type: none"> <li><input type="checkbox"/> Line designations &amp; diameters</li> <li><input type="checkbox"/> Flow directions</li> <li><input type="checkbox"/> Trunk line tie ins &amp; service taps</li> <li><input type="checkbox"/> Valves, tees, crosses,</li> <li><input type="checkbox"/> Plugs, bends, reducers</li> <li><input type="checkbox"/> Meters &amp; fire hydrants</li> <li><input type="checkbox"/> Back flow devices</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Manholes &amp; cleanouts</li> <li><input type="checkbox"/> Right of way &amp; easements</li> <li><input type="checkbox"/> Dash in storm sewers alignment</li> <li><input type="checkbox"/> Creeks &amp; 100yr flood plain</li> <li><input type="checkbox"/> Stationing &amp; 100ft tick marks</li> <li><input type="checkbox"/> PC, PT&amp; curve data</li> <li><input type="checkbox"/> Benchmark</li> <li><input type="checkbox"/> Property lines</li> <li><input type="checkbox"/> Pavement &amp; curbs</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Utility poles</li> <li><input type="checkbox"/> Fences</li> <li><input type="checkbox"/> Sprinkler systems</li> <li><input type="checkbox"/> Structures</li> <li><input type="checkbox"/> Trees &amp; signs</li> <li><input type="checkbox"/> Label private lines</li> <li><input type="checkbox"/> Retaining walls</li> <li><input type="checkbox"/> North &amp; graphic scale</li> <li><input type="checkbox"/> Other above ground features w/in ROW</li> </ul>
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- Locate, label and dimension existing and proposed utility easements with recording information.
- Locate and define size of existing water lines to be connected to, and proposed lines.
- Locate and label existing and proposed sanitary, storm sewer lines with flow direction arrow.
- Review and verify existing water, storm and sanitary sewers w/ as-builts / record drawings.
- Verify capacity / adequacy of existing lines to serve proposed use.
- For commercial developments, are mains of sufficient size to provide total fire flow required?
- Mains 6 to 12-inches, PVC DR-18 (C900) located north and east of street centerline, 6ft from ROW.
- Water lines > 12-inches RCCP, Note on plans: Taps made by Hanson Products Personnel Only.

- Minimum cover 6" & 8"=4.0ft, 10" & 12"=5.0ft, > 12"=6.0ft, verify properly shown on storm and sanitary sewer profiles.
- Water mains greater than 12-inch diameter requires profile.
- Each development must have two sources of water, no closed loops allowed.
- Use 45 deg bends where possible avoid 90 degree bends.
- Minimum 5-foot separation required between structures and 10-feet between parallel lines.
- Define domestic and irrigation tap sizes and meter locations.
- Locate and label all fittings used to connect to existing and proposed mains.
- Locate and label all proposed valves, bends, crosses, tees, fire hydrants, reducers, etc.
- Verify no trees, retaining walls; post, signs, private lines, structures, etc are w/in utility easement.
- Verify utility crossing on existing concrete streets specified by other than open cut.
- Verify development facilitates future extensions. (31.47, 51.32 (7))
- At creek crossing plans must note, "Install concrete cap per City standard construction details".
- At sanitary sewer crossings, verify 18 LF pipe encasement is shown on profile when separation is < 9 ft or specify SDR26 PVC.

### **Dead End Lines**

- Maximum length equals 150 feet (31.48).
- Locate valve at end of main, provide instruction extend one full joint past valve.

### **Valves**

- Valves spacing 1000 feet - residential, 500 feet - non-residential
- Locate 6" valves adjacent to all fire hydrants and fire service lines.
- Place valve after last tap and extend one joint of pipe.
- Provide air release/blow off valves at high points and creek crossings.
- Butterfly valves required on 16" and larger size mains.
- Where required to establish a loop system - verify cut in valves are specified, between taps on existing mains up through 12".
- Verify valve placement, allows block shut down w/ 2 but not more than 3 valves and no more than 1 fire hydrant out of service.

### **Water Services**

- Minimum size for all zoning is 3/4" service line, installed from main to property line.
- Maximum service line length from main to meter is 70-feet.
- Provide irrigation service / meter / easement / backflow device to detention ponds.
- Residential plans must show water/sewer connection detail w/ 3/4" min. water service, 4" sanitary.
- For residential subdivisions: Indicate no taps on lines in utility easements.
- Residential, verify water service shown at center of each lot 10 ft upstream of sanitary sewer.
- Show existing water meters, if removal spec-plug service at main, return meter to Water Dept.
- Verify meters located out of driveways and sidewalks, in ROW or easement and allows for free impeded access.
- Standard size taps on City side 1-, 2-, 3-inch, etc. no half sizes allowed.
- Non-residential taps, specify domestic or irrigation service, plan must locate and label back flow device on private property (51.61(B)), 51.74 (3).
- Services allowed off of fire hydrant lead only if double valved, not allowed off of fire line.

### **Fire Hydrants**

- Locate and label exact locations of existing and propose hydrants, verify in easement and/or ROW.
- Fire hydrants leads - 50 feet or less = 6" and single valve. Leads > 50ft double valve and 8".
- Max dead end water line = 150 feet, if greater lines must be looped.
- Existing fire hydrants can only be relocated with approval of the Water and Fire Departments.
- Specify: Install two way blue reflector button in center of fire lane or street opposite hydrant.
- Spacing, check with Fire Department for current requirements.
- Check for conflicts w/ sidewalks, driveways, and utilities.
- Verify location is at least 10 feet pass curb returns, fire hydrants are not allowed in radius.
- Verify fire hydrant protection, 2.5 - 8 feet from curb or fire lane, if no curb specify bollard protection.

**Fire**

- Fire lanes (10% max shading allowed on Site Plan), specify 6-inch minimum thickness, Class "C" concrete, 24-ft wide, turnaround required at dead ends >150 feet.
- Fire line tap 6-inch minimum with valve for commercial and industrial applications.
- Show exact location fire line w/in 5 ft of structure, and backflow device shown on private property.
- Fire Department Connection w/in 50ft of fire hydrant, on private property not w/in utility easement.
- Verify fire lane grades are less than 10%.

**Water Profiles (nearest 0.10-foot)**

Indicate:

<input type="checkbox"/> Existing & propose water, sanitary and storm sewer, gas, electric, phone, others	<input type="checkbox"/> Stationing of	<input type="checkbox"/> Fire hydrants
<input type="checkbox"/> Size, slope & line designation	<input type="checkbox"/> Tees, crosses, plugs bores, & sleeves,	<input type="checkbox"/> Right of way
<input type="checkbox"/> Valves, tees & ends, to be tied to	<input type="checkbox"/> Wet tap connections	<input type="checkbox"/> Manholes,
<input type="checkbox"/> Street, creek, railroad xings	<input type="checkbox"/> Bends & reducers	<input type="checkbox"/> Other below ground features w/in ROW
	<input type="checkbox"/> Easements	<input type="checkbox"/> Benchmark

At creek crossing, specify embedment per City standard construction details.

**4.1.8 Sanitary Sewer**

Provide overall plan view of existing / proposed water & sanitary sewer layout w/

<input type="checkbox"/> Line designations & diameters	<input type="checkbox"/> Manholes & cleanouts	<input type="checkbox"/> Other utilities	<input type="checkbox"/> Pavement & curbs
<input type="checkbox"/> Flow directions	<input type="checkbox"/> Right of way & easements	<input type="checkbox"/> Fences, signs	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Trunk line tie ins & service taps	<input type="checkbox"/> Dash in storm sewers alignment	<input type="checkbox"/> Sprinkler systems	<input type="checkbox"/> Property lines
<input type="checkbox"/> Valves, tees, crosses,	<input type="checkbox"/> Creeks & 100yr flood plain	<input type="checkbox"/> Structures, poles	<input type="checkbox"/> Other above ground features w/in ROW
<input type="checkbox"/> Plugs, bends, reducers	<input type="checkbox"/> PC, PT& curve data	<input type="checkbox"/> Trees & signs	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Meters & fire hydrants		<input type="checkbox"/> Label private lines	
<input type="checkbox"/> Back flow devices		<input type="checkbox"/> North & graphic scale	
<input type="checkbox"/> Stationing & 100ft tick marks			

Dash in proposed and existing water, storm sewers, and other utility lines crossing over or under sanitary sewer.

Mains - residential / duplex 6-inch min. (31.49) all others uses - 8" min w/ double cleanout at ROW.

- Indicate on both plan and profile line designations, existing and propose size, stationing, and flow directions.
- Check curve data w/ stationing and alignment shown.
- Verify capacity / adequacy of existing lines and locations w/ record drawings.
- Verify development facilitates future extension complies w/ standard details, traffic control, TCEQ regulations, SH 190 & E. Garland Master Plan and other plans where applicable(31.47,51.32 (7))
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling utility easement.

## Profile

- Profile views should line up directly under the plan view, typical scale (1"=40' H, 1"=4' V).
- Profiles required for lines greater than 4-inch, specify:  
Invert elevations (nearest 0.01 ft) at every 100 ft, manholes in/out (0.1 ft min. fall), tie ins, clean-outs, proposed and existing water / storm / utility crossings. Indicate pipe % grade, flow direction, diameter, total footage, ground above pipe, fill area hatching w/ 95 % compaction note.
- Profile private sanitary sewers systems when crossing public water / storm sewer lines.
- Show benchmark on all profile sheets.
- Sanitary sewer slopes per TCEQ regulations
  - 6" - minimum 0.50%, maximum 12.35%,
  - 8" - minimum 0.33%, maximum 8.40%,
  - 10" - minimum 0.25%, maximum 6.23%.
- Minimum grades sufficient to provide gravity flow of sewage at velocity of < 2 fps, maximum 8 fps.
- Indicate/note sanitary sewers SDR-35 PVC pipe<15 ft deep, Depths > 15 ft SDR-26 PVC.
- Aerial crossings use ductile iron, pier and spacing design required, 2 feet above 100 yr WSEL.
- Check service conflicts and need for parallel system when > 12 feet.
- Compare and verify line designations, and slope is > TCEQ minimum % grade requirements.
- Specify 18 LF pipe encasement or Class 150 pipe per TCEQ spec's at water crossing ≤ 9 ft.
- Verify stations / elevations in plan and profile views are the same.
- Compare and verify all station / elevations of water / storm and utility crossing on plan and profile views, compare existing line location with as-builts / record drawing.
- Check manhole top of rim elevation against paving profile, provide 0.10 ft drop across manhole.
- Provide instructions where required, to adjust existing manhole tops to finish grade.
- Check proposed elevation above the line w/ grading / paving plan every 100 ft and at critical points.

## Services

- All sewer services > 4-inch shall tie into manhole.
- Trunk depths greater than 12 feet require parallel line.
- Services sized per uniform plumbing code, common services are not allowed.
- Check and verify that service laterals are provided to all platted lots, 4-inch minimum (31.49).
- Check / avoid conflicts w/ walls, storm sewers, inlets, fire hydrants, etc. Extend services past walls.
- Verify service laterals will not conflict w/ storm sewer.
- For shallow lines check finish floors and verify structures can be serviced.

## Manholes

- Provide false bottom when connecting to existing manhole, note "to remove prior to acceptance".
- Cleanout required at dead end < 100 feet from manhole, > 100 feet requires manhole.

- Sealed manholes required in creeks, drainage easements, and 100-year flood plains.
- Manholes spacing  $\leq 500$  ft, locate at pipe size and direction changes, junctions.
- Standard manhole = 4' diameter w/ 0.10 ft drop, depths  $\geq 15'$  - 5' diameter manholes required.
- Internal drop manhole connection required when distance between connections  $\geq 4'$ .

### **Special Structures**

- Provide reference on plan to construct special structures such as, retaining walls, junction boxes and headwalls per City standard construction details or include separate equivalent detail.
- Show proposed grading contours at headwalls and culvert - confirm slopes w/in easement or ROW.
- Provide culvert design using TXDOT procedure; specify inlet or outlet control, calculations, details, boring logs, etc.
- Ensure culvert conveys 100-yr, w/ minimum 1 foot of freeboard from top of curb. Show Q, V, S, length, tail- and head water and flowline elevations.
- Provide gabion specifications when used.

**4.1.9 Stormwater Pollution Prevention Plans / Narrative**

	Accept	N/A
1. Total area of site----- acres	0	0
2. Area to disturbed----- acres	0	0
3. Nature of activity -----	0	0
4. Sequence of major construction-----	0	0
5. Description of potential pollutants-----	0	0
6. Estimated project start date-----	0	0
7. Estimated project completion date-----	0	0
8. Name of receiving waters-----	0	0
9. Soil data-----	0	0
10. Impervious area sheet (commercial only)-----	0	0
11. Structural practices proposed-----	0	0
12. Non-structural practices proposed-----	0	0
13. Stabilization practices proposed -----	0	0
14. Waste management practices proposed-----	0	0
15. Runoff coefficient before and after construction-----	0	0
16. Inspection/maintenance procedures for cntrl measures-----	0	0
17. Acknowledgement that historic places considered-----	0	0
18. Onsite batch plant considered-----	0	0
19. Operator certification-----	0	0
20. Engineers seal-----	0	0
21. Notice of Intent / Site Notice from Operator/s-----	0	0
22. Copy of TPDES permit attached-----	0	0

**Site Plan (Map)**

1. Drainage patterns (pre-construction contours) -----	0	0
2. Location of disturbance -----	0	0
3. Location of structural controls -----	0	0
4. Location of construction entrances-----	0	0
5. Location of onsite & adjacent surface waters -----	0	0
6. Location of stormwater discharges -----	0	0
7. Tree Survey with summary table-----	0	0
8. Approximate slopes after grading -----	0	0
9. Location of on site and adjacent wetlands-----	0	0
10. Location of stabilization practices-----	0	0
11. Location of off site material waste, borrow, fill, or equipment storage-----	0	0
12. Location of sanitary facilities-----	0	0
13. NCTCOG details attached -----	0	0

## Stormwater Pollution Prevention Plan Checklist

DEVELOPMENT/ADDRESS: \_\_\_\_\_

SWPPP Sheets 1-5 are part of the site engineering and public works construction plans. All data fields must be filled out. If not applicable, indicate "N/A". Please do not alter the original contents and format of these SWPPP sheets. The standard SWPPP sheets are available via email by contacting the Engineering Department at 972-205-2170.

### **SWPPP Narrative sheet 1:**

- Indicate areas of responsibilities of operators if a shared SWPPP.
- Provide "intended sequence or sequence of activities that will disturb soils".
- Provide "description of potential pollutants", as described on the TCEQ permit.
- Provide "description of locations where stormwater discharges from the project will drain directly to surface water bodies (Waters of the U.S. or Waters of the State).
- For 10 acres and larger development, provide temporary sediment basin or provide written explanation (on letterhead) of why basin not feasible.

### ➤ **For SWPPP Narrative Sheet 2:**

- Provide "Sequence and Timing of Indicated Erosion Control Practices and/or Features".
- Provide detailed description of BMP maintenance protocols.
- Provide description of methods to modify pollution controls if existing controls are inadequate.
- Provide Operator's signatures per TCEQ General Permit TXR15000 requirements.

### ➤ **Sheet 3, Erosion Control Plan**

- Show location of onsite and adjacent surface waters.
- Show location of onsite and adjacent wetlands. Obtain information from National Fish and Wildlife website at <http://www.fws.gov/>
- Locate proposed stabilization practices, (seed, sod, paving...) on erosion control plan.
- Indicate proposed location of sanitary facilities.

### ➤ **For 5 acres and larger development:**

- Provide an executed copy of Owner/Operator N.O.I. on TCEQ form.
- Provide an executed copy of Contractor/Operator N.O.I. on TCEQ form.

### ➤ **Other related items**

- Place erosion and sediment control details on Sheet 4.
- Place housekeeping details on Sheet 5.
- For other than single-family residential developments, provide impervious area status sheet with the correct development address.
- For 1 acre and larger development, provide an executed copy of the TCEQ Site Notice, ("Attachment 2" of the TCEQ permit).
- Provide a tree survey with summary table or a letter addressed to Stormwater Manager, on the Engineer's letterhead indicating that no trees are on site or that no trees are cut and removed from this project.

Obtain preliminary SWPPP approval prior to final plan submittal. All questions related to stormwater comments should be address to Wayne Wolverton and Albert Lawrence at 972-205-2170.

## 4.2 Appendix 2 - Cover Sheet General Notes

**THESE NOTES SHALL APPEAR ON THE COVER SHEET OF ALL PRIVATE DEVELOPMENT PLANS WITHIN THE CITY OF GARLAND**

### **GENERAL NOTES**

**ALL CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH THE ADOPTED STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN NORTH CENTRAL TEXAS, LATEST EDITION, BY NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS, P.O. BOX COG, ARLINGTON, TEXAS 76005-5888 (817) 461-3300, AS AMENDED BY THE CITY OF GARLAND. A COPY OF THIS BOOK MAY BE OBTAINED FROM THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS AT THE ADDRESS OR PHONE NUMBER LISTED ABOVE. A COPY OF THE CITY OF GARLAND AMENDMENTS IS AVAILABLE IN THE ENGINEERING DEPARTMENT, LOCATED AT 800 MAIN STREET, THIRD FLOOR, GARLAND, TEXAS.**

1. The licensed Professional Engineer affixing his or her seal to the cover sheet of this document certifies that the license holder has reviewed and elects to use the City of Garland standard construction details and specifications and said details are applicable for this particular project and site conditions in conformance with section 137.33 (c) of the Texas Engineering practice act.
2. The Engineer of record for the construction documents is responsible for the accuracy and completeness of the documents. The City reserves the right to require corrections to the construction documents to accommodate actual site conditions differing from that shown on the approved plans; for details not consistent or equivalent to the latest revision to the City of Garland standard construction details; and, to accommodate omissions on the approved plans.
3. The existing public water, sanitary sewer, and storm sewer utility lines and appurtenances shown on these plans have been taken from record drawings and utility locator maps. The City of Garland makes no guarantee that the underground utility lines and structures shown comprise all the City of Garland underground utility lines and appurtenances in the area, either in service or abandoned. The City of Garland furthermore does not warrant the accuracy of the information shown on the record drawings and the utility locator maps.
4. The contractor shall be responsible for determining the depth and location of existing underground utilities prior to trenching or excavation and is required to take any precautionary measures to protect all lines shown and / or any other underground utilities not of record or not shown on the plans. Contractor is responsible for contacting all the franchise utility companies, City utility departments and Digtess for locates prior to construction.
5. The Developer and contractor shall comply with all acceptance procedures and processes identified at the pre-construction meeting. Schedule the mandatory pre-construction meeting prior to any construction by contacting the Engineering Department's field inspection supervisor at 972-205-2170.
6. The Developer or his / her contractor shall maintain daily contact with the City inspector during construction of improvements. No public sanitary sewer, water or storm sewer pipe shall be covered without approval of the City inspector. No subgrade material, stabilization or paving shall be applied in public right of way without approval of the City inspector. The inspector may at any time cause any construction, installation, maintenance of improvements to cease when, in

his/her judgment the City's standard construction details have been violated and may require reconstruction or other work as may be necessary to correct the violation.

7. Construction plans without the City of Garland's "Released for Construction" stamp are not valid for construction and shall be removed from the construction site. A copy of the current City of Garland standard construction details with all the latest revisions shall be onsite during construction.

8. The Developer is responsible for obtaining all applicable City, state, and federal permits.

9. Prior to any construction activity within rights of way (ROW) and easements a utility construction permit is required. Contact the ROW administrator at 972-205-3622 for further information.

10. Flood plain development permits are required when a project is located in a special flood hazard area as defined on the City of Garland effective Flood Insurance Rate Maps (FIRM). Prior to issuance of building permits the Developer shall process, coordinate and correct FIRMs according to current Federal Emergency Management Agency rules and regulations.

11. Erosion control and stormwater management measures must be in place and comply with applicable City, state and federal regulations. Erosion and sedimentation control measures and practices shall be maintained at all times during construction, additional measures and practices shall be installed if deemed necessary by the City inspector.

12. Detention pond and outlet structure(s) shall be in accordance with chapter 31.36 of the code of ordinances and fully operational prior to any paving activities.

13. The contractor shall make every effort not to impede traffic on existing streets, alleys or fire lanes open to the public. The Developer / contractor is responsible for furnishing and installing all temporary and permanent traffic control devices in accordance with the minimum requirements of the latest revision to the Texas Manual on Uniform Traffic Control Handbook.

14. All excavations within the right of way shall be filled and compacted within twenty-four (24) hours of completion of work and no excavation shall remain open for longer than 96 hours.

**15. The contractor shall be responsible for providing "record drawings" to the Engineer of record / firm defining the location of improvements and any changes to the City approved drawings constructed in conjunction with the project including but not limited to public and private paving, grading, drainage, and utilities and appurtenances. Prior to final acceptance by the City, the Engineer of record / firm shall provide the City inspector with "RECORD DRAWINGS" on 24" x 36" sheets along with PDF's of the record drawings and a digital copy of all files on compact disk (cd) in a City approved microstation (.dgn) or autocad (.dwg) format of all drawings that bear the City's "Release for Construction" stamp.**

4.3 Appendix 3 - Impervious Area Status Sheet

**COMMERCIAL DEVELOPMENT**

Name of Business: \_\_\_\_\_

Street Address: \_\_\_\_\_

Subdivision: \_\_\_\_\_

Engineer/Surveyor: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Net Change in Impervious Area, This Project: \_\_\_\_\_ Square Feet (nearest 100 SF)

Net Area Disturbed During Construction, This Project: \_\_\_\_\_ Square Feet (nearest 100 SF)

TOTAL IMPERVIOUS AREA, for This Site: \_\_\_\_\_ Square Feet (nearest 100 SF)

\_\_\_\_\_  
Signature of Engineer or Surveyor                      Date

OFFICE USE ONLY:

Polygon ID # : \_\_\_\_\_

Account No. : \_\_\_\_\_

Changes Implemented:

By: \_\_\_\_\_ Date: \_\_\_\_\_

#### **4.4 Appendix 4 - Example Detention Pond Manual & General Notes**

##### Operation and Maintenance Manual” Review Checklist

- Name of project/site
- Address of site
- Purpose of manual
- Normal operation of detention/water quality enhancement facility
- General Maintenance procedures
- Safety considerations
- City-responsibility declaration
- Project information:

Project Name

Location

Contact Person

Address

Phone number

- Detention/water quality enhancement facility physical characteristics

Flow line at inlet

Flow line at outlet – lower and upper

Normal pond/pool elevation

Pond 100-year WSEL, overflow elevation, pond 1-inch elevation

Inlet pipe diameter (s)

Outlet diameter (s)

- Declaration of **water-quality** enhancement measures
- Inspection checklist
- Original **maintenance acknowledgement** form (signed by operator and notarized)
- Engineer-sealed copies attached to the manual:

Storm drainage plan

Drainage area map

Grading plan

Pond profiles/elevations

Pond landscaping plans

Irrigation Plan

- **Maintenance manual** for stormwater quality enhancement devices
- **Letter-of-conformance** certification from the detention pond design Engineer

Please provide the above items for review and approval of the Operation and Maintenance Manual. Contact Wayne Wolverton at 972-205-2844 for questions and additional information.

An example manual is attached. Manual must be approved prior to stamping plans “Released for Construction”.

(Project Name & Address)

SAMPLE ONLY

## **Detention / Retention Pond Operation and Maintenance Manual**

**Note: Any detention pond modifications affecting the storage capacity or outlet structure of a detention pond will require a new manual and calculations reflecting the altered configuration to be approved by the Engineering Department prior to release for Site Permit. An updated plan view is required for pond modifications affecting only side slopes prior to release for Site Permit. The updated plan view reflecting the modifications must be included in the owner's Operations and Maintenance Manual.**

## **Background / Purpose**

A defined maintenance program is essential for detention facilities to maintain their operational integrity and original design intent. Prior to plan approval, the owner will provide an Operation and Maintenance (O&M) Manual to the Engineering Department for review and approval. Attached is an outline of the major topics and specific procedures the O&M manual shall address. O&M manuals are required for retention, detention, and amenity ponds.

The O&M manual will define the pond's key components, their function, and operational characteristics under normal flow conditions. The O&M manual will define the design intent of the system's primary components, its scope, and schedule of maintenance activities required to maintain a safe and effective operating facility.

The O&M manual shall include the name, address and telephone number of the party or parties responsible for long-term maintenance. Documentation of their assumption of this responsibility shall be included in O&M manual with the completion of Attachment Number 1. The transfer of maintenance responsibility to individual property owners in residential subdivisions shall be prohibited except through a homeowner's association agreement.

Maintenance responsibility as detailed on Ordinance 5637 shall be defined on the subdivision plat. Permanent access to the facility shall be provided by platting a 15-foot wide continuous access easement to a public right of way as stated in Sec.31.36.E.8.a of the Code of Ordinances.

## **General Maintenance Procedures**

The structural and functional integrity of the ponds shall be maintained at all times by removing and preventing drainage interference, obstructions, blockages, or other adverse effects into, through, or out of the system.

The O&M manual shall include provisions for periodic silt removal when standing water conditions occur or the pond's storage volume is reduced by more than 10%. Silt shall be removed and the pond/basin returned to original lines and grades shown on the approved engineering plans. In addition, corrective measures are required any time a basin does not drain completely within 72 hours of cessation of inflow. NO STANDING WATER IS ALLOWED in basins designed for dry detention purposes.

Accumulated litter, sediment, and debris shall be removed every 6 months or as necessary to maintain proper operation of the basin. Disposal shall be in accordance with federal, state and local regulations.

Detention facilities shall be mowed monthly between the months of April and October or anytime vegetation exceeds 12-inches in height.

During subdivision construction, the detention facility and all associated appurtenances will be constructed in accordance with Ordinance 5637 and the approved design plans. Note the ordinance requires among other things, that the basin and appurtenances be constructed at the beginning of the project. The manual will address interim facility maintenance from initial construction through final inspection and acceptance by the City.

Vegetation shall be established on disturbed areas in accordance with the Stormwater Pollution and Prevention Plan and North Central Texas Council of Governments Best Management Practices Manual specification. Irrigation shall be provided during and after subdivision construction. Hardy, disease resistant, perennial grasses shall be specified for the bottom and side slopes of the detention basin.

To prevent debris from entering and clogging the downstream storm sewer system a wire mesh screen or similar screening device shall be installed over the outlet until final acceptance.

As indicated in Section 31.36 of the Code of Ordinances the example O&M manual below outlines minimum sections to be included. Additional sections / procedures shall be included to address unique or unusual features.

**SAMPLE**  
**DETENTION BASIN OPERATION AND MAINTENANCE**  
**MANUAL**

**CONTENTS**

- Scope and Responsibilities
- Design & Performance Criteria
- Operational Procedures
- Normal
- Abnormal Indicators
- Preventive Maintenance and Inspection
- Maintenance & Repair
- Safety
- Inspection

**1. SCOPE AND RESPONSIBILITIES**

The O&M manual shall include sections defining the scope and the party or parties responsible for maintenance. Attachment Number 1, must be included, signed, and notarized by the owner.

The O&M manual shall provide guidance for:

- Funding needed – anticipated future monitoring and maintenance cost,
- Training required,
- Reporting,
- Record retention, and
- Coordination required with others.

**2. CITY RESPONSIBILITY**

The only responsibility of the City of Garland has in the operation and maintenance of this facility is inspection. The City of Garland will inspect the basin at a minimum annually and prepare a Notice of Violation (NOV) if required.

Any deficiencies noted on the NOV that are not corrected in the times specified herein will result in criminal fines not exceeding \$2,000.00 per day or application of a lien upon the property adequate to cover the required maintenance and/or repair plus administrative costs.

**3. PROJECT INFORMATION**

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number(s): \_\_\_\_\_

## A. DETENTION BASIN PHYSICAL CHARACTERISTICS / STRUCTURES

**(A separate form should be provided for projects with multiple ponds. Pond name should correspond with the identification shown on the approved plans.)**

Pond flowline at inlet \_\_\_\_\_ Pond flowline at outlet \_\_\_\_\_ Pond normal pool elev. \_\_\_\_\_

Pond 100 yr. WSEL \_\_\_\_\_ Pond overflow elev. \_\_\_\_\_

Pond water quality elev. (first 1" rainfall) \_\_\_\_\_

Pond inlet pipe diameter(s) \_\_\_\_\_

Pond outlet pipe diameter(s) \_\_\_\_\_

Aerator information (if applicable) \_\_\_\_\_

Water quality enhancement measures are provided by treating the first one-inch of rainfall runoff from the site. The first one-inch runoff from the site is \_\_\_\_\_ cfs during the 1-year storm event with a 6-hour duration. The water quality portion of the outlet is the \_\_\_\_\_ (state manufacturer if prefabricated storm screening device is use) Model \_\_\_\_\_ (provide unit number when applicable) or approved equal with a capacity of \_\_\_\_\_ cfs. The structure removes 70% or greater of the total suspended solids greater than or equal to 100 micron particle size from the first 1-inch of runoff from the site.

***NOTE: Water quality enhancement measure shall be designed using the 1-year, 6-hour duration storm with an intensity of 0.35 inches per hour as defined in "iSWM Design Manual for Site Development, Appendix A", January 2006.***

***If using a prefabricated stormwater screening device provide supporting literature/data from the manufacturer, indicating that the selected unit is properly sized for this project and complies with the City requirements.***

## B. DESIGN AND PERFORMANCE CRITERIA

Describe design approach, methods, assumptions and performance criteria, stormwater quality enhancement measures. Document manufacture's recommendations where pre-fabricated devices are used. Include pertinent structural details and shop drawings where necessary.

### 4. OPERATIONAL PROCEDURES

#### NORMAL

- Describe what is considered normal operating conditions, and

#### ABNORMAL INDICATORS

- Outflow reductions,
- Side slope and erosion near outfalls,
- Sinkholes along drain line,
- Standing water,
- Evidence of piping along embankments,
- Trees along embankments / emergency spillway ,
- Spotty / thin plant cover and weed growth,
- Increases in water loving plants, and
- Other.

## 5. PREVENTIVE MAINTENANCE / INSPECTION

Preventive maintenance guidelines and a routine and annual inspection checklist shall be developed and included in the O&M manual for the detention basin and appurtenances. Visual inspections of all components will be conducted every 6 months. The O&M manual shall stress and require that a log be kept of maintenance actions, and inspections. The log should document the condition of the detention system's primary components, mowing, and silt, litter and debris removal dates.

A good quality assurance and quality control program is essential at the outset. Records are important for evaluation and protection. There is little benefit to monitoring if records are poorly kept. A system should be established with the thought that it may some day have to be defended. **Written maintenance and repair records shall be maintained by the party or parties signing the O&M manual and shall be provided to the City upon request.**

Additional items to consider and suggestions when inspecting and monitoring detention basins and appurtenances include but are not limited to the following:

### MANHOLES

- Monitor monthly during construction and every 6 months thereafter unless problems develop.
- When monitoring manholes, these items should be noted:
  - Observe and document general condition of manholes. Check for cracks or other signs of deterioration.
  - Measure and record depth of water surface from lid.
  - Note whether water is clear or cloudy.
  - Note sand or silt in the bottom of the manhole. If bottom is covered, measure the depth.
  - Note condition of inlet and outlet pipes.

### INTAKE / OUTLET STRUCTURES

- Observe condition of appurtenant structures in relation to the as-built facilities.
- Monitor every 1 to 2 years or following 2-inch storm event.
- When monitoring, the following items should be noted:
  - General condition of intake / outlet structure.
  - Condition of the riprap, if any.
  - Check if there is a trash rack in place and if so, if it needs cleaning.
  - Check for signs of recent erosion in the vicinity of the structure.
  - Check the vicinity of the structure for sinkholes.

### SIDE SLOPE AND BOTTOM

- Observe condition of side slopes and bottom in relation to the as-built facilities.
- Note silt & sand accumulations.
- Note cracks along side slope, and slope failure areas.
- Inspect geosynthetic fabrics used for slope protection

## FLUMES

- Observe /document standing water areas.

## STORMWATER QUALITY DEVICES

- Observe / document clogging of filters and/or other devices.

## AREATOR

- Define manufacturer, make and model
- Observe and document any clogging of unit
- Follow manufacturer's manual for maintenance of pumps.

## 6. MAINTENANCE & REPAIR

Identify basic requirements to maintain the operational characteristics of the facility, expected and typical materials and equipment to be used. Discuss methods and procedures required to repair and replace system components.

### BASIC REQUIREMENTS

- Preserve the drain system in good working condition so it will perform without interruption.
- Keep the pipe and structures clear of obstructions.
- Keep structures in proper repair and earthwork in good condition.

### MATERIALS

- Identify materials needed for maintaining the detention basin.

EQUIPMENT - Identify equipment needed, such as;

Lawn Mower

- Weed Eater
- Excavator, front end loader, etc.
- Trucks and appropriate small tools
- Pumps and ladders
- High pressure hydraulic drain cleaner
- Trench box
- Video inspection equipment
- Oxygen sensor
- Rain Gauge

### METHODS AND PROCEDURES

- Define anticipated maintenance operations and procedures.

## REPAIR, REPLACEMENTS AND ADDITIONS

- System repairs should always be to the original design standards or better.
- Replacements and additions should be treated as original construction.

## 7. SAFETY

- Establish general safety guidelines and procedures. Safety measures may include but are not limited to fencing, warning signs, and stadia rod indicating depth at lowest point, outlet structures to limit public access, Trench safety and work in confined spaces could raise additional safety concerns.

ATTACHMENT NUMBER 1

MAINTENANCE ACKNOWLEDGEMENT

I acknowledge and agree by my signature below that I am responsible for the performance of the detention basin maintenance as defined in the attached Operation and Maintenance (O&M) manual. I agree to notify the City of Garland of any problems with the system and / or prior to any changes to the system or responsible party.

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Driver License Number \_\_\_\_\_ Date of Birth \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, \_\_\_\_\_, Notary Public for the State of \_\_\_\_\_

County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_

\_\_\_\_\_ personally appeared before me this \_\_\_\_\_

day of \_\_\_\_\_, \_\_\_\_\_, and acknowledge the due execution of forgoing maintenance requirements identified in the attached O&M manual. Witness my hand and official seal,

My commission expires \_\_\_\_\_

8. INSPECTION CHECKLIST CHART

<b>FREQUENT INSPECTION</b>	<b>DATE</b>	<b>REPAIRS REQUIRED</b>	<b>REPAIRS MADE</b>	<b>NOTES</b>
Mowing				
Remove trash and debris				
Inspect irrigation system operation				
Remove grass clippings				
Violations noted				

<b>MINOR INSPECTION</b>				
Condition of Pond				
Amount of silt in pond				
Amount of silt in flume				
Amount of ponded water				
Amount of wetland vegetation				
Location of Erosion				
Percent of vegetation				
Condition of trash guard				
Location of erosion				

<b>MAJOR INSPECTIONS</b>				
Condition of Stormwater Quality Structure				
Type of Stormwater Quality Structure				
Structure type and Condition				
Condition of rip-rap				
Condition of filtration system				
Berm or Embankment Settlement				
Location of erosion				
Evidence of Animals				
Evidence of Aquatic life				
Condition of Aeration Fountain				

Format for Detention Facility Letter of Conformance  
Submitted on Letterhead of Engineering Firm

(Date)

City of Garland Engineering Department  
Field Operations  
116 North Glenbrook Drive  
Garland, Texas 75040

Attn: William J. Heinze, PE, Senior Field Engineer

RE: **(Name of Subdivision or Private Development)**  
Detention Facility Conformance

Dear Mr. Heinze:

I certify that the design, as approved by the City of Garland, of each Detention Facility located at **(Name of Subdivision or Private Development and street address if applicable)** conforms to the requirements of the City of Garland Code of Ordinances Section 31.36. I further certify that each Detention Facility has been constructed in accordance with the lines and grades on the approved design drawings and I believe will function in accordance with the intent and purpose of the approved design.

Sincerely,

**{Signed Seal of Engineer}**

**(Name of Engineer), PE**  
**(Title of Engineer)**

cc: Wayne Wolverton, Stormwater Detention Inspector  
**(Developer/Owner of Facility)**  
**(Contractor)**

#### **4.4.1 Detention Basin General Notes**

1. All construction shall be done in accordance with the Standard Specifications for Public Works Construction in North Central Texas, latest edition, by North Central Texas Council of Governments, (NCTCOG) P.O. Box COG, Arlington, Texas 76005-5888 (817) 461-3300, as amended by the City of Garland.
2. Detention pond and outlet structure(s) shall be in accordance with chapter 31.36 of the code of ordinances and fully operational prior to any paving activities.
3. The property owner or homeowner's association shall maintain the pond in accordance with the maintenance and operation manual approved by the Engineering Department.
4. Erosion control shall be in accordance with the stormwater quality ordinance and the latest revision to the NCTCOG standard specifications and NCTCOG BMP manual.
5. All ponds shall be constructed with a permanent irrigation system around the perimeter of the pond. The irrigation system shall provide sufficient coverage to establish and maintain grass vegetation to prevent erosion of the pond side slopes and bottom.
6. Pond(s) shall be excavated to the lines and grades shown on the approved construction plans including the inlet and outlet structures and shall be verified by the design Engineer. Written certification shall be provided by the design engineer to the Engineering Department stating that the pond(s) has been constructed and is operating in accordance with the approved design and construction plans.
7. Ponds deeper than ten feet shall require a slope stability analysis by a licensed geotechnical Engineer. The analysis shall be submitted to the City Engineering Department. Pond depth shall not exceed twenty feet with side slopes no greater than 4:1 unless a variance is specifically approved by the Engineering Department.
8. Grass coverage shall be defined as 70% perennial vegetative cover per NCTCOG latest specifications including St. Augustine, Bermuda, Buffalo or equally hardy warm weather grasses as approved by the Engineering Department.
9. When warm weather grasses will not germinate due to fall or winter seasonal conditions annual, cool weather grass cover (rye or fescue) shall be established as a temporary substitution. The owner shall establish the required perennial vegetative cover no later than June 1<sup>st</sup> of the following year.
10. Should the owner fail to establish 70% perennial vegetative cover, refundable fees of an amount equal to the cost to grade and sod the pond shall be submitted to the Director of Engineering prior to release of the plans for construction. Said fee shall not be less than \$12 per square yard. If vegetation is not established the fee will be forfeited to the City for use in establishing required vegetative cover. Building Inspection will cease and final occupancy approval for the property will be withheld until approved, 70% perennial vegetative cover is established.
11. Pond(s) shall be constructed with a paved low flow concrete flume (4 feet min. width) between the inlet and outlet structures unless pond is excavated in stable rock.

12. Flumes must be constructed at point discharge locations, such as curb outlets or swale outfalls between the top of slope and the pond's low flow flume.

13. Items 1 through 12 shall be completed prior to the City granting acceptance to the public improvements and issuing a Certificate of Occupancy for non-residential developments or a Building Permit for single family residential developments.

14. Stormwater quality measures with minimum removal efficiency of 70% of total suspended solids up to 100 microns are required to be constructed in conjunction with all detention and retention pond(s).

15. Pond design and operation shall be in accordance with the most current "Stormwater Detention and Retention Ponds" ordinance number 5637.

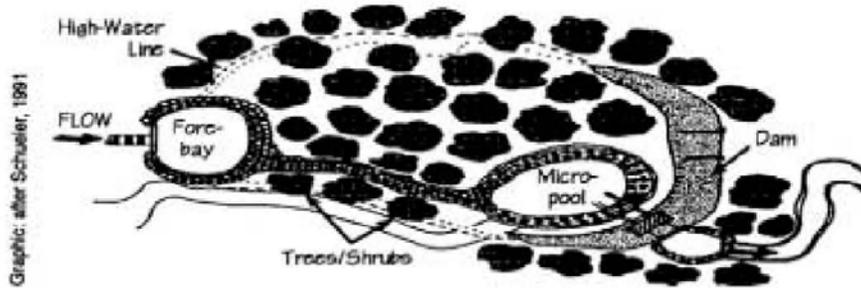
16. A dedicated access easement (15 foot min. width) is required by plat to a public right of way. An all weather access surface to the bottom of the pond shall be provided.

17. The owner shall remain responsible for silt, trash and miscellaneous construction debris removal from the pond during all phases of subdivision and building construction.

18. Should the condition of the pond deteriorate during construction, building permits, inspections, and certificate of occupancy will be denied by the Building Inspection Department until the pond is brought into compliance with the approved construction plans.

# EXTENDED DETENTION BASINS

**TC4-1**



**DESCRIPTION**

Extended detention basins are normally dry between storms. During a storm the basin fills. An outlet placed at the bottom is sized to release the storm water slowly during and after the storm to provide time for sediments to settle to the bottom.

**SELECTION CRITERIA**

- Objective is to remove only particulate pollutants
- Use where unavailability of water prevents the use of wet ponds, vegetated treatment ponds (VTPs), or vegetated swales and strips
- Use where wet ponds or VTPs would cause unacceptable conditions for mosquitoes

**LIMITATIONS**

- Limitation on the diameter of the orifice may not allow use of extended detention on small watersheds.
- Requires differential elevation between inlet and outlet.
- Improper design may result in a mudhole.
- Limited in size to 100 acres.

**DESIGN AND SIZING CONSIDERATIONS**

- Basin volume is sized to capture a particular fraction of the runoff
- Drawdown time of 24 to 40 hours
- A shallow basin with maximum surface area performs better than a deep basin with the same volume
- The length of the basin should be at least three times its width
- The inlet and outlet must be at opposite ends of the basin unless baffling is used to direct the water to the far end of the basin before it returns to the outlet
- Place energy dissipaters at the entrance to minimize bottom erosion and resuspension
- Vegetate side slopes and bottom to the maximum extent practical
- If side erosion is particularly severe, consider paving or soil stabilization
- If floatables are anticipated to be a problem, place the orifice in a manhole rather than in the basin, and submerge the outlet

**Considerations**

- Soils
- ✓ Area Required
- Slope
- Water Availability
- ✓ Aesthetics
- Hydraulic Head
- ✓ Environmental Side Effects

**Targeted Constituents**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oxygen Demanding Substances
- Oil & Grease
- Bacteria & Viruses

**Implementation Requirements**

- Capital Costs
- O & M Costs
- Maintenance
- Training

**Legend**

- Likely to Have Significant Impact
- Probable Medium Impact
- Probable Low Impact
- ? Unknown or Site Specific Impact

## Extended Detention Basins

## TC4-2

### INSPECTION/MAINTENANCE CONSIDERATIONS

- None special except to make sure the orifice is installed as per design
- Check orifice regularly for clogging
- Check banks and bottom of surface basin for erosion and correct as necessary
- Remove deposited sediment when accumulation reaches 6-inches, or if resuspension is observed

### COST CONSIDERATIONS

- Generally less expensive than wet ponds and VTPs, but more expensive than vegetated swales and strips
- Erosion of open space areas in residential developments will increase maintenance costs.

### ADDITIONAL INFORMATION

Extended detention basins may be particularly appropriate to North Texas where irrigation cannot be used to maintain water levels, as is required for wet ponds and VTPs, and vegetated swales and strips. These systems are suitable for essentially any size tributary area up to 100 acres. Surface ponds are less expensive to construct, but underground vaults may be appropriate. Use of concrete retaining walls will reduce the space required by a pond. A typical plan and section view of an extended detention basin is shown in Figure TC4-A.

Extended detention provides a lower removal efficiency than wet ponds and VTPs: the facilities are smaller thereby reducing their effectiveness with particulate pollutants, and they do not have the ability to remove dissolved contaminants. The extended detention volume and draw down time could be greater than that recommended in this manual to achieve a higher removal efficiency of the particulate pollutants. If irrigation water is available, a thick grass turf on the bottom of the facility may provide some removal of dissolved contaminants, like vegetated swales and strips. See TC3 Vegetated Swales and Strips, for recommendations on turf grass and ground cover species.

Where irrigation water is not available, there may be concerns about erosion and resuspension of particulate pollutants in surface ponds. This, however, has not been a significant problem in Austin, Texas where sand filters are preceded by dry settling ponds (Hartigan, pers. comm.). However, the design must incorporate several features to minimize the potential for erosion control and resuspension. Drought tolerant vegetation may work but has not been evaluated. Non-vegetative materials may help such as concrete or plastic grids, small riprap, erosion matting, or paving. A paved forebay may facilitate maintenance thereby reducing the material available for resuspension.

The recommended drawdown time of 24 to 40 hours for a full pond is based on very limited laboratory data. A few extended detention ponds have been monitored and generally provide a removal efficiency of 60 to 80% of sediment with a drawdown time of 24 hours. Forty hours is recommended for reasons given below.

### Design

What should be the capture goal? It is generally believed based on limited field research that the extended detention basin will remove about 70 to 80% of the suspended solids. If the basin is to be off-line, then 90 to 95% of the runoff must be captured over time to approach removal rates achieved by other BMPs. If, however, the basin is on-line, it will achieve the desired goal because during flows that exceed the volume of the basin it will operate momentarily like a wet pond. However, because of the possibility of resuspension of materials during extreme storms it is advisable to place the basin off line, that is, it should have a bypass for the extreme events

## Extended Detention Basins

## TC4-3

To design the extended detention basin to have the minimum surface area and still remove 70% of TSS, the following equation developed by the City of Austin should be used.

$$\begin{aligned} A_s &= AdH/10 \\ A_s \text{ (ft}^2\text{)} &= \text{minimum surface area (Austin, 1988)} \\ Ad &= \text{contributing drainage area} \\ H \text{ (ft)} &= \text{design storm volume (inches)/12} \end{aligned}$$

A drawdown time of 40 hours is recommended although 24 hours is also used. The analysis of runoff using precipitation data found that increasing the drawdown time from 24 to 40 hours increased the size of the basin by only about 10% to 20% depending on the location.

The outlet control orifice should be sized using the following equation (GKY, 1989).

$$a = \frac{2A(H - H_o)^{0.5}}{3600cT(2g)^{0.5}} = (7 \times 10^{-5})A(H - H_o)^{0.5}/cT \quad (1)$$

where:

- a = area of orifice (ft<sup>2</sup>)
- A = average surface area of the pond (ft<sup>2</sup>)
- c = orifice coefficient
- T = drawdown time of full pond (hrs.)
- g = gravity (32.2 ft/sec<sup>2</sup>)
- H = elevation when the pond is full (ft)
- H<sub>o</sub> = final elevation when pond is empty (ft)

With a drawdown time of 40 hours the equation becomes:

$$a = (1.75 \times 10^{-6})A(H-H_o)^{0.5}/C \quad (2)$$

Assuming an average release rate at one half the pond depth, a common approach in several design manuals, leads to considerable error. If the pond has a significant variation of surface area with depth, do not use Equation (2); consult GKY (1989).

Care must be taken in the selection of "c": 0.60 is most often recommended and used. However, based on actual tests GKY (1989) recommends the following:

c = 0.66 for thin materials, that is, the thickness is equal to or less than orifice diameter

c = 0.80 when the material is thicker than the orifice diameter

Drilling the orifice into an outlet structure that is made of concrete can result in considerable impact on the coefficient, as does the beveling of the edge. The experiments by GKY (1989) were with sharp edged orifices.

The above approach implies only one outlet orifice. However, a recent survey of extended detention facilities (Galli, pers. comm.) found the drawdown time of small storms that do not fill the facility to be too short to provide effective treatment. The facilities surveyed were designed for a drawdown time of 24 hours. A 40 hour drawdown may provide sufficient time for the smaller storms. But it may be prudent to take additional steps to be certain that the small storms, which represent the majority of pollution, are effectively treated. One approach would be to check the design analysis

# Extended Detention Basins

# TC4-4

to determine if the facility takes at least 24 hours to drain when half full. If not, either modify the design to achieve this objective, or install a two orifice outlet. The lower outlet is sized to drain a half-full facility in 24 hours. The second orifice is placed at the mid-water elevation and is sized in combination with the lower orifice to drain the entire facility in 40 hours. A second approach would be to place the single orifice at 1/4 or 1/3 the distance from the bottom. Small storms would then be retained in the facility. After the storm the water would either infiltrate or evaporate in a surface pond. If water remains in the facility until the next storm no harm occurs as it will function like a shallow wet pond. Do not install a low flow channel in the facility.

Three alternative outlet structures are suggested (Figure TC4-B.1). The concrete block structure is appropriate for large ponds. The riser pipe is suggested for small to large ponds. Placing the outlet control in the berm or downstream of the facility is most suitable for small ponds.

Recommendations regarding the design of a riser pipe are taken from Austin (1988). Table 4A provides guidance on the location of holes. To prevent clogging of this orifice and the bottom orifices of the riser pipe, wrap the bottom three rows of orifices with geotextile fabric and a cone of one to three inch rock. The holes in the riser pipe should not be modified to achieve a 40 hours drawdown time. Rather, the control orifice should be placed downstream. For small facilities place the control orifice in a manhole between the pond and the filter as shown in Figure TC4-B.2. Use a "T-pipe" (Figure TC4-B.3) to submerge the orifice.

**TABLE 4A PERFORATED OUTLET RISER PIPE ORIFICES (AUSTIN, 1988)**

RISER PIPE DIAMETER	VERTICAL SPACING BETWEEN ROWS	NUMBER OF PERFORATIONS	PERFORATION DIAMETER
6"	2.5"	9 per row	1"
8"	2.5"	12	1"
10"	2.5"	16	1"

Underdrain systems to control the drawdown have experienced clogging problems (NVPDC, 1987) and riser pipe systems are now generally recommended. Clogging of the bottom holes has been observed in riser pipes in the mid-Atlantic states (MWCOG, 1992) suggesting that the diameter of the riser holes should not be less than 3/4 to 1" (MWCOG, 1992) although a minimum diameter of 2" is not being considered (Galli, pers comm.). However, most of the facilities surveyed had risers without the gravel cone and the outlet holes were modified to provide drawdown control. Modifying the holes in the riser to control the outlet rate reduces the diameter of the holes and increases the risk of clogging. Submerging the control orifice as shown in Figure TC4-B.3 will allow the use of smaller orifice diameter. One orifice with a diameter of 1/2 inch, or 1 inch to be conservative, allows the use of extended detention for very small catchments.

- Do not locate on fill sites or on or near steep slopes if is expected that much of the water will exit through the bottom, or modify the bottom to prevent excessive infiltration.
- Energy dissipation at the inlet to minimize erosion
- Vegetate the slopes and bottom for the same reason
- Freeboard of 1 foot
- Side slopes of at least 2:1 unless vertical retaining walls are used
- Incorporate bypass or overflow for large areas
- Provide dedicated access to the basin bottom (minimum 4:1) for maintenance vehicles
- With a riser structure, include an anti-vortex device and a debris barrier.

## Extended Detention Basins

## TC4-5

### Maintenance

Conduct inspections semiannual and after each significant storm. Remove floatables and correct erosion problems in the pond slopes and bottom. Pay particular attention to the outlet control orifice(s) for signs of clogging. If the orifice is located in a Type 2 catch basin, remove sediments if they are within 18" of the orifice plate.

### References

Austin (City of), 1988, "Environmental Criteria Manual."

Galli, J., pers. comm., Metropolitan Washington Council of Governments.

GKY, 1989, "Outlet Hydraulics of Extended Detention Facilities," for the Northern Virginia Planning District Commission.

Hartigan, P., pers. comm., Washington Department of Ecology (formally with the City of Austin).

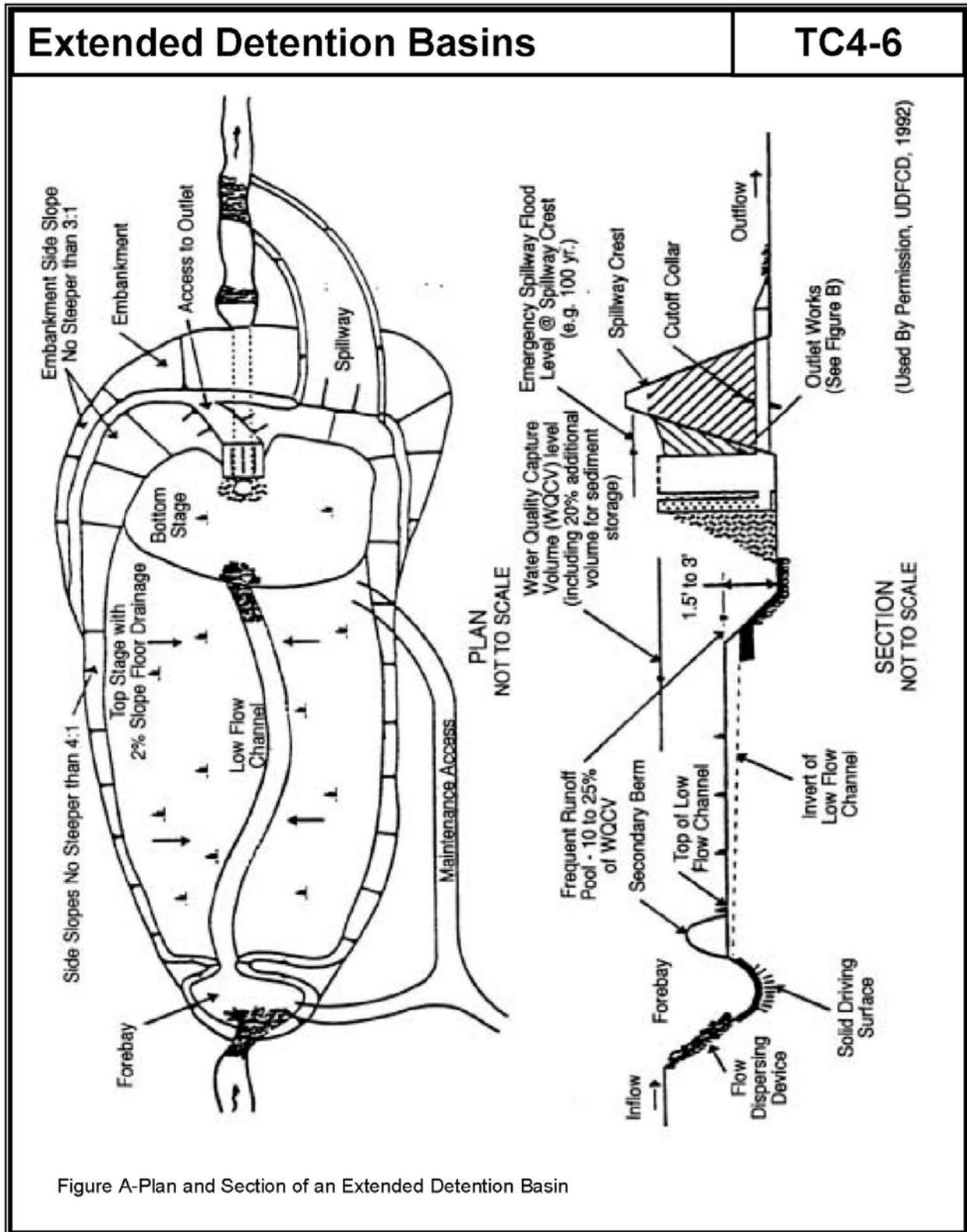
Metropolitan Washington Council of Governments (MWCOG), 1983, "Nationwide Urban Runoff Program Pollution Removal Capabilities or Urban Best Management Practices in the Washington Metropolitan Area," NTIS, PB84-245497.

Northern Virginia Planning District Commission (NVPDC), 1987, "BMP Handbook for the Occoquan Watershed."

Randall, C.W., et al., 1982, "Urban Runoff Pollutant Removal by Sedimentation," in Proceedings of the Conference on Stormwater Detention Facilities, Henniker, NH, ASCE, pp 205-209.

Schueler, T.R., Kumble, P.A., and Heraty, M.A., "A Current Assessment of Urban Best Management Practices", Metropolitan Washington Council of Governments, 1991.

Whipple, W. and J. Hunter, 1981, "Settleability of Urban Runoff Pollution," J. Water Pollution Control Federation, 53 (12): 1726-1731.



North Central Texas  
Residential/Commercial BMP Manual

July 1993

(Used By Permission, UDFCD, 1992)

# Extended Detention Basins

TC4-7

FIGURE 4B.1 CONCRETE STRUCTURE

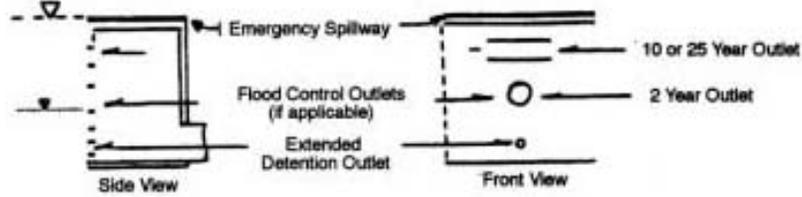


FIGURE 4B.2 RISER PIPE

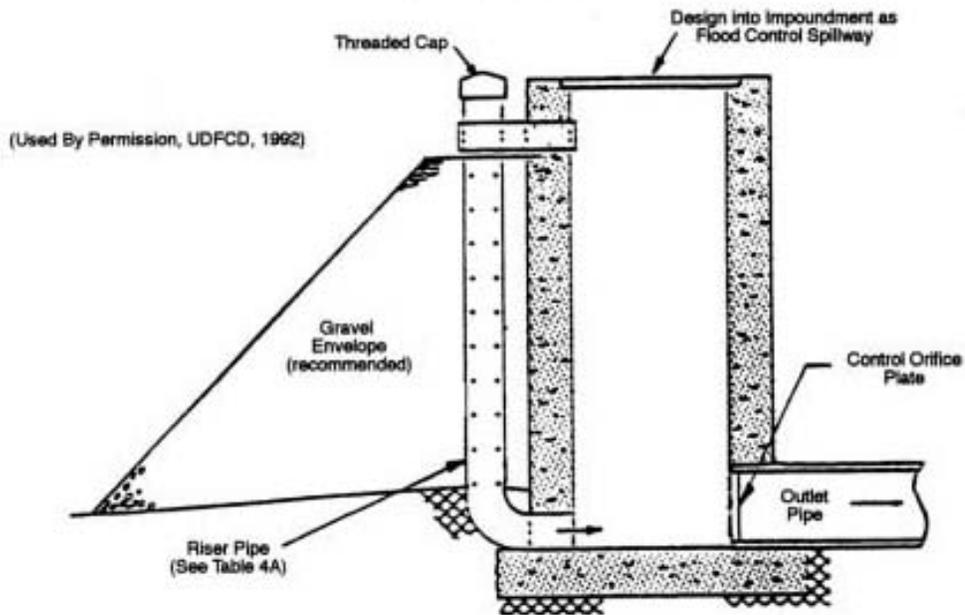


FIGURE 4B.3 CONTROL MANHOLE

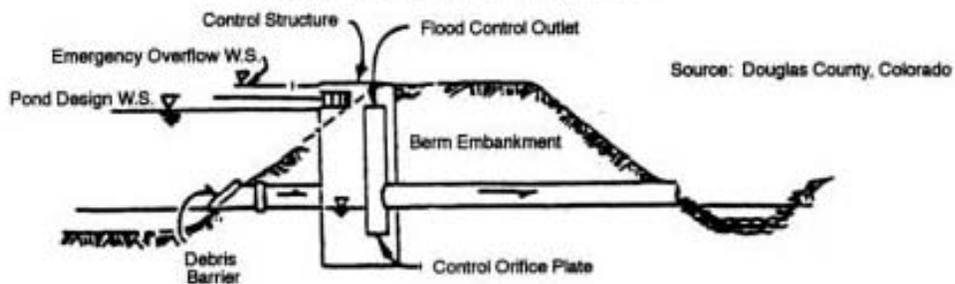


Figure B-Alternative Outlet Configurations

#### **4.5 Appendix 5 - License Agreement**

This Agreement is made and entered between the City of Garland, Texas (the "City"), a home-rule municipality duly incorporated and existing under the constitution and laws of the State of Texas, and \_\_\_\_\_ ("Licensee").

### **W I T N E S S E T H**

#### **Section 1. Grant of License.**

In and for the consideration of \_\_\_\_\_ dollars (depending on the number of pages to be filed), paid in hand by Licensee, the City hereby grants to Licensee the nonexclusive right and license to install, place and maintain a \_\_\_\_\_ (the "Facilities") **and incidentals** at \_\_\_\_\_ (location). Incidentals include items such as trees, bushes, shrubs, ornamental grasses, flowers, other landscaping, landscape walls and the like. The license hereby granted extends only to those Facilities in the locations and pertaining only to the property of the City (the "Property") as depicted in Exhibit "A" attached hereto and incorporated herein. Licensee shall not alter, add to, expand or otherwise change the Facilities or the use of the Facilities without a written amendment to this License.

#### **Section 2. License Non-exclusive.**

The license granted hereby is non-exclusive and the City reserves all rights it has or may have in and to the Property to which this License pertains. Licensee shall not assign, transfer or sublet this License, in whole or in part, without the express written approval of the City.

#### **Section 3. Indemnity.**

Licensee shall indemnify and hold harmless the City of Garland, Texas, and all of its present and former agents, employees, officials and representatives in their official, individual and representative capacities (collectively referred to hereinafter as the "City") from any and all claims, demands, causes of action, judgments, liens and expenses (including attorney's fees and attorney's fees under 42 U.S.C. §1988), costs and damages (whether common law or statutory, whether actual, punitive, consequential or incidental and expressly including those caused by the negligence or other fault or strict liability of any party indemnified herein), of any conceivable character, from injuries to persons (including death) or to property (both real and personal) created by, arising from or in any manner relating to the Facilities or the Property, without limitation. The City, its officers, employees and agents shall not be liable for any loss or damage to any real or personal property of any person, or for any injury to or death of any person, arising out of or in connection with the use, construction, operation, maintenance, repair or removal of, or other action or event with respect to the Facilities regardless of cause.

#### **Section 4. Removal or Modification of Facilities.**

The City reserves the right to require Licensee to relocate or remove, at the sole expense of Licensee, any part of the Facilities, if determined necessary by the City. The Licensee acknowledges that the City holds a paramount right to the use of the Property. The City shall not be liable to the Licensee for any damage to or loss of all or any part of the Facilities regardless of cause. City may require the Facilities to be removed or modified, in which event the cost of removal or modification shall be borne exclusively by Licensee. In the event that Licensee fails or refuses to

remove the Facilities as required, the City may perform such removal or cause the removal to be done and charge the cost to Licensee.

**Section 5. Termination.**

This Agreement may be terminated by the City upon: (i) substantial breach of a material provision of this Agreement by Licensee; (ii) abandonment (whether intentional or inadvertent) or non-use of the Facilities for a period of one-hundred eighty (180) days or more; or (iii) by delivering written notice of termination at least one-hundred eighty (180) days prior to the date of termination. Licensee shall have the right to terminate this Agreement by delivering written notice of termination at least one-hundred eighty (180) days prior to the date of termination. Upon termination, Licensee shall promptly remove the Facilities from the Property and restore the Property, at Licensee's expense, to as good a condition as that prevailing before the installation of the Facilities. The indemnity provisions of this Agreement shall survive termination to extent of occurrence arising prior to termination.

**Section 6. Severability.** If any term or provision of this Agreement is held to be illegal, invalid or unenforceable, the legality, validity or enforceability of the remaining terms or provisions of this Agreement shall not be affected thereby, and in lieu of each such illegal, invalid or unenforceable term or provision, there shall be added automatically to this Agreement a legal, valid or enforceable term or provision as similar as possible to the term or provision declared illegal, invalid or unenforceable.

**Section 7. Waiver.** Either City or License shall have the right to waive any requirement contained in this Agreement, which is intended for the waiving party's benefit, but, except as otherwise provided herein, such waiver shall be effective only if in writing executed by the party for whose benefit such requirement is intended. No waiver of any breach or violation of any term of this Agreement shall be deemed or construed to constitute a waiver of any other breach or violation, whether concurrent or subsequent, and whether of the same or of a different type of breach or violation.

**Section 8. Governing Law; Venue.** This Agreement and all of the transactions contemplated herein shall be governed by and construed in accordance with the laws of the State of Texas. The provisions and obligations of this Agreement are performable in Dallas County, Texas such that exclusive venue for any action arising out of this Agreement shall be in Dallas County, Texas.

**Section 9. Paragraph Headings; Construction.** The paragraph headings contained in this Agreement are for convenience only and shall in no way enlarge or limit the scope or meaning of the various and several paragraphs hereof. Both parties have participated in the negotiation and preparation of this Agreement and this Agreement shall not be construed either more or less strongly against or for either party.

**Section 10. Binding Effect.** Except as limited herein, the terms and provisions of this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, devisees, personal and legal representatives, successors and assigns.

**Section 11. Gender.** Within this Agreement, words of any gender shall be held and construed to include any other gender, and words in the singular number shall be held and construed to include the plural, unless the context otherwise requires.

**Section 12. Counterparts.** This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

**Section 13. Exhibits.** All exhibits to this Agreement are incorporated herein by reference for all purposes wherever reference is made to the same.

**Section 14. Entire Agreement.** It is understood and agreed that this Agreement contains the entire agreement between the parties and supersedes any and all prior agreements, arrangements or understandings between the parties relating to the subject matter. No oral understandings, statements, promises or inducements contrary to the terms of this Agreement exist. This Agreement cannot be changed or terminated orally.

**Section 15. Relationship of Parties.** Nothing contained in this Agreement shall be deemed or construed by the parties hereto or by any third party to create the relationship of principal and agent or of partnership or of joint venture or of any association whatsoever between the parties, it being expressly understood and agreed that no provision contained in this Agreement nor any act or acts of the parties hereto shall be deemed to create any relationship between the parties other than the relationship of independent parties contracting with each other solely for the purpose of effecting the provisions of this Agreement.

**SIGNATURE PAGE ONE – TO BE EXECUTED BY THE LICENSEE**

**EXECUTED AND AGREED** this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**LICENSEE**

By: \_\_\_\_\_  
Title: \_\_\_\_\_

**STATE OF TEXAS**

**Before Me** \_\_\_\_\_ (here insert the name and character of the officer) **on this day personally appeared** \_\_\_\_\_, known to me (or proved to me through \_\_\_\_\_ (description of identity card or other document) to be the person whose name is subscribed to the foregoing instrument **and acknowledged to me that he or she executed the same for the purposes and consideration therein expressed.**

**GIVEN UNDER MY HAND AND SEAL OF OFFICE** this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

\_\_\_\_\_  
Notary Public in and for  
The State of Texas

**SIGNATURE PAGE TWO – TO BE EXECUTED BY THE CITY OF GARLAND AFTER SIGNATURE PAGE ONE HAS BEEN COMPLETED**

THE CITY OF GARLAND, TEXAS

By: \_\_\_\_\_  
Michael Polocek, P.E.

Title: Director of Engineering

**STATE OF TEXAS**

**Before Me** \_\_\_\_\_ (here insert the name and character of the officer) **on this day personally appeared** \_\_\_\_\_, known to me (or proved to me through \_\_\_\_\_ (description of identity card or other document) to be the person whose name is subscribed to the foregoing instrument **and acknowledged to me that he or she executed the same for the purposes and consideration therein expressed.**

**GIVEN UNDER MY HAND AND SEAL OF OFFICE** this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for  
The State of Texas

4.6 Appendix 6 - TXDOT Permits



Form 1058  
(Rev 2/2000)  
Electronic Version GSD-EPC Word 97  
Page 1 of 2

**Permit to Construct Access Driveway Facilities  
On Highway Right of Way**

To: \_\_\_\_\_ Hwy. \_\_\_\_\_ Permit No. \_\_\_\_\_  
\_\_\_\_\_ Control \_\_\_\_\_ Section \_\_\_\_\_

The Texas Department of Transportation, hereinafter called the State, hereby authorizes \_\_\_\_\_ hereinafter called the Grantee, to (re) construct an access driveway on the highway right of way abutting highway no. \_\_\_\_\_ in \_\_\_\_\_ County, located \_\_\_\_\_

Subject to the following:

1. The Grantee is responsible for all costs associated with the construction of this access driveway.
2. Design of facilities shall be as follows and/or as shown on sketch:

---



---



---

All construction and materials shall be subject to inspection and approved by the State.

3. Maintenance of facilities constructed hereunder shall be the responsibility of the Grantee, and the State reserves the right to require any changes, maintenance, or repairs as may be necessary to provide protection of life or property on or adjacent to the highway. Changes in design will be made only with approval of the State.
4. The Grantee shall hold harmless the State and its duly appointed agents and employees against any action for personal injury or property damage sustained by reason of the exercise of this permit.
5. Except for regulatory and guide signs at county roads and City streets, the Grantee shall not erect any sign on or extending over any portion of the highway right of way, and vehicle service fixtures such as service pumps, vendor stands, or tanks shall be located at least 3.6 meters (12 feet) from the right of way line to ensure that any vehicle services from these fixtures will be off the highway.
6. The State reserves the right to require a new access driveway permit in the event of a land use change or change in driveway traffic volumes or vehicle types.
7. This permit will become null and void if the above-referenced driveway facilities are not constructed within six (6) months from the issuance date of this permit.
8. The Grantee will contact the State's representative \_\_\_\_\_, telephone ( ) \_\_\_\_\_ at least twenty-four (24) hours prior to beginning the work authorized by this permit.

Texas Department of Transportation

\_\_\_\_\_  
Date of Issuance

\_\_\_\_\_  
District Engineer

The undersigned hereby agrees to comply with the terms and conditions set forth in this permit for construction of an access driveway on the highway right of way.

Date: \_\_\_\_\_

Signed: \_\_\_\_\_  
(Property Owner or Owner's Representative)

<p>ALL TRAFFIC CONTROL AND PROTECTIVE DEVICES USED MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.</p>
--

<p>A COPY OF THIS PERMIT SHALL BE KEPT ON JOB SITE AT ALL TIMES DURING THE PROPOSED WORK.</p>
---



# UTILITY WORK ON HIGHWAY RIGHT OF WAY WITHIN THE DALLAS DISTRICT

\_\_\_\_\_ is giving written notice of proposed work to take place within the right of way of \_\_\_\_\_ in \_\_\_\_\_ County, TX as follows:  
(Give general written description of location and work to take place- Do not write "See Attached")

The work listed above **is not to include the following:** The installation of any new facilities, any work requiring a highway bore, **major** capacity improvements, or upgrades. This work is limited to repair of broken, damaged or defective equipment, minor maintenance to improve a hazardous condition, repair/replace existing equipment resulting in improper or poor performance, placement of minor equipment for service upgrades (i.e. repeaters, load coils, etc.), or minor adjustments to existing facilities (Removing/adjusting utility pole locations or guy wires *along the right of way, inline*).

At no time shall any work activity that involves digging take place any closer than 3 feet from the edge of pavement or back of curb.

Our firm will use best management practices to minimize erosion and sedimentation resulting from the proposed work, and we will revegetate the work area as indicated under "Revegetation Special Provisions."

Our firm will insure that traffic control measures complying with applicable portions of the *Texas Manual of Uniform Traffic Control Devices* will be installed and maintained for the duration of this work (Approval of traffic control plans required by area/maintenance office.)

Refer to attached location map and drawing for a more specific location a description of work activity. The undersigned utility representative agrees to comply with the terms and conditions set forth in this notice.

The proposed work will begin on the \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

Utility Owner \_\_\_\_\_

By (Print) \_\_\_\_\_

Signature \_\_\_\_\_

Address \_\_\_\_\_

Texas Department of Transportation  
Northeast Area Office  
P.O. Box 133067  
Dallas, Texas 75313-3067  
Att. Paul Williams, P.E.

\_\_\_\_\_

Phone

\_\_\_\_\_

\_\_\_\_\_  
Area Maintenance Supervisor

Signature: \_\_\_\_\_

\_\_\_\_\_  
Date

**COPY OF THIS DOCUMENT MUST BE KEPT ON  
JOBSITE**

**CITY OF GARLAND, TEXAS  
DEVELOPMENT PERMIT**

APPLICATION NUMBER: \_\_\_\_\_

NAME OF APPLICANT: \_\_\_\_\_

NAME OF PERMITTEE: \_\_\_\_\_

THE ABOVE NAMED APPLICANT APPLIED FOR A DEVELOPMENT PERMIT ON \_\_\_\_\_. THE CITY ADMINISTRATOR REVIEWED THE APPLICATION AND DETERMINED THAT THE PROPOSED DEVELOPMENT IS LOCATED WITHIN AN IDENTIFIED FLOODPLAIN OF THE CITY OF GARLAND.

THE CITY ADMINISTRATOR REVIEWED THE PLAN AND SPECIFICATIONS OF THE PROPOSED DEVELOPMENT FOR CONFORMANCE WITH THE DEVELOPMENT STANDARDS REQUIRED BY THE *CITY OF GARLAND FLOODPLAIN MANAGEMENT REGULATIONS*. YOU ARE HEREBY AUTHORIZED TO PROCEED WITH THE FOLLOWING DESCRIBED WORK:

\_\_\_\_\_

ON THE FOLLOWING DESCRIBED PROPERTY:

\_\_\_\_\_

In order to maintain compliance with the development Standard of the *City of Garland Floodplain Management Regulations* and to eliminate or minimize flood damage potential to the proposed development, you are hereby directed to construct you proposed development in accordance with the following special provisions:

- For residential structures, the lowest floor (including basement) must be elevated to \_\_\_\_\_ feet mean sea level.
- For non-residential structures, the lowest floor (including basement) must be elevated or floodproofed to \_\_\_\_\_ feet mean sea level.
- Permittee must submit a certification from a registered Professional Engineer or land surveyor that the finished floor level of the residential structure was constructed at the specified elevation.
- For non-residential floodproofing, a registered Professional Engineer must certify that the floodproofing methods are adequate to withstand the flood depths, pressure, velocities, impact, and uplift forces and other factors associated with the base flood.
- Other provisions (see attached list).

\_\_\_\_\_  
Acknowledgment of Conditions by Permittee

\_\_\_\_\_  
Signature of City Administrator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

**NOTE: THIS PERMIT EXPIRES ONE (1) YEAR FROM THE DATE OF ISSUANCE.**

j:\data\eng\l\signey\formdp3.doc



**CITY OF GARLAND, TEXAS  
NOTICE TO DEVELOPMENT PERMIT APPLICANT**

APPLICATION NUMBER: \_\_\_\_\_

NAME OF APPLICANT: \_\_\_\_\_

THE ABOVE NAMED APPLICANT APPLIED FOR A DEVELOPMENT PERMIT ON \_\_\_\_\_. THE CITY ADMINISTRATOR REVIEWED THE APPLICATION AND DETERMINED THAT THE PROPOSED DEVELOPMENT IS LOOCATED WITHIN AN IDENTIFIED FLOODPLAIN OF THE CITY OF GARLAND.

THE CITY ADMINISTRATOR REVIEWED THE PLANS AND SPECIFICATIONS OF THE PROPOSED DEVELOPMENT FOR CONFORMANCE WITH THE DEVELOPMENT STANDARDS REQUIRED BY THE CITY OF GARLAND FLOODPLAIN MANAGEMENT REGULATIONS.

BASED ON THIS REVIEW, THE CITY ADMINISTRATOR DEEMS IT APPROPRIATE TO:

**APPROVE** THE APPLICATION FOR DEVELOPMENT

**REJECT** THE APPLICATION FOR DEVELOPMENT

CONDITIONS FOR APPROVALS OR REASONS FOR REJECTION ARE AS FOLLOWS:

\_\_\_\_\_  
\_\_\_\_\_

**WARNING:**

The flood hazard boundary maps and other flood data used by the City Administrator in evaluating flood hazards to proposed developments are considered reasonable and accurate for regulatory purposes and are based on the best available scientific and engineering data. On rare occasions, greater floods can and will occur and flood heights may be increased by man-made or natural causes. Construction standards required by the City Floodplain Management Regulations are the minimum standard deemed necessary to minimize or eliminate flood damage, but reliance on these minimum standards shall not create liability on the part of the City of Garland, the City Administrator, or any other officer or employee of the City of Garland in the event of flooding or flood damage.

I, the undersigned applicant, do hereby:

- acknowledge the warning and disclaimer of liability of the City;
- agree with the conditions of permit approval;
- agree to construct my development in strict compliance with the specified conditions once a permit has been issued;
- agree to provide certification of work as may be required.

**OR**

- disagree with the reasons for rejection of my application and desire to make a formal appeal to the City Council of Garland;
- disagree with the conditions for approval of a development permit and desire to make a formal appeal to the City Council of Garland.

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Signature of City Administrator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

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#### **4.8 Appendix 8 RIGHT OF WAY AND EASEMENT ABANDONMENT**

Public right of way and easement abandonment is the process by which the City gives up the public's interest, if any, in rights of way or easements. All private abandonment requests require a pre-submittal meeting to initiate the process and are subject to a public hearing before City Council. Rights of way and easements are dedicated to the City and are held in trust for public use for the purpose intended. Only the City council can formally abandon City of Garland right of way or easements. State law requires that the City receive consideration at fair market value for abandoned rights of way and easements.

The following documents are required for easement or right of way abandonment:

1. Letter to the Director of Engineering requesting the abandonment of a City right of way or easement. Please reference case number on all correspondence and submittals.
2. A plat or boundary survey showing the area requested for abandonment and all contiguous lots, recorded owners, and any easements or public facilities contained in the area for which abandonment is requested. However, if a separate instrument of the public easement, street, or alley has been filed of record with the appropriate County Clerk's office, then a copy of that filed instrument shall be furnished to the Engineering Department with this application in lieu of the plat or survey.
3. After review of the request, the Director of Engineering may direct the applicant to complete the Application for the Vacation/Abandonment of a Public Easement, Street or Alley Right of Way form. The application shall include, but not limited to, a metes and bounds description of the are to be abandoned, a survey plat or graphical depiction of the area to be abandoned, both signed and sealed by a registered professional land surveyor in the state of Texas, depicting all existing easements. When necessary, provide a separate drawing locating and labeling on the ground locations of all contiguous and intersecting public and private utility lines, structures, or other facilities within the abandonment area.
4. Letters of consent from all public utility companies (if applicable).
5. Consent from all abutting property owners (if applicable).

Public rights of way or easements may have been obtained used different methods, including by plat, deed, and separate instruments. In some instances, easements can be abandoned by platting or re-platting. Typically this occurs when easements have been granted for public infrastructure but never installed or accepted by the City. In these instances, the applicant should follow the platting procedure as required by the Planning Department.

Sometimes, a license agreement may be more appropriate, if the request only involves minor encroachments.

**APPLICATION FOR THE VACATION/ABANDONMENT  
OF A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY AT OR NEAR**

\_\_\_\_\_  
(Street name, address or nearest intersection)

- EASEMENT
- STREET
- ALLEY

**BEING PART OF:** \_\_\_\_\_  
(Entire name of subdivision)

-OR-

**ABSTRACT NO.:** \_\_\_\_\_  
(Complete if not in a platted subdivision)

TO THE CITY OF GARLAND: Date: \_\_\_\_\_

The undersigned hereby makes application for the vacation and abandonment of that portion of the public easement, street, or alley right of way as indicated above, and more particularly described or depicted in Exhibits "A" and "B", attached hereto. **If a separate instrument of the public easement, street, or alley has been filed of record with the appropriate County Clerk's office, then a copy of that filed instrument shall be used as Exhibit "A" (with "EXHIBIT 'A' labeled at the top of each page of the complete document) and an Exhibit "B" shall not be necessary.** In support of this application, the undersigned represents, warrants, and submits the following:

1. A metes and bounds description of the public easement, street, or alley right of way proposed for abandonment, attached hereto as Exhibit "A" and incorporated herein by reference.
2. A survey plat or graphical depiction showing the limits of the property interests to be abandoned and being the same property as described in the metes and bounds description, the record owners and boundary lines of all contiguous lots, tracts, or parcels, and any easements or public facilities contained in the area for which abandonment is requested, attached hereto as Exhibit "B" and incorporated herein by reference.
3. Consent to the vacation or abandonment by utility companies, if applicable, attached hereto as Exhibit "C" and incorporated herein by reference.
4. Consent to the vacation or abandonment by all the abutting property owner(s), if applicable, attached hereto as Exhibit "D" and incorporated herein by reference.

**PROPERTY OWNER/APPLICANT:**

\_\_\_\_\_  
Printed Name \_\_\_\_\_ Title (if applicable) \_\_\_\_\_ Phone No.

\_\_\_\_\_  
Street Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip Code

\_\_\_\_\_  
Signature \_\_\_\_\_ Date

**APPLICATION FOR THE VACATION/ABANDONMENT OF**  

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**A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY**

The following questions should be answered completely.

1. Why does the property owner wish to vacate this easement, street or alley right of way?

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2. How is this easement or right of way currently being used?

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3. How does the property owner propose to use the area of the easement or right of way, if vacated? \_\_\_\_\_

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4. Is it proposed that the City retain an easement after abandonment, or that a new easement may be platted subsequent to the abandonment? If possible, please indicate if either case is proposed or if it is unknown at this time.

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5. Are there any public utilities or infrastructure currently located in the easement or right of way? If so, please fully describe.

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**APPLICATION FOR THE VACATION/ABANDONMENT OF**

\_\_\_\_\_,  
**A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY**

Exhibit "C"

The undersigned public utility companies, using or entitled to use, under the terms and provisions of our respective franchise with the City of Garland, that portion of the public easement, street, or alley right-of-way as described in EXHIBITS "A" and "B" of the Application to Vacate/Abandon a Public Easement, Street, or Alley Right-of-Way, do hereby CONSENT to the vacation and abandonment of the described portion of such public right-of-way or easement adjacent to \_\_\_\_\_, Lot(s) \_\_\_\_\_, Block(s) \_\_\_\_\_, an addition to the City of Garland, Dallas County, Texas, or adjacent to an unplatted tract of land situated in Abstract No. \_\_\_\_\_.

**TXU ELECTRIC DELIVERY**

\_\_\_\_\_  
**Print Name** **Title**  
\_\_\_\_\_  
Signature Date

**ATMOS ENERGY-GAS**

\_\_\_\_\_  
Print Name Title  
\_\_\_\_\_  
Signature Date

**SBC SOUTHWEST**

\_\_\_\_\_  
Print Name Title  
\_\_\_\_\_  
Signature Date

**APPLICATION FOR THE VACATION/ABANDONMENT OF**  

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**A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY**

**TIME WARNER**

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Print Name	Title
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Signature	Date
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**VERIZON**

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Print Name	Title
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Signature	Date
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**ONCOR ELECTRIC**

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Print Name	Title
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Signature	Date
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**GARLAND INDEPENDENT SCHOOL DISTRICT**

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Print Name	Title
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Signature	Date
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**APPLICATION FOR THE VACATION/ABANDONMENT OF**  

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**A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY**

**GARLAND POWER & LIGHT**

Print Name	Title
Signature	Date

**WATER UTILITIES DEPARTMENT/ENGINEERING**

Print Name	Title
Signature	Date

**NORTH TEXAS MUNICIPAL WATER DISTRICT**

Print Name	Title
Signature	Date

APPLICATION FOR THE VACATION/ABANDONMENT OF

\_\_\_\_\_,  
A PUBLIC EASEMENT, STREET OR ALLEY RIGHT OF WAY

Exhibit "D"

The following abutting/impacted property owners **DO NOT APPROVE** nor give their consent to this request for the reasons stated herein. If none exist, indicate as such. This sheet may be copied and attached hereto if additional signatures are required.

Property Owner: \_\_\_\_\_

Address: \_\_\_\_\_

Lot: \_\_\_\_\_ Block: \_\_\_\_\_, \_\_\_\_\_ Addition

\_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_

Property Owner: \_\_\_\_\_

Address: \_\_\_\_\_

Lot: \_\_\_\_\_ Block: \_\_\_\_\_, \_\_\_\_\_ Addition

\_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_

Property Owner: \_\_\_\_\_

Address: \_\_\_\_\_

Lot: \_\_\_\_\_ Block: \_\_\_\_\_, \_\_\_\_\_ Addition

\_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_

Property Owner: \_\_\_\_\_

Address: \_\_\_\_\_

Lot: \_\_\_\_\_ Block: \_\_\_\_\_, \_\_\_\_\_ Addition

\_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_