

Technical Memorandum



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To: Forum Staff Committee
From: Joe Simmler, PhD, Project Manager
Copies:
Date: August 22, 2008
Subject: Lake Ballinger/McAleer Creek Watershed
Strategic Action Plan - Preliminary Scope of Work
Project No.: 31325

Purpose

The primary objective of this study is to develop a Strategic Plan address the flooding of homes around Lake Ballinger and the downstream flooding experienced within the City of Lake Forest Park, along the lower reaches of McAleer Creek. Although flooding is the primary objective, there are also the secondary objectives of water quality, fish/habitat, and stream/lake enhancement.

In addition to these technical objectives, there are a number of non-technical issues relating to the successful implementation of the developed Strategic Plan that include the selection, funding, and implementation of short- and long-term solutions, both structural and non-structural, that are effective, reasonable in scope, equitable, and relatively easy to permit, fund, and construct.

Methodology

A watershed based approach will be used to identify the problems and develop solutions that are designed to recreate some of the functions of the natural, unaltered watershed. The recreated natural functions will be used to explain and document how the water historically flowed through the watershed prior to development. These natural conditions will then be compared to how the water currently flows through the watershed under altered conditions, after the removal of natural vegetation, the filling in/removal of wetlands, the encroachment and filling of the flood plains, and the reduction of infiltration and detention, along with the creation of new impervious surfaces. This watershed based approach will be used to provide a sound technical basis for documenting how the watershed has changed, how these changes have transformed and increased the flows within the watershed, and what potential solutions are needed to re-establish a self-sustaining watershed, without major flooding during larger runoff events.

Background

A Hydrologic Simulation Program – Fortran (HSPF) model will be coupled with ground water models and assessments to reconstruct the natural and altered elements of the hydrologic cycle, as

documented in a water balance. HSPF is considered to be the industry standard for this type of basin modeling. Reducing high peak flows, while enhancing groundwater infiltration will be one of the primary objectives of restoring the hydrology of this highly urbanized watershed that contains approximately 65% of impervious area. Flow control options will be developed, evaluated, rated, and ranked for presentation in a strategic plan, that will outline short and long term capital projects and costs, along with early actions for responding to the flooding of homes around the lake and downstream flooding within the business district and along Lake Washington.

Otak has already collected most of the readily available information and developed calibrated HSPF models for both McAleer Creek and Lyon Creek. The recent study by Doug Beyerlein of Clear Creek Solutions updated the model for the upper reaches of McAleer Creek to focus on lake levels around Lake Ballinger. In the Interview, Bob Anderson of Golder Associates suggested that a few probes be placed around the lake and upstream along Hall Creek to monitor how the upper watershed responds to storms, and specifically to record the interactions between groundwater infiltration and shallow aquifer levels, with the elevations in the lake.

The HSPF models, field data, and existing reports will be used to characterize the watershed in terms of its hydrologic cycle. Important flow areas within the watershed will be correlated with needed infiltration opportunities to reduce peak flows and mitigate the impacts of the removal of vegetation and the addition of impervious surfaces throughout the watershed. An analysis of the existing drainage system will be used to document flooding problems and record the size and capacity of the existing drainage system to convey flows from major storm events. Using the results of the HSPF model and the characterization of the watershed structural and non-structural flow control options will be identified and evaluated. Results will be documented in a Strategic Plan and presented to the Forum and public for review, approval, and implementation.

Scope of Work

The Strategic Action Plan for the Lake Ballinger/McAleer Creek Watershed will be developed according to the following five tasks as outlined in the Otak Proposal and verbally presented at the August 20, 2008 Interview. These tasks include the following:

- Task 1 – Watershed Characterization and Analysis
- Task 2 – Planning and Pre-Engineering Strategies and Costs
- Task 3 – Strategic Plan and SEPA
- Task 4 – Public Review and Implementation Planning
- Task 5 – Coordination and Reporting

Each of these tasks is further defined in the following detailed Scope of Work.

Task I: Watershed Characterization & Analysis

I.1 Data Collection & Analysis

- Data collection
- Mapping/GIS
- GAP Analysis
- Identify/collect new data

I.2 Existing Conditions

- Topography
- Wetlands/Lakes/Streams
- Drainage systems
- Hydrology
- Geohydrology
- Water Quality
- Habitat/Fish
- Recreation
- Beneficial uses
- Geomorphology
- Flood Plans
- Land use/build out
- Redevelopment
- Regulatory Overview

I.3 Watershed Characterization & Analysis: Flow Analysis

- Unaltered analysis: water balance
- Altered analysis: water balance
- Flooding/water quality assessment
- Beneficial uses

I.4 Regulatory Overview

- Permitting
- Mitigation/strategies
- Integrated approach
- Design criteria/guidelines

I.5 Write Report: Tech Memo #1 (Ecology Task 2 Report)

- Water balance
- Identify “important flow areas”
- Surface/groundwater model

- Mitigation strategy

Deliverables

- Tech Memo #1 (DOE Task 2 Report)
- Existing conditions (Appendix A)
- Surface water (Appendix B)
- Groundwater (Appendix C)
- Permitting/mitigation guidance (Appendix D)
- Base maps

Task 2: Planning & Pre-engineering Strategies & Costs

2.1 Planning & Pre-engineering

- Conceptual strategies for solutions & mitigation
- Evaluation criteria
- Cumulative benefits
- Costs/benefit analysis
- Ranking & Rating

2.2 Refine Permitting/Mitigation

2.3 Write Tech Memo #2

- Long- and short-term solutions
- Select preferred strategy
- Schedule
- Implementation

Deliverables

- Tech Memo #2: Pre-engineering reports
- Refined permitting/mitigation
- Recommended flow/water quality strategy

Task 3: Strategic Plan and SEPA

3.1 Preferred Strategy

- Select & develop
- Conduct more detailed engineering & cost analyses
- Define permitting process & mitigation
- Refine costs

- Establish implementation plan & schedule

3.2 Finalize Permitting/Mitigation

3.3 Write Draft and Final Strategic Plan

- Long- and short-term solutions
- Costs and funding
- Implementation
- Permitting/mitigation

3.4 SEPA checklist

- Write draft and finalize

Deliverables

- Draft Strategic Plan
- SEPA checklist
- Final permitting/mitigation

Task 4: Public Review & Implementation Planning

4.1 Public Involvement and Education (PIE) Plan

- Develop and finalize PIE Plan

4.2 Implement PIE Plan

- TC briefings
- Forum briefings
- Ecology briefings
- Stakeholders
- Public meetings

4.3 Implementation Planning: Phase II

- Funding
- ILA II: Cost and action plan

Deliverables

- PIE Plan
- Public meetings
- Final Strategic Plan

- Implementation Plan: Phase II

Task 5: Coordination and Reporting

5.1 Monthly Reports

5.2 Technical Committee and Forum Briefings

5.3 Ecology Quarterly Reports and Cost Reimbursement

Deliverables

- Reports
- Briefings