

CHAPTER 8

CAPITAL IMPROVEMENT PLAN

INTRODUCTION

The Capital Improvement Program (CIP) is based on a number of criteria. First, all known storm drainage problems identified by the District staff and the general public were investigated. Capital improvements or other measures are recommended for these problems. In addition, the hydrologic/hydraulic modeling effort identified that some storm drainage facilities are inadequately sized to convey the runoff generated by the 25-year and/or 100-year design storm event based on future land use conditions.

It is important to keep in mind that whenever an inadequate pipe or channel is replaced or reconstructed, the improvement may transfer the problem downstream. It is therefore **strongly** recommended that all improvements include consideration for on-site detention and water quality treatment, as described in the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington*, especially in the steep, currently forested areas.

The cost estimates provided herein are conservative in nature and should be considered adequate for planning purposes. Also, as stated in Chapter 5, since no on ground field survey was conducted throughout the compilation of this plan, any recommended capital improvement projects resulting from this plan need to include surveys to ensure the most accurate and effective design for the project. All recommended projects assume that the existing pipe slope will be utilized in the future. However, the most optimum slope should be analyzed in order to provide maximum pipe capacity. Table 8-1 summarizes all of the recommended capital improvements (See Figure 8-1). Costs estimates are detailed in Appendix E. Projects within the County rights-of-way are identified but cost estimates have not been generated for all projects.

The projects presented here are those identified from computer numeric modeling, District input and public comments. These projects are ranked based on the severity of the problem as outlined in Chapter 5. Other drainage problems may arise in the future and will need to be addressed at that time. The Comprehensive Plan will need to be updated as development and regulatory requirements change.

TABLE 8-1

Recommended District Capital Improvements

| Priority ⁽¹⁾ | Project | Priority Year | Estimated Total Project Cost ⁽²⁾ |
|-------------------------|---|---------------|---|
| 2. | Port Ludlow No. 2 Condo Conveyance System | 2003 | \$ 15,000 |
| 3. | Area 7 Detention Pond/Bioswale rehabilitation | 2003 | \$ 5,000 |
| 4. | Montgomery Lane Outfall Repair/Replacement | 2004 | \$117,000 |
| 6. | Incised Drainage Ditch Repair | 2004 | \$ 11,000 |
| 7. | Oak Bay Road / Montgomery Lane Detention and Redirection of flows (ditch grading) | 2005 | \$ 90,000 |
| 13. | Cascade Lane Conveyance/Greenbelt Channel | 2006 | \$ 12,000 |
| 15. | Walker Way/Phinney Lane Detention System | 2007 | \$ 49,000 |

(1) A complete listing of projects is found in Table 5-3. The priority projects are discussed below.

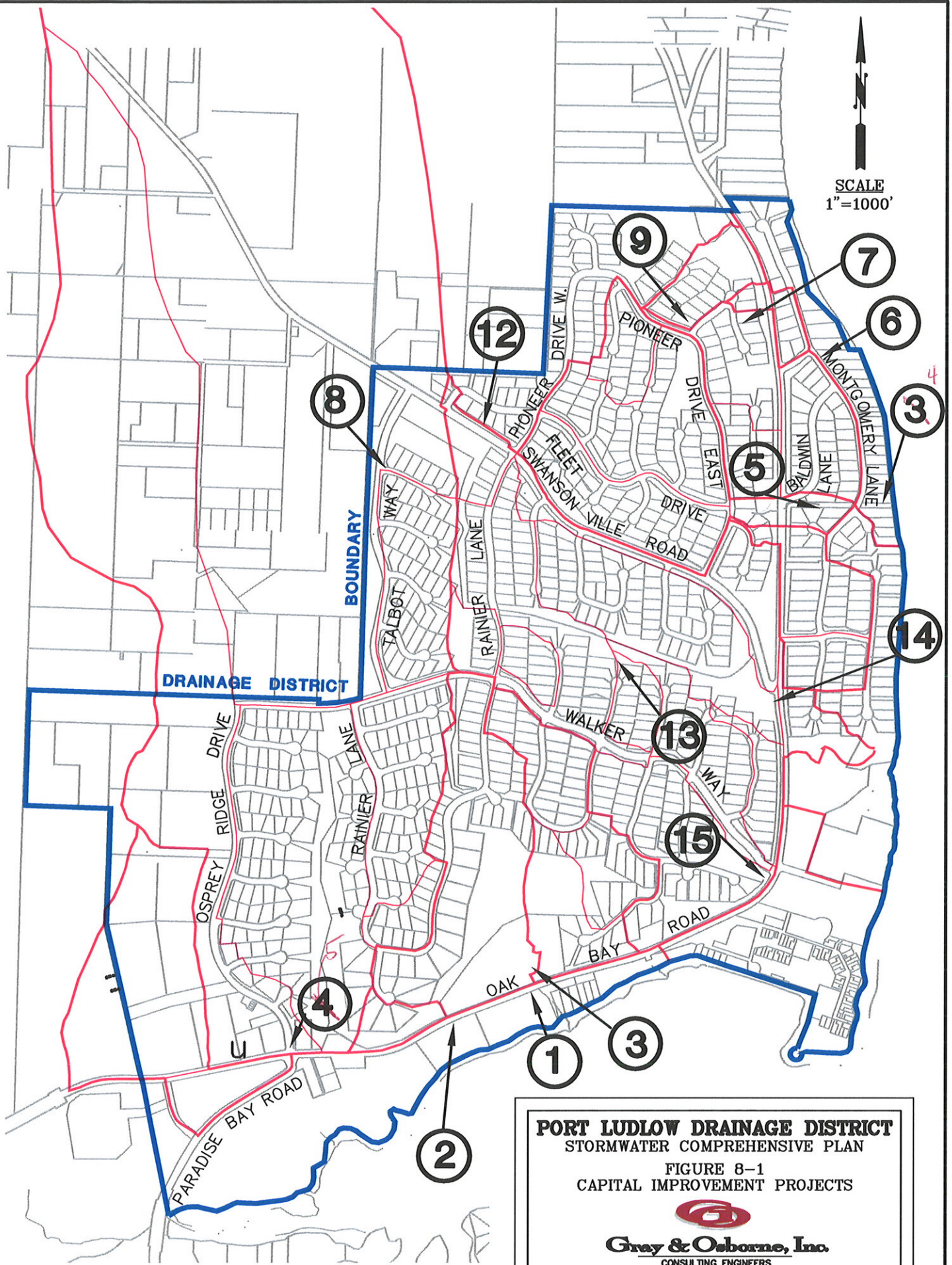
(2) 2003 Dollars. Total cost includes engineering, administrative, legal, permitting and construction costs

SIX YEAR CAPITAL IMPROVEMENT PLAN

DITCH REHABILITATION

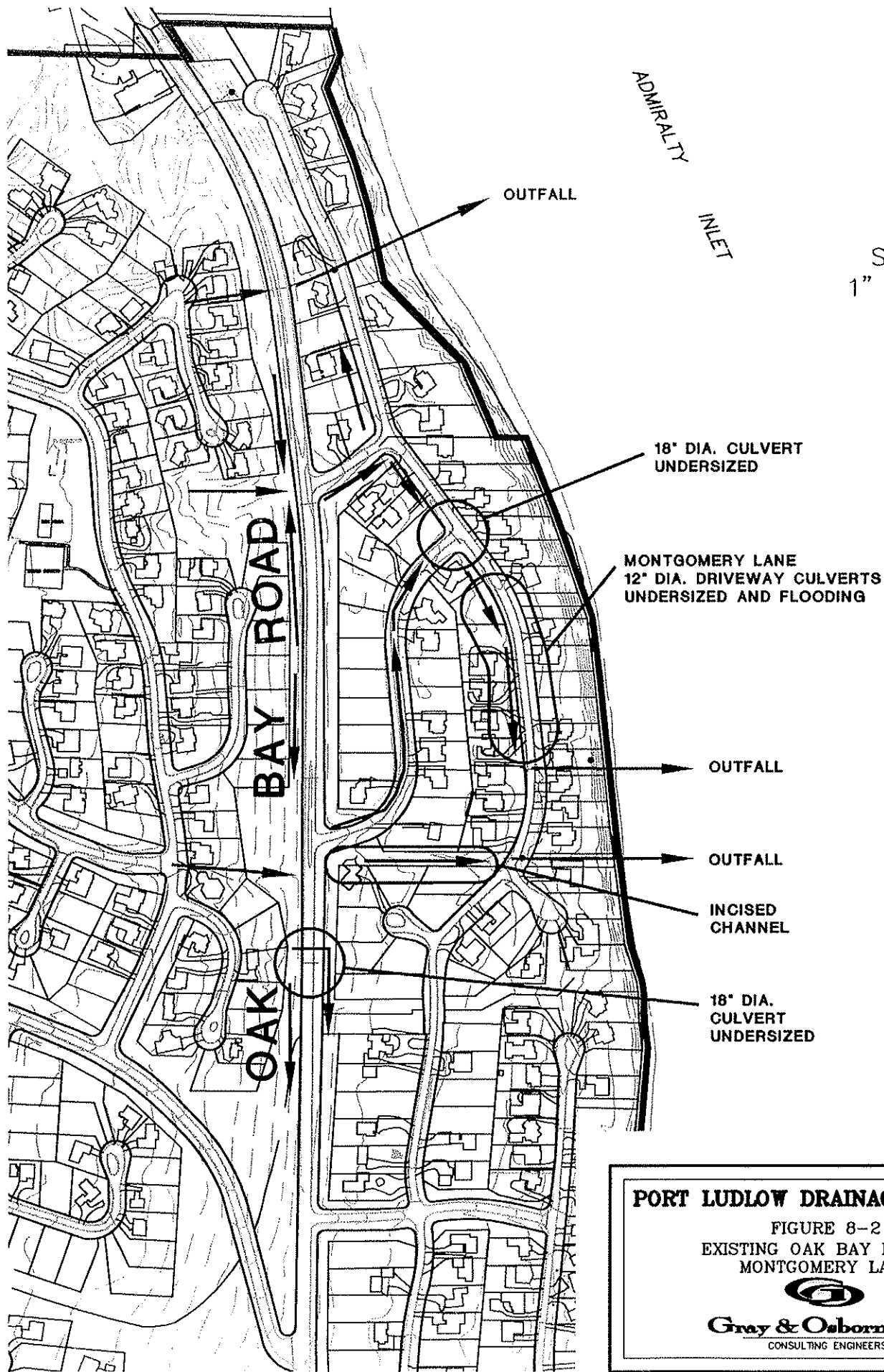
Maintenance of ditches belonging to both the District and the County is critical in reducing flooding. All ditches should be inspected and maintained as described in the maintenance program in Appendix D. To facilitate this maintenance on a regular basis, it is highly recommended that the District obtain easements for all stormwater systems (including pipes and ditches) lying within private property. Maintenance of these systems involves clearing ditches of trash and debris, removing sediment that exceeds 20 percent of the ditch's depth, and ensuring that existing vegetation allows free movement of water throughout the ditch. Side slopes shall also be checked for erosion hazards and repaired on an as-needed basis. Since the first cleaning will be more involved than future ones, the estimated cost of the first phase of this project is greater than the on-going annual maintenance costs.


1. Port Ludlow No. 7 detention pond outfall underneath Oak Bay Road (Culvert No. 89). Settlement of the pavement was observed over the top of the pipe and the bottom of the 30-inch pipe has rusted and eroded away. Slip-lining of the existing pipe with a smaller diameter pipe is recommended. A 24-inch diameter pipe is adequate to convey the 100-year storm flows. (COUNTY)



2. North Bay Condominiums currently have heavy surface sheet flows over the existing driveway and parking area. Immediately upstream of the location of the flooding, a 12-inch culvert crosses Oak Bay Road and discharges onto the asphalt pathway south of Oak Bay Road. These concentrated flows disperse somewhat in the greenbelt south of Oak Bay Road and the North Bay Condominiums. However, down gradient of the greenbelt is the parking area and driveway. The flows then concentrate again causing some flooding and flow control problems near the entrance to the two of the buildings. The 12-inch culvert is adequately sized for the modeled flow. A closed pipe connection between the existing culvert on Oak Bay Road and the downstream culvert between the buildings would eliminate the problem. Downstream impacts must be addressed to assure the system can handle the flow. **(Condominium Owners and DISTRICT)**
3. The detention pond and bioswale leading to the pond have been neglected for years. Significant vegetation has developed in both the pond and the swale. The facility needs to have vegetation removed, sediment removed, and regraded to the original design. **(DISTRICT)**
4. The outfall pipe downstream of Montgomery Lane near Libby Court appears to have a rusted and eroded pipe bottom. A historical television inspection was inconclusive on the overall condition of the pipe due to flow in the pipe at the time of the tapping. Slip-lining of this pipe is recommended if possible. A 30-inch diameter pipe is adequate to convey 100-year flows. **(DISTRICT)**
5. The inlet to Culvert No. 12 located at the intersection of Oak Bay Road and Osprey Ridge Drive is poorly configured and the culvert is undersized. The inlet configuration should be revised and culvert diameter increased from 12- to 30-inches. The drainage system upstream of this culvert should also be enlarged. That modification includes upsizing of the driveway tiles for the commercial businesses along Osprey Ridge Drive from 12- to 24-inch diameter pipes and enlargement/installation of a roadside ditch between the northernmost driveway tile and Culvert No. 12. **(COUNTY – Culvert No. 12 and roadside ditches; BUSINESS OWNERS and/or DISTRICT – driveway tiles)**
6. The channel located in the reserve area between Culvert No. 84 in Oak Bay Road and Culvert No. 64 in Montgomery Lane near Libby Court is heavily incised. Regrading, erosion protection and rock check dams should be installed to reduce the flow velocity and stabilize the ongoing erosion in this channel. **(DISTRICT)**

7. Culvert No. 74 located at the intersection of Montgomery Lane and Baldwin Lane is undersized. The culvert diameter should be increased from 18- to 30-inches. Subsequently, the downstream ditch between Culvert Nos. 74 and 63 should be enlarged, Culvert No. 63 should be enlarged to 30-inch diameter pipe, and driveway tiles also increased to 30-inch diameter pipes. Culvert No. 63 is located within Montgomery Lane approximately 280 feet north of Libby Court and is the outfall for Basin I. The inlet to Culvert No. 63 should be reconfigured to accept flow more efficiently. A house on the east side of Montgomery Lane has had water from the ditch overtop the roadway and enter into the house. An alternative to replacing culverts and drainage tiles is to redirect flows from west of Oak Bay Road south to the Montgomery Lane/Libby Court Outlet. Figures 8-2 through 8-5 show the existing and alternative approaches. It is imperative that improvements described in items 3 and 5 above are completed before any redirection of flows occurs. The detention pond shown in Figure 8-5 would also need to be completed prior to redirection of flows. More detailed design work will be required to determine the preferred alternative for this problem. **(COUNTY – R/W culverts and ditches; HOMEOWNERS and/or DISTRICT– driveway tiles)**
8. Flooding across the road has been observed on Jackson Lane downstream of Culvert No. 53. There is no culvert to convey flows under the road at this location. An 18-inch diameter pipe and catch basin should be installed to eliminate the flooding. The discharge of the culvert should extend to the greenbelt area immediately to the south**(COUNTY)**
9. Flooding observed near Culvert No. 41 at the intersection of Talbot Way and Ames Lane. Field investigation found the upstream ditch in need of maintenance. **(COUNTY)**
10. Flooding onto residential property at northwest corner of the intersection of Pioneer Drive East and Jackson Lane caused by flows originating within right-of-way. The ditch on the north edge of Pioneer Drive East should be enlarged and maintained. **(COUNTY)**
11. Green belt detention west of Oak Bay Road at Montgomery Lane. Flows from upland areas discharge to the roadside ditch of Oak Bay Road. A detention pond and conveyance pipe to the north could reduce runoff getting into the Montgomery Lane system. A detention system would need to be sized and pipe to convey to the north **(DISTRICT)**
12. Field investigation found the water reservoir located south of Swansonville Road between Talbot Way and Rainier Lane discharged to the ditch upstream of the intersection of Swansonville Road and Rainier Lane. The culvert crossing under Rainier Lane at this intersection appears



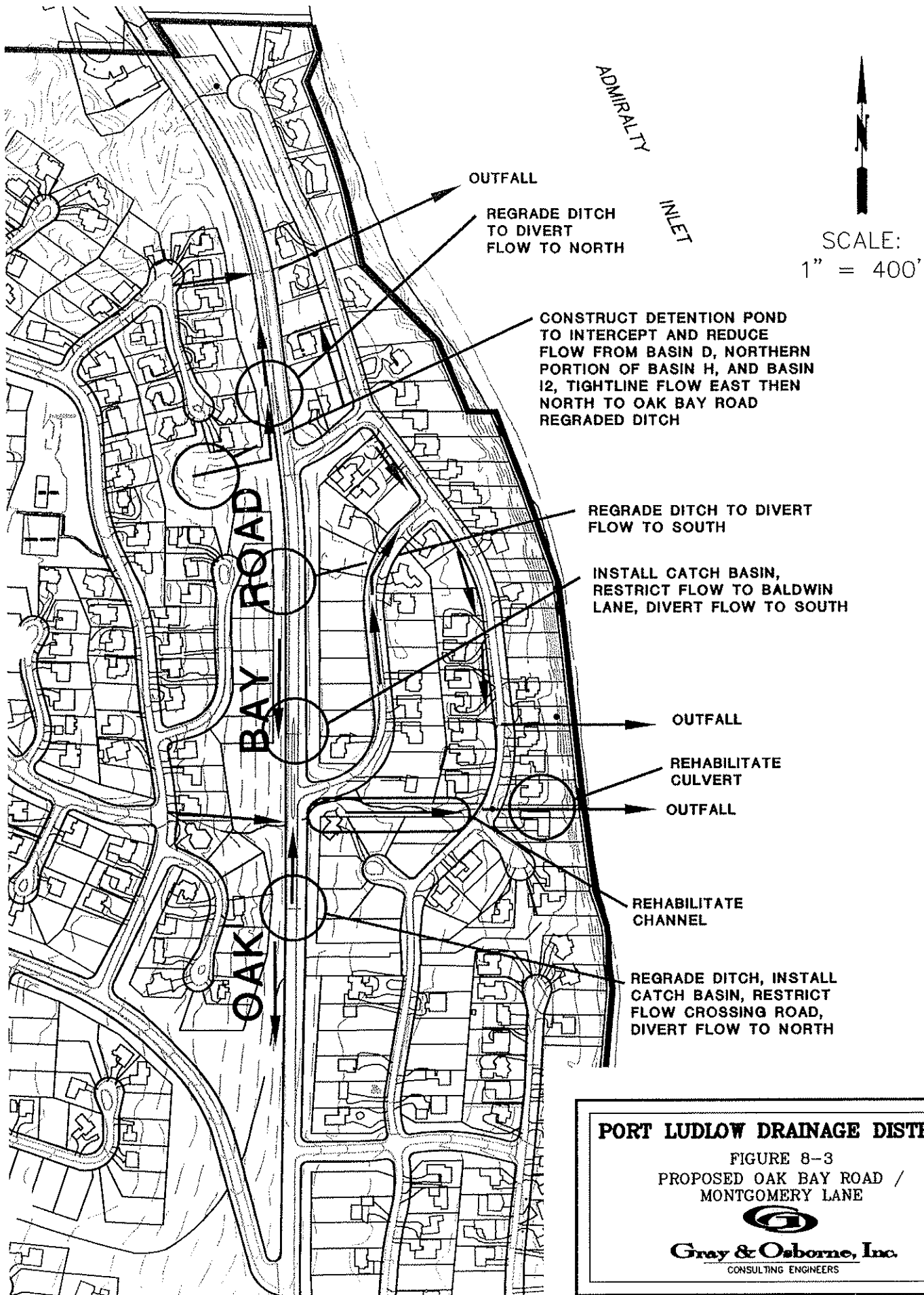

 SCALE:
 1" = 400'

PORT LUDLOW DRAINAGE DISTRICT

FIGURE 8-2
 EXISTING OAK BAY ROAD /
 MONTGOMERY LANE




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PORT LUDLOW DRAINAGE DISTRICT

FIGURE 8-3
 PROPOSED OAK BAY ROAD /
 MONTGOMERY LANE



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 CONSULTING ENGINEERS

Figure 8-4 – Existing Oak Bay Road Profile

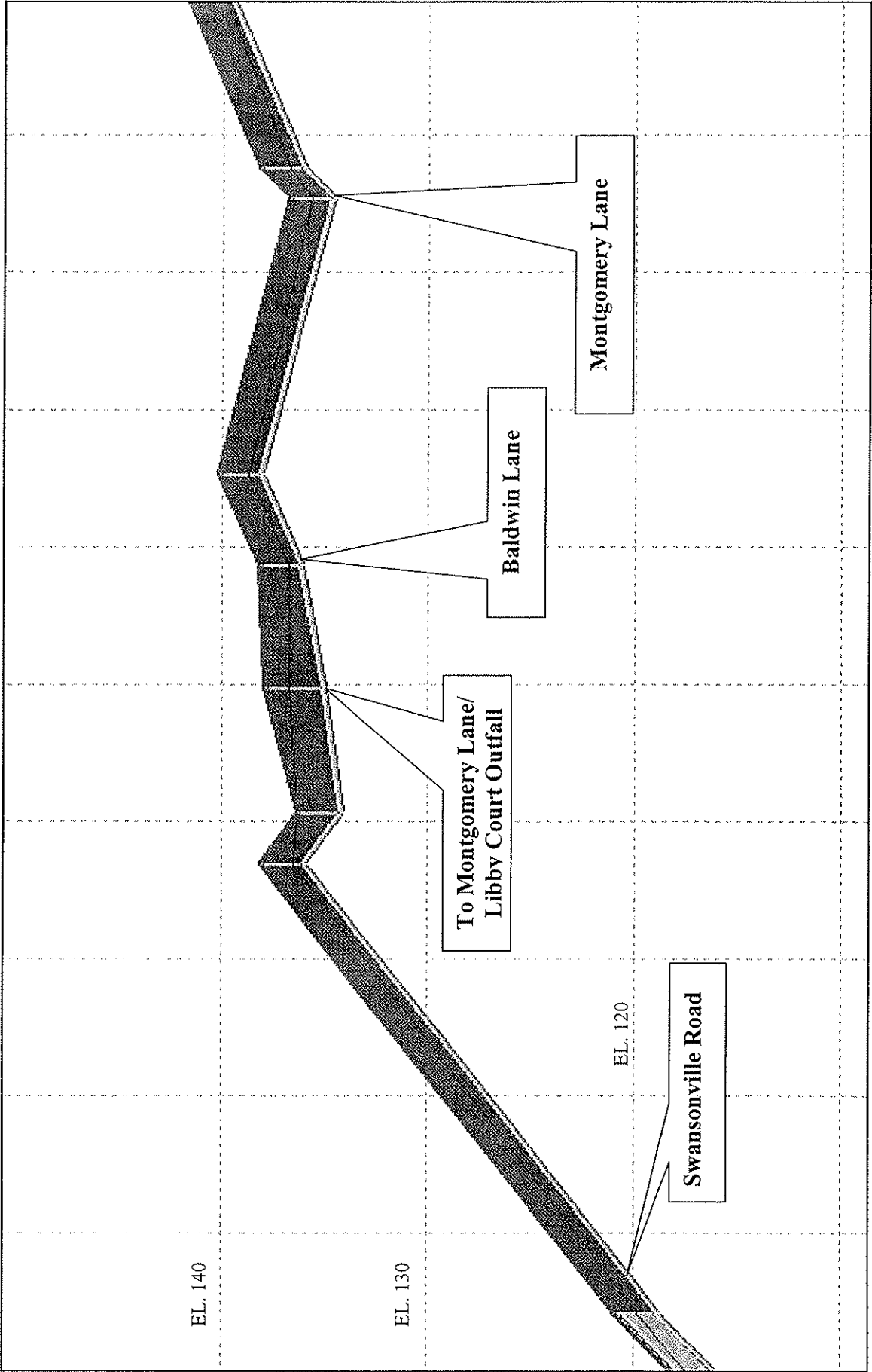
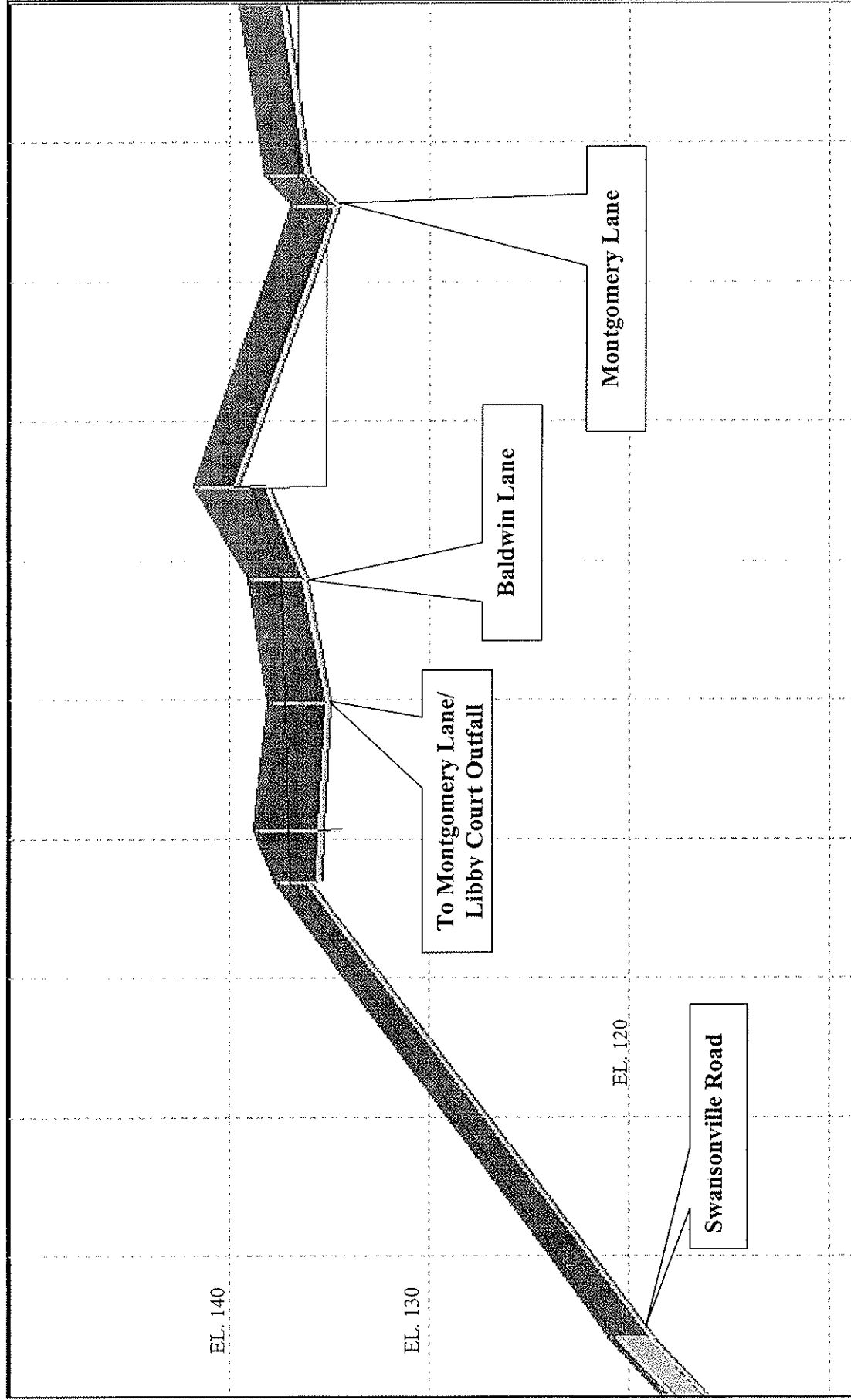


Figure 8-5 – Alternative Oak Bay Road Profile



to be adequately sized to convey the 100-year storm event but the capacity is reduced by the capacity of the ditch downstream of the culvert, causing the conveyance capacity of the outlet of the pipe to be reduced. If the water reservoir discharges a large quantity of water at the same time as a storm event, flooding could occur at this intersection. This intersection should be monitored during larger storm events. **(DISTRICT)**

13. Areas north of Cascade Lane have surface and subsurface flow that collect from the greenbelt behind homeowners at the end of Cascade Lane. Runoff is collected in a ditch and conveyed to Cascade Lane. Cascade Lane had ditches on both the east and west side. Currently the east side ditch is filled and two driveways cross where the ditch once was. The solution could be to install driveway tiles and reconstruct the ditch or to install a single culvert from the north end of Cascade Lane to the downstream ditch on the east side. This would require cutting through the bulb of the cul-d-sac. Alternatively, the greenbelt behind (north) of Cascade could have improvements to the conveyance system through improved channels. This would reduce the flow migrating out of the greenbelt area. **(Homeowners, COUTY, DISTRICT)**
14. Greenbelt between Walker Way and Swansonville Road. The greenbelt collects water from a number of sources including homeowners and roadway ditches. Some areas of the greenbelt have a defined channel and other areas disperse flows. The area just upstream from Oak Bay Road area could provide detention to reduce flows downstream. A detention system would need to be sized and conveyance of flows directed to the system. **(DISTRICT)**
15. Greenbelt between Walker Way and Phinney Lane. The greenbelt collects water from a number of sources including homeowners and roadway ditches. Some areas of the greenbelt have a defined area and other areas disperse flows. The area just upstream from Oak Bay Road channel could provide detention to reduce flows downstream. A detention system would need to be sized and conveyance of flows directed to the system. **(DISTRICT)**

OTHER RECOMMENDED PROJECTS

Development Standards

The District is recommended to adopt the development standards included in Appendix B as a part of this Comprehensive Plan. The development standards provide stormwater management for development that fall below the current thresholds of the 2001 DOE Stormwater Management Manual for Western Washington. Because Port Ludlow is a platted area with little or no open land that can be subdivided, development of existing

lots and infill are the primary forms of future development. These developments often fall below the thresholds outlined in the 2001 DOE manual but will contribute significantly to additional stormwater runoff. The District may request Jefferson County to include these requirements as part of the Unified Development Code.

GENERAL RECOMMENDATIONS

The District is recommended to continue to update the stormwater system base map and inventory, and that this base map be updated at least once per year.

The District is recommended to enact a complete maintenance program that includes not only the physical task of cleaning catch basins, pipes, and open ditches, but also involves items such as completing and maintaining a system inventory, maintenance scheduling, assessing costs for contract maintenance versus staff maintenance, and record keeping. In order to ensure that maintenance will be provided on a regular basis throughout the entire City, it is highly recommended that the District obtain easements for those portions of the stormwater system that exist on private property.

Gray & Osborne recommends that during the course of review of development proposals, the District and the County strictly enforce the development codes with respect to steep slope buffers, stormwater flow control, erosion hazards buffers, and habitat assessments.

Gray & Osborne also recommends that during the course of review of development proposals, the District enforce the provisions in the Washington State Department of Ecology Manual with respect to downstream analysis. If the analysis identifies conveyance problems, the District should require additional mitigation as a condition of approval.