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CHAPTER 3

3.000 STORM DRAINAGE

3.010 General

The standards established by this section are intended to represent the minimum standards for the design and construction of storm drainage facilities.

Sizing of storm water conveyance and retention/detention systems are the responsibility of the professional engineer retained by the developer and is subject to approval by the City.

Specific projects may warrant storm drainage facilities be constructed in excess of the requirements of this section, e.g., slopes of 15 degrees or greater will be subject to the criteria of the City's Critical Areas Ordinance (GHMC 18.08); developments which occurs within 200 feet of tidally-influenced waters will require review under the City's Shoreline Master Program. Generally when this situation occurs, the environmental review (SEPA) will address the requirements of additional storm drainage runoff concerns. The City does, however, reserve the right to impose more stringent storm drainage runoff discharge, retention/detention and infiltration criteria when and so the public interest is best served.

The *City of Gig Harbor Stormwater Management and Site Development Manual (most current edition)*, is considered a part of this section and the Public Works Standards. This Manual sets forth the minimum drainage, erosion control and Low Impact Development requirements as supplemented herein. Where conflicting information occurs within this section, known as Section 3 Storm Drainage, the Manual shall supersede.

All new and re-development projects shall comply with the Low Impact Development standards set forth in the most current edition of the City of Gig Harbor Stormwater Management and Site Development Manual and construction details outlined in Chapter 2 Transportation section of these standards.

3.020 Design Standards

The design of storm drainage and/or retention/detention system shall depend on the type and local site conditions. The design elements of storm drainage systems shall conform to the *City of Gig Harbor Stormwater Management and Site Development Manual* and Section 14.20 of the GHMC.

- A. Use of designated open space areas for stormwater detention/retention and for infiltration shall satisfy all conditions of the City of Gig Harbor for usability and landscape conformity. See Section 3.022 for landscape considerations.

In determining usability of open space where drainage concepts are involved, staff will apply two main tests: Orientation of Design and Overall Aesthetic Impression.

Because the primary purpose of consolidated open space is to provide usable area for recreation activities, buffer zones, and green belt areas, the open space must be designed for this intent. Any use of this area for stormwater detention/retention must clearly be subordinate to and not detract from open space uses. Because active recreation requires primarily flat topography, the usable open space will be predominantly flat. In no event shall slopes exceed 4:1 (horizontal: vertical) where drainage facilities are present and a minimum of 50 percent of the linear slope length shall not exceed 7:1. Design of the combined facility, as well as ease of access into and out of the facility, will be considered by the City in review of the design of such facilities.

Open space also serves an aesthetic function by providing areas of green space that are attractive and an amenity to the project site. The second test applied to open space will be that of the general impression the open space provides. The open space must be designed to give the impression of an attractive open space area available for park uses.

- B. Infiltration trenches shall not be located under a public roadway prism. Infiltration trenches and swales may be located within the public right-of-way within a planter strip or green belt as long as the trench or swale does not interfere with the original intent of the planter strip or green belt.
- C. Maximum catch basin spacing shall be 300 feet on boulevards, arterials and collectors; and 300 feet on all other street classifications.

The General Notes on the following pages shall be included on any plans dealing with storm systems in the City.

GENERAL NOTES (STORM DRAIN CONSTRUCTION)

- 1. All workmanship and materials shall be in accordance with City of Gig Harbor standards and the most current copy of the State of Washington *WSDOT Standard Specifications for Road, Bridge and Municipal Construction*. (WSDOT). In cases of conflict, the most stringent standard shall apply.
- 2. The contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA and the State of Washington, Department of Labor and Industries.
- 3. The contractor shall be responsible for all traffic control in accordance with Section 2B.126 of the *Gig Harbor Public Works Standards*, the *WSDOT Standard Plans for Road, Bridge and Municipal Construction* (all applicable "K" plans) and/or the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to

the City for approval. No work shall commence until all approved traffic control is in place.

4. All approvals and permits required by the City of Gig Harbor shall be obtained by the contractor prior to the start of construction. A grading permit for storm pond construction may be required.
5. If construction is to take place in the County and/or Washington State Department of Transportation right-of-way, the contractor shall notify the City and the City shall obtain all the required approvals and permits. The contractor shall reimburse the City for associated permit fees.
6. A preconstruction meeting shall be held with the City of Gig Harbor prior to the start of construction.
7. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the Underground Locate line at 811 a minimum of 48 hours prior to any excavation.
8. It shall be the responsibility of the contractor to have a copy of an approved set of plans on the construction site at all times.
9. All surveying and staking shall be performed per the corresponding section of the *City of Gig Harbor Public Works Standards*.
10. Temporary erosion control/water pollution measures shall be required in accordance with the *WSDOT Standard Specifications*, the Department of Ecology NPDES requirements and the *City of Gig Harbor Stormwater Management and Site Development Manual* and as follows:
 - A. Soil erosion and water pollution/flood control plans shall be submitted to the City, approved by the City, and implemented by the contractor prior to disturbing any soil on the site. Submittal and approval of these plans shall preclude any construction activity on the site.
 - B. All permanent storage and retention/detention areas used as part of the temporary erosion control and water pollution/flood activities and conveyance systems shall be cleaned of all silts, sand, and other materials following completion of construction and the permanent facilities shall then be completed including permanent infiltration areas.
11. Storm drain pipe shall: be on the WSDOT Qualified Products list for the specification listed below:
 - A. Plain concrete storm sewer pipe or reinforced concrete storm sewer pipe per WSDOT Standard Specification 9-05.7.
 - B. Ductile iron sewer pipe per WSDOT Standard Specification 9-05.13.

- C. Corrugated storm sewer polyethylene pipe per WSDOT Standard Specifications 9-05.20.
 - D. PVC storm pipe conforming to ASTM D 3034 SDR or ASTM F 789 with joints and gaskets conforming to ASTM D 3212 and ASTM F 477.
- 12. All storm drainage systems are required to be air testable at 4 psi per WSDOT testing procedures. At the discretion of the City Inspector all flexible pipes shall be mandrel tested per WSDOT standards. Testing shall be done by the contractor, and witnessed by City Inspector.
 - 13. At the discretion of the City Engineer, testing of the storm sewer may also include videotaping of the main by the contractor. Immediately prior to videotaping, enough water shall be run down the line so it comes out the lower catch basin. A copy of the video shall be submitted to the City of Gig Harbor. Acceptance of the line will not be made until after the video has been reviewed and approved by the City. Testing shall take place after all underground utilities are installed and compaction of the roadway subgrade is complete. Testing shall occur before placement of any pavement.
 - 14. Special structures, such as oil/water separators and outlet controls, shall be installed per plans and manufacturers' recommendations.
 - 15. All disturbed areas shall be seeded and mulched. For sites where vegetation has been planted through hydro seeding, the financial guarantee will not be released until the vegetation has been thoroughly established.
 - 16. Where connections require "field verifications", connection points will be exposed by contractor and fittings verified 48 hours prior to distributing shut-down notices.
 - 17. All catch basins/manholes shall have concrete collars per Gig Harbor detail 3-5.
 - 18. Any changes to the design shall first be reviewed and approved by the project engineer and the City Engineer.
 - 19. A stamped and signed letter from the engineer of record attesting to the construction of any storm water facility, and a Pond Volume Certification Letter will be required prior to final acceptance of project.

3.022 Landscape Considerations

The final landscape design shall be prepared by a licensed landscape architect or certified nursery person. Wherever possible, existing trees and other native vegetation around the facility shall be saved. This allows for a smooth transition to other undeveloped areas and helps retain the character of the site.

New vegetation will need to be planted regardless of how much is cleared. Plantings should be designed with specific functions in mind: soil preservation, erosion control, evapotranspiration, screening, space definition, sun and shade, and others. Use a combination of trees, shrubs and groundcovers to provide variety and interest. Plant at least three different species of trees and shrubs.

Native plants that will tolerate flooding and wet conditions are preferred. To ensure survival of newly planted native vegetation, it is recommended that the plants be irrigated for the first season. In wet ponds with standing water, wetland herbaceous species (cattails, sedges, rushes, etc.) must be included.

Regional wet ponds located in commercial developments should be designed with consideration for pedestrian and passive recreation facilities. Amenities around regional wet ponds such as picnic tables, benches, gazebos, etc. are encouraged. Aeration and/or recirculation of the water, such as waterfalls, cascades and fountains, should be considered to reduce the potential for odors to develop during the warmer months, to add visual interest, and to mask unwanted traffic noise.

3.025 Conveyance

Pipe: Storm drain pipe within a public right-of-way or easement shall be sized to carry the maximum anticipated runoff from the possible contributing area using a 25-year, 24-hour storm event model or a continuous time series model with 25-year conditions, whichever is more stringent.

The minimum cover for storm drain pipe shall be 2 feet. Where the minimum depth includes the roadway section, structural calculations for the appropriate H-loading shall be submitted along with the plans. All pipe specified where the cover is 2 feet or less shall be ductile iron of a class determined by the structural calculations.

All pipe for storm mains shall comply with the requirements specified in the Storm General Notes on the previous pages

Channels: The City encourages the use of open vegetated channels to convey stormwater runoff when possible. Open channels shall meet the sizing requirements of piped systems. Any open channels proposed to be located within public right-of-way shall require special approval from City Engineer.

Generally open channels shall not exceed 2.5 feet in depth and shall have maximum 3:1 side slopes. All open channels shall be vegetated with grass or other vegetation as approved by the City. Channel velocities shall be controlled so as to prevent scouring of the channel bottom and sides.

3.030 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a professional land surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of storm sewer systems shall be as directed by the City Engineer or as follows:

- A. Stake centerline alignment every 50 feet with station and cut or fill to invert of pipe.
- B. Stake location of all catch basins, manholes and other fixtures for grade and alignment with cut or fill to rim and invert of all pipes.
- C. Grade stake or slope stake (as appropriate) at intervals, sufficient to control location, size and depth of retention/detention facilities.

3.035 Erosion Control

See Section 14.20 and 14.40 of the GHMC for specific erosion control requirements.

3.040 Trench Excavation

See Section 4.160 for requirements regarding trench excavation.

3.030 Backfilling

See Section 4.170 for requirements regarding backfilling. Pea gravel shall NOT be used as bedding or backfill of storm piping or structures.

3.060 Street Patching and Restoration

See Section 2B.170 and 2B.180 for requirements regarding street patching and trench restoration.

3.070 Clearing of Permanent Retention/Detention Areas

Systems shall be cleared of all silt, sand and other material when the infiltration rate becomes 60 percent of the initial. No vegetation shall be planted in the infiltration area of the retention/detention area.

3.080 Maintenance

The City shall maintain all stormwater system elements such as catch basins, oil water separators, and conveyance systems located within the public rights-of-way. The development's owner association shall be responsible for maintaining the on-site storm water facilities including, but not limited to, the on-site ponds, catch basins and conveyance system.

Prior to the final acceptance of any private development project, the owner/developer must provide a maintenance schedule and agreement for all the storm water facilities per requirements outlined in the *City of Gig Harbor Stormwater Management Site Development Manual*.

**LIST OF DETAILS
CHAPTER 3 - STORM DRAINAGE**

<u>Title</u>	<u>Detail</u>
Catch Basin Marker.....	3-01
Curb Inlet.....	3-02
Infiltration Trench.....	3-03
Silt Trap Tee and Depression Detail for Catch Basin.....	3-04
Storm Manhole Collar.....	3-05
Stormwater Chamber Detail.....	3-06
Chamber Inspection and Maintenance.....	3-07