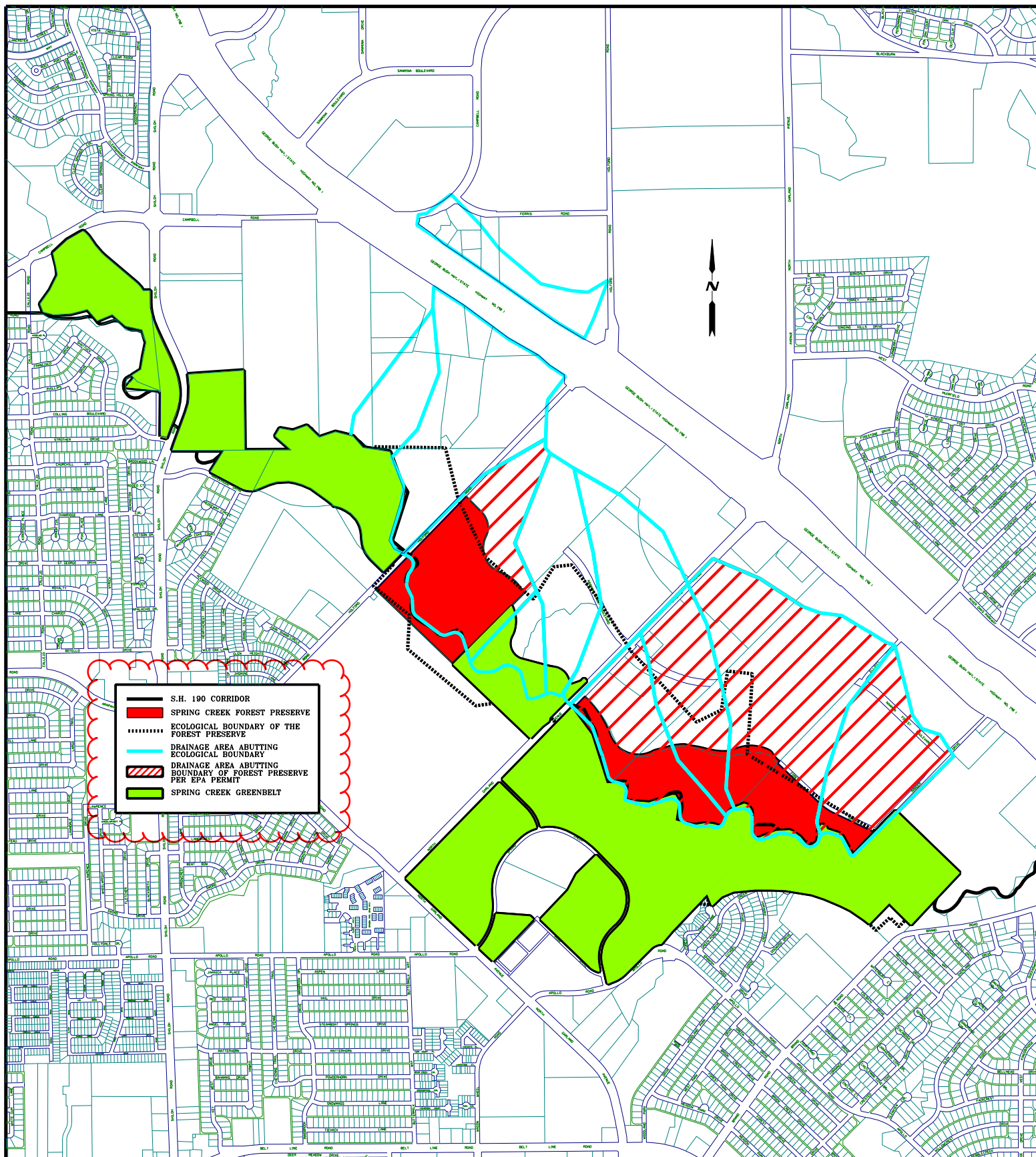


- N. Boring locations with elevations of top of rock must be included on the drainage plans, and all existing and proposed easements, and right-of-ways.
- O. Proposed paving plans and pavement location must be cross-referenced and agree horizontally and vertically with the storm drain plans inlet and manhole locations, cross-sections, and existing topographic features.

4.11 Detention/Retention Facility Design

- A. Detention is mandatory if the project is located within the Spring Creek Forest Preserve Ecological Boundary. See [Appendix 4A](#) for map.
- B. Detention is required per the [GDC Section 3.87](#).
- C. Should the Downstream Assessment results show that downstream facilities are adequate and on-site detention is not required, fully developed off-site conditions must be taken into account for the on-site design facilities.
- D. Define maximum design water surface elevation for the 2, 10 and 100-year storms and the first 1" of rainfall.
- E. Detention facilities shall be designed based upon the following minimum criteria:
 - 1. Detention shall be provided for the 2, 10, and 100 year design storms based on the results of a downstream assessment. Sites without a downstream assessment will be required to provide detention to undeveloped runoff rates.
 - 2. 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 0.41 inches per hour as shown in [Table 4.3](#) (derived from "[iSWM Technical Manual for Hydrology](#)").
 - a. A dry detention pond shall, at a minimum, be designed to hold the first 1 inch of rainfall over a 24 hour period. Per Section 10.0 of the [iSWM Site Development Controls Technical Manual](#), a dry detention pond only removes 65% of the Total Suspended Solids (TSS) and therefore must be part of a treatment train to provide the required 70% TSS removal. Provide details of the treatment train and TSS removal calculations within the construction plans unless using an alternative method as described by (b) below.
 - b. Alternative Methods for Improvement per [GDC 3.89.F](#): The Director of Engineering may approve alternate methods for detention and for achieving improved stormwater quality. Alternate methods may include utilization of mechanical filters, traps, or other prefabricated systems provided that the alternative methods prevent seventy percent (70%) or more of the total suspended solids, down to a one-hundred micron-sized particle, from passing through the outlet structure and entering the MS4 and so long as the intent of the provisions contained in the GDC are met. If using a prefabricated stormwater screening device, the applicant shall provide supporting literature/data from the manufacturer indicating that the selected unit is properly sized for the project and

APPENDIX 4A



GARLAND
ENGINEERING DEPT.

ENVIRONMENTAL BOUNDARIES

Scale : 1" = 1600'

File : eco_bound2

Date : 11/09/01

Drawn : SAN

SHEET

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OF

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Appendix 4B: Detention Pond Checklist & Manual

Detention/Retention Pond Requirements & Example

- A. Detention is required per the GDC Section 3.87 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. GDC Section 3.89 and Section 4.11 of this TSM contains design and maintenance requirements for detention basins in the City.
- B. 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 2-, 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. A detailed checklist of plan requirements is provided below. Modeling software that aids in the design computations of stormwater detention facilities may be utilized upon approval from the City Engineering Department.
- C. 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 Table 4.3 from the "iSWM Technical Manual". Per the iSWM Manual in the Site Development Controls section, a dry detention pond designed to hold the first 1 inch of rainfall over a 24 hour period will remove 65% of the total suspended solids (TSS). Additional measures will have to be calculated and implemented to provide an additional 5% TSS removal essentially creating a treatment train for the project which will remove a minimum of 70% of the TSS particles 100 microns or larger. Consult the "iSWM Technical Manual, Hydraulics, Chapter 2.0" for accepted methods. Or alternative Methods for Improvement, per GDC 3.89.F: The Director of Engineering may approve alternate methods for detention and for achieving improved stormwater quality. Alternate methods may include utilization of mechanical filters, traps, or other prefabricated systems provided that the alternative methods prevent seventy percent (70%) or more of the TSS, up to a one-hundred micron-sized particle (100 μ m), from passing through the outlet structure and entering the MS4 and so long as the intent of the provisions contained in the GDC are met. If using a prefabricated stormwater screening device, the applicant shall provide supporting literature/data from the manufacturer indicating that the selected unit is properly sized for the project and that it complies with the intent of this TSM and the GDC.
- D. An Operation and Maintenance Manual is required for all ponds including amenity ponds (**see example at end of this [Section](#)**). Plans must include the Detention Basin General Notes provided [below](#). 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.
- E. EXAMPLE

GIVEN: A 10 acre site is currently undeveloped and will be developed as a non-residential use. The entire site is the drainage area for the proposed detention basin.

DETERMINE: Maximum release rate and required detention storage.