



CITY OF KIRKLAND
Department of Public Works
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MEMORANDUM

To: Kurt Triplett, City Manager

From: Jenny Gaus, P.E., Environmental Services Supervisor
Bobbi Wallace, Storm/Sewer Maintenance Manager
Ray Steiger, P.E., Interim Public Works Director

Date: January 6, 2011

Subject: December Storm Debrief

RECOMMENDATION:

It is recommended that City Council review the attached December (2010) storm debrief and approve next steps in addressing issues identified.

BACKGROUND AND DISCUSSION:

This memo is an update to the City Council on various elements of the December 12th, 2010 rainfall event including a number of lessons learned. The memo describes the specific flooding that occurred as a result of the rain, summarizes the City's response to the event, and outlines planned actions to reduce future flood impacts.

The storm

Kirkland received about 3.3 inches of rainfall between the 24 hour period of 2PM on 12/11/2010 and 2PM on 12/12/2010. This storm event has an approximately 2% chance of occurring in a given year; put another way, this would likely be categorized as a "50-year storm event" based on historic rainfall records. Design of stormwater conveyance systems in the City are expected to contain a 10 to 25-year event depending on when the system was constructed; larger storms are anticipated to generate localized flooding. Rainfall appears to have been heaviest in the northern portion of the City based on radar images, and this was borne out in where the most flooding occurred. This "Pineapple Express" storm event was accurately predicted by local weather forecasters and thus gave the City reasonable time to prepare.

The flooding

In urban areas, flooding that results from a given rain event depends not only on the total amount of rainfall, but more so on the intensity of the rainfall. During this event, rain fell at high intensities (0.2" inches per hour or greater) for two periods between midnight and 8:00AM. Most calls to the City regarding flooding occurred between midnight and noon on December 12th.

The following areas experienced flooding of roads and public infrastructure (ATTACHMENT A):

Billy Creek –

This is a small tributary of Juanita Creek that drains the eastern portion of Finn Hill. Much of the watershed is currently in unincorporated King County, Kirkland's annexation area. Water and sediment

overflowed the stream channel at two locations (ATTACHMENT B: Billy Creek Flooding Overview). Several houses were flooded, yards were covered with sediment, and a large amount of sediment was deposited on 94th Ave NE between NE 126th Place and NE 124th Street, along NE 124th Street between 94th and 98th Avenues NE. The majority of storm cleanup costs and ensuing citizen claims are associated with impacts of the storm in this area.

Totem Lake -

The level of Totem Lake began to rise in the early morning hours of December 12th, and it reached a peak elevation in the early evening. At its largest impact, the intersection of Totem Lake Boulevard and 120th Avenue NE was inundated, and water up 2 feet deep was standing on portions of Totem Lake Boulevard. Private properties that experienced flooding included: the Totem Lake Mall, Bank of America, and Toyota of Kirkland. Road access was restricted for four days although the roadway was partially opened after two days. Access to Evergreen Hospital was restricted due to the need to detour vehicles around the intersection. In addition, many local businesses were impacted by this road closure which occurred during the holiday shopping season. Flooding of this magnitude was accurately anticipated as shown on the attached map (ATTACHMENT C: Totem Lake Potential Flood Areas) which was distributed to Totem Lake businesses in the fall of 2010 as a part of the City's outreach to allow businesses in the area to anticipate the flood potential.

NE 62nd Street/Lakeview Drive -

NW University Creek flows into a pipe as it crosses Lakeview Drive. The trash rack at the pipe entrance plugged (despite frequent periodic cleaning by City crews) and water overflowed onto Lakeview Drive and then from the street into two homes at the intersection of NE 62nd Street and Lakeview Drive.

Silver Spurs: 130th Ave NE/NE 61st Street -

Water from a ditch/pipe system near the intersection of NE 61st Street and 130th Ave NE overflowed through private property, flooding one crawl space and threatening the basement of another property (the homeowners' efforts to pump water kept damage to a minimum).

In addition, many private properties experienced flooding. A small fraction of these problems were reported to the City (i.e. cases where the owner felt that City facilities may have contributed to the problem), but many owners have worked directly with their insurance companies and/or have repaired damages without City involvement.

City Response During and After The Event

City crews patrolled known flooding "hot spots" before and during the storm and responded to calls for help. Activities included unplugging catch basins and trash racks, and helping to minimize property damage where possible.

As the flood waters rose, roads were closed in the Totem Lake area using city signage and later by contracting with National Barricade as the area of closure expanded. In the Billy Creek area, staff monitored and cleaned a trash rack in the right of way of 94th Avenue NE to prevent clogging, although an undersized private culvert still caused water to overflow for some time. Following the storm, city crews cleaned streets and the drainage system, and assisted property owners by collecting sediment that they removed from their yards and had placed in the street. Cleanup in other parts of the City was minimal, though heavy rains often wash large quantities of sediment into the drainage system as a whole. It is expected that routine cleaning will net a larger-than-average amount of material in the coming months.

Five news releases were issued regarding road closures and flooding. The news releases were distributed via the following:

- City webpage postings: Home page/What's New Announcement, News Room & Emergency

- Non-city webpage: Regional Public Information Network website (www.rpin.org)
- City list serves:
 - News Room, 388 subscribers
 - Neighborhood News, 914 subscribers
 - Emergency Updates, 449 subscribers
- News releases are sent to TV, Radio & newspapers and to Kirkland blog sites

Cost of City Response

City costs for staff response during the event and for cleanup following the event totaled approximately \$16,000. Staff is currently waiting to hear whether King County or the State will declare the event an emergency, which would allow the City to recoup some of these documented costs.

Lessons Learned and Actions to Prevent Future Problems

Overall response:

Overall City response to the event went smoothly, though as with any emergency situation, there are lessons to be learned and improvements to be made. We will, for example, be working to better coordinate scheduling between the after-hours standby crew and crew members that are called in during an emergency to improve overall coverage and service.

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Emergency Public Information

Staff will be working to improve communication with the City's Communications Program Manager (Public information Officer) by having that person stationed at the Maintenance Center during an event. This will improve the flow of information and the will ease creation of news release items. We are also investigating the possibility of calling in a GIS analyst to help provide maps of road closures and flooded areas.

The following are responses specific to particular flooding problems.

Billy Creek:

- King County is planning to repair an undermined stormwater pipeline in the upper reaches of Billy Creek. This project will help to reduce the sediment load. City staff will continue to work with King County urging them to complete this project as soon as possible, and definitely prior to annexation. In the short-term, a funded Kirkland CIP project is now underway to repair the downstream pipe system that carries the Creek from the City limits to Juanita Creek. This Project will prevent sinkholes in the street under which the pipe system runs as well as mitigate other potential downstream impacts. The Project will not increase the capacity of the system nor its ability to contain sediment received from the County. A long-term solution to this problem will involve stabilizing the upland stream channel to reduce delivery of sediment to the pipe system. Study and design of this project will be incorporated into the surface water CIP once annexation takes place.

Totem Lake:

- A traffic detour plan for Totem Lake flooding had been developed, but associated signage and coordination were not complete at the time of the storm. The traffic detour plan has now been refined based on observations made during the storm, and additional city signage will be ready shortly. National Barricade, a local signage and barricade provider, now has a copy of the traffic closure and detour plan, and they can be called to assist as needed. Contacts have been established for future coordination with WSDOT and Evergreen Hospital during storm events. The I-405 variable message reader board was utilized for notifying the public of the Totem Lake boulevard closures for the first time during this recent event and will continue to be available under similar situations.

- Staff is working to develop a long-term solution to the flooding. Consultant interviews are taking place during the week of January 10th, with the goal of having a consultant team under contract in 4-6 weeks. The first task for the selected consultant team will be to look for solutions that can be implemented for short-term relief while the long-term solution is developed.
- Discussions with private property owners indicate that the flood preparedness information provided in November was helpful. We are continuing to provide informational resources on possible mitigation measures to private property owners to help them protect their assets.

NE 62nd/Lakeview Drive and Silver Spurs:

- Maintenance and engineering staff are working to develop alternatives to prevent these flooding occurrences. Depending on the cost of the preferred solutions, they will be implemented through the regular maintenance budget, or through the surface water CIP. Staff has contacted the various property owners to discuss temporary protection as long-term solutions are developed and to keep them informed of progress.

ATTACHMENT A: Map of December 12, 2010 flooding problems

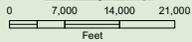
ATTACHMENT B: Billy Creek flooding overview map

ATTACHMENT C: Totem Lake Potential Flood Areas

December 12, 2010 Flooding Problems



Vicinity Map



Map Legend

- Drainage Basin Boundaries
- City Limits
- SA_SLMFLG**
- Known Salmonid Locations



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-Print Date: 3/31/2010

-Location: \\SRV-GISF01\Vol1\TWork\CM\TemplateFiles\COK11x17P\trail.mxd



Vicinity Map

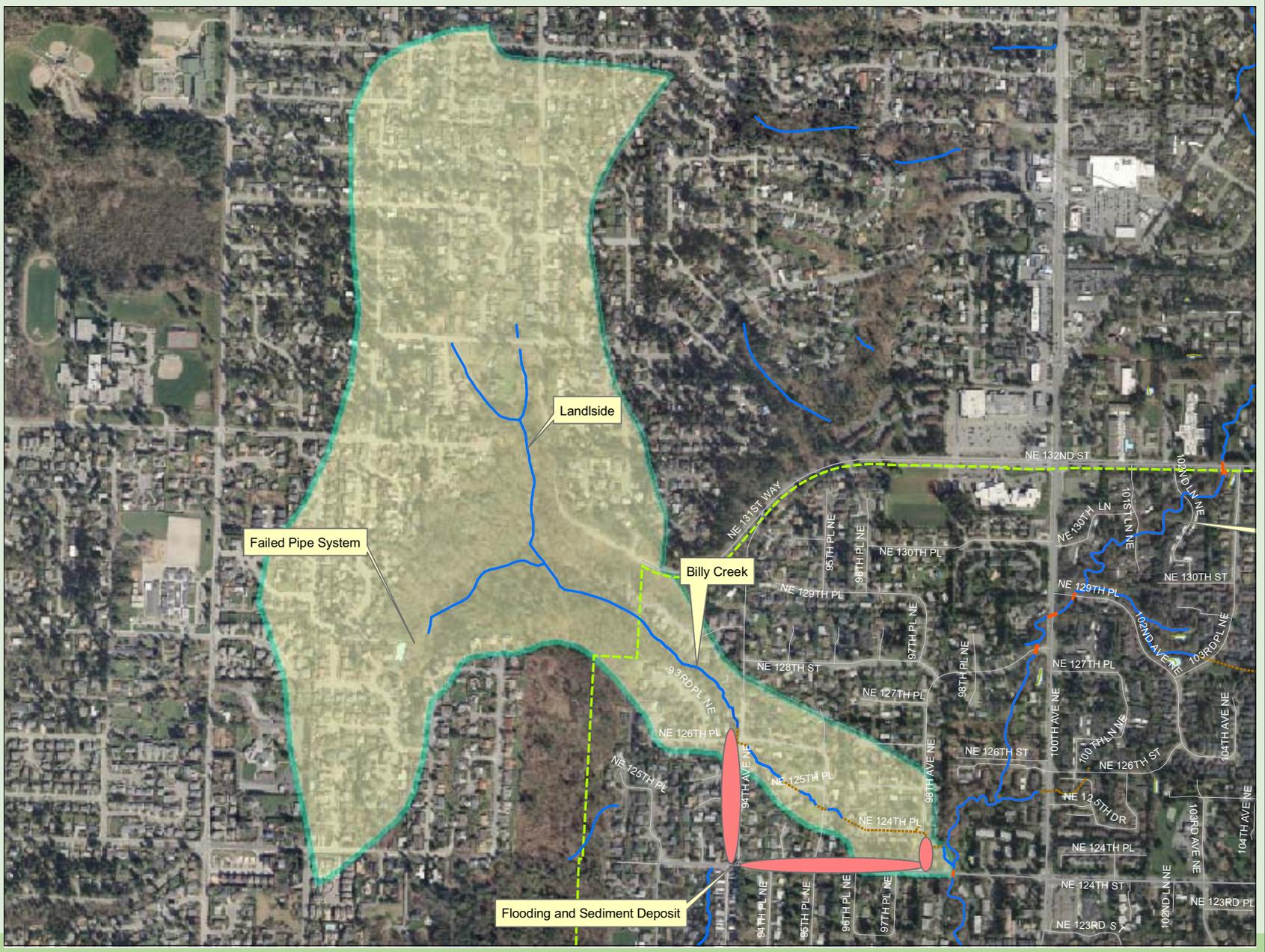


Map Legend

- Sensitive Area Streams**
LINE_TYPE, SA_SLMFLG
- Known Salmonid Locations
 - Streams in Pipes
 - Open Streams
 - Kirkland City Limits (Line)



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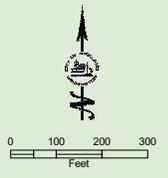




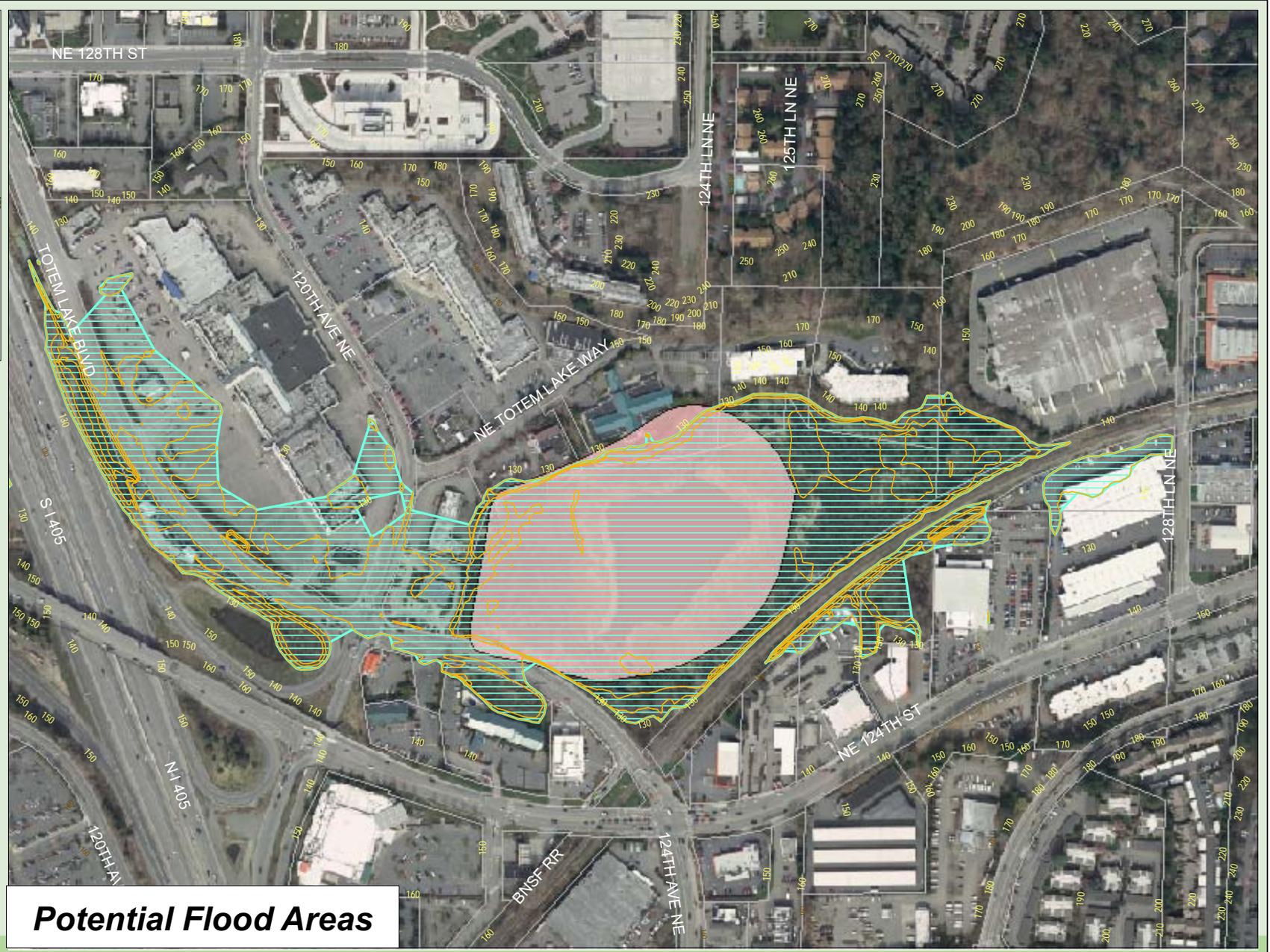
Vicinity Map



- Map Legend**
- Floodplain Areas**
- 100 Year Floodplain
 - Floodway
 - ElevLessThan128



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Potential Flood Areas

-Print Date: 11/17/2010

-Location: \\SRV-FILE02\users\JGaus\DATA\WORD\CIP\Totem Lake Flooding\Totem Lake Road Flooding.mxd