Appendix G

Summary of Annexation Area Stream Survey

Appendix G- Summary of Annexation Area Stream Survey

Methodology

Annexation area streams (Champagne Creek, Denny Creek, and Holmes Point Creek) were walked in February 2013 to qualitatively assess biological and physical stream and hillslope conditions. Observations and occasional measurements included stream channel dimensions (bankfull width and depth), substrate, presence or absence of pools, riffles and large woody debris, riparian vegetation, and bank and hillslope failures, potential fish passage barriers, instream structures or debris, and other relevant information. Photographs were taken periodically to document conditions. Photo logs for each of the stream walks are included in Attachment A. In general, the streams were walked from the lowest accessible point to the highest accessible locations within the City. The mouths of Holmes Point and Champagne creeks were not accessible because of private property along the shore of Lake Washington. However, Denny Creek was accessible at the mouth because of public access at O.O. Denny Park.

Results

The stream walks were useful to better understand how in-stream conditions are or have the potential to be affected by upstream surface water management. Evidence of issues from current and past surface and stormwater management was observed in all of the stream channels walked. Potential capital and programmatic projects were identified to improve conditions in these stream channels. Attachment B includes a summary of observations, issues and potential projects, some of which are included in this Plan's recommended capital and programmatic projects.

Champagne Creek

Champagne Creek extends from its mouth at Lake Washington to its headwaters in the residential area in vicinity of NE 123rd Street. The stream channel drops approximately 360 feet in approximately 4,800 feet. The stream channel exhibits very different characteristics in the reach downstream of Juanita Drive where it is in a more natural state, and upstream of Juanita Drive where it is mostly a ditch that has several piped segments. Attachment C provides general characteristics of each of these reaches.

Lower Reach

Below Juanita Drive, Champagne Creek enters a wooded ravine (Juanita Woodlands) through an 18-inch diameter steel pipe (upstream end of the culvert is a 24-inch diameter concrete pipe) that outfalls onto a rip-rap lined channel. Approximately 100 feet downstream of Juanita Drive, the channel starts to incise (bed material is eroded away), with the incision getting more severe in the downstream direction. The maximum incision observed in this reach was on the order of several of feet (up to 15 feet). The incision appears to be primarily in advance outwash glacial deposits that are fairly erodible. Lower in this reach, clay and silt deposits were observed and the incision lessens as the channel enters these geologic deposits that are generally less erodible. Close to the mouth where the channel gradient flattens, there is a lot of sediment deposition (presumably material eroded from the upstream channel bed and banks as well as material from hillslope failures) that has caused the channel to migrate back and forth across

the valley floor. The riparian corridor for most of this reach is fairly wide and benefits from the Juanita Woodlands open space. Conditions at the mouth were not observed.

Three stormwater outfalls were observed in the lower reach of Champagne Creek: a 30-inch diameter corrugated metal pipe (CMP) from NE 112th Street, an 18 inch CAP from Champagne Point Drive, and a 12" – 18" pipe from Juanita Drive. Energy dissipation (rip-rap and other large rock) was provided at each outfall.

Hillslope failures were observed in the lowest reaches walked, and coincided with significant groundwater seepage.

Upper Reach

The upper reach of Champagne Creek is conveyed through ditches and pipes in a narrow corridor adjacent to commercial businesses, residents and NE 122nd (which becomes NE 123rd Street).

Denny Creek

Denny Creek extends from its mouth at Lake Washington at O.O. Denny Park to its headwaters in the vicinity of Big Finn Hill Park. The stream channel drops approximately 360 feet in approximately 1 ¼ miles. Denny Creek and the riparian area adjacent to it is in fairly good condition, and has benefited from previous restoration work at the mouth and in the open space of Big Finn Hill Park that encompasses most of the stream channel. For illustrative purposes, the stream channel is described by reaches that exhibited similar characteristics or where logical breaks occur. Attachment C provides general characteristics of each of these reaches.

Lower Mouth Reach

Below Holmes Point Drive, Denny Creek flows through O.O. Denny Park. Recent stream restoration work was completed in conjunction with a sewer line crossing project. The stream forms a delta into Lake Washington at O.O. Denny Park, and it is possible that during certain times of the year the sediment that has built up in this area and raised the elevation of the stream channel, may prevent upstream fish migration. On the upstream end of the park, Denny Creek crosses under Holmes Point Drive in a 10-foot wide concrete box culvert that is passable to migrating fish.

Lower Ravine Reach

Above Holmes Point Drive, Denny Creek is characterized by a slightly meandering channel of proportionate width and depth (approximately 4:1 ratio). Many bank and hillslope failures were observed in this reach, in an area of significant groundwater seepage likely at the interface of sandy erodible material (advance outwash) overlying clay and silt deposits that are less erodible and relatively impermeable. The elevation where seepage was observed was approximately the same as for Champagne Creek, located just south of Denny Creek. Evidence of bank stabilization efforts was observed in the channel, however, the coir rolls that had been placed were dislodged from continued slope movement. Sand deposits were observed on the in channel bars, and substrate consisted of cobbles, gravel and sand. An 18-inch diameter black plastic outfall was observed adjacent to the channel. Subsequent investigation showed this pipe starting at the top of the plateau and tightlining

stormwater runoff from residential roads above directly to Denny Creek. A stream restoration/fish ladder project was installed beneath the "stone bridge," a box culvert crossing that was constructed in the past during logging operations, and to serve the few residents that formerly lived in this area. The stream restoration installed large boulder structures to create fish passable steps through this reach.

Middle Reach

The middle reach of Denny Creek extends upstream of the Stone Bridge to a point where the gradient gets much steeper. In this reach, a gully entering the channel from the right bank was observed and walked to the top of the slope. There was minor flow in this channel that developed from surface and stormwater discharges at the top of the slope prior to being piped by King County to Denny Creek (see description above). The gully was formed in erodible advance outwash geologic conditions and was incised up to 15 feet in some places. An impressive amount of sediment was eroded from this channel when surface and stormwater runoff was still being directed to this area.

An old pump house was observed on the north side of the channel near where former houses were located, but have since removed.

Numerous landslides were observed on both the north and south hillsides adjacent to Denny Creek in the middle reach. The slides appeared to be initiated in sandy advance outwash deposits.

Upper Reach

The upper reach of Denny Creek is similar to the middle reach, except that the valley narrows and the gradient increases for a ways before flattening out again near the Juanita Drive crossing. Boulders and cobbles were the predominant substrate in the steeper sections of channel. Landslides were present equally on both the right and left bank hillslopes.

Stormwater outfalls were present in this reach on the Juanita Drive side of the channel (right bank). An 18-inch concrete pipe and an 18-inch solid wall polyethylene pipe were observed discharging near the top of the slope. Energy dissipation was provided at the outfall locations, however, erosion below the energy dissipaters was present in the ditches leading to Denny Creek.

The Juanita Drive stream crossing is through a 24-inch diameter concrete culvert. The culvert appears to be a complete fish passage barrier. The channel immediately upstream of Juanita Drive was not walked because private property access was not obtained. In Big Finn Hill Park, there are multiple channels through a wetland complex that also has significant beaver activity that alters flow patterns. This area is near the top of the basin and is very low gradient.

Holmes Point Creek

Holmes Point Creek extends from its mouth at Lake Washington on residential property to its headwaters in the vicinity of St. Edwards State Park. The stream channel drops approximately 186 feet in approximately 2,100 feet within the City of Kirkland. Holmes Point Creek continues to parallel Holmes Point Drive on the north side of the City limit in Kenmore until it reaches St. Edwards State Park. Holmes Point Creek was walked from 62nd Ave NE at the lower end to a pump house located near the top of the stream channel adjacent to St. Edward Park. For illustrative purposes, the stream channel is described

by reaches that exhibited similar characteristics or where logical breaks occur. Attachment C provides general characteristics of each of these reaches.

Lower Reach

Below 62nd Avenue NE, Holmes Point Creek is confined to constructed narrow channels routed through private residential backyards. A large concrete dam is located at one of the residents, and the stream channel is conveyed through a wooden flume through what used to be the reservoir behind the dam. There was no standing water behind the dam during our field visit, and it appears to have been filled in with sediment and vegetated with reed canary grass. The stream is piped under 62nd Ave NE.

Middle Reach

Immediately above 62nd Avenue NE, Holmes Point Creek is still confined between homes and Holmes Point Drive NE in a steep narrow ravine. A fair amount of Sediment deposition was observed through this reach, and bank and hillslope failures were present as well. A black plastic pipe was observed sitting on the surface of the channel through the entire reach and extending into the upper reach as well.

Upper Reach

The upper reach of Holmes Point Creek was similar to the middle reach, however, at the top of the reach (in Kenmore) several water diversion structures and pump house were observed. Concrete debris and pipes were present in the channel downstream of the main structures. Water diversion appears to be continuing, even though many of the structures appeared fairly old and in disrepair. A series of ditches and pipes were also present upstream of the pump house.

Attachment A

Stream Walk Photo Logs

Champagne Creek Stream Walk Photo Log

Photo #1. Lower Champagne Creek deposition

Photo #2. Left bank outfall from NE 112th Street

Photo #3. Left bank slope. Lots of seepage, leaning fir trees, and generally unstable conditions approximately 800 feet upstream from mouth

Photo #4. Channel incision in Champagne Creek

Photo #5. More channel incision upstream of Photo #4—channel narrows in this location

Photo #6. Road runoff from Juanita Drive on left bank

Photo #7. Champagne Creek crossing under Juanita Drive

Photo #8. Upstream end of culvert under Juanita Drive

Photo #9. Champagne Creek upstream of Juanita Drive behind commercial businesses

Photo #10. Driveway culvert as Champagne Creek crosses through residential yards

Photo #11. Champagne Creek adjacent to NE 123rd Street

Denny Creek Stream Walk Photo Log (Locations are approximate)

Photo #1. Denny Creek Alluvial Fan in Lake Washington

Photo #2. Denny Creek upstream of Lake Washington

Photo #3. Pedestrian bridge over Denny Creek in O.O. Denny Park

Photo #4. Holmes Point Drive 10-ft wide box culvert looking upstream

Photo #5. Denny Creek just upstream of Holmes Point Drive

Photo #6. Left bank seepage, and bank failure in clay deposits

Photo #7. Left bank slope instability and downed trees

Photo #8. Denny Creek downstream of Stone Bridge

Photo #9. Right bank hillslope failure downstream of Stone Bridge

Photo #10. Stream restoration and fish ladder in vicinity of Stone Bridge

Photo #11 Box culvert at Stone Bridge

Photo #12. Eroded gully on right bank, extends upslope to plateau in vicinity of 72nd Ave NE

Photo #13. Near top of eroded gully

Photo #14. Yard at top of gully that begins at the edge of the lawn

Photo #15. Typical stream conditions in upper ravine, just upstream of Stone Bridge

Photo #16. Right bank hillslope failure

Photo #17. Example of steeper gradient and larger bed material in upper ravine reach

Photo #18. Example of landslides in upper ravine reach

Photo #19. Just downstream of Juanita Drive in lower gradient reach.

Photo #20. Juanita Drive culvert crossing, looking upstream.

Big Finn Hill Park Photos of Denny Creek

Photo #21. Near Finn Hill Junior High School

Photo #22. Wetlands and multiple Denny Creek tributary channels in Big Finn Hill Park

Holmes Point Creek Stream Walk Photo Log

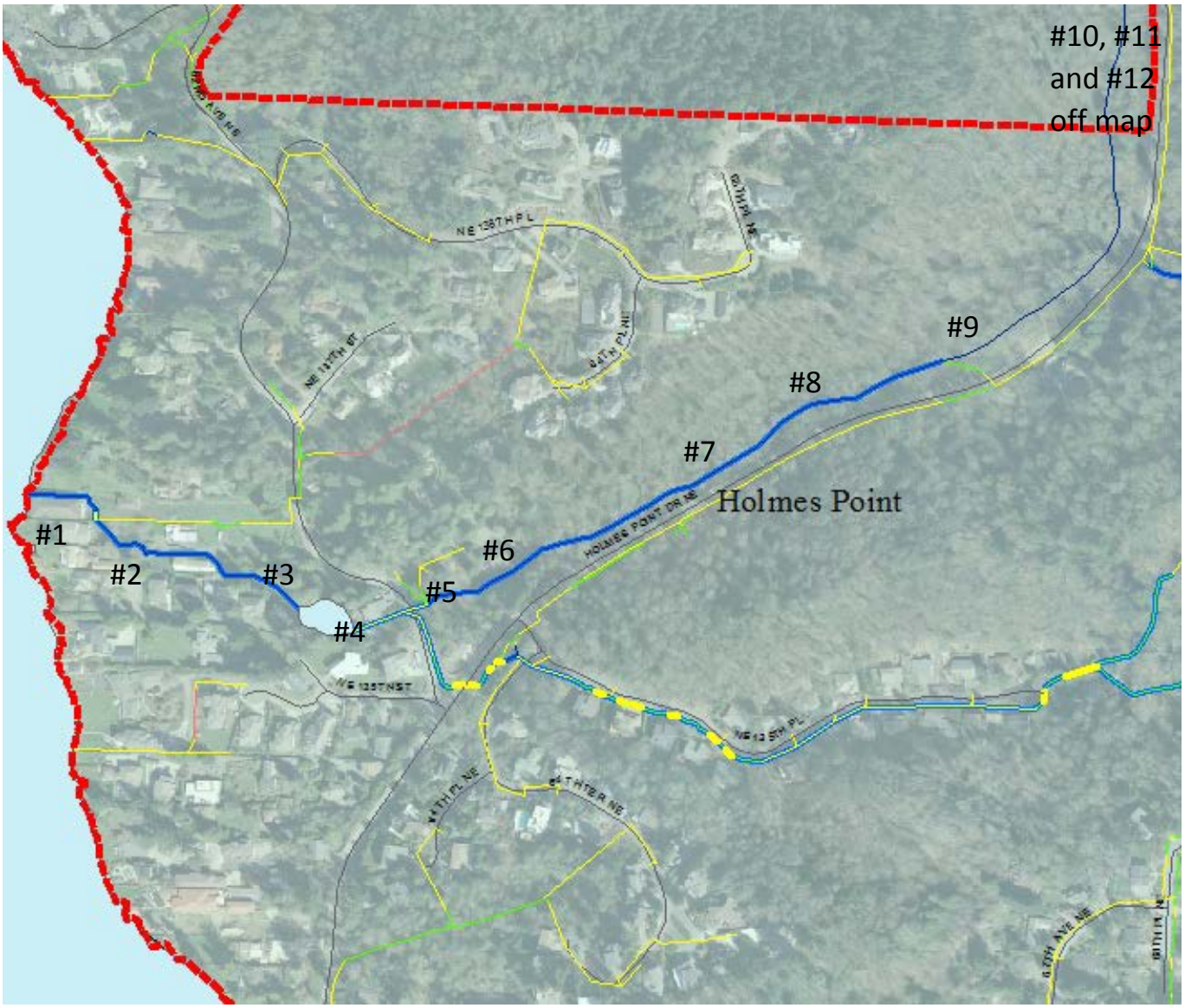


Photo #1. Lower Holmes Point Creek near Lake Washington

Photo #2. Holmes Point Creek confined to constructed channel

Photo #3. Downstream end of private dam in line with Holmes Point Creek

Photo #4 Channel upstream of dam filled with sediment and reed canary grass

Photo #5. Holmes Point Creek upstream of 62nd Avenue NE

Photo #6. Upstream of 62nd Ave NE looking upstream. Black pipe in stream channel was present throughout this reach. Right side of photo is Holmes Point Drive road embankment.

Photo #7. Rip rap in channel from road embankment

Photo #8. Typical stream section. Black pipe is in center of channel.

Photo #9. Slope failures adjacent to channel

Photo #10. Downstream end of pump house. Concrete debris in channel.

Photo #11. Concrete debris in channel downstream of pump house

Photo #12 Upstream of pump house (roof visible in center of photo)

Attachment B

Stream Walk Issues, Observations and Potential Projects

Champagne Creek Observation, Issue, and Potential Project List

Number: 1

Subject/Name: Downstream, Depositional Reach

Type: Observation, Project (Ivy and Other Non-Native Vegetation Removal)

Location: Lower parts of the Champagne Creek ravine, but upstream of lakeshore residential areas.

Identification Source(s): Field walk 2/8/13

Description and Comments: Approaching the residences near its mouth, Champagne Creek flows through a depositional reach occupying the lower portions of its wooded ravine. Here, much of the sediment that is mobilized in the deeply incised reach just upstream (see below) is deposited. As a result of this excessive sediment loading, the channel in the lower reach is broad, ill-defined, and braided, migrating and depositing sediments across the entire flood plain along the ravine bottom, which is fairly broad in that section. Alder saplings have sediments deposited around them and/or find themselves in the middle of the channel as it migrates through or past them. Non-native vegetation is very prevalent including primarily English Ivy, Himalayan blackberry, and laurel. A project to remove such non-native vegetation would be in order. Wood is fairly abundant in the stream channel and the substrate consists of very sandy small-to-medium-sized gravel. Some pools are formed around logs, but remain fairly shallow due to the predisposition for deposition. Native plant species present include western red cedar, bigleaf maple, hemlock, alder, sword fern, and salmonberry. See Photos below:

Photo(s)

Number: 2

Subject/Name: Middle Champagne Creek Ravine

Type: Observation, Project (Ivy and Other Non-Native Vegetation Removal)

Location: Middle, incised part of the Champagne Creek ravine.

Identification Source(s): Field walk 2/8/13

Description and Comments: The central portion of the Champagne Creek Ravine downstream of Juanita Drive NE is characterized by deep channel incision through glacial soils. The incision is commonly 8-10 feet in depth and more, and provides the sediment source for deposition farther downstream. Banks are vertical and lack vegetation, though the ravine sideslopes above the channel banks are well-vegetated. Few pools are present, and wood in the channel is sporadic. Non-native vegetation including primarily ivy is prevalent up the ravine sideslopes above the incised channel. Sources of storm drainage entering the creek through this reach have been armored to try to reduce erosion. See Photos below:

Photo(s)

Number: 3

Subject/Name: Upper Champagne Creek Ravine

Type: Observation, Project (Ivy and Other Non-Native Vegetation Removal)

Location: Upper part of the Champagne Creek ravine.

Identification Source(s): Field walk 2/8/13

Description and Comments: The upper part of the Champagne Creek Ravine has diminishing incision proceeding upstream to the outfall of the culvert under Juanita Drive NE. There is a fair amount of wood in the stream and fairly good-quality gravel. English ivy remains pervasive, making a project aimed towards removing it worth suggesting. The culvert outfall from Juanita Drive NE is clearly a barrier to upstream fish migration, if fish were to make it that far upstream. See Photos below:

Photo(s)

Number: 4

Subject/Name: Upper Champagne Creek

Type: Observation

Location: Champagne Creek upstream of Juanita Drive NE.

Identification Source(s): Field walk 2/8/13

Description and Comments: Immediately upstream of Juanita Drive NE, the stream channel is straight and incised, appearing disturbed, with steep, bare-earth banks and no in-stream wood or pool formation. Several culvert outfalls would be barriers to fish movements, though fish presence is not expected. Proceeding upstream, the channel's riparian area becomes better vegetated in places.

Headwater sources include swale-like channel sections paralleling NE122nd Pl. and NE 123rd St. See Photos below:

Photo(s)

Denny Creek Observation, Issue, and Potential Project List

Number: 1

Subject/Name: Mouth of Denny Creek

Type: Observation

Location: At Lake Washington

Identification Source(s): Field walk 2/7/13

Description and Comments: Typical alluvial fan location at the mouth of Denny Creek at O. O. Denny Park. Sand and gravel deposition occurs as flow loses energy entering the lake, causing the shoreline to bulge outward at that location. Note that Lake Washington was lowered by approximately __ feet in 19__ meaning that the original alluvial fan was farther upstream, perhaps near the location of Holmes Point Dr. NE. Also of note, the Corps keeps the lake a foot and half lower in winter than summer, which is the opposite of a more natural lake hydroperiod. This has implications for fish passage out of the lake and into the creek, especially during the winter. Due to shallow flows across the fan, it can be harder for fish to enter during the winter and this could make it harder for adult coho to enter the creek in November or cutthroat trout throughout the winter or on their spawning migration Feb.-Mar. Corrective actions have been proposed and implemented at the mouths of other Lake Washington Streams, for Example Coal Creek, but is not proposed particularly here. See Photos below:

Photo(s)

Number: 2

Subject/Name: Denny Creek through O. O. Denny Park

Type: Observation, Project (Ivy Removal)

Location: Through O. O. Denny Park downstream of Holmes Point Dr. NE.

Identification Source(s): Field walk 2/7/13

Description and Comments: Vegetation noted – Cottonwood, fir, cedar, holly, ivy. Potential for a project to remove ivy and other non-natives. New log structures installed as part of or mitigation for late 2011/early 2012 sewer line crossing project. Older series of log weirs leads up to concrete box culvert under Holmes Point Dr. NE which is 10 feet wide with about 3 feet of clearance. No fish passage issues. Banks fairly stable, w/ added logs. Good bank vegetation, but the buffer is narrow. Gravel generally a good size gradation for salmonid fish spawning, but sandier than ideal. Pools are of moderate depth and definition. See Photos below:

Photo(s)

Number: 3

Subject/Name: Lower Denny Creek Ravine

Type: Observations

Location: Denny Creek upstream of Holmes Point Dr. NE

Identification Source(s): Field walk 2/7/13

Description and Comments: A stream gage is present at the upstream end of box culvert. Streambanks near-vertical in places, up to 3-4 feet high. Gravel variable being very coarse but still sandy in places and mostly sand in others. Stream flows through wooded ravine with wide buffers. Vegetation includes alder, bigleaf maple, cottonwood, cedar, hemlock, salmonberry, sword fern and vine maple. One stand of non-native Japanese knotweed noted. Good amounts of moderately-sized large wood in the stream, resulting in good pool/riffle definition, but pools on the shallow side possibly due to high sand loading. Some areas of moderate bank instability recruiting silt and sand to the creek. See Photos below:

Photo(s)

Number: 4

Subject/Name: Middle Denny Creek Ravine

Type: Observations

Location: Central part of Denny Creek Ravine between Holmes Point Dr. NE and Juanita Dr. NE

Identification Source(s): Field walk 2/7/13

Description and Comments: Features in this reach include a multi-step rock weir structure built by King County in ____ providing fish passage at an old concrete bridge. Also a significant gully erosion feature originates apparently as a result of neighborhood runoff from the vicinity of 72nd Avenue NE. Boulders are more prominent in the streambed. Wide buffers of native vegetation as the stream flow though the large open space areas of Big Finn Hill Park. See Photos below:

Photo(s)

Number: 5

Subject/Name: Upper Denny Creek Ravine

Type: Observations

Location: Upper part of Denny Creek Ravine between Holmes Point Dr. NE and Juanita Dr. NE

Identification Source(s): Field walk 2/7/13

Description and Comments: Noteworthy characteristics of the upper ravine include a prevalence of boulders along much of the streambed length. Also, sections of ravine sideslope and streambank instability are common, resulting in large amounts of wood, as well as substrate materials, being supplied to the stream channel as trees fall and slide into the creek. A natural log weir barrier to fish passage was noted, though this is likely not a permanent feature and should correct itself on its own with time. A short distance farther upstream is the outfall of the culvert under Juanita Drive NE, a 2-foot-diameter concrete pipe which is likely a complete or near-complete fish passage barrier due to high velocities and a plunge at the outfall. See Photos below:

Photo(s)

Number: 6

Subject/Name: Upper Denny Creek

Type: Observations

Location: Upper, near-headwater sections of Denny Creek upstream of Juanita Dr. NE

Identification Source(s): Field walk 2/7/13

Description and Comments: Includes low-gradient stream sections through upper Big Finn Hill Park, with some areas inundated as a result of beaver activity. See Photos below:

Photo(s

Holmes Point Creek Observation, Issue, and Potential Project List

Number: 1

Subject/Name: Lower section of Holmes Point Creek

Type: Observation

Location: Downstream of 62nd Avenue NE to Lake Washington

Identification Source(s): Field walk 2/8/13

Description and Comments: Near its mouth, Holmes Point Creek Typical passes through the yards of a number of houses in a very narrow, armored channel with little tree or shrub vegetation along its banks. Lawns typically extend right up to the creek. Several plunges occur along the way which would block upstream fish movements, including a major barrier in the form of an 8 to 10 foot-high concrete dam with a vertical plunge at its spillway. The former pond above the dam is now completely filled up with sediment such that it is now meadow-like with a lumber-lined, constructed channel passing across it. See Photos below:

Photo(s)

Number: 2

Subject/Name: Middle section of Holmes Point Creek

Type: Observation, Project (Ivy Removal)

Location: Ravine along Holmes Point Drive NE upstream of 62nd Avenue NE
Identification Source(s): Field walk 2/7/13

Description and Comments: Vegetation noted – Alder, Maple, cedar, salmonberry, sword fern, ivy. Strong potential for a project to remove ivy and other non-natives. The channel substrate is mostly silty, very sandy small gravel with some larger gravel. Braided sections, the filled-up reservoir in the lower section, and alluvial fan deposits at the mouth plus bank instability indicate that the stream carries a high sediment loading. Some wood is present, but pools formed tend to be shallow due to the sediment load. See Photos below:

Photo(s)

Number: 3

Subject/Name: Upper section of Holmes Point Creek

Type: Observations

Location: Vicinity of water diversion structures neat St. Edwards State Park

Identification Source(s): Field walk 2/7/13

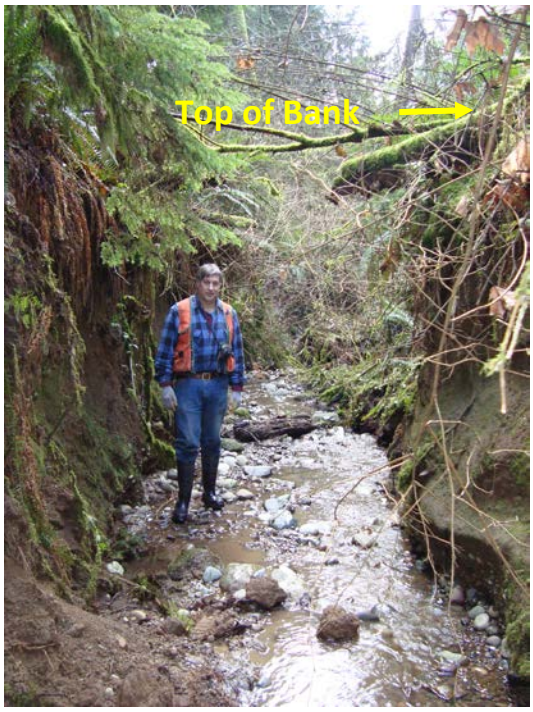
Description and Comments: A collection of flow diversion structures is in place apparently to collect water for and pump it to a water tower at Saint Edwards State Park. Some of the features are mossy and to appear to be old and out of use, but the overall feature appears to still be functioning. is present at the upstream end of box culvert. Streambanks near-vertical in places, up to 3-4 feet high. Gravel variable being very coarse but still sandy in places and mostly sand in others. Stream flows through wooded ravine with wide buffers. Vegetation includes alder, bigleaf maple, cottonwood, cedar, hemlock, salmonberry, sword fern and vine maple. One stand of non-native Japanese knotweed noted. Good amounts of moderately-sized large wood in the stream, resulting in good pool/riffle definition, but pools on the shallow side possibly due to high sand loading. Some areas of moderate bank instability recruiting silt and sand to the creek. See Photos below:

Photo(s)

Attachment C

Stream Walk General Reach Characteristics

CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS



Example of extreme channel incision in Champagne Creek.

Stream
Champagne Creek

Reach
Lower Reach (below Juanita Drive)

General Characteristics
Gradient: ≈ 0.0039 to 0.05 ft/ft
Valley Width: 100 – 300 feet
Planform: Ranges from braided at mouth to relatively straight
Average BFW: ≈ 6 feet
Average BFD: ≈ Not applicable—incised
Substrate: Primarily silt, some gravel, glacial till
Vegetation: Mix of natives and non-natives

Issues:
Deposition in lowest reaches, and extreme incision through Juanita Woodlands.

CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Typical stream section above Juanita Drive

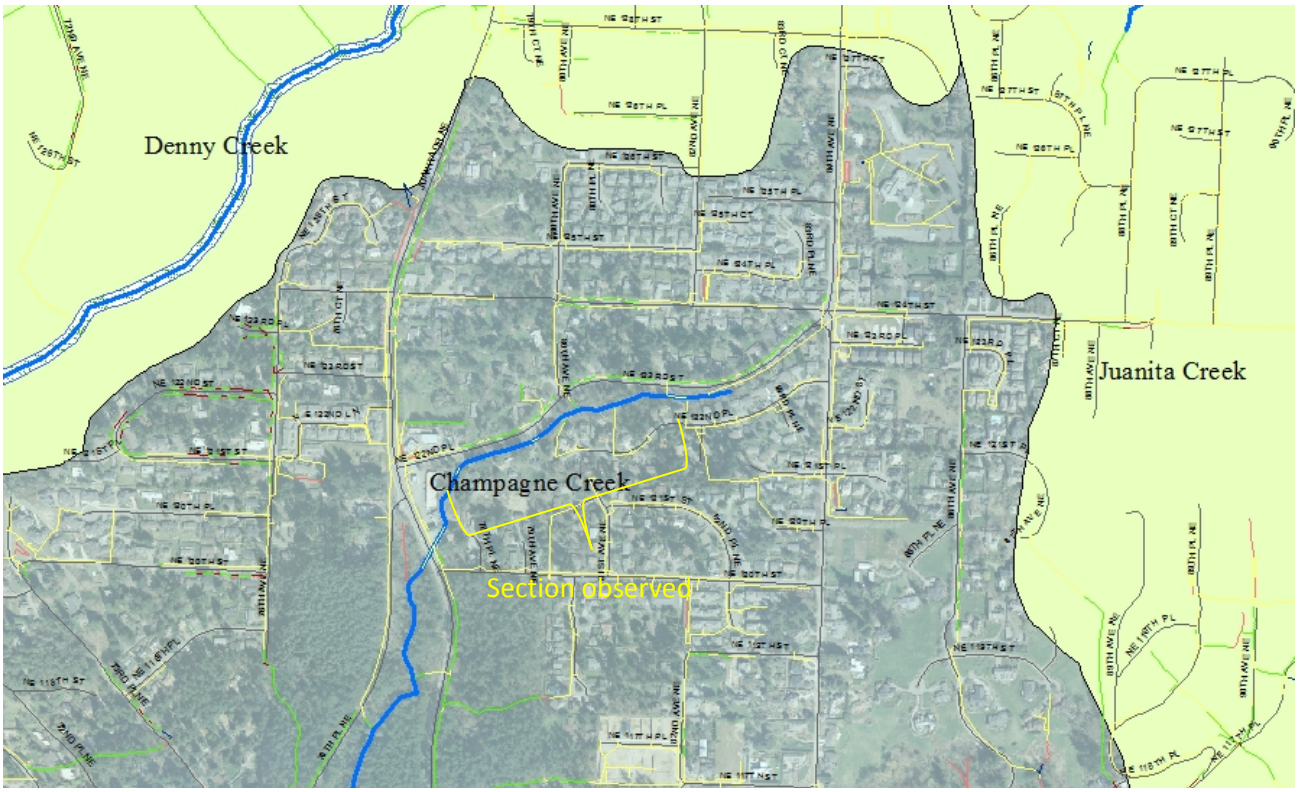
Stream
Champagne Creek

Reach
Upper Reach (above Juanita Drive)

General Characteristics
Gradient: ≈ 0.08 ft/ft
Valley Width: less than 100 feet
Planform: Relatively straight, ditch-like
Average BFW: ≈ 3 feet
Average BFD: ≈ 4 feet
Substrate: Primarily sand and gravel
Vegetation: Alders, deciduous trees

Issues:
Very little bank vegetation, confined channel, narrow riparian area

Champagne Creek above Juanita Drive



CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Denny Creek through O.O. Denny Park. Stream restoration was completed in this reach as part of sewer line project.

Stream
Denny Creek

Reach
Lower Reach (below Holmes Pt. Drive)

General Characteristics
Gradient: ≈ 0.03 ft/ft
Valley Width: Stream delta
Planform: Meandering
Average BFW: ≈ 5 feet
Average BFD: ≈ 1.5 feet—somewhat incised in locations
Substrate: Cobbles (up to 5" dia), gravel and sand
Vegetation: Mix of natives and non-natives.

Issues:
Non-native vegetation, potential fish migration issues during certain times of the year.

CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Denny Creek upstream of Holmes Pt. Drive

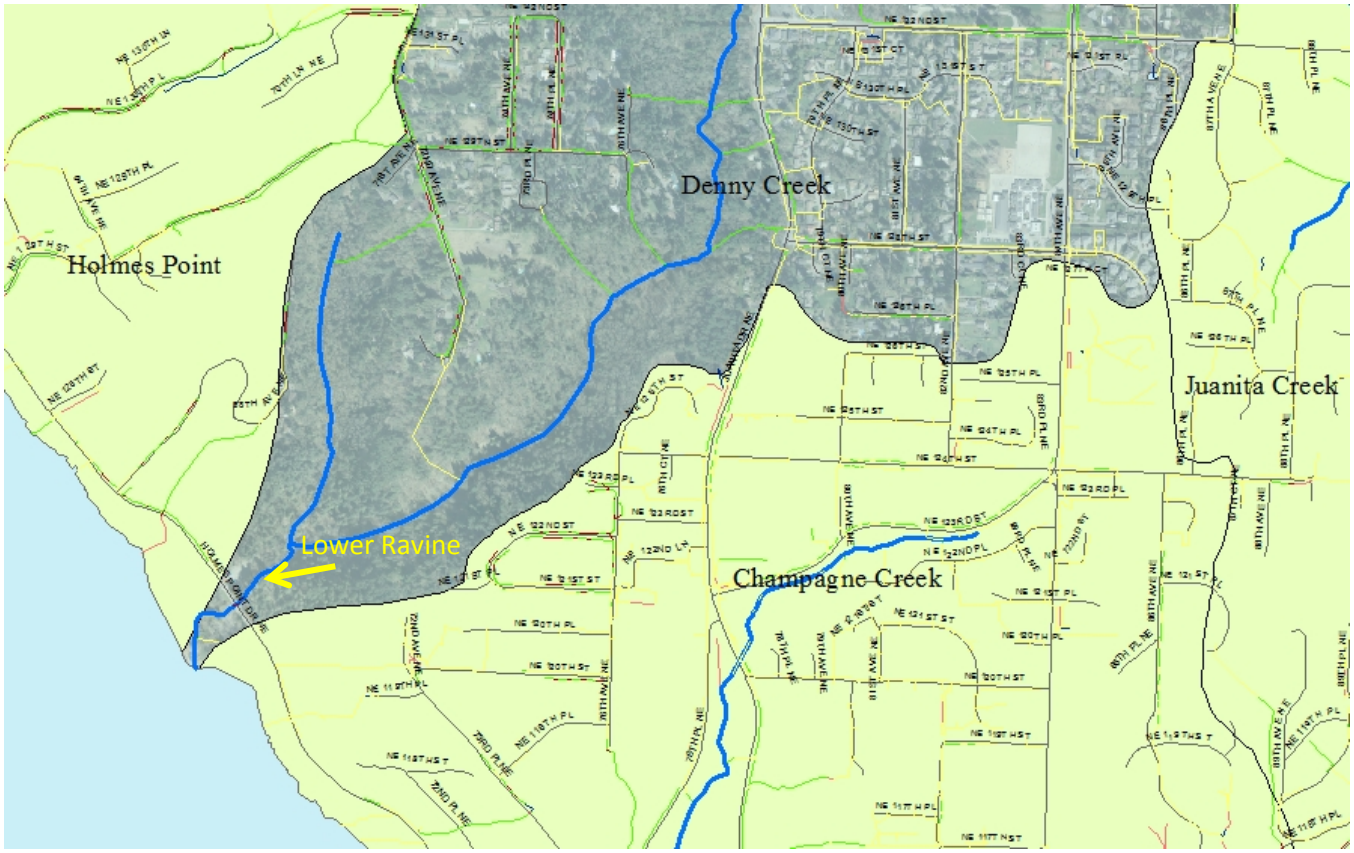
Stream
Denny Creek

Reach
Lower Ravine (above Holmes Pt. Drive)

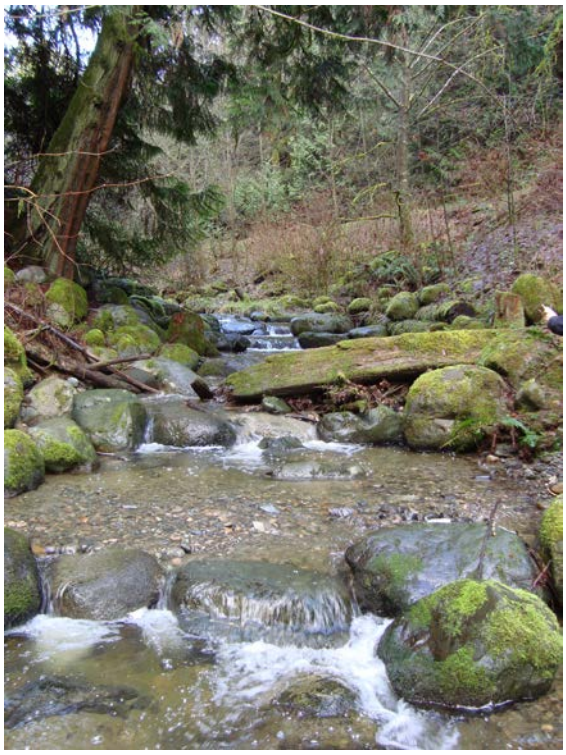
General Characteristics
Gradient: ≈ 0.02 ft/ft
Valley Width: 150 – 250 feet
Planform: Meandering
Average BFW: ≈ 8 -10 feet
Average BFD: ≈ 2 – 3 feet-
Substrate: Cobbles, gravel and sand
Vegetation: Mostly native riparian. One stand of Japanese knotweed.

Issues:
Moderate bank instability.

Positive Traits:
Good pool/riffle sequences.
Great riparian area with wide buffer between homes.
Good amount of large woody debris.



CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS



Denny Creek restoration downstream of Stone Bridge

Stream
Denny Creek

Reach
Middle Ravine (vicinity of Stone Bridge)

General Characteristics
Gradient: ≈ 0.02 – 0.03 ft/ft
Valley Width: 500 - 700 feet (top of plateau)
Planform: Meandering
Average BFW: ≈ 8-10 feet
Average BFD: ≈ 2 – 3 feet-
Substrate: Cobbles, gravel and sand
Vegetation: Mostly native riparian.
Issues:
Deep eroded gully on right bank from stormwater runoff on top of slope. Stormwater has since been tightlined to stream via large diameter HDPE pipe

Positive Traits:
Good pool/riffle sequences.
Great riparian area with wide buffer between homes.
Good amount of large woody debris.

CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Denny Creek downstream of Juanita Drive.

Much steeper gradient and coarser substrate in this reach.

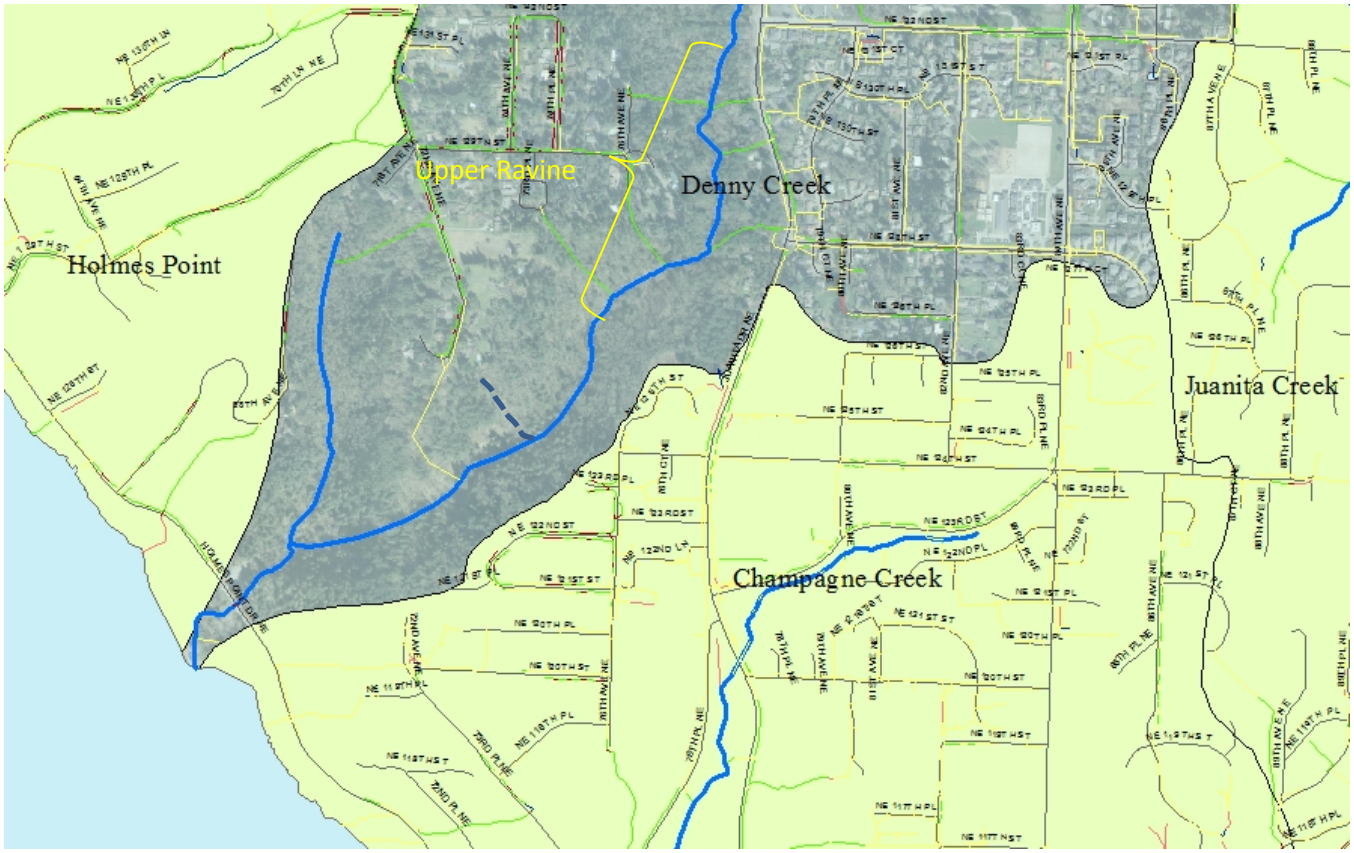
Stream
Denny Creek

Reach
Upper Ravine (below Juanita Drive)

General Characteristics
Gradient: ≈ 0.08 – 0.2 ft/ft
Valley Width: 100 - 400 feet (top of plateau)
Planform: Meandering
Average BFW: ≈ 8-10 feet
Average BFD: ≈ 2 – 3 feet-
Substrate: Boulders, cobbles, gravel and sand
Vegetation: Mostly native riparian, narrower riparian corridor.

Issues:
Many landslides in advance outwash.
Fish passage barrier at Juanita Drive.

Positive Traits:
Large amounts of wood from hillslope and bank failures.



CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

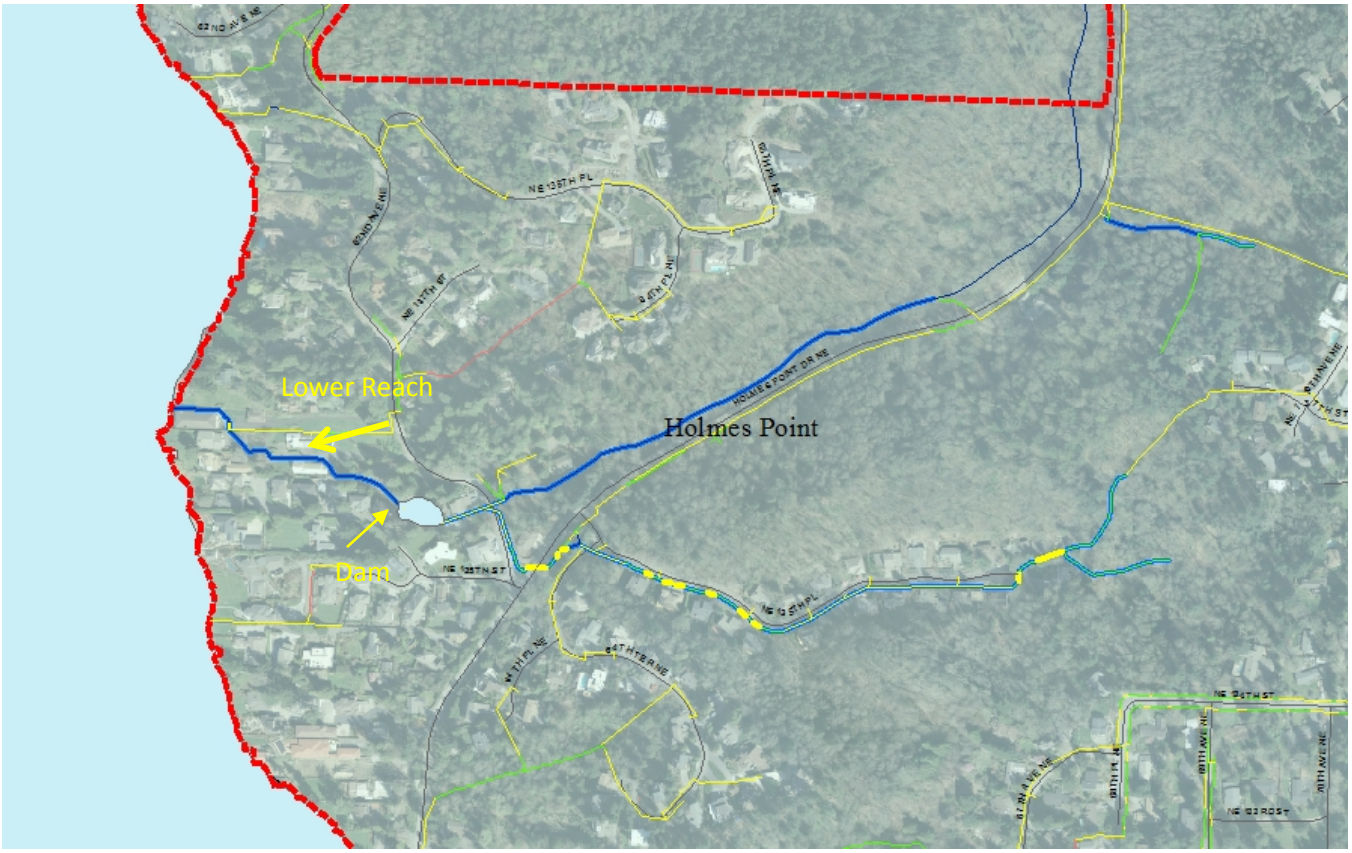
Holmes Point Creek near mouth in Lake Washington

Stream
Holmes Point Creek

Reach
Lower Reach (below 62nd Avenue NE)

General Characteristics
Gradient: ≈ 0.04 ft/ft
Valley Width: Not applicable, mouth of stream
Planform: Straight, channelized
Average BFW: ≈ not applicable
Average BFD: ≈not applicable-
Substrate: armored, constructed
Vegetation: Lawn and ornamental plants

Issues:
Channelized.
Large private dam.
No native riparian vegetation.



CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Holmes Point Creek near upstream of 62nd Avenue NE

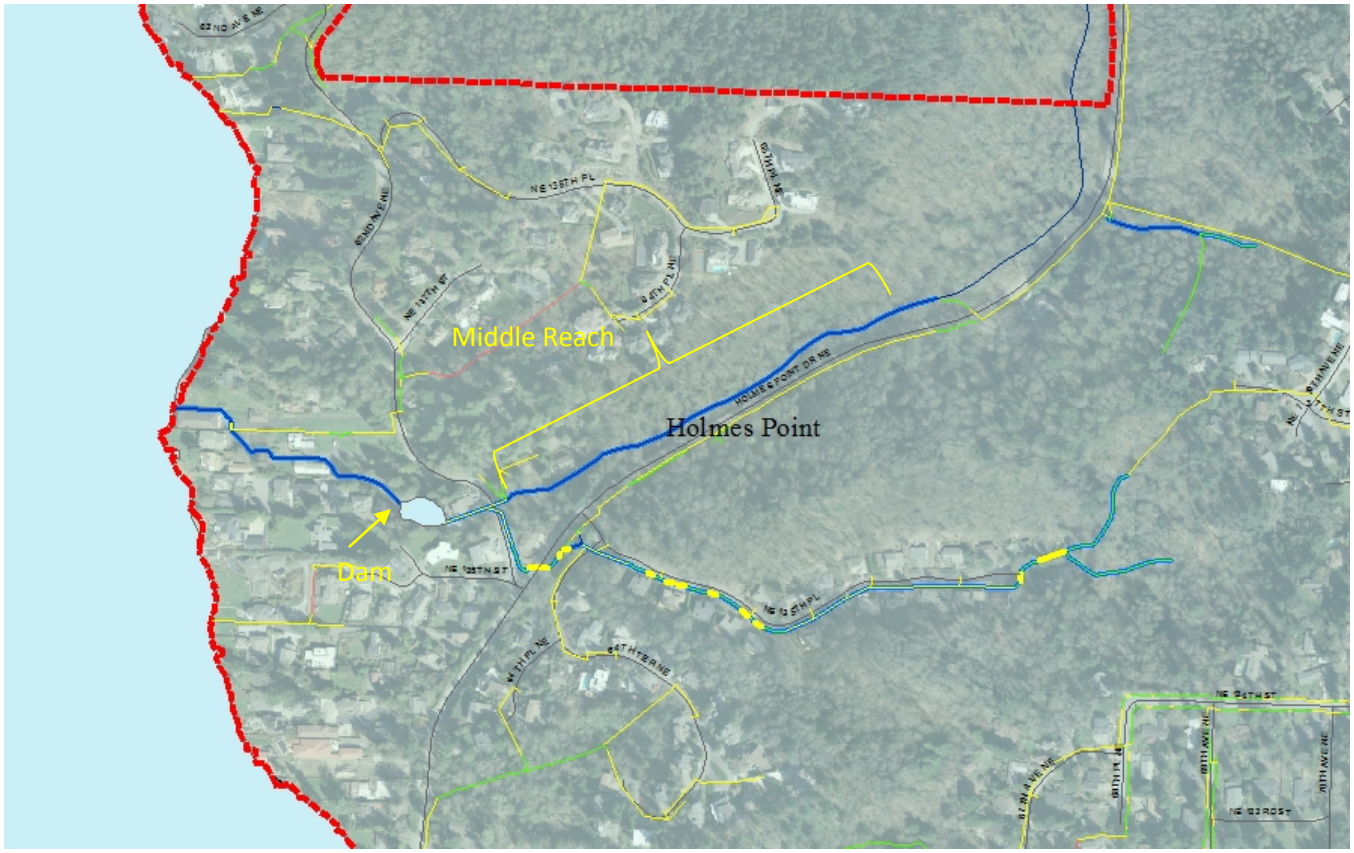
Stream
Holmes Point Creek

Reach
Middle Reach (above 62nd Avenue NE)

General Characteristics
Gradient: ≈ 0.03 – 0.08 ft/ft
Valley Width: 200- 600 feet
Planform: fairly straight, step pool, braided from high sediment in some places
Average BFW: ≈ 12 feet
Average BFD: ≈3 feet
Substrate: sand, silt and small gravel
Vegetation: Native vegetation and some non-natives, such as ivy.

Issues:
Shallow pools.
Sparse woody debris.

Positive Traits:
Fairly good and wide riparian corridor.
Holmes Point Drive borders south edge of channel.



CITY OF KIRKLAND
STREAM ASSESSMENT REACH DESCRIPTIONS

Holmes Point Creek downstream of St. Edwards Park.

Stream
Holmes Point Creek

Reach
Upper Reach (downstream of St Edwards Park)

General Characteristics
Gradient: ≈ 0.03 – 0.08 ft/ft
Valley Width: 200- 300 feet
Planform: fairly straight, step pool
Average BFW: ≈ 8 feet
Average BFD: ≈3 feet
Substrate: rip-rap, sand and gravel
Vegetation: Native vegetation and some non-natives, such as ivy.

Issues:
Moderately unstable banks.
Debris in channel.

Positive Traits:
Fairly good and wide riparian corridor.
Good pool-riffle definition