

AM NO. 11-028

TO: Mayor and City Council

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SUBJECT: **RESPONSE REPORT FOR 2010 RAIN EVENT - DECEMBER 11 AND 12**

This report is intended to review the conditions that developed and the City's response during the December 2010 significant rainfall event.

Starting Saturday, December 11 through Sunday, December 12, western Washington experienced an extraordinary amount of rain. In Redmond we estimate that approximately 3.5 inches of rain fell between noon on Saturday and noon on Sunday (a 100 year rainfall event is 3.7 inches in 24 hours). During and after the event, the City received approximately two dozen flooding related calls/e-mails from citizens; staff also identified additional impacts from the storm. Available stormwater crew members and some additional maintenance staff were deployed from 7 p.m. on Saturday to 7 p.m. on Sunday (~100 hours of overtime). Additionally, the Fire Department and Police Department provided support.

In general, the City did not experience any significant damage due to the storm. The drainage and stormwater systems functioned well given the extreme nature of the event. Only minor structural deficiencies were identified during our response. Most of the incidents that did occur were maintenance related (such as leaves and debris clogging structures) or as designed (river flooding streets and parking). The stormwater crew response during the event was exceptional. Additionally, our ongoing stormwater maintenance program prepared and prevented any significant incidences. Our streams did experience erosion and debris movement that damaged habitat. Previous restoration projects fared well where vegetation has had time to grow. However, many stream channels experienced problems in the areas where stormwater flow controls are lacking.

Highlights of the City Stormwater Management Response

Leaves

About half of the citizen inquiries during the event were related to leaves blocking inlet grates resulting in street surface flooding. Beginning at 5 p.m. on Saturday, December 11, a call was received reporting significant street ponding on 152nd Ave NE at approximately NE 22nd Street in the Overlake area. The stormwater crew responded and found leaves on the catch basin grate – debris was removed and area drained.

Debris

With large rain events, the energy of the increased flow tends to wash debris into the drainage system which can block pipes and limit flow capacity. The small stream at NE 50th Way off Westlake Sammamish Parkway had several private driveway culvert crossings that were blocked with debris. Water overtopped the channel and spilled across driveways and into the street. There was minor impact to some private landscaping and excessive ponding along the shoulder and southbound lane of West Lake Sammamish Parkway.

At about 10 p.m. on Saturday a call came in about flooding at the Old Redmond Place Apartments. The public detention system was overflowing and significant water was flowing down the parking lot and ponding. Public Works staff and Fire responded to the call. Public Works determined that the outlet pipe from the pond was partially blocked by debris and tree root intrusion. The situation was resolved and the site was cleared by 4 a.m. Flooding may have impacted one of the units.

At approximately 10 a.m. on Sunday, a home off of 135th Place NE near Rose Hill Junior High School was experiencing flooding in their yard and crawl space. The drainage system in this area is older; it was inherited from King County and is not built to our standards. The system is partially piped and partially an open ditch. Debris washed from the open ditch section into a pipe that has a 90 degree bend with no structure for access. The pipe plugged with debris and started to flood the property. Neighbors helped the property owner create a berm to divert water away from the house. Because of the construction of the system, we were not able to clear it during the event. The City was able to clear the blockage on Monday so the system could function properly. Modifications to the system are necessary to prevent this in the future.

The gabion (rock filled wire baskets) transition section from the stream by Emerald Heights to the Abbey Road Pond off NE 111th Street and 172nd Ave NE filled with debris, plugged the outlet structure and overtopped. The flow caused some minor erosion of the bank to the pond.

The Idylwood diversion structure sediment pond at 9200 Redmond-Woodinville Road and the Shadowbrook Ponds (on Peters Creek) are all sediment traps that were maintained this year. These systems all performed well. However, the traps would typically have capacity for several years but are now full again.

River Surcharge

With the large quantity of rainfall, Bear Creek, Lake Sammamish and the Sammamish River all rose significantly. Drainage systems and low areas near the Sammamish River were inundated by high water levels for an extended length of time.

Redmond Way (under the railroad overpass at 159th Ave NE) started to flood at about 11 p.m. on Saturday. One lane was initially blocked and by 8 a.m. Sunday the entire roadway was covered which necessitated a full closure. That situation only lasted a few hours, but one lane remained blocked for about five days.

Areas of Westpark, NE 95th Street, and NE 92nd Street west of the river, all experienced extended flooding of the roadway and parking areas due to surcharge from the river. These roadway and parking areas were designed knowing they would flood when the river was high. Many of the property owners/managers were aware of this and chose to wait it out. Some tried to use pumps to draw down the water, but with limited success.

The City did respond to a few inquiries. We located some areas along 152nd Ave NE and along the railroad right-of-way by Willows Road where the drainage system has been modified (without permits). We also found root intrusion along 152nd Ave NE and some properties with failing private infiltration systems. Additionally, a drainage improvement project for NE 95th Street is on our six year CIP. The City maintenance crew has already begun addressing the public drainage system issues in the area. The City's private system inspection program will encourage upgrades to the private systems that were identified with issues.

The Sammamish River Trail was closed for about a week under the bridges at NE 85th Street and NE 90th Street and Leary Way. The trail along Bear Creek behind the Safeway and under the Union Hill Bridge was also inundated.

Groundwater

The Public Safety Building, Frasier Court on NE 85th Street, and the Marriot Hotel at Redmond Town Center all have underground parking below the flood elevation that occurred in the river. Each facility has pumps to locally draw down the groundwater level when necessary. The pumps at the Public Safety Building were able to keep pace for the most part, but some standing water covered the floor area for several days. The pumps at Frasier Court failed during the storm threatening to flood their parking areas. The City loaned them a pump until they were able to get their own system operating. We did not hear of any concerns at the Marriot Hotel.

The area between East Lake Sammamish Parkway and Marymoor Park has had drainage challenges over the years. Surface discharging systems in the area that previously had concerns have benefited from some recent CIP projects in the area. In particular, infiltration systems in the Oakridge Business Park have been identified as functioning poorly due to the age of the system and high groundwater. Parking lot flooding occurred during the rain event and lasted for several days due to slowly draining infiltration. The City will work with the property owners through our private system inspection program to make improvements to their systems.

Land Slides

We experienced a minor slide on West Lake Sammamish Parkway. The slide occurred around 9 a.m. on Sunday. It was cleaned up quickly. There was also a slide Sunday night on 196th Ave NE in King County near Perrigo Park. It did not impact Redmond and was addressed by the county.

Construction Projects

On the Mondavio Lot 71 Project, the temporary stormwater pond was very close to overflowing; corrective action was taken and no storm related damage occurred.

The Reservoir Park Pump Station experienced a minor slide, no damage—just cleanup required.

The roadway project at NE 124th Street and Redmond-Woodinville Road had recent improvements damaged by the storm. Significant debris flow blocked a county culvert which overflowed. A reconstructed stream channel and associated planting were impacted. Cost to the project could be up to \$100,000.

Streams

Debris movement and minor erosion are expected in stream systems during significant rainfall events. However, we did see this characteristic in some of our streams which is likely driven by inadequate stormwater flow controls. We are in the process of evaluating conditions in our streams through our ten year stream reconnaissance update project. We have identified areas of Peters Creek, Willows Creek, and some other tributaries that were impacted by the storm. Some channel maintenance will be needed. Additionally, conditions may drive up the priority of some stormwater retrofit projects in our CIP.

Miscellaneous

Areas of Southeast Redmond also experienced localized high water. Sections of 192nd Ave NE and NE 84th Street were covered with water as roadside ditches were overwhelmed. This area of the city has very little drainage infrastructure. Drainage system improvements and regional stormwater facilities are planned for the future in this area.

Sewer Pump Station No. 1 along the lake was recently reconstructed. The flood water level of this event was approximately one foot above the height of the original station. If we had not pursued reconstructing the station it would have been submerged and we might have experienced a sewage discharge to the lake.

Police and Fire Coordination

Coordination between Public Works, Police, and Fire was seamless. For Police, most of the burden fell on Lt. Don Baumgartner's squad as they requisitioned a Public Works truck and crew to drive through the water on Redmond Way to set out cones. They used traffic markers from the EVOC trailer to mark a lane and also to close off Redmond Way for a time. Police also used their utility vehicles to push about ten stranded cars through the high water. The Fire staff, particularly Phil Grieb (Office of Emergency Management), coordinated responses with the stormwater maintenance crew. Fire was also involved with planning and incident response at the Old Redmond Place apartments.

What we learned – Trial by Flood

The drainage system functioned very well – Structurally the conveyance system had only minor deficiencies during the storm. However, stormwater retrofitting is needed to control flows and better minimize stream impacts.

Stormwater Maintenance crew performed exceptionally well. It was clear that our ongoing level of maintenance truly pays off as confirmed by minor impacts that resulted from this incident. During the storm, the stormwater crew was able to mobilize quickly (on the weekend) and efficiently respond to the numerous calls. They were able to address most issues within about 24 hours and followed up during the next week. There will be a need for added maintenance in the coming year to again bring our system back to the maintenance level it was before the storm.

Keeping ahead of the leaves is critical. About half the calls were about leaves blocking inlets.

Public Works, Fire, and Police coordinated well. We have ready and willing partners to help when needed.

Debris movement will occur during big rain events. Knowing where the trouble spots are and monitoring them is important in preventing major problems. We will be evaluating whether any of these locations need additional overflow protection and where we can effectively retrofit stormwater flow controls.

Private drainage system inspection helped prepare businesses. The private drainage systems in the City functioned well during the events. We did identify some areas where the private system now needs maintenance – we will notify property owners and work with them in the coming year.

We must remain diligent. One of our most significant problems was caused by roots growing into a pipe and catching debris. To minimize these types of problems, we must continually monitor our system which includes literally hundreds of miles of pipe and tens of thousands of structures, along with more than 50 miles of streams.

List of Attachments

Flood Photos, December 2010

FLOOD PHOTOS – December 2010



NE 50th Way – Local stream flooding



Bear Creek Bridge at NE 95th Street – Near capacity



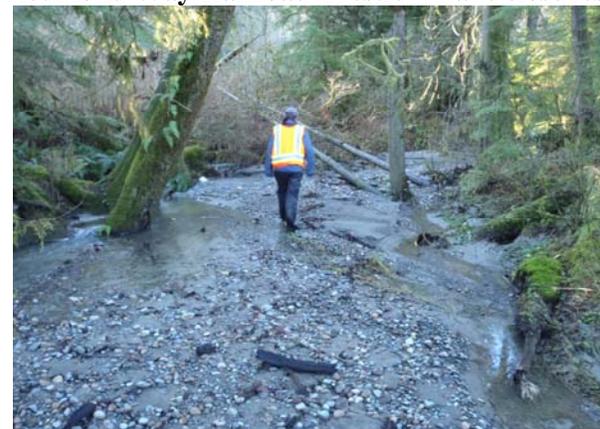
Sammamish River Overlook - Underwater



Redmond Way Railroad Trestle – Lane closures



The river kept Westpark underwater for days



Willows Creek experienced sediment deposition