City of Kirkland

Aquatics, Recreation, & Community Center Concept Plan

PART 2: TECHNICAL REPORT

the Kirkland ARC CENTER
Aquatics • Recreation • Community

CITY OF KIRKLAND WASHINGTON

Sections

01

Environmental Assessment

Environmental Assessment

Lead Agency is The City of Kirkland

Proposed Project Site: Juanita Beach Park Site

1.Natural environment

(a) Earth	Response
(i) Geology	
General site description (choose one): Flat, hilly, steep slopes, mountainous, other:	The site is generally flat with very gentle slopes toward Juanita Bay to the southwest.
Steepest slope percent:	Slopes on the property range from 1% to 4%.
(ii) Soils	
General types of soil found:	Soils beneath the Juanita Beach Park consist of Recessional Outwash, which is generally described as stratified sand and gravel, moderate to poorly graded, and well-bedded silty sands to clayey sands. Boring logs from near by found loose to medium dense, sand with variable amount of silt and clay.
Surface indications or history of unstable soils:	There are no surface indications or history of unstable soils on or in the immediate vicinity of the site.
Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.	The purpose of the site grading will be to construct the aquatics, recreation & community center, parking, pedestrian pathways, and utilities. For the infiltration option, the project entails 7,930 CY of excavation and 8,370 CY of fill. For the detention option, the project entails 9,220 CY of excavation and 10,130 CY of fill.
(iii) Describe topography	The site is relatively level with approximately 10 feet of elevation change over a distance of 500 feet.
(iv) Unique physical features	Juanita Creek runs through the northwest corner of the site, with mature landscaping on both sides. This area will be maintained and enhanced with all new development clear of the required setback from the creek. There are no other unique physical features.
(v) Erosion/enlargement of land area	
Could erosion occur as a result of clearing, construction, or use? If so, generally describe.	There could be a short-term increase in the potential for on-site erosion where soils are exposed during site preparation and construction. Little potential for erosion is anticipated after construction is complete and during normal operations of the center and park. The project will comply with all applicable erosion control measures, short and long term.
About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?	There will be increased impervious surfaces that will result from the construction of the center. For the infiltration option, pervious pavements will be used for parking areas to reduce new impervious surfaces and to promote infiltration of surface water. Approximately 22% of the site will be covered with impervious surfaces for the infiltration option. Approximately 60% of the site will be covered with impervious surfaces for the detention option.

Proposed measures to reduce or control erosion, or other impacts to the earth, if any.	A temporary erosion control plan will be implemented at the appropriate time. Temporary erosion control measures will be implemented for all construction. The erosion control measures may include the following: hay bales, siltation fences, temporary siltation ponds, controlled surface grading, stabilized construction entrance, and other measures which may be used in accordance with requirements of the City of Kirkland. The project will require a Stormwater Pollution Prevention Plan (SWPPP), which will include Best Management Practices (BMPs) for control of construction-related sediments.
(b)Water	
(i)Surface water movement/quantity/quality	
Runoff/absorption	
Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wet- lands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.	Juanita Beach Park is uniquely sited on the northeast shore of Lake Washington in the Juanita Creek Drainage Basin. The watershed area is 6.6 square miles. The Lake Washington shoreline to the south of the site is shallow water with sandy or silty/organic substrate and minimal vegetation. To the southeast of the park are the extensive wetlands in Juanita Bay Park. Juanita Creek is a perennial creek that flows from the north to the south through the park and has its outlet on Lake Washington to the south of the site. It is located in the Juanita Creek Drainage Basin, a primary drainage basin under the City of Kirkland code (KZC). Juanita Creek is approximately 3 miles in length, with approximately 9 miles of open stream in the basin. Base flows in Juanita Creek are approximately 5 cfs (with minimum discharges of 2-3 cfs). Juanita Creek flows have been modified as a result of urbanization and removal of forested cover in the basin and can be considered to be typical of urban stream in western Washington with higher peak flows and larger runoff volumes during storm events. Annual peak flows range from 90-270 cfs. Juanita Creek is rated as a Type A stream by the City of Kirkland code due to the use of the creek by salmonid species. Required buffers on Type A streams within Primary Drainage Basins area a minimum of 75 feet wide per the KZC Chapter 90.90. The City requires a 10-foot building setback from the stream buffer (KZC 90.45 and 90.90).
Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.	The project is not within 200 feet of Lake Washington. The project is within 100 ft of Juanita Creek. All new construction will be clear of the required 75ft setback from the creek and the landscaping in the 75ft setback will be enhanced.
Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.	No fill or dredge material will be placed in or removed from surface water or wetlands.
Will the Proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.	There will be no surface water withdrawls or diversions.
Does the Proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.	No, a public sanitary sewer connection will be installed to serve the center. There will be no discharge of waste materials to surface waters. A WDOE NPDES construction permit will be required for construction of the new center and park facilities. Construction of the various center elements will utilize BMPs to avoid discharge of waste materials to surface waters.
Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if shown). Where will this water flow? Will this water flow into other waters? If so, describe.	Stormwater runoff will result from the proposed parking, rooftop, and landscape areas. The infiltration option uses pervious pavement and rain gardens to store and infiltrate site runoff up to a 100-yr storm event. Flows exceeding this capacity will discharge to the downstream system in Juanita Beach Park. For the detention option, runoff generated by the parking area will flow through swales and cartridge filters for water treatment. Outflow from cartridge filters and the remainder of site runoff will flow into a detention tank that discharges to the storm system in NE Juanita Drive. All treatment and flow control systems will be designed in accordance with the 2009 King County Surface Water Design Manual, as adotped by the City of Kirkland.

Could waste materials enter ground or surface waters? If so, generally describe.	No. Infiltration and treatment systems will remove sediment, oils, and other waste from runoff for the detention option.
Proposed measures to reduce or control surface, ground, and runoff water impacts, if any.	For the infiltration option, City approved infiltration systems will be designed to mitigate impacts to groundwater. For the detention option, a City approved storm drainage system will be designed to mitigate storm water runoff impacts. Permanent water quality and detention will be provided onsite in this option.
Does the Proposal lie within a 100- year floodplain? If so, note location on the site plan.	No.
(iv)Ground water movement/quantity/quality	
Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.	No groundwater will be withdrawn. For the infiltration option, surface runoff will discharge to ground water through infiltration facilities.
Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc. Describe the general size of the system, the number of such systems, the number of humans the system(s) are expected to serve.	No waste material is proposed to be discharged into the ground. The site will be served by public sanitary sewers.
(v)Public water supplies	
Describe	Domestic and fire water lines exist under Juanita Drive and 98th Avenue.
(c)Plants and animals	
Circle types of vegetation found on the site:	
Deciduous tree: alder, **maple**, aspen, other:	Bigleaf maple, black cottonwood
Evergreen tree: fir, cedar, spruce, pine, other: hemlock	
shrubs	shrubs
grass (orchard grass)	mowed lawn
pasture	
crop or grain	
wet soil plants: cattail, buttercup, bulrush, other:	
water plants: water lily, eelgrass, milfoil, other:	
other types of vegetation (Deer fern, blackberry, holly, scotch broom)	
What kind and amount of vegetation will be removed or altered?	It is anticipated that up to 20 mature trees would be removed, primarily cottonwood and Bigleaf maple varieties. Much of the lawn area would be removed. Creek buffer plantings would not be impacted.
Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.	New landscaping would include a variety of deciduous and conifer tree varieties incorporated into landscaped parking areas and streetscape, based on City of Kirkland standards. Native and ornamental shrubs and groundcovers would also be incorporated into the landscaping. A landscaping plan would be developed as part of the schematic design phase of the project.

(d)Energy and natural resources	
(ii)Source/availability	
What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.	The building will use electricity and natural gas. Should funding be available, it will incorporate onsite power generation with rooftop photovoltaic panels and an inverter. The primary uses are for heating, cooling and pool water heating.
Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.	There are currently no known facilties around the site which currently utilize solar energy. There is sufficient open space proposed on all sides of the buidling to avoid any impact of shadows from the new buidling affecting the use of solar energy on any adjacent parcels.
(iv)Conservation and renewable resources	
What kinds of energy conservation features are included in the plans of this Proposal? List other proposed measures to reduce or control energy impacts, if any.	Passive systems for reducing energy use would include carefully planned buidling orientation and massing to reduce heat gain, highly insulated walls and roofs, double glazed thermopane windows, sunshading, and operable windows with fans for natural ventilation wherever possible. An option in the pool areas would be the incorporation of an operable venting skylight system. A range of energy conserving systems for heating, ventilation, and air conditioning will be studied and the appropriate choices will be included. All major spaces will have natural light, and indoor openings or skylights will provide shared light where possible in other areas. The lighting system will incorporate daylight sensor controls and highly efficient bulbs. Energy efficient pool heating systems and filters will also be included in the design.

(2) Built Environment

(a)Land and shoreline use	Response
(i)Relationship to existing land use plans and to estimated population	
What is the current use of the site and adjacent properties?	The site is currently the "north section" of the overall Juanita Beach Park. The project site (north section) is currently used for active and passive recreational activities with baseball fields, tennis courts and walking trails. Dog training classes and informal park activities. On-site parking.
(ii)Existing structures	
Describe any structures on the site.	There is a small existing historic residence - the Forbes house - in the northeast portion of the site, and there are illuminated tennis courts in the southwest corner. There are two little league fields with backstops and other minor improvements, but they are not in good condition.
Will any structures be demolished? If so, what?	The proposed design calls for the relocation of the Forbes house to a different portion of the site, and demolition of the baseball fields and tennis courts.

(iii)Light and glare	
What type of light or glare will the Proposal produce? What time of day would it mainly occur.	The new building is proposed to have extensive areas of windows, so it will generate light when in operation during non-daylight hours. It is anticipated that the pools and fitness areas would be open weekdays from 5:30am to 9:00pm and weekend schedule will operate Saturday 8:00am-8:00pm and Sunday 11:00am-6:00pm. The community room will be rented for social events which may be scheduled until 11:00pm on a limite (weekend) basis.
Could light or glare from the finished project be a safety hazard or interfere with views?	The light or glare generated by this project would not pose a safety hazard or interfere with any views.
(iv)Aesthetics	
What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?	The tallest height is approximately 50' above grade. The exterior materials would include wood, stucco, or prefabricated panels with large areas of aluminum framed windows on the walls, and most likely composition shingles or metal on any sloping and exposed areas of roof.
What view in the immediate vicinity would be altered or obstructed?	No views would be altered or obstructed, but some wonderful new views out from the new Center to Lake Washington would be provided.
(v)Recreation	
What designated and informal recreational opportunities are in the immediate vicinity?	Directly across Juanita Drive is the southern portion of Juanita Beach Park, which provides beach and water access with a pedestrian pier for fishing on Lake Washington, and area for outdoor events. There is a major bike lane on Juanita Drive, and the site connects to the city's pedestrian path system. Just southeast of the site is a major public open space along the western shore of Lake Washington with developed trails.
Would the proposed project displace any existing recreational uses? If so, describe.	Construction of this project would result in the demolition of the two small baseball fields and the illuminated tennis courts on the project site. It is proposed that the ballfields at the nearby Finn Hill Middle School could be renovated to accommodate the programs currently operating at this site, and that another set of tennis courts in the city could be illuminated to replace the loss of the lighted courts.
Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.	The proposed project's purpose is to provide a wide range of new recreational opportunities at this site. Activity enhancements include aquatics programs (swim lessons, lap swim, competition, diving,waterpolo, and recreational swim), gymnasium programs (basketball, volleyball), fitness, dance, martial arts, gymnastics, and other indoor social, educational, and recreational activities. In addition, a new hiking/jogging trail may be proposed around the perimeter of the site which would tie into the surrounding network of paths, and the facility would connect to the bike routes. As noted in the previous question, the displaced baseball fields may be moved to a school site and tennis courts will be renovated at another city site to provide lighted courts.

(vi)Historic and cultural preservation	
Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.	The Dorr and Eliza Forbes House has been nominated for listing as a historic property on the federal register by the City. The orginal portion of the Forbes House was constructed n 1905, after an earlier family home on the same site, was destroyed by fire. Dorr and Eliza Forbes were early settlers and important figures n local history, who continued ot reside n the house until their deaths in 1919 and 1942, respectively. A major addition and remodel occurred in 1936-37, when a side-gable wing was added to the orignial gable-front wing and the interior was updated. The current interior reflects this remodel and there is little evidence of the earliest interior construction. However, the original 1905 exterior form and finishes remain in place and the 1936-37 addition was designed and constructed keeping with the vernacular character of the original section. The wood-frame construction and vernacular design character of the initial wing of the house is typical of domestic designs built in Kirkland between the 1870s and 1920. The 1936-37 construction and interior remodel is associated with revival design styles that were popular in the 1920s and commonly constructed in a minimal traditional mode throughout the 1930s and 1940s. The house was used by King County for various purposes after the property came into public ownership in 1956 and necessitated more recent relatively minor exterior alterations.
Generally describe any landmarks or evidence of historic, archacological, scientific, or cultural importance known to be on or next to the site.	Identification of specific cultural resources are not yet determined. A Cultural Study is anticipated to be prepared to identify and describe any other cultural resources in the vicinity and to propose any measures to protect cultural resources. No other landmarks or evidence of historic, arcaeological, scientific, or cultural importance are known on or near the site at this time. A brief history of the Juanita Beach Park site is summarized in the bullets below: * 1876 Juanta Beach property homesteaded by Dorr and Eliza Forbes * Uraniz Dock - ferry Urania and Urania Club House (Scandinavian meeting place from Finn Hill-west of Forbes property) *1906 Forbes House/Juanita House: Two story frame house constructed by the Forbes family *1916 Construction of Lake WA Ship Canal caused Lake Washington to drop 8.8 ft, exposing vast expanse of fine white sand at Juanita. Sand shelf extended 500 ft. from shore, only 5 ft. deep *1921 Forbes and Nelson constructed restrooms and 20x30 foot bath house and opened beach business for day use resort *1925 Forbes built open-air kitchen with tables, stove and hot water *1928 Forbes built a larger, two-story bath house wiht jukebox and dance floor, swimsuits for rent * After WWII Juanita Beach lost its appeal, people went into mountains instead * 1957 King County bought the Shady Beach and Sandy Beach properties * Forbes House/Juanita House: Two story wood fram house, 1906 i. King County Parks used Forbes House for interpretive program offices **The Forbes House is the only remaining structure on the property of cultural or historic interest.
Proposed measures to reduce or control impacts, if any.	The Forbes House can be relocated on the existing site and used as a community resource.
(b)Transportation	**Response**
(i)Transportation systems	
Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.	The Juanita Beach proposal site is accessed from 97th Avenue NE, a two-lane road that connects NE Juanita Drive to 98th Avenue NE, both principal arterials, and provides access to the Juanita Village neighborhood and commercial center. The south leg of the 97th Avenue NE/NE Juanita Drive intersection provides access to the Juanita Beach Park drop-off and parking lot. The site has two existing entry points - one 160 feet north of the 97th Avenue NE/NE Juanita Drive into a gravel parking lot and a second across from the 97th Avenue NE/NE 119th Way intersection leading into the Forbes House loop driveway. Access to/from I-405 is 1.6 miles east of the park on NE 116th Street and NE 124th Street. Figures illustrating site access patterns are included in the Traffic Assessment memorandum.
Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?	King County Metro routes 234, 236, and 255 are available on 98th Avenue NE just near the Juanita Drive intersection. This is within .25 miles of the Juanita Beach proposal site.

(ii)Vehicular traffic	
Will the Proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).	To accommodate traffic demand into and out of the Juanita Beach proposal site, a new southbound right-turn pocket may be needed on 97th Avenue NE at the NE Juanita Drive intersection. Additionally, the existing eastbound left-turn pocket at NE 120th Place / 98th Avenue NE intersection would need to be lengthened (this could be achieved by restriping within the existing width of roadway). Additional details about these potential mitigations and long-term actions that may be needed to accommodate regional travel demand growth are included in the Traffic Assessment memorandum.
How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.	150 - 180 vehicle trips would be generated by the proposal during the PM peak commute hour depending on the day of week and season of the year. The peak weekday vehicle trip generation for the proposal would be 260 - 320 trips and would occur from 7 to 8 PM.
Proposed measures to reduce or control transportation impacts, if any.	Adult programs at the ARC Center would not be scheduled to begin until after 6:30 PM on weekdays to reduce travel during the PM peak commute hour. For many of the school affiliated programs, students would travel by bus, walking, or biking.
(iv)Parking	
How many parking spaces would the completed project have? How many would the project eliminate?	The proposal would include approximately 270 to 300 parking spaces to accommodate ARC Center peak hour demand. The gravel parking lot on the northwest corner of the 97th Avenue NE / NE Juanita Drive intersection would be removed as part of the proposal. This parking lot can accommodate approximately 50 vehicles and currently functions as dedicated parking for North Juanita Beach Park, overflow parking for the southern portion of Juanita Beach Park, and informal overflow parking for Juanita Village businesses.
(c)Public Services and Utilities	
Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.	It is not anticipated that this project would result in an increased need for any of these services.
Proposed measures to reduce or control direct impacts on public services, if any:	
Fire	The fire marshall will be involved in the design of the new facility to ensure that their needs for access to the new buidling and surrounding areas will be properly maintained.
Police	The police department will be consulted to review the design to ensure that it has no negative impacts on public safety.
Health Services	The health department will review the plans to ensure compliance in the pool and kitchen areas.
Schools	The pool has been identified as a school district need and will be made available for use by the City per future negotiated agreement. The new facilities will alleviate some of the existing school district facilty scheduling issues for community access and will accommodate their existing and expanding programs for aquatics and other extra curricular activities.
Parks or other recreational facilities	This project is being developed by the City of Kirkland's Community Services Department to enable them to better serve the citizens of the community and address unmet needs.
Maintenance	The project will impact the maintenance department, as it will create new facilities which will require regular upkeep; including pools which require ongoing maintenance. The design and construction team will work with the City's maintenance staff to ensure adequate training on the new systems is provided to those responsible for the operations and maintenance of the ARC.
Communications	Communications department will be consulted to ensure no negative impacts.
Water/storm water	See the sections on water and storm water above.

Sewer/solid waste	Twin sanitary sewer force mains run south across Juanita Drive from the Metro Pump Station and then east along the south side of the Juanita Drive right-of-way. A sanitary sewer connection will be provided for the building. All construction and trenching for utilities will be in accordance with City of Kirkland requirements.
Other governmental services or utilities	None anticipated at this time.
List utilities currently available at the site:	Domestic and fire water, storm drainage, sanitary sewer, power, natural gas, cable
Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.	Puget Sound Energy is the electrical service provider. Northshore Utility District is the water and sanitary service provider. Water and fire service connections will be provided to the building. A water loop will be provided around the building to provide flow to fire hydrants. A sanitary sewer connection will be provided for the building. All construction and trenching for utilities will be in accordance with City of Kirkland requirements.

Environmental Assessment

Lead Agency is The City of Kirkland

Proposed Project Site: North Kirkland Community Center Park Site

1.Natural environment

(a) Earth	Response
(i) Geology	
General site description (choose one): Flat, hilly, steep slopes, mountainous, other:	The site generally slopes down from the southeast corner to the northwest corner.
Steepest slope percent:	Steepest slopes on the property are around 33%.
(ii) Soils	
General types of soil found:	Soils beneath the site consist of Transitional Beds and Recessional Outwash. Transitional Beds are generally described as laminated to massive silt, clayey silt, and silty clay. Recessional Outwash is generally described as stratified sand and gravel, moderate to poorly graded, and well-bedded silty sands to clayey sands. Test pits excavated near the site encountered stiff silt and medium dense sand (Transitional Beds).
Surface indications or history of unstable soils:	None.
Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.	The purpose of the site grading will be to construct the aquatics, recreation & community center, parking structure, pedestrian pathways, and utilities. Option A entails 11,300 CY of excavation and 6,690 CY of fill. Option B entails 48,420 CY of excavation and 3,570 CY of fill.
(iii) Describe topography	The site topography generally slopes down from the southeast to the northwest. From the southeast corner to 103rd Ave NE, the elevation drop is approximately 28 ft. From 103rd Ave NE to the northwest corner, the elevation drop is approximately 25 ft.
(iv) Unique physical features	This is a mostly developed park site, with an existing operating community center (which was formerly a church), two paved parking lots, a basketball court, and a train themed playground. The site is bisected by 103rd Avenue. The most unique physical features of the site are the hilly topography and existing large evergreen trees. The existing buildings are small enough to work within the constraints of the slopes and trees.

(v) Erosion/enlargement of land area	
Could erosion occur as a result of clearing, construction, or use? If so, generally describe.	There could be a short-term increase in the potential for on-site erosion where soils are exposed during site preparation and construction. Little potential for erosion is anticipated after construction is complete and during normal operations of the center and park. The project will comply with all applicable erosion control measures, short and long term.
About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?	There will be increased impervious surfaces that will result from the construction of the center. Approximately 35% of the site will be covered with impervious surfaces for Option A. Approximately 50% of the site will be covered with impervious surfaces for Option B.
Proposed measures to reduce or control erosion, or other impacts to the earth, if any.	A temporary erosion control plan will be implemented at the appropriate time. Temporary erosion control measures will be implemented for all construction. The erosion control measures may include the following: hay bales, siltation fences, temporary siltation ponds, controlled surface grading, stabilized construction entrance, and other measures which may be used in accordance with requirements of the City of Kirkland. The project will require a Stormwater Pollution Prevention Plan (SWPPP), which will include Best Management Practices (BMPs) for control of construction-related sediments.
(b)Water	
(i)Surface water movement/quantity/quality	
Runoff/absorption	
Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wet- lands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.	There are no surface water bodies on or in the immediate vicinity of the site.
Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.	No.
Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.	No fill or dredge material will be placed in or removed from surface water or wetlands.
Will the Proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.	There will be no surface water withdrawls or diversions.
(b)Water continued	
Does the Proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.	No.
Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if shown). Where will this water flow? Will this water flow into other waters? If so, describe.	Stormwater runoff will result from the proposed parking structures, building rooftop, and landscape areas. Both options will use combined detention and wetvault storage followed by cartridge filters to provide treatment and flow control for top levels of parking structures. Separate detention will provide flow control for building and site runoff. Stormwater will discharge from the site to the storm system in NE 126th Street. This system discharges to Juanita Creek approximately 1/4 miles downstream. All treatment and flow control systems will be designed in accordance with the 2009 King County Surface Water Design Manual, as adotped by the City of Kirkland.

Could waste materials enter ground or surface waters? If so, generally describe.	Treatment will remove sediment, oils, and other waste from runoff.
Proposed measures to reduce or control surface, ground, and runoff water impacts, if any.	A City approved storm drainage system will be designed to mitigate impacts from storm water runoff. Permanent water quality and detention will be provided onsite.
Does the Proposal lie within a 100- year floodplain? If so, note location on the site plan.	No.
(iv)Ground water movement/quantity/quality	
Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.	No groundwater will be withdrawn. No water will be discharged to the groundwater.
Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc. Describe the general size of the system, the number of such systems, the number of humans the system(s) are expected to serve.	No waste material is proposed to be discharged into the ground. The site will be served by public sanitary sewers.
(v)Public water supplies	
Describe	Domestic and fire water lines run under 124th Street and 103rd Avenue, and would provide water for the new Center
(c)Plants and animals	
Circle types of vegetation found on the site:	
Deciduous tree: alder, maple, aspen, other:	Bigleaf maple
Evergreen tree: fir, cedar, spruce, pine, other: hemlock	Douglas fir, Western red cedar
shrubs	shrubs
grass (orchard grass)	mowed grass (lawn)
pasture	
crop or grain	
wet soil plants: cattail, buttercup, bulrush, other:	
water plants: water lily, eelgrass, milfoil, other:	
other types of vegetation (Deer fern, blackberry, holly, scotch broom)	
What kind and amount of vegetation will be removed or altered?	It is anticipated that up to 20 mature trees would be removed, primarily Douglas fir and Bigleaf maple varieties. Much of the lawn area would be removed. Ornamental foundation plantings would also be removed.
Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.	New landscaping would include a variety of deciduous and conifer tree varieties incorporated into landscaped parking areas and streetscape, based on City of Kirkland standards. Native and ornamental shrubs and groundcovers would also be incorporated into the landscaping. A landscaping plan would be developed as part of the schematic design phase of the project.

(d)Energy and natural resources	
(ii)Source/availability	
What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.	The building will use electricity and natural gas. Should funding be available, the center will incorporate onsite power generation with rooftop photovoltaic panels and an inverter. The primary uses are for heating, cooling and pool water heating.
Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.	There are currently no known facilties around the site which utilize solar energy. A possible impact consideration is in option B the new center will shade the rooftop of one adjacent single family residence.
(iv)Conservation and renewable resources	
What kinds of energy conservation features are included in the plans of this Proposal? List other proposed measures to reduce or control energy impacts, if any.	Passive systems for reducing energy use would include carefully planned buidling orientation and massing to reduce heat gain, highly insulated walls and roofs, double glazed thermopane windows, sunshading, and operable windows with fans for natural ventilation wherever possible. An option in the pool areas would be the incorporation of an operable venting skylight system. A range of energy conserving systems for heating, ventilation, and air conditioning will be studied during design and the appropriate choices will be included. All major spaces will have natural light, and indoor openings or skylights will provide shared light where possible in other areas. The lighting system will incorporate daylight sensor controls and highly efficient bulbs. Energy efficient pool heating systems and filters will be included in the design.

(2) Built Environment

(a)Land and shoreline use	
(i)Relationship to existing land use plans and to estimated population	
What is the current use of the site and adjacent properties?	The site is currently a public park with a community center, basketball court, train themed playground, parking areas, and large open spaces for passive recreation. The adjacent properties to the north, east, and south are all single family residential, and to the west, multi-family residential. The site is bordered to the south by 124th Street, which is a major arterial.
(ii)Existing structures	
Describe any structures on the site.	There is a two story community center, which was originally a church, built in 1974. Smaller structures include a basketball court, train themed playground, and more recently constructed restroom facility.
Will any structures be demolished? If so, what?	In option A, the community center and basketball court would be demolished. In option B, the train playground would be deconstructed and relocated to a different portion of the site if possible, and the restroom building would also be demolished.

(iii)Light and glare	
What type of light or glare will the Proposal produce? What time of day would it mainly occur.	The new building is proposed to have extensive areas of windows, so it will generate light when in operation during the
Could light or glare from the finished project be a safety hazard or interfere with views?	The light or glare generated by this project would not pose a safety hazard or interfere with any views.
(iv)Aesthetics	
What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?	The tallest height is approximately 50' above grade, although with the existing slope, the impact of this is somewhat minimized. The exterior materials would include wood, stucco, or prefabricated panels with large areas of aluminum framed windows on the walls, and most likely composition shingles or metal on any sloping and exposed areas of roof.
What view in the immediate vicinity would be altered or obstructed?	The views from the surrounding homes into the existing park would be obstructed.
(v)Recreation	
What designated and informal recreational opportunities are in the immediate vicinity?	The existing park provides a range of informal recreational opportunities. The programs currently housed in the existing community center would all be incorporated into the new facility. There is a bicycle path along 124th Street that would not be impacted by this project.
Would the proposed project displace any existing recreational uses? If so, describe.	Yes. Because of the size of the proposed new building and parking structure at this site, the passive uses of the existing park would be displaced. In option B, the existing train theme playground would be removed, but may be relocated to another portion of the site.
Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.	The proposed project adds a wide range of new recreational opportunities at this site. .Activity enhancements include aquatics programs (swim lessons, lap swim, competition, diving, waterpolo, and recreational swim), gymnasium programs (basketball, volleyball), fitness, dance, martial arts, gymnastics, and other indoor social, educational, and recreational activities.
(vi)Historic and cultural preservation	
Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.	There are no known resources either listed or proposed for listing on local, state, or national registers of historic places on or next to the site.
Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.	There are no known landmarks or resources known to be historically, archaeologically, scientifically, or culturally important on or next to the site.
Proposed measures to reduce or control impacts, if any.	No impacts identified at this time.

(b)Transportation	
(i)Transportation systems	
Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.	The North Kirkland proposal site is adjacent to NE 124th Street NE, a five-lane principal arterial that provides an east-west connection between I-405 (1.00 miles to the east) and 100th Ave NE (0.12 miles to the west). The site is bisected by 103rd Avenue NE, a two-lane local street used to access the existing North Kirkland Community Center and a residential neighborhood. There are two site access options - one would keep the existing access point on 103rd Avenue NE and the other would have direct access from the parking structure onto NE 124th Street. The latter option would require the closure of 103rd Avenue NE and the construction of a cul-de-sac approximately 300 feet south of NE 125th Place. Figures illustrating site access patterns are included in the Traffic Assessment memorandum.
Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?	A bus stop for King County Metro routes 255 is directly adjacent to the site on NE 124th Street. Stops for Route 234 are located near the NE 124th Street/100th Avenue NE intersection, approximately 0.12 miles west of the site.
(ii)Vehicular traffic	
Will the Proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).	For either site access option at the North Kirkland proposal site, the primary entry/exit point from/to NE 124th Street would need to include a traffic signal, dedicated left-turn pockets, and crosswalks to safely and efficiently accommodate peak hour traffic demand into and out of the ARC Center. Additionally, the existing midblock crosswalk located on NE 124th Street approximately 200 feet west of the 103rd Avenue NE intersection would need to be removed to accommodate site access improvements. Due to regional travel demand growth along NE 124th Street, more substantial long-term actions may be needed at the 100th Avenue NE/NE 124th Street intersection directly to the west of the site. In particular, westbound vehicle queues at this intersection could extend past the proposed ARC Center access point during the PM peak hour. Improvements to address this westbound queuing issue have been previously described in the 100th Avenue NE Corridor Study. Additional detail about site improvements is provided in the Traffic Assessment memorandum.
How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.	150 - 180 vehicle trips would be generated by the proposal during the PM peak commute hour depending on the day of week and season of the year. The peak weekday vehicle trip generation for the proposal would be 260 - 320 trips and would occur from 7 to 8 PM.
Proposed measures to reduce or control transportation impacts, if any.	Adult programs at the ARC Center would not be scheduled to begin until after 6:30 PM on weekdays to reduce travel during the PM peak commute hour. For many of the school affiliated programs, students would travel by bus, walking, or biking.
(iv)Parking	
How many parking spaces would the completed project have? How many would the project eliminate?	The proposal would include approximately 270 to 300 parking spaces to accommodate ARC Center peak hour demand. The existing parking lot for the North Kirkland Community Center would be removed as part of this proposal.

(c)Public Services and Utilities	
Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.	It is not anticipated that this project would result in an increased need for any of these services.
Proposed measures to reduce or control direct impacts on public services, if any:	
Fire	The fire marshall will be involved in the design of the new facility to ensure that their needs for access to the new buidling and surrounding areas will be properly maintained.
Police	The police department will be consulted to review the design to ensure that it has no negative impacts on public safety.
Health Services	The health department will review the plans to ensure compliance in the pool and kitchen areas.
Schools	The pool has been identified as a school district need and will be made available for use by the City per future negotiated agreement. The new facilities will alleviate some of the existing school district facilty scheduling issues for community access and will accommodate their existing and expanding programs for aquatics and other extra curricular activities.
Parks or other recreational facilities	This project is being developed by the City of Kirkland Community Services Department to enable them to better serve the citizens of the community and address unmet needs..
Maintenance	The project will impact the maintenance department, as it will create new facilities which will require regular upkeep; including pools which require ongoing maintenance. The design and construction team will work with the City's maintenance staff to ensure adequate training on the new systems is provided to those responsible with for the operations and maintenance of the ARC.
Communications	Communications department will be consulted to ensure no negative impacts.
Water/storm water	See the sections on water and storm water above.
Sewer/solid waste	Separate sanitary sewer connections will be provided for the building and parking garage. Option B will require relocation of water and sanitary main lines in 103rd Ave NE. All construction and trenching for utilities will be in accordance with City of Kirkland requirements.
Other governmental services or utilities	None anticipated at this time.
List utilities currently available at the site:	Domestic and fire water, storm drainage, sanitary sewer, power, natural gas, cable
Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.	Puget Sound Energy is the electrical service provider. Northshore Utility District is the water and sanitary service provider. Water and fire service connections will be provided to the building. Fire hydrants will be provided for the site as needed. Separate sanitary sewer connections will be provided for the building and parking garage. Option B will require relocation of water and sanitary main lines in 103rd Ave NE. All construction and trenching for utilities will be in accordance with City of Kirkland requirements.

02

Historic Resources Assessment

JUANITA CREEK ASSESSMENT PREPARED BY
FRANK STIPE, TETRA TECH EC, INC.

Juanita Creek Restoration Project

King County, Washington

Prepared for

City Hall - Public Works Department
123 Fifth Avenue
Kirkland, WA 98033

Prepared by

Frank Stipe - Archaeologist

TETRA TECH EC, INC.

12100 Northeast 195th Street – Suite 200
Bothell, WA 98011

December 2006

Abstract

Tetra Tech EC (TtEC) conducted a cultural resources overview and assessment of the proposed Juanita Creek Restoration Project in King County, Washington. This effort included an archival and literature review, tribal and state agency consultation, field reconnaissance of the project area, identification of historic buildings and structures within the project Area of Potential Effect (APE), and the production of this report. The proposed project aims to restore banks along Juanita Creek on and near Juanita Beach Park, located in Kirkland, WA.

TtEC did not identify any historic or prehistoric archaeological sites during a field reconnaissance of the project area. The majority of the APE has been greatly disturbed by heavy machinery operations, land development, paving and soil removal/deposition activities.

A one story maintenance building, located in Juanita Beach Park on the east side of Juanita Creek, is scheduled for demolition as part of this project. Jason Filan of the Kirkland Parks Department contacted Mark Johnston (former Parks Manager for the City of Kirkland) to determine that the structure was built in either 1956 or 1957. A review of county and city records regarding the maintenance building revealed no additional information regarding the age or history of the building.

No cultural materials were identified by the field survey. Previous studies in the area, having produced similar results, suggest a low probability for archeological resources in the area. However, the project area is located near a water course and in proximity to Lake Washington, areas generally thought to be likely to contain archaeological sites. Therefore, it is recommended that, in the event cultural resources are encountered during project related excavation activities, all work in the immediate area of the find be halted until a qualified Archeological Monitor can be summoned to the site to assess and evaluate the find.

Table of Contents

Tables and Figures

1.0 Introduction

The City of Kirkland, Public Works Department has consulted with TtEC to complete a background research study and pedestrian archaeological inventory of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East (Figure 1). Background research was conducted at the Washington Office of Archaeology and Historical Preservation on September 27th, 2006 and survey of the project area was completed on October 5th, 2006.

2.0 Project Description

The project entails the restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City-owned Juanita Beach Park. The project will employ bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 (Horizontal: Vertical) slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 side slopes. Construction of restoration features will use heavy machinery, primarily excavators and backhoes.

Additionally, the restoration project includes the demolition of an existing single story structure that is located in the floodplain of the creek and the removal of nearly 0.5 acres of invasive plant species (e.g. Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

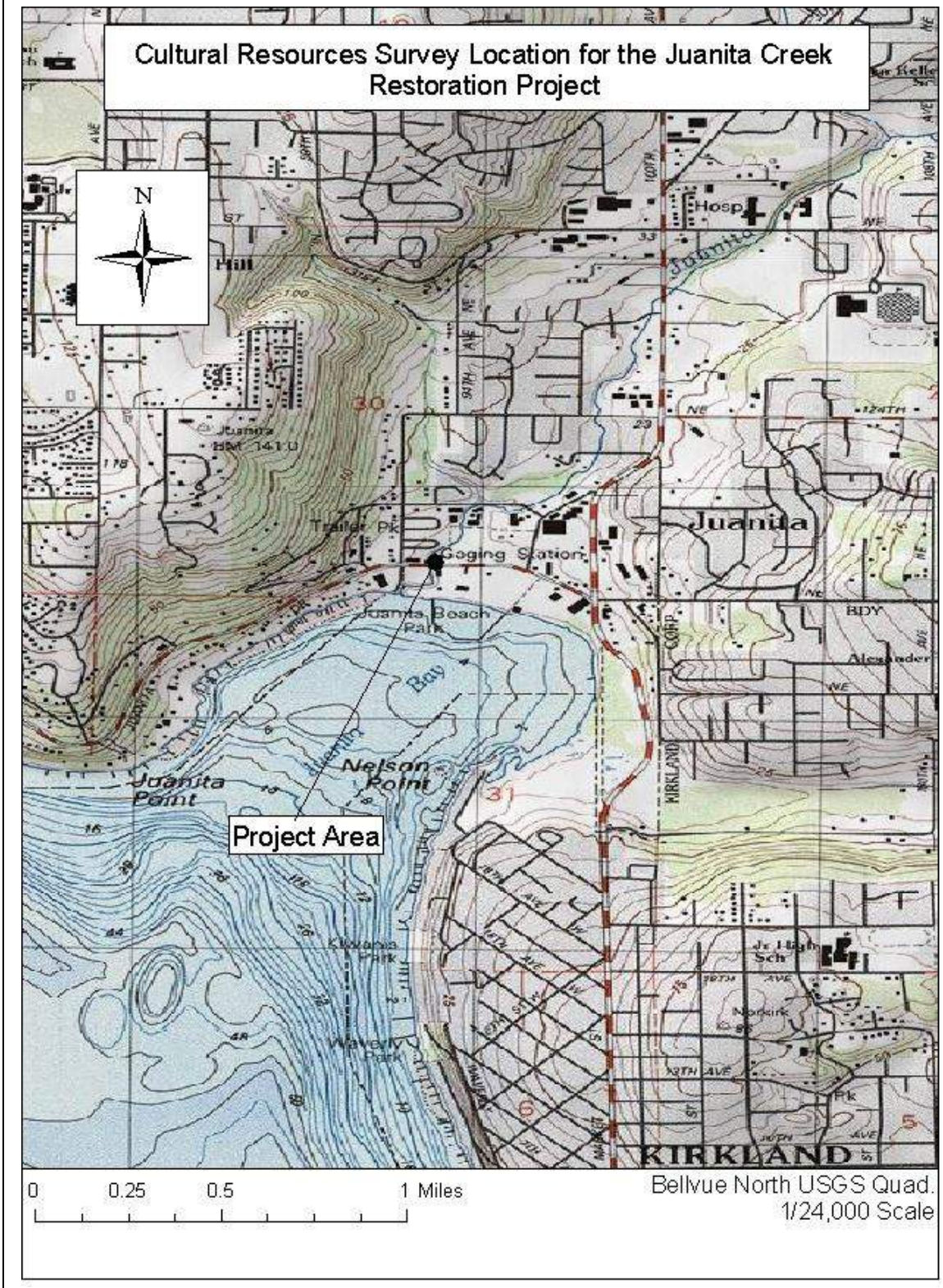


Figure 1 Project Area.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

3.0 Tribal Consultation

TtEC initiated tribal consultation with the Snoqualmie, Tulalip, Duwamish, and the Muckleshoot Indian Tribes by sending a project area map and letter explaining the proposed Juanita Creek Restoration Project to the tribal chairperson and the designated cultural representative of each tribe (Appendix A).
The letters were sent to the appropriate tribal offices on November 9, 2006. As of November 29, 2006 no response has been received from any of the tribal offices.

4.0 Environmental Setting

The project APE is located along Juanita Creek, which flows south into Lake Washington after traveling through a recreation field, under Juanita Drive, and through Juanita Beach Park.

Figure 2 Overview of the southern portion of the project area.

The southern portion of the project area is located within Juanita Beach Park, managed by the city of Kirkland, south of Juanita Drive (Figure 2). This portion of the project area

has been covered with asphalt and is used as a parking area and transportation corridor for vehicles and pedestrians. Vegetation in this portion of the project area includes Douglas fir, willow trees, blackberry, lawn grass and various forbs.

The northern portion of the project area, north of Juanita Drive, is composed of residential apartments to the west and a recreation field to the east. Vegetation in the area includes oak trees, lawn grass, blackberry, and various forbs (Figure 3).

Figure 3 Overview of the northern portion of the project area, facing southwest

Blackberry growth in this portion of the project area makes access to the creek difficult. This portion of the project area has been impacted by the presence of the recreational field to the east and the apartment complex to the west (Figure 4). Soils were tested here but excavations proved to be futile as the ground surface is extremely compacted, likely the result of high volume foot traffic, landscaping, and other activities.

Figure 4 Overview of project area within apartment complex grounds, facing west.

5.0 Cultural Setting

5.1 Previous Archaeological Survey

TtEC conducted a literature review of previous cultural resource investigations within one mile of the proposed project area. The literature review was conducted at the Washington Department of Archaeology and Historic Preservation (DAHP) in Olympia, WA. The file search revealed that only one archaeological survey has taken place within one mile of the proposed Juanita Creek Restoration project (Table 1).

Table 1 Cultural resource surveys within 1 mile of the proposed project area.

Author(s)	Date	Title	Cultural Resources Identified	Evaluation Status
Roedel, Forsman, Lewarch, Larson	2003	Juanita Bay Pump Station and Force Mains Cultural Resources Overview and Assessment, King County, Washington	None	N/A

5.2 Historic Buildings and Structures

No previously inventoried buildings exist in or adjacent to the Juanita Creek Restoration project APE.

The one-story building which is slated for demolition as part of the Juanita Creek Restoration project has been found to be either 49 or 50 years old (personal communication with Mr. Jason Filan of the Kirkland Parks Department). Mr. Filan was able to contact Mark Johnston, the former Parks manager during the period when the building was constructed. According to Mr. Johnston the building was built in either 1956 or 1957. A *Historic Property Inventory Report* for the building was completed and is being submitted to the Washington DAHP as Appendix B of this report.

5.3 Ethnography

The information gathered to produce this brief ethnography of the project area was taken from the Handbook of North American Indians Vol. 7, Suttles and Lane p. 485.

The Juanita Creek Restoration project lies in the region once occupied by the Southern Coast Salish, these people were divided into two groups, those that spoke Twana and those that spoke Lushootseed. The people living in and around the Juanita Creek Restoration project area would have fallen into the group of Lushootseed speakers. These people relied heavily on fish, especially salmon, but may have utilized vegetable foods and land animal game more than surrounding peoples. Plank houses were used as dwellings with one or more families staying in each. Canoes were the preferred method of transport across water and overland travel was accomplished with the help of bags looped around either the forehead or chest. Clothing in the warmer months was minimal with the women wearing an apron and men wearing a simple breechcloth or nothing at all. During the colder months robes made of animal pelts or whole bear hides were worn with shirts, leggings or trousers. Socially these people were divided by family, household and village. One or two families might live in a plank house, the plank house occupants composed the household and several households might compose a village. Patrilineal or matrilineal kin association might have been used but varied from group to group (Suttles and Lane 1990).

The earliest known contact with the Southern Coast Salish group by Europeans was made by the 1792 British expedition under George Vancouver. At this time expedition records state that the local Indian populations had already suffered a small pox epidemic but had apparently not encountered Europeans before. During the next 30 years little contact was made with the Southern Coast Salish peoples as the only Europeans in the region were fur traders and didn't find the pelts that were after within the Strait of Juan de Fuca or points beyond. In 1833 the Hudson's Bay Company established Fort Nisqually as a trading post to the south of the project area. Following establishment of this and other trading posts in the region Roman Catholic missionaries began traveling the region in an effort to convert the local populations to the ways of the Catholic Church. By the 1850's

most Southern Coast Salish were selling fur, natural resources and labor. During the 1850's Southern Coast Salish peoples signed treaties with the U.S. government and most moved to reservations (Suttles and Lane 1990).

5.4 Historic Context

The City of Kirkland was named after a British-born steel tycoon, Peter Kirk, who came to the Northwest in the 1880s seeking new development opportunities. In 1880, the Moss Bay Iron and Steel Works were built by Kirk and several prominent Seattle businessmen. They hoped to tap the rich mineral resources of Snoqualmie Pass and believed that a ship canal would soon be cut through Seattle to Puget Sound, opening Lake Washington to Pacific Rim trade. A rail line to the Pass and a ship canal to Puget Sound were both constructed, but too late to save Kirk's dream. Due to a stock market crash in 1893, the mill closed without producing any steel (City of Kirkland 2006).

Juanita Beach and the surrounding areas were originally called Hubbard after Martin Hubbard who established a boat landing in the area in 1870. Martin Hubbard drowned in Lake Washington on May 27, 1887. Remembered for their varied and widespread activities and contributions to the area Dorr and Eliza Forbes moved to Hubbard in 1877. In 1880 the area began to be referred to as Juanita after a popular song from that era. The Forbes family acquired the 5 acre parcel of land on which they settled from Martin Hubbard in 1878 (King County 2006).

Dorr Forbes started a sawmill on the 5 acres purchased from Hubbard after 1878. The sawmill burned down in 1894 but Dorr continued to operate several other mills in the area until his retirement when he turned to poultry farming. Eliza Forbes was an important resident of Juanita as well. On January 23, 1887 she was elected to the office of Justice of the Peace, the first woman to hold that position in Washington Territory. In 1889 Washington gained statehood and unfortunately for Eliza the state constitution did not allow women to vote or hold public office so she was forced to resign (King County 2006).

One of Dorr and Eliza's sons, Leslie, returned to Juanita after business ventures in Alaska and Lake County Oregon. After moving back to Juanita in 1910 he married Alicia Stuart that same year. Leslie and Alicia opened a small confectionary store at the waterfront pier or landing where Lake Washington steamers docked near the senior Forbes' home. They were forced to close the store after the Washington Ship Canal opened in 1917 which lowered the water level and made the bay too shallow for steamers (King County 2006).

The water lowering exposed a wide sandy beach which later became Juanita Beach Park. This strip of land was owned by Eliza Forbes and Leslie bought his mothers land and two adjacent lots to form a resort park. The park opened in 1921 and was run by Leslie and Alicia until 1950 when they retired to Rockaway Beach on Camano Island. They leased the park to others but due to poor maintenance took the park back in 1953. They later sold the park outright to King County in 1956. King County transferred ownership of the park to the City of Kirkland in 2002 (King County 2006).

6.0 Methodology

Investigation of the archaeological resources contained within and around the Juanita Creek Restoration project lands involved a literature search of the project area and a physical survey of the project lands. The literature search was accomplished by reviewing Washington DAHP records and the City of Kirkland Records website. The literature search at the Washington DAHP occurred on September 27th, 2006. Both historic structures records and archaeological site and survey records were consulted to determine the presence or absence of known archaeological materials in the area of the proposed project. The City of Kirkland's website was also accessed, and a search of historic properties within and around the proposed project area was completed.

Survey of the project area included pedestrian surface survey and shovel testing. Field work was completed on October 5th, 2006. Surface survey consisted of transects spaced 5 meters apart and walked either in cardinal directions, or parallel to natural features. Shovel test units consisted of 30 cm. diameter probes dug to 50 cm. below surface level. The soils appears to be a mix of heavy clay subsoil and organic rich alluvial soil, these soils were mixed together and appear to be the result of heavy disturbance likely from construction of the adjacent maintenance building and park maintenance activities.

7.0 Inventory Results

Results of the literature search have been provided in the Project Area Cultural History section above.

No historic or prehistoric artifacts or features were identified during the survey of the Juanita Creek Restoration project. Five meter spaced transects were conducted in all areas of the project and three shovel test pits were dug on the west side of the one-story building slated for demolition. The same one-story building was previously discussed in the Historic Buildings and Structures section above. The structure does not appear to possess any attributes which would fulfill the eligibility requirements for the NRHP. The building is constructed of cinder block, with a simple utilitarian purpose. The inside of the building was not observed, as access was not available during the time of survey.

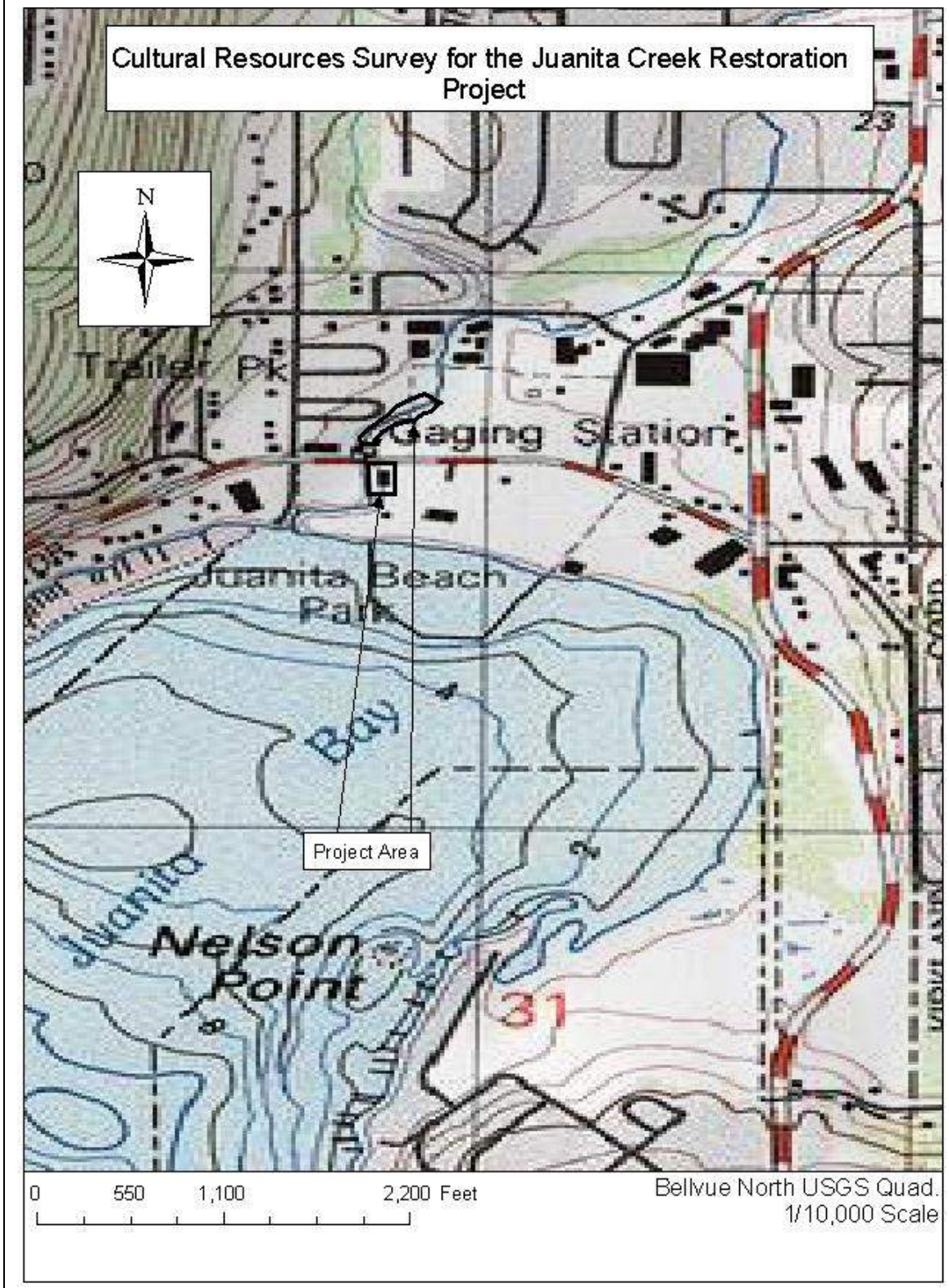


Figure 5 Area Surveyed.

The area to the east and south of the one-story building has been paved; the areas to the north and east are maintained for a park environment. Shovel testing was attempted in both areas but soils proved to be highly compacted, likely from recreational use. The project area north of Juanita Drive is currently used for recreation and is adjacent to an apartment complex. The areas in this location are maintained as a park environment and are also compacted.

8.0 Recommendations

Based on the results of the literature review and subsequent survey of the project area, TtEC recommends that the project be implemented as planned, provided the following standard protections measure is adhered to:

> If artifacts or unusual amounts of bone or shell are uncovered during the construction activity, work will be stopped and a qualified archeologist will be contacted for on-site consultation.

With compliance to this protection measure, the Juanita Creek Restoration Project will have no effect on any cultural resource property listed on, or eligible for nomination to, the National Register of Historic Places.

9.0 Bibliography

City of Kirkland
History of Kirkland, site accessed 11/27/2006
http://www.ci.kirkland.wa.us/dynamic/Page762.aspx

King County Historic Preservation Program
Juanita Beach Park History, site accessed 11/27/2006
www.ci.kirkland.wa.us/__shared/assets/**Juanita**BeachPark_**History**1892.pdf

Larson Anthropological Archaeological Services Limited (LAAS). 2003. *Juanita Bay Pump Station and Force Mains Cultural Resources Overview and Assessment*. Report submitted to King County Department of Natural Resources and Parks. June 16, 2003.

Suttles, Wayne and Lane, Barbara
1990 Southern Coast Salish. In *Handbook of North American Indians, Volume 7: Northwest Coast*, edited by Wayne Suttles. Pp. 485-502. Smithsonian Institution, Washington DC.

Appendix A

Tribal Consultation Documentation

TO: James Rasmussen
Cultural Resources Manager
Duwamish Tribe
CO/ Bud's Jazz Records
102 S. Jackson St
Seattle, WA 98104

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Duwamish Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Duwamish Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Cecile Hanson
Chairperson
Duwamish Tribe
4717 West Marginal Way, SW
Seattle, WA
98106

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Duwamish Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Duwamish Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Donna Hogerhuis
Cultural Resources Specialist
Muckleshoot Indian Tribe
39015 172nd Ave. SE
Auburn, WA, 98002-9763

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Muckleshoot Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Muckleshoot Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: John Daniels Jr.
Chairperson
Muckleshoot Indian Tribe
39015 172nd Ave. SE
Auburn, WA
98002-9763

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Muckleshoot Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Muckleshoot Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Karen Suyama
Cultural Resource Director / Tribal Historic Preservation Officer
Snoqualmie Tribe
P.O. Box 969
Snoqualmie, Washington 98065

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Snoqualmie Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Snoqualmie Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Joe Mullen
Chairperson
Snoqualmie Tribe
P.O. Box 969
Snoqualmie, Washington 98065

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Snoqualmie Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Snoqualmie Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Hank Gobin
Cultural Resources Manager
Tulalip Indian Tribe
6410 23rd Ave. NE
Tulalip, WA

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Tulalip Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Tulalip Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

TO: Herman A. Williams Jr.
Chairperson
Tulalip Indian Tribe
6700 Totem Beach Road
Marysville, WA
98270

FROM: Frank Stipe, Archaeologist, Tetra Tech EC (TtEC)

DATE: November 9, 2006

SUBJECT: Juanita Creek Restoration Project

The City of Kirkland Public Works Department has hired Tetra Tech EC (TtEC) to complete a survey and background research study of the Juanita Beach Restoration Project. The project area is located along Juanita Creek in Section 31, Township 26 North, Range 5 East. Background research was conducted at the Washington Office of Archaeology and Historical Preservation on 10/4/2006 and survey of the project area was completed on 10/5/2006.

The project entails restoration of 400 linear feet of Juanita Creek, all of which is located within the boundaries of the City owned Juanita Beach Park. The project will use bioengineering techniques to stabilize approximately 250 linear feet of over steepened bank line. Bioengineered banks will be graded to 3:1 slopes up to the elevation of the 100-year water surface, and then will transition to 2:1 side slopes to tie into existing topography. Live stakes and coir fabric, along with riparian plantings, will be installed below the 100-year water surface elevation to provide for slope stability during high flows. Approximately 130 tons of existing rock armoring and slabs of concrete debris will be removed from the toe of the banks and from the banks themselves. Protection of the toe, specifically at the two sharp bends in the creek alignment, will be attained through placement of a mixture of rock and large woody debris.

Floodplain terrace features will be cut into the incised cross section at three locations along the restoration reach. The terraces will be roughly 10 to 15 feet wide. Riparian plantings will be established on the floodplain terrace features.

To address the need for off-channel habitat, approximately 110 linear feet of backwater channel will be constructed. The backwater channel will be excavated on the west side of the creek to a depth of 6 to 8 feet below the existing topography. The backwater channel will have a bottom width of approximately 10 feet and will be constructed with 2:1 (Horizontal: Vertical) side slopes. Construction of restoration features will use heavy machinery primarily excavators and backhoes.

Additionally, the restoration project includes demolition of an existing single story structure that is located in the floodplain of the creek.

The project also includes removal of nearly 0.5 acres of invasive plant species (primarily Himalayan Blackberry, Japanese knotweed, morning-glory, and field bindweed) on the banks, within the riparian zone, and in upland areas of the site. Native upland and riparian plant species will be planted.

The restoration project will restore critical habitat function to nearly 400 feet of Juanita Creek. A secondary benefit will be to provide educational and passive recreational opportunities to park users.

TtEC's cultural resources overview and traditional cultural places assessment for the proposed Juanita Beach Restoration Project consists of archival and literature review, agency consultation, tribal consultation, field reconnaissance and the production of a technical report. We have gathered existing archaeological, historic, ethnographic and historic Indian data from the Washington State Department of Archaeology and Historic Preservation. However, we are aware that the Tulalip Tribe may have information regarding Traditional Cultural Properties or sensitive cultural sites in the area of the proposed project or the Tribe may currently use the proposed project areas for traditional cultural activities.

We encourage the Tulalip Indian Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact Frank Stipe at 425-482-7787 or at frank.stipe@tteci.com at your earliest convenience if you would like to discuss the matter further.

Sincerely,

Frank Stipe
Senior Technician

Appendix B

Historic Property Inventory Report

Submitted directly to the Washington DAHP through electronic database.

03

Historic Resources Assessment

NORTH KIRKLAND ASSESSMENT PREPARED BY
HISTORICAL RESEARCH ASSOCIATES, INC.

North Kirkland Community Center Cultural Resources Assessment, City of Kirkland, King County, Washington

Submitted to:
The City of Kirkland

Submitted by:
Historical Research Associates, Inc.
Jordan Pickrell, PhD, RPA
Chrisanne Beckner, MS
Heather Lee Miller, PhD
Jenny Dellert, MA

Seattle, Washington
August 2014

Historical Research Associates, Inc.

This report was prepared by HRA research archaeologists Jordan Pickrell, PhD, RPA, and Jenny Dellert, MA, who both meet the Secretary of the Interior's professional qualification standards for archaeology; Chrisanne Beckner, MS, who meets the Secretary of the Interior's professional qualification standards for architectural history; and Heather Lee Miller, PhD, who meets the Secretary of the Interior's professional qualification standards for history. This report is intended for the exclusive use of the Client and its representatives. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the project described in lieu of review by the appropriate reviewing or permitting agency. This plan should be submitted to the appropriate state and local review agencies for their comments prior to the commencement of the project.

Executive Summary

In June 2014, the City of Kirkland (the City) contracted with Historical Research Associates, Inc. (HRA), to complete an archaeological and historical literature review to determine the presence of known archaeological or historic properties near or within the boundaries of the new Kirkland Recreation & Aquatic Center Project (Project), King County, Washington. The proposed Project is located in Township 26 North, Range 5 East, Willamette Meridian, in the Kirkland quadrangle. Plans for the project include: demolition of an existing community center structure at 10221 NE 124th Street; development of a 75,000–90,000 square-foot multipurpose recreation and aquatic center facility with structured parking west of 103rd Avenue NE; and an additional parking area east of 103rd Avenue NE.

The Project is in the planning phase only, thus specific regulatory requirements have not been identified. If the Project receives federal funding, permits, or licenses and is defined as a federal undertaking, Section 106 of the National Historic Preservation Act applies. Washington State law may apply to the Project if federal compliance is not required. Such legislation includes, but is not limited to, the State Environmental Protection Act (SEPA), Governor's Executive Order 05-05, RCW 27.44 Indian Graves and Records, RCW 27.53 Archaeological Sites and Resource, and RCW 68.69 Abandoned and Historic Cemeteries and Historic Graves. Located in the City of Kirkland, the study area falls under the jurisdiction of the City's inter-local Agreement Relating to Designation and Protection of Historic Properties, as well as King County Ordinance 10474, K.C.C. 20.62.

HRA conducted an archaeological and historical literature review using the Department of Archaeology and Historic Preservation's (DAHP) online database (WISAARD), HRA's in-house library, the Seattle Public Library, and other sources to obtain data on the environmental, archaeological, and historical context of the general study area. HRA also conducted a site visit and documented historic-era architectural resources within one parcel of the project area.

HRA prepared a desktop analysis and in-depth background study of the property for this stage of the project; no formal archaeological fieldwork (e.g., systematic pedestrian transect or subsurface shovel probes) was conducted at this time. No previously recorded archaeological resources have been identified within the study area location. Due to the Project's location in an area with moderate to very high probability for cultural resources, HRA recommends pedestrian archaeological survey and subsurface shovel probing of the unpaved portions of the project area.

Eight buildings within the study area were found to meet age criteria for listing in either local, state, or national registers of historic places. A reconnaissance-level survey of historic-era properties found that none of the buildings within one parcel of the community center appear to be individually eligible for listing in the National Register of Historic Places, the Washington Heritage Register, or the King County Landmarks Register for their architectural character.

Table of Contents

List of Figures

List of Tables

1. Introduction and Project Description

Historical Research Associates, Inc. (HRA), was tasked by the City of Kirkland (City) with producing a cultural resources assessment providing precontact and historic-era contexts for the new Kirkland Recreation & Aquatic Center Project (Project), King County, Washington. The Project is located in Township 26 North, Range 5 East, Section 29, Willamette Meridian of the Kirkland quadrangle, within the limits of the City of Kirkland, in the North Juanita neighborhood (Figure 1-1).

The following report is based on a review of primary and secondary research sources and uses historic maps and aerials, along with contemporary photographs, to address the history of the project vicinity and the alteration that has occurred in the area over time. The report also seeks to assist the City in determining its regulatory requirements for the Project, should various funding or oversight mechanisms come into play (e.g., federal or state funding; local permitting, etc.), and to provide recommendations with regard to potential archaeological or historical resources that the Project might impact or affect.

1.1 Project Description

The City is proposing construction of a new Kirkland Recreation & Aquatic Center at the location of the current North Kirkland Community Center, 12421 103rd Avenue NE. The Project includes:

- Development of a 75,000–90,000 square foot multipurpose recreation and aquatic center facility with structured parking west of 103rd Avenue NE;
- Demolition of the existing community center structure (constructed in 1974);
- Construction of an additional parking area east of 103rd Avenue NE;[1] and
- Up to 7.1 acres of potential site disturbance.

HRA visited the property; documented buildings, structures, and objects forty years of age or older; and conducted research on the area's history using primary and secondary sources. The following cultural resources assessment focuses on land use during the precontact through historic periods.

[1] Linda Murphy, personal communication to Jordan Pickrell, June 26, 2014.

1.2 Study Area and Recommended Area of Effects and/or Area of Impacts

The study area includes the North Kirkland Community Center and Park, which comprises parcel numbers 2926059101, 2926059014, 2926059187, 2926059225, 2926059078, 7424110010, 7424110020, 7424110030, and 7424110040. All of these parcels are owned by the City.[2]

The study area is located within the city boundaries of Kirkland, and is bound by private property on the north, east, and west, and by NE 124th Street on the south. Entry to the park is gained through entrances on either side of 103rd Avenue NE. Pedestrian entrances are located on a grassy lawn facing NE 124th Street (Figure 1-2).

Should the Project move forward, HRA recommends that the Area of Potential Effects (APE), or Area of Impact (AI), be defined as the study area referenced above, comprising parcel numbers 2926059101, 2926059014, 2926059187, 2926059225, 2926059078, 7424110010, 7424110020, 7424110030, and 7424110040, as well as a one-parcel buffer in all directions to encompass indirect effects to architectural resources over 40 years of age (see Figures 1-1 and 1-2).

1.3 Applicable Regulations and Laws

As of this writing, there are no regulatory requirements for the Project—it is in the planning phase only. Several laws and regulations may apply as the work proceeds, however, depending upon the sources of funding and/or permits necessary for the project.

The National Historic Preservation Act of 1966 (NHPA) Section 106 and its accompanying regulations, 36CFR800, state that any federal or federally assisted project or any project requiring federal licensing or permitting that is defined as a federal undertaking must consider the project's effects on historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP). Historic properties are those listed in or eligible for listing in the NRHP and may include historic and prehistoric archaeological sites; districts, buildings, structures, objects, and landscapes; and cultural or traditional places or resources that have value to a community, such as an Indian tribal group (NHPA Section 101).

Historic properties compliance for the Project may also include Washington State and King County laws, regulations, and programs. State Environmental Policy Act (SEPA) regulations (WAC Chapter 197-11) require discussion of historic and cultural preservation in the Project Environmental Impact Statement, including resources of historic, archaeological, scientific, or cultural importance; resources that could be eligible for listing in national, state, or local preservation registers; and measures produced to reduce or control impacts on these resources.

[2] "Parcel Viewer 2.0," King County, 2013, http://gismaps.kingcounty.gov/parcelviewer2/

RCW Chapter 27.44, Indian Graves and Records, provides for the protection of Indian graves, making it a Class C felony to disturb such sites. RCW Chapter 27.53, Archaeological Sites and Resources, addresses the conservation, preservation, and protection of archaeological remains. This law prohibits disturbance of an archaeological site without a permit from the State Department of Archaeology and Historic Preservation (DAHP). The agency administers the Washington Heritage Register (WHR), which identifies and documents significant historic and prehistoric resources throughout Washington at the state level.

The City of Kirkland has entered into an interlocal agreement with King County under which the County Landmarks and Heritage Commission acts as municipal landmarks commission for the City, designating landmarks for it. Landmarks are buildings, structures, sites, districts, or objects that are formally designated because they meet certain criteria. King County's regulations provide for landmark designation and design review of properties that are 40 years or older and meet the County's criteria for listing.

1.4 Evaluation Criteria for Historic Properties

The criteria for listing properties in the NRHP require that a historic property be at least 50 years old; possess integrity of location, design, setting, materials, workmanship, feeling, and association; and meet at least one of the following criteria:

A. Property is associated with events that have made a significant contribution to the broad patterns of our history; or

B. Property is associated with the lives of persons significant in our past; or

C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction; or

D. Property has yielded, or is likely to yield information important in prehistory or history.

The criteria for listing properties in the WHR include[3]:

- A building, site, structure or object must be at least 50 years old. If newer, the resource should have documented exceptional significance.
- The resource should have a high to medium level of integrity, i.e. it should retain important character defining features from its historic period of construction.

[3] DAHP, *Washington Heritage Register* (Olympia, WA: Department of Archaeology and Historic Preservation, 2014), http://www.dahp.wa.gov/washington-heritage-register

- The resource should have documented historical significance at the local, state or federal level.

In order to be designated a King County landmark, a nominated building, site, structure, object, or district must:

- Be more than 40 years old;
- Possess integrity of location, design, setting, materials, workmanship, feeling, and

association; and,

- Meet at least one of the following criteria listed below:

    1. Be associated with events that have made a significant contribution to the broad patterns of national, state, or local history; or
    2. Be associated with the life of a person or persons significant in national, state, or local history; or
    3. Embody the distinctive characteristics of a type, period, style or method of design or construction, or represent a significant and distinguishable entity whose components may lack individual distinction; or
    4. Yield or be likely to yield information important in prehistory or history; or
    5. Be an outstanding work of a designer or builder who has made a substantial contribution to the art.

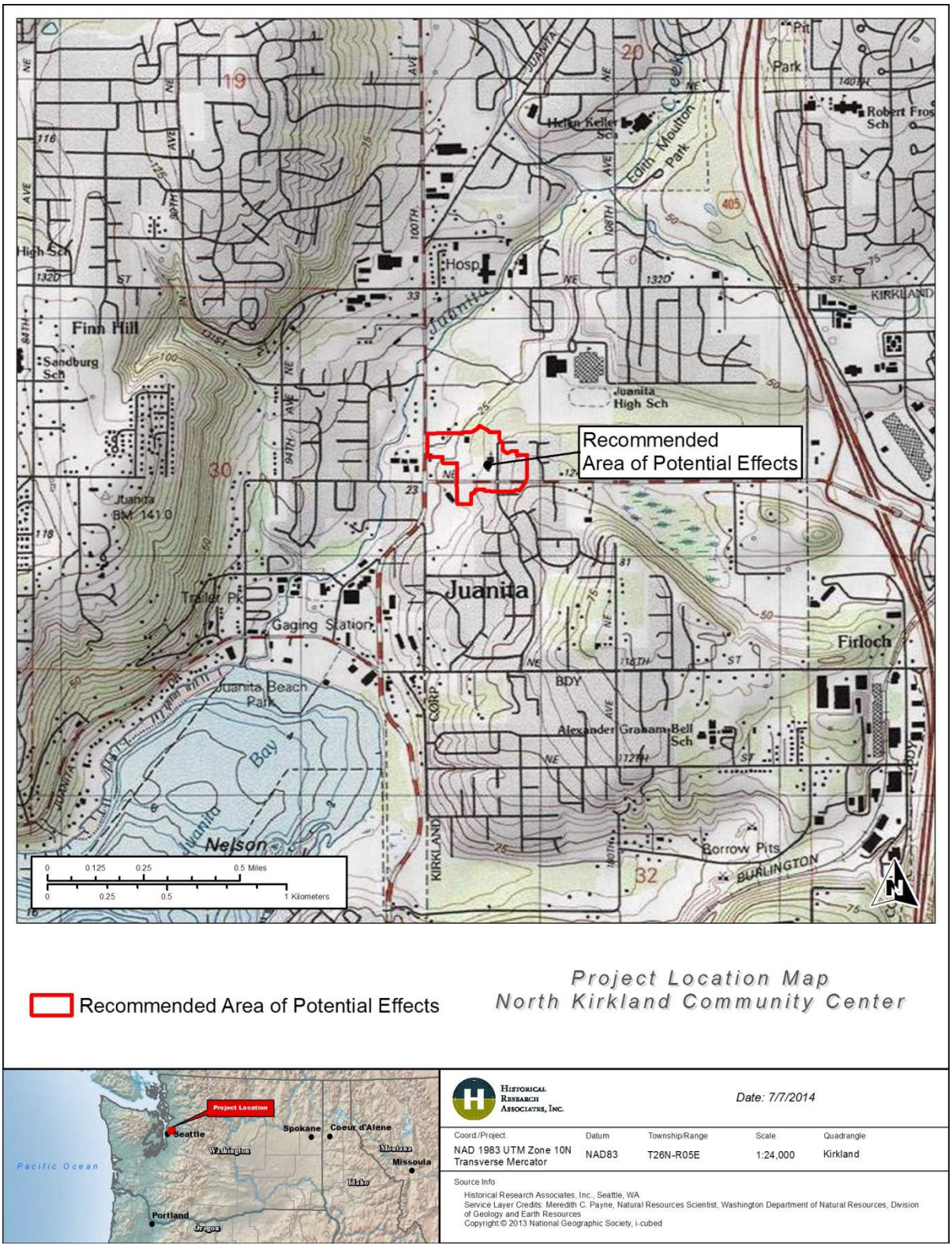


Figure 1-1. Recommended APE for the North Kirkland Community Center project.

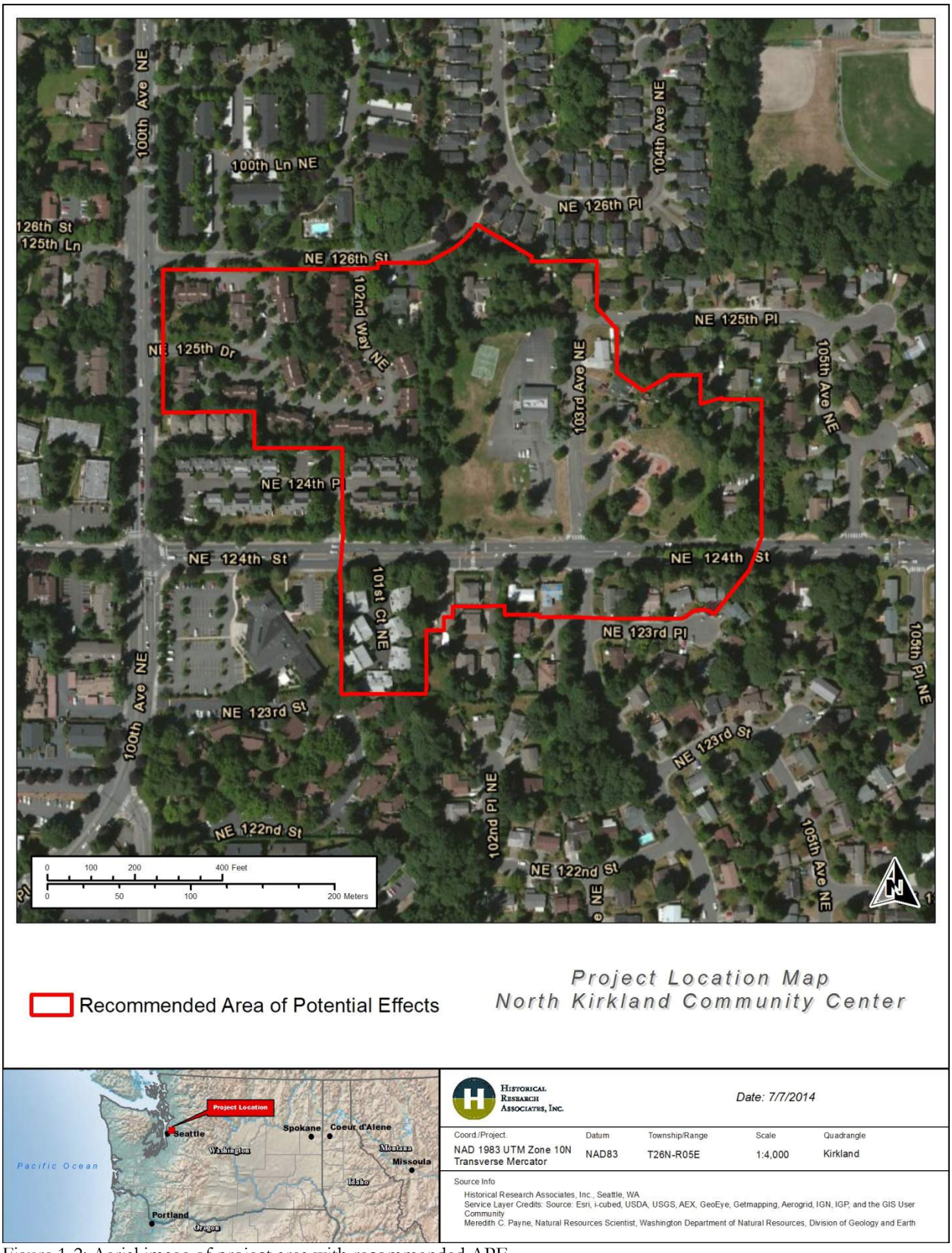


Figure 1-2: Aerial image of project area with recommended APE.

2. Archival Research

This chapter provides a review of archival data, including previous cultural resources surveys; documented archaeological sites; historic properties listed in or eligible for listing in the NRHP, WHR, or the King County Landmarks Register; and historic maps. Understanding previous cultural resource surveys and known cultural resources in the vicinity of a project is important for understanding how intensively work has been conducted in the area. This archival research is also necessary for developing expectations for identifying archaeological resources within the proposed APE, which are outlined in Section 5.

2.1 Research Methods and Materials Reviewed

HRA archaeologist Jordan Pickrell, PhD, RPA, conducted an archival record search for records pertaining to locations within 1 mile (mi) of the North Kirkland Community Center and Park. Pickrell searched DAHP's online database (WISAARD) for archaeological site records, cultural resource survey reports, historic property inventory forms (HPIs), historic register information, and cemetery records. HRA's in-house library, the Seattle Public Library, and online information were used to obtain data on the environmental, archaeological, and historical context of the general study area. Historic-period nineteenth-century maps from the US Surveyor General (USSG) General Land Office (GLO) and other historic maps and atlases were reviewed for the presence of structures, sites, and features that might be extant within the study area.

HRA architectural historian Chrisanne Beckner, MS, and HRA archaeologist Jenny Dellert, MA, researched the site's history and prepared a brief historic context for the site using primary and secondary sources.

2.2 Archival Research Results

2.2.1 Previous Cultural Resources Studies

A review of previous cultural resources studies provides an overview of information that has been gathered in the study area vicinity through previous archaeological or architectural research and fieldwork. The studies present data on environmental and cultural context, surface and subsurface investigations, and will indicate if archaeological sites or other resources have been identified within the vicinity of the park, or on a similar landform, in the past. The previous reports, along with the current archival research, help paint a broad picture of the surrounding landscape, how it was used in the past, and what precontact or historic-era resources one might expect to encounter within the

study area during future park projects. This type of background information may also provide material for interpretive signage and landscape design.

Twelve previous cultural resources studies have been conducted within 1 mi of the study area (Table 2-1). One cultural resource survey directly adjacent to the study area was conducted in advance of a street improvement project on NE 124th Street.[4] A second survey for a street improvement project on 100th Avenue NE was located approximately 0.23 mi west of the study area.[5] No cultural resources were identified during either study.

HRA conducted a cultural resource assessment of Edith Moulton Park, approximately 0.71 mi northeast of the study area in 2014. Investigators identified historic pathways/trails and an orchard which HRA recommended as eligible for the NRHP as a cultural landscape.[6]

Table 2-1. Cultural Resources Studies Conducted Within 1 Mi of the Study Area.

Reference	NADB#	Title	Distance from Study Area	Cultural Materials Identified
Robinson 1983a	1332031	*A Cultural Resources Survey of 116th Avenue NE from NE 124th Street to the Vicinity of the Metro Park and Ride Lot, and NE 124th Street between 100th Avenue NE and 116th Avenue NE*	Directly adjacent	None
Robinson 1983b	1330672	*An Archaeological Reconnaissance of 100th Avenue NE, NE 124th St. to NE 145th St., Juanita Vicinity, King County*	~0.23 mi W	None
Shaw and Hicks 2008	1352413	*Archaeological Resource Assessment for the 100th Ave. NE and 99th Place NE Sidewalks Improvement Project, City of Kirkland, King County, Washington*	~0.5 mi SW	None

[4] Joan M. Robinson, *A Cultural Resources Survey of 116th Avenue NE from NE 124th Street to the Vicinity of the Metro Park and Ride Lot, and NE 124th Street between 100th Avenue NE and 116th Avenue NE* (Eastern Washington University, Cheney. Conducted for the King County Department of Public Works, 1983a).

[5] Joan M. Robinson, *An Archaeological Reconnaissance of 100th Avenue NE, NE 124th St. to NE 145th St., Juanita Vicinity, King County* (Archaeological and Historical Services, Eastern Washington University, Cheney. Prepared for Washington State Department of Transportation, District 1, Mercer Island, 1983b).

[6] Chrisanne Beckner, Jenny Dellert, and Heather Lee Miller, *Edith Moulton Park Project, City of Kirkland, King County, Washington* (Historical Research Associates, Inc.., Seattle, WA. Submitted to Otak, Inc., 2014. On file with the City of Kirkland). Note that this report was for planning purposes only, was not submitted to DAHP, and did not receive any formal review or determinations of eligibility from any local, state, or federal agency.

Roedel et al. 2003	1342532	*Final Juanita Bay Pump Station and Force Mains Cultural Resources Overview and Assessment, King County, Washington*	~0.68 mi SW	None
Le Tourneau 2006	1348232	*Cultural Resources Monitoring of Microtunnel Access Shaft Excavations for King County's Juanita Bay Pump Station Replacement Project*	~0.68 mi SW	None
Robbins and Dugas 2000	1339845	*Proposed Sound Transit Regional Express Totem Lake Project Cultural Resource Assessment*	~0.68 mi E	None
Bundy 2009	1353740	*Interstate 405 Corridor Survey: Phase III I-405, SR 520 to I-5 Improvement Project*	~0.71 mi E	None
WSDOT 2005	1344441	*Historic, Cultural, and Archaeological Resources Discipline Report and Supplemental Analysis*	~0.71 mi E	Modern debris
Stallings 1994	1334043	*Edith Moulton Park Channel Stabilization Project, Archaeological and Cultural Resources Review (BOAS No. 9308 12)*	~0.71 mi NE	None
Beckner et al. 2014	NA	*Edith Moulton Park Project, City of Kirkland, King County, Washington*	~0.71 mi NE	Historic pathways/ trails and an historic orchard within the park
Thompson 1978	1330707	*Cultural Resources Assessment of Department of Transportation Park and Ride Lot at 132nd Street and 116th Street, Near Kirkland, Washington*	~0.75 mi NE	None
Sheridan 2001	168705	*Historic Residential Properties in Kirkland, Washington DRAFT National Register Nomination*	May encompass	Approximately 70 pre-war residential buildings and "a considerable number" of buildings constructed between 1940 and 1963

The nine remaining cultural resources studies, all between ½ and ¾ mi from the study area, documented no cultural resources. One survey was conducted in advance of sidewalk installation at 100th Avenue NE and 99th Place NE.[7] Two cultural resource studies document background research

[7] Derek Shaw and Brent Hicks, *Archaeological Resource Assessment for the 100th Ave. NE and 99th Place NE Sidewalks Improvement Project, City of Kirkland, King County, Washington* (Historical Research Associates, Inc., Seattle, WA. Submitted to SvR Design Company, Seattle, WA, 2008).

for and results of archaeological monitoring of construction at the Juanita Bay Pump Station.[8] One survey, conducted in advance of a proposed Sound Transit Regional Express Project in Totem Lake, identified no cultural resources.[9] Two studies related to improvements along I-405 were conducted. One of these studies recorded the presence of modern debris.[10] Another transportation related study at the site of the Park and Ride Lot at 132nd Street and 116th Street, located approximately 0.75 mi northeast of the study area, documented no cultural resources.[11] BOAS, Inc., conducted an archaeological survey along the Juanita Creek in Edith Moulton Park, approximately 0.71 mi northeast of the study area. They documented no cultural resources.[12] The Sheridan Consulting Group submitted a draft of a Multiple Property Documentation Form for historic residential properties in Kirkland, Washington, to DAHP. This document provides a context for the neighborhood.[13]

2.2.2 Previously Recorded Cultural Resources

No previously recorded archaeological sites are located within one mile of the study area. The Gerturde Wiley Homesite (45KI741) was identified approximately 2.9 mi southeast of the study area. Site 45KI741 consists of an historic-era debris scatter with architectural remains (a wood-lined pumphouse and galvanized steel pipes). Most of the artifacts at the site date from the 1920s to the 1950s.[14]

2.2.3 Ethnographic Period Native American Place-Names and Potential Ethnographic Period Sites

[8] Philippe D. Le Tourneau, *Cultural Resources Monitoring of Microtunnel Access Shaft Excavations for King County's Juanita Bay Pump Station Replacement Project* (Letter Report to Wes Sprague, King County Department of Natural Resources and Parks, Wastewater Treatment Division, Seattle, WA, from BOAS, Inc., Seattle, WA. August 8, 2006); and Kurt W. Roedel, Leonard A. Forsman, Dennis E. Lewarch, and Lynn L. Larson, *Final Juanita Bay Pump Station and Force Mains Cultural Resources Overview and Assessment, King County, Washington* (Larson Anthropological Services Limited, Gig Harbor, WA. Submitted to King County Department of Natural Resources and Parks, Wastewater Treatment Division, Seattle, WA, 2003).

[9] Jeffrey R. Robbins and Amy E. Dugas, *Proposed Sound Transit Regional Express Totem Lake Project Cultural Resource Assessment* (Letter Report to Lloyd Skinner, Adolfson Associates, Incorporated, Seattle, WA, from Compliance Archaeology L.L.C., Seattle, WA. March 8, 2000).

[10] Washington State Department of Transportation (WSDOT), *Historic, Cultural, and Archaeological Resources Discipline Report and Supplemental Analysis, Appendix M* (Prepared by the Washington State Department of Transportation, Olympia, 2005); and Barbara E. Bundy, *Interstate 405 Corridor Survey: Phase III, I-405, SR 520 to I-5 Improvement Project* (Anchor QEA, LLC. Prepared for Washington State Department of Transportation, Seattle, WA, 2009).

[11] Gail Thompson, *Cultural Resources Assessment of Department of Transportation Park and Ride Lot at 132nd Street and 116th Street, near Kirkland, Washington* (Letter report to R.D. Howard, Washington State Department of Transportation, Issaquah, from the University of Washington, Seattle, 1978).

[12] Rachel J. Stallings, *Edith Moulton Park Channel Stabilization Project, Archaeological and Cultural Resources Review* (Letter report to Tricia Juhnke, Surface Water Management Division, from BOAS, Inc., Seattle, WA. July 29, 1994).

[13] Mimi Sheridan, *Historic Residential Properties in Kirkland, Washington DRAFT National Register Nomination* (Sheridan Consulting Group. Prepared for the King County Landmarks Program, Seattle, WA, 2001).

[14] Mike Fallon, *I-405 Northbound MP 19.6 (45KI741) State of Washington Archaeological Site Inventory Form* (AMEC Earth and Environmental, Kirkland, WA, 2006).

Two ethnographic place names have been documented in the study area vicinity. The creek at Juanita was called t¢b(¿)tubiù (Lushootseed orthography), meaning "red marked land/people" or "loamy place."[15] Nelson Point was called Leqa'bt (Waterman orthography), meaning "something gathered or scooped up with the fingers." This referred to the rust colored soil (probably ochre) that was collected at the cliff and baked beneath a fire. The reddest portions were used as face paint.[16]

2.2.4 Cemeteries

No cemeteries were identified within 1 mi of the study area. The closest cemetery, the Chapel of the Resurrection Mausoleum (45KI858), is situated approximately 2.28 mi north of the study area. The Cedar Park Assembly of God owns this cemetery.[17] Saint Edwards Seminary graveyard (45KI634) was located approximately 2.7 mi east of the study area. The first known burial occurred in 1932. All of the burials at the Saint Edwards Seminary graveyard were removed in 1977.[18]

2.2.5 Historic-Period Buildings, Structures, and Objects

No previously recorded buildings, structures, or objects were identified within ½ mile of the study area that have been listed or determined eligible for listing in the Kirkland City or King County Landmarks lists, WHR, or NRHP.[19] Two residential buildings were recorded in the WISAARD database. However, neither has yet been assessed for eligibility to local, state, or national registers of historic places.

2.2.6 Map and Land Patent Research

[15] Vi Hilbert, Jay Miller, and Zalmai Zahir, *Puget Sound Geography: Original Manuscript from T. T. Waterman* (Seattle, WA: Lushootseed Press, 2001), 82–89.

[16] Hilbert, Miller, and Zahir, *Puget Sound Geography*, 82–89.

[17] DAHP, *Cemetery Detail Report–Chapel of the Resurrection Mausoleum* (Olympia, WA: DAHP, n.d.a.).

[18] DAHP, *Cemetery Detail Report–Saint Edwards Seminary Graveyard [Removed]* (Olympia, WA: DAHP, n.d.b.).

[19] King County Historic Preservation Program, *Technical Paper No. 6: King County and City Landmarks List* (revised August 2012).

Table 2-2. Features Documented on Atlases and Maps over Time Near or within the Study Area.

TRS Location	Reference	Description
T26N R5E S29	USSG 1871	Within study area: none In the vicinity: Hubbard homestead on north end of Lake Washington.
	Anderson 1907	Within study area: parcels owned by J. S. Emery In the vicinity: parcels owned by C. B. Harris, Margt Harris, Martha A Voris, J. A. Osterberg, Etta Fulton, Kirkland Land & I. Co, Martha Hartman, Marie Jostan, Olga Domu, G. T. Maekler & E Wilcox; roads.
	Kroll 1912	Within study area: parcels owned by Josephine S. Emory. In the vicinity: parcels owned by Mrs Marit Josten, C. B. Harris, Marguerite Harris, J. A. Ostergerg, G. A. Voris, Borke & Farrer, Juanita Land Co., Sophie Heffner & Ed Willcox; roads.
	Kroll 1926	Within study area: parcels owned by Jos. S. Emory In the vicinity: parcels owned by J. Wheeler, G. A. Abbe, J. G. Yeoman, City of Seattle, Anna J. Wright, H. G. Wilcox et al., C. B. Harris, Dom Wagner, M. H. Thompson, M. Harris, J. A. Osterberg, M. E. Voris, E. Voris, Wm. Kiesler, Emanuel Jenkins, Wm. Fox, H. M. Dickerman; roads.
	Metsker 1936	Within study area: parcels once owned by Jos. S. Emory now owned by West & Wheeler's Unrec. Subd. In the vicinity: parcels owned by City of Seattle, L. Robinson, H. G. Wilcox, Lexington Rlty Co., H. G. Dickerman, Wm. Kiesler, E. Jenkins, Martha E. Voris, Ed Voris, Marg. H. Thompson, R. V. Welty; roads.
	Thomas Bros. 1955	In the vicinity: local roads.

County Atlases and Maps

Twentieth-century maps and atlases for King County were reviewed for features within the study area and surrounding vicinity (see Table 2-2). During the first quarter of the twentieth century, the land on which the current park sits was owned by Josephine S. Emory.[20] Sometime between 1926 and 1936, the land became part of West & Wheeler's Unrecorded Subdivision.[21]

[20] Anderson Map Company, Atlas of King County, Washington, 1907; Kroll Map Co., *Kroll's Atlas of King County*, 1912; and Kroll Map Co., *Kroll's Atlas of King County*, 1926, all retrieved from http://www.historicmapworks.com/, but available in original form at various repositories in Western Washington, including University of Washington and Seattle Public Library.

[21] Chas. F. Metsker, *King County 1936,* 1936, http://www.historicmapworks.com/.

General Land Office Plats

One available historic nineteenth-century plat compiled by the USSG, GLO, was reviewed for evidence of historic-period activities including property ownership, structures, and buildings.[22] The 1871 map indicates that there were no features located in the study area at that time, but depicts one homestead (Hubbard) nearby, on the north shoreline of Lake Washington.

GLO Land Patents

One land patent encompassed the study area. The Hiram Langdon homestead (Land Patent WASAA 068976) was filed on March 14, 1887.[23] Langdon owned 160 acres in the S ½ of the N ½ of Section 29, which encompasses the boundaries of the study area. To the north of the Langdon homestead was the Annie H. Josten homestead (Land Patent WAOAA 069085), which was filed on September 6, 1889. Josten owned 160 acres in the N ½ of the N ½ of Section 29.[24] To the south of the Hiram Langdon homestead was the Rowland Langdon homestead (Land Patent WAOAA 68991), which was filed on July 19, 1889. Rowland Langdon owned 160 acres in the SE ¼ of Section 29.[25] Another homestead to the south of the Hiram Langdon homestead was the Bernard Crossen homestead (Land Patent WAOAA 068873), which was filed on March 10, 1873. Crossen owned 160 acres in the E ½ of the SW ¼ of Section 29 and the N ½ NW ¼ of Section 32.[26]

2.2.7 Aerial Photographs

Twentieth-century aerial photographs of the project vicinity show a progression of development. The earliest aerials, from 1936 and 1968, show a forested area in this location.[27] By 1968, some clearing had taken place.[28] The aerial photograph taken in 1980 shows the current North Kirkland

[22] United States Surveyor General, General Land Office Plat, Township 26 North, Range 5 East, Willamette Meridian (Olympia, WA: Washington State Department of Natural Resources, 1871), http://www.blm.gov/or/landrecords/survey/ySrvy1.php.

[23] General Land Office, "Land Patent Record-Hiram Langdon. BLM Serial Nr. WASAA 068976," Bureau of Land Management, General Land Office Records, March 14, 1887, http://www.glorecords.blm.gov/details/patent/default.aspx?accession=WAOAA 068976&docClass=SER&sid=o1dfkxym.ixx.

[24] General Land Office, "Land Patent Record-Annie H. Josten. BLM Serial Nr. WAOAA 069085," Bureau of Land Management, General Land Office Records, September 6, 1889, http://www.glorecords.blm.gov/details/patent/default.aspx?accession=WAOAA 069085&docClass=SER&sid=g5ccihjm.dkw.

[25] General Land Office, "Land Patent Record-Rowland Langdon. BLM Serial Nr. WAOAA 068991," Bureau of Land Management, General Land Office Records, July 19, 1889, http://www.glorecords.blm.gov/details/patent/default.aspx?accession=WAOAA 068991&docClass=SER&sid=g5ccihjm.dkw

[26] General Land Office, "Land Patent Record-Bernard Crossen. BLM Serial Nr. WAOAA 068873," Bureau of Land Management, General Land Office Records, March 10, 1873, http://www.glorecords.blm.gov/details/patent/default.aspx?accession=WAOAA 068873&docClass=SER&sid=g5ccihjm.dkw

[27] NETR Online, *Historic Aerial for Kirkland, Washington area*, 1936, http://www.historicaerials.com.

[28] NETR Online, *Historic Aerial for Kirkland, Washington area*, 1968, http://www.historicaerials.com.

Community Center building (constructed in 1974).[29] By 1998, the footprint of the playground located in the east side of the study area appears along with a parking lot south of the North Kirkland Community Center building.[30]

2.2.8 DAHP Predictive Model

The DAHP predictive model for archaeological sites is based on statewide information, using large-scale factors. Information on geology, soils, site types, landforms, and from GLO maps was used to establish or predict probabilities for archaeological resources throughout the state. The DAHP model uses five categories of prediction: Low Risk, Moderately Low Risk, Moderate Risk, High Risk, and Very High Risk. The DAHP predictive model map indicated that the study area is in a Moderate to Very High Risk probability area.

[29] NETR Online, *Historic Aerial for Kirkland, Washington area*, 1980, http://www.historicaerials.com.

[30] NETR Online, *Historic Aerial for Kirkland, Washington area*, 1998, http://www.historicaerials.com.

3. Environmental Context

Environmental variables such as geology, climate, topography, fauna, and flora affect the way humans use the landscape. The information below presents the resources that would have been available to precontact- and ethnographic-period groups inhabiting, seasonally frequenting, and traversing through the study area and surrounding vicinity.

3.1 Topography and Geology

The study area is situated within the Puget Sound Basin, a subset of the Puget Trough Physiographic Region.[31] The Puget Trough extends from the Canadian border on the north to the Willamette Valley in Oregon to the south.[32]

The Cordilleran ice cap advanced and retreated several time over the Puget Trough and Strait of Juan de Fuca during the Pleistocene epoch, carving out the landscape.[33] The ice cap split into two separate sections, the Puget Lobe in the Puget Sound area and the Juan de Fuca Lobe, which reached the western boundary of the continental shelf off the Strait of Juan de Fuca.[34]

Approximately 18,750 calibrated years ago (cal yr BP), glacial ice covered the northern portion of Puget Sound.[35] During the Vashon Stade of the Fraser Glaciation (last advance of the Cordilleran ice

[31] Jerry F. Franklin and C. T. Dyrness, *Natural Vegetation of Oregon and Washington* (n.p.: USDA Forest Service, General Technical Report PNW-8, 1973), 6.

[32] Franklin and Dyrness, *Natural Vegetation*, 6; and Jim Pojar and Andy Mackinnon, *Revised-Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia, and Alaska* (Vancouver, BC: Ministry of Forests and Lone Pine Publishing, 2004).

[33] Cathy W. Barnosky, Patricia M. Anderson, and Patrick J. Bartlein, "The Northwestern U.S. during Deglaciation: Vegetation History and Paleoclimatic Implication," in *North America and Adjacent Oceans during the Last Deglaciation*, Vol. K-3, ed. W. F. Ruddiman and H. E. Wright, Jr. (Boulder, CO: Geological Society of America, 1987), 289; Don J. Easterbrook, "Advance and Retreat of Cordilleran Ice Sheets in Washington, U.S.A," *Geographie physique et Quaternaire* 46, no. 1 (1992): 57; E. C. Pielou, *After the Ice Age: The Return of Life to Glaciated North America* (Chicago, IL: University of Chicago Press, 1991); Stephen C. Porter and Terry W. Swanson, "Radiocarbon Age Constraints on Rates of Advance and Retreat of the Puget Lobe of the Cordilleran Ice Sheet during the Last Glaciation," *Quaternary Research* 50 (1998); Robert M. Thorson, "Glacio-isostatic Response of the Puget Sound Area, Washington," *Geological Society of America Bulletin* 1 (1989): 1163; and Cathy Whitlock, "Vegetational and Climatic History of the Pacific Northwest during the last 20,000 Years: Implications for Understanding Present-Day Biodiversity," *Northwest Environmental Journal* 8 (1992): 9.

[34] Cathy W. Barnosky, "Pleistocene and Early Holocene Environmental History of Southwestern Washington State, U.S.A.," *Canadian Journal of Earth Sciences* 21, no. 6 (1983): 624; Linda B. Brubaker, "Climate Change and the Origin of Old-Growth Douglas-Fir Forests in the Puget Sound Lowland," in *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*, ed. Leonard F. Ruggiero, Keith B. Aubry, Andrew B. Carey, and Mark F. Huff (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-286, 1991), 19; and Thorson, "Glacio-isostatic Response," 1163.

[35] Porter and Swanson, "Radiocarbon Age Constraints," 207, 212.

cap), the Puget Lobe measured approximately 60 miles wide with an elevation of approximately 4,000 feet.[36]

Topography of the Puget Sound Basin was carved by glacial ice, which also changed stream flows by blocking them during advances. A shift in drainage patterns to the south and west was the result of the blockage. The glacial ice dammed mountain valleys, causing lakes to form.[37] As the ice retreated, meltwater flooded areas and deposited till and outwash sediments over deeply eroded bedrock.[38]

North-south trending ridges and drainages were formed by carving from the glacial ice and the catastrophic meltwater floods.[39] As the ice retreated, isostatic rebound occurred. The land that had been depressed by the weight of the ice extended upward, or rebounded, to achieve the preglacial elevation and equilibrium. Subsequently, the uplift caused north-south tilt of the shorelines in Puget Sound.[40] Moderately rolling hills interspersed with inlets, lakes, and rivers make up the landscape at present.

In 1859, the USSG surveyor recorded a hilly landscape with swampy lowlands and third-rate soil quality.[41] Soils mapped in the study area are predominantly glacial soils of the Ragnar-Indianola association, sloping, with a minimal Kitsap silt loam presence. This combination of soils tends to support timber (see below).[42]

3.2 Climate and Vegetation

Over the past 20,000 years, variations in the climate have affected the landscape and vegetation on both a continental and regional scale. The Laurentide ice sheet covered most of North America, which cooled the climate and bifurcated the jet stream.[43] The split in the jet stream diverted most of the moisture from the Pacific Northwest during the high point of the glaciations, which in turn displaced winter storms trends. The cold, arid conditions in the Northwest were amplified by the circulation patterns at the southern boundary of the ice. This created strong easterly winds.[44] Later

[36] Franklin and Dyrness, *Natural Vegetation*, 16–17; and Thorson, "Glacio-isostatic Response," 1165.

[37] Barnosky, "Pleistocene and Early Holocene Environmental History," 625.

[38] Easterbrook, "Advance and Retreat," 57; and Thorson, "Glacio-isostatic Response," 1166.

[39] Porter and Swanson, "Radiocarbon Age Constraints."

[40] Easterbrook, "Advance and Retreat," 57; and Thorson, "Glacio-isostatic Response," 1166.

[41] USSG, *Field Notes for the Survey of Township 26N, Range 5 East, Willamette Meridian,* 1859 (WA R0013). http://www.blm.gov/or/landrecords/survey/yNoteView1_2.php?R0013WA0383003840

[42] Soil Survey Staff, Web Soil Survey, 2014, Natural Resources Conservation Science, United States Department of Agriculture,.http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx; and Dale E. Snyder, Philip S. Gale, and Russell F. Pringle*, Soil Survey of King County Area, Washington* (Washington DC: USDA Soil Conservation Service, 1973).

[43] A. J. Broccoli and S. Manabe, "The Effects of the Laurentide Ice Sheet on North American Climate during the Last Glacial Maximum," *Geographie physique et Quaternaire* XLI, no. 2 (1987): 294; and Easterbrook, "Advance and Retreat," 52.

[44] Broccoli and Manabe, "Effects of the Laurentide Ice Sheet," 291, 294; and Whitlock, "Vegetation and Climatic History," 10.

the land masses warmed, sea levels rose, and moisture was redistributed as the continental glaciers melted and retreated.[45] The vegetation patterns were affected by the climatic conditions and shifts according to paleoecological samples.[46]

Retreat of the glacial ice on a regional scale allowed for marine waters in the Strait of Juan de Fuca to enter Puget Sound during backwasting events. Glaciomarine drift sediments were subsequently deposited, causing a domino effect for regional climate and vegetation patterns.[47] The climate was colder between 20,000 and 16,000 years ago than what we experience today. Tundra and subalpine species migrated to lower elevations.[48] Grass, sedge (*Cyperaceae*), artemisia, and tundra herbs were dominant species in the Puget Trough area during this time.[49]

The climate shifted again between 12,000 and 7,000 years ago, becoming warmer and drier. Cooler, moister conditions occurred approximately 6,000 to 5,000 years ago during another fluctuation. A closed-canopy forest emerged from the previous mosaic-forest parkland vegetation scenario. Today, the typical Northwest climate consists of cool summers and mild, wet winters with westerly prevailing winds that carry moisture from the Pacific Ocean.[50] Glacial soils in the region are currently covered with conifer forest, dominated by the *Tsuga heterophylla* (western hemlock) vegetation zone with a wet, mild maritime climate.[51] Variations occur within the microclimates depending on elevation, latitude, and relative location to mountain ranges.[52]

Pseudotsuga menziesii (Douglas fir), *Tsuga heterophylla* (western hemlock), and *Thuja* plicata (western redcedar) are the dominant species in this zone.[53] *Abies grandis* (grand fir), *Picea sitchensis* (Sitka spruce), and *Pinus monticola* (western white pine) are less common but present.[54] Red alder (*Alnus rubra*) and big-leaf maple (*Acer macrophyllum*) are secondary species.[55] In 1870, the USSG surveyor

[45] W. F. Ruddiman and H. E. Wright, Jr., "North American and Adjacent Oceans during the Last Deglaciation," *Geological Society of America* (Boulder, CO: n.p., 1987).

[46] Whitlock, "Vegetation and Climatic History."

[47] Easterbrook, "Advance and Retreat," 57; and Whitlock, "Vegetational and Climatic History," 5.

[48] Whitlock, "Vegetational and Climatic History," 12.

[49] Cathy W. Barnosky, "A Record of Late Quaternary Vegetation from Davis Lake, Southern Puget Lowland," *Quaternary Research* 16 (1981); and Cathy W. Barnosky, "Late Quaternary Vegetation near Battle Ground Lake, Southern Puget Trough, Washington," *Geological Society of America Bulletin* 96 (1985).

[50] Wayne Suttles, "Environment," in *Handbook of North American Indians*, ed. William C. Sturtevant, vol. 7, *Northwest Coast*, ed. Wayne Suttles (Washington, DC: Smithsonian Institution, 1990), 17.

[51] Franklin and Dyrness, *Natural Vegetation*, 17.

[52] Franklin and Dyrness, *Natural Vegetation*, 70–71.

[53] Pojar and Mackinnon, *Revised-Plants of the Pacific Northwest Coast*, 30–42.

[54] Barnosky, Anderson, and Bartlein, "Northwestern U.S. during Deglaciation"; Brubaker, "Climate Change": Franklin and Dyrness, *Natural Vegetation*, 72; and Whitlock, "Vegetational and Climatic History."

[55] Franklin and Dyrness, *Natural Vegetation*.

also recorded wild cabbage, wild parsnips, fern, and salmonberry as a sampling of plants located in the project vicinity.[56]

3.3 Fauna

During precontact and ethnographic times, fauna was abundant in the study area. Deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), black bear (*Ursus americanus*), mountain lion (i.e., cougar, *Felis concolor*), and coyote (*Canis latrans*) would have been available for hunting in upland areas. Smaller mammals included red fox (*Vulpes vulpes*), snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*), and weasel (*Mustela frenata*).[57] In addition to terrestrial mammals, all five species of salmon, freshwater fish (such as trout [*Oncorhynchus* sp.], whitefish [*Coregonus* sp.], and eels [*Anguillidae* sp.]), otter (*Lutra candensis*), muskrat (*Ondatra zibethica*), beaver (*Castor canadensis*), and waterfowl (*Aix* and *Anas* sp.) would have been part of the subsistence pattern.[58] Shellfish was also a dietary staple for Southern Coast Salish groups. Commonly used shellfish species include butter clam (*Saxidomus giganteus*), native littleneck clam (*Protothaca staminea*), native oyster *(Ostrea lurida),* geoduck (*Panopea generosa*), thin-shelled clam (*Protothaca tenerrima*), razor clam (*Siliqua patula*), horse clam (*Tresus* sp.), basket cockle (*Clinocardium nuttallii*), barnacle (*Balanus* sp.), and bay mussel (*Mytilus edulis*).[59]

[56] USSG, *Field Notes of the Survey of the Subdivisional Lines and Meanderings of Lake Washington in Township No 26 E R. No 5 E Will Mer,* 1870, http://www.blm.gov/or/landrecords/survey/yNoteView1_2.php?R0007WA0547005500

[57] Arthur R. Kruckeberg, *The Natural History of Puget Sound Country* (Seattle: University of Washington Press, 1991); and Earl J. Larrison, *Mammals of the Northwest: Washington, Oregon, Idaho, and British Columbia* (Seattle, WA: Seattle Audubon Society, 1967).

[58] Kruckeberg, *Natural History*; Larrison, *Mammals of the Northwest*; and Wayne Suttles and Barbara Lane, "Southern Coast Salish," in *Handbook of North American Indians*, ed. William C. Sturtevant, vol. 7, *Northwest Coast*, ed. Wayne Suttles (Washington, DC: Smithsonian Institution, 1990).

[59] William R. Belcher, "Shellfish Utilization among the Puget Salish" (master's thesis, Western Washington University, 1985), 47, 57–58; and Suttles, "Environment," 28.

4. Cultural Context

4.1 Precontact Background

Human occupation of the Pacific Northwest could have occurred as early as 14,000 years ago, after the retreat of the Vashon Stade of the Fraser Glaciation, the last glacial episode. Although sparse, evidence of the earliest sites includes low-density lithic scatters, indicative of campsite or foraging locations. Organic materials such as bone, antler, and shell tend to decompose in the highly acidic soils of Puget Sound, but lithic artifacts are better preserved.[60] This provides a minimal archaeological record for early sites making re-creation of human land-use patterns over time difficult. However, multiple cultural chronologies for the region have been formulated. Ames and Maschner have compiled the most comprehensive chronology.[61]

The latest radiocarbon information for the region comes from the Manis Mastodon Site (45CA218) located in Sequim on the Olympic Peninsula. DNA analysis indicates that humans were in the area approximately 13,800 years ago, and is one of the oldest sites in North America. A bone point fragment was identified in faunal remains, a unique occurrence in early sites.[62]

According to Ames and Maschner, cultural changes are based on advances in technology and increased sedentism.[63] Their chronology is divided into five periods: Paleo-Indian, Archaic, Early Pacific, Middle Pacific, and Late Pacific. Early peoples traveled in small, nomadic groups, relying on a generalized hunter-fisher-gatherer subsistence strategy. Innovations in patterns over time demonstrate that the rise of semi-permanent and permanent villages were commensurate with the change to a seasonal round subsistence strategy. The seasonal round focused on specialized resources, especially riverine and marine materials. A summary of the chronological sequence is provided in Table 4-1.

[60] Charles M. Nelson, "Prehistory of the Puget Sound Region," in *Handbook of North American Indians*, ed. William C. Sturtevant, vol. 7, *Northwest Coast*, ed. Wayne Suttles (Washington, DC: Smithsonian Institution, 1990), 481.

[61] K. M. Ames and H. D. G. Maschner, *Peoples of the Northwest Coast, Their Archaeology and Prehistory* (London, England: Thames and Hudson Ltd., 1999).

[62] Michael R. Waters, Thomas W. Stafford, Jr., H. Gregory McDonald, Carl Gustafson, Morten Rasmussen, Enrico Cappellini, Jesper V. Olsen, Damian Szklarczyk, Lars Juhl Jensen, M. Thomas P. Gilbert, and Eske Willerslev, "Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington," *Science* 334 (October 2011): 351.

[63] Ames and Maschner, *Peoples of the Northwest Coast*, 57–112.

Table 4-1. Model of Precontact Change in the Puget Basin (after Ames and Maschner 1999:66 and Waters et al. 2011).

Dates	Period	Land Use	Settlement	Subsistence	Technology
~13,800 B.C.–10,500 B.C.	Paleo-Indian	Generalized marine, littoral, and/or terrestrial	Short-term use pit houses and shelters	Generalized marine, littoral, and/or terrestrial	Stone; bone, antler, and perishable materials likely
10,500 B.C.–4400 B.C.	Archaic	Generalized littoral, neritic, and terrestrial	Short-term use pit houses and shelters	Generalized littoral, neritic, and terrestrial	Stone; some bone and antler; other perishable materials likely
4400 B.C.–1800 B.C.	Early Pacific	Littoral, neritic, and terrestrial	Increased sedentism in seasonal villages	Increased focus on littoral resources and expanded use of neritic resources	Increase in ground stone, bone, antler, and perishable materials
1800 B.C.–A.D. 200/500	Middle Pacific	Neritic, littoral, and terrestrial	Winter villages of plank houses and seasonal camps	Increased focus on marine and riverine resources. Food storage technologies developed	A decrease in stone and diversification of tools and tackle of bone, antler, and perishable materials
A.D. 200/500–A.D. 1775	Late Pacific	Neritic, littoral, and terrestrial	Large permanent villages and special use sites	Specialized marine, riverine, littoral, and terrestrial resource use and management. Extensive food storage	Tools and tackle of bone, antler, and perishable materials; very little stone

4.1.1 Paleo-Indian (~13,800 B.C.–10,500 B.C.)

The Paleo-Indian period is characterized as the earliest phase of human occupation, with sparse lithic scatters. The sites are thought to represent small, highly mobile groups, with a general foraging subsistence pattern.[64] An early diagnostic tool assemblage in North America is the Clovis tradition.[65] Clovis tools have typically been identified in areas south of the glacial ice, but are relatively rare in the Pacific Northwest. The Richey-Roberts site near Wenatchee was an exceptional find, as it contained a cache of Clovis tools; this is unusual as Clovis tools are typically found in the Pacific Northwest as isolates.[66] Diagnostic features of the Clovis tradition include large, lanceolate implements, usually used as projectile points. The Clovis toolkit also includes bone shafts, bone

[64] Ames and Maschner, *Peoples of the Northwest Coast*, 24.

[65] Ames and Maschner, *Peoples of the Northwest Coast*, 65.

[66] Ames and Maschner, *Peoples of the Northwest Coast*, 66.

points with beveled bases, blades, blade cores, scrapers, retouched flakes, and hammerstones.[67] Basalt cobble choppers and flaked scrapers are other tools representative of the Paleo-Indian phase.

4.1.2 Archaic (10,500 B.C.–4400 B.C.)

During the Archaic period, the environment was extremely dynamic. The weight of the ice cap pushed the landscape into earth's mantle during the proglacial episodes, called isostatic depression. Isostatic rebound, the upward movement of earth's crust in order to achieve equilibrium, occurred following the recession of the ice sheets when the pressure or depression on landscape relaxed allowing the land to rise.[68] Isostatic rebound altered sea levels.[69] The rise in sea levels submerged areas that were formerly coastal lowlands, and other locations were uplifted by the isostatic rebound and tectonic activity. These factors also caused shifts in vegetation patterns.[70] Environmental changes would have affected the way humans used and adapted to the landscape.

Robust lithic tools continued to be used during the Archaic period, the Olcott toolkit being a diagnostic example. The Olcott tradition is represented by leaf-shaped projectile points and cobble tools. Bone and antler implements have also been documented for sites in this period. Olcott assemblages are typically found on terraces overlooking rivers, primarily within the Snohomish River basin.[71]

Semi-subterranean pithouses are first seen during the Archaic. This suggests settlement pattern changes and a rise in sedentism.[72] Use of resources in microclimates helped spur the development of the seasonal round. A complex hunter-gather society emerged out of the earlier foraging subsistence strategy used by Paleo-Indian groups.[73]

4.1.3 Pacific (4400 B.C.–A.D. 1775)

The Pacific period is divided into three phases-Early, Middle, and Late.[74] The Pacific period extends from the end of the Archaic to the beginning of the ethnographic period, when native populations were first introduced to European influences, such as the smallpox epidemic of 1775.

---

[67] Ames and Maschner, *Peoples of the Northwest Coast*, 65.

[68] Michael Pidwirney and Scott Jones, *Structure of the Earth*, 2010, http://www.physicalgeography.net/fundamentals/10h.html.

[69] Ames and Maschner, *Peoples of the Northwest Coast*, 50, 53.

[70] Ames and Maschner, *Peoples of the Northwest Coast*, 67.

[71] Nelson, "Prehistory of the Puget Sound Region," 483.

[72] Nelson, "Prehistory of the Puget Sound Region," 483.

[73] Ames and Maschner, *Peoples of the Northwest Coast*, 25.

[74] Ames and Maschner, *Peoples of the Northwest Coast*.

Semi-permanent and permanent winter village use persisted during the Pacific period.[75] The seasonal round continued to be employed for subsistence and settlement strategies. Microenvironments were utilized for seasonal and specialized resources. Nelson described Whitlam's model of intensification, in which more microenvironments became exploited over time, reflecting greater economic complexity.[76] Overall increasing social and cultural traits, such as intensification of resources, innovations in technology, permanent winter village sites, and social stratification, occurred. These traits evolved in three different subperiods, divided by Ames and Maschner.[77]

Early Pacific (4400 B.C.–1800 B.C.)

Fluctuations in the environment occurred again between approximately 5,000 and 3,000 years ago. As sea levels stabilized, some rivers drained affecting areas available for use by humans. This encouraged resource specialization and intensification. It was during this phase that specialization of resources such as camas (*Camassia quamash*) and shellfish were first noted. Thick shell midden sites lend credence to the rise of sedentism and increase in food production. Additionally, human burials are seen for the first time during this phase.[78]

Middle Pacific (1800 B.C.–A.D. 200/500)

Continuity with an increase in shell middens and sedentism is shown in Middle Pacific sites with the inclusion of large cedar plank houses, villages, and canoes. Diversification in tool assemblages is evident with the use of bone, antler, and groundstone tools. The toggling harpoon was an innovation that occurred during the Middle Pacific. Use of groundstone as net weights provides a link to an expansion of fishing-related activities.[79]

Late Pacific (A.D. 200/500–A.D. 1775)

Cultural continuity can be seen in groups dating between the beginning of the Late Pacific Period and the Ethnographic period. Thus Late Pacific peoples are the "direct biological and cultural ancestors to the coast's modern Native peoples."[80]

Changes in population demographics and subsistence and settlement patterns are seen during the Late Pacific. An escalation in warfare occurred, as well as development of mortuary rituals. Use of

[75] Nelson, "Prehistory of the Puget Sound Region," 483.

[76] Nelson, "Prehistory of the Puget Sound Region," 484; and Robert Whitlam, "Models of Coastal Adaptation: The Northwest Coast and Maritimes," in *The Evolution of Maritime Cultures on the Northwest and the Northwest Coasts of America*, ed. Ronald J. Nash (Burnaby, BC: Simon Fraser University Department of Archaeology Publications 11, 1983).

[77] Ames and Maschner, *Peoples of the Northwest Coast*, 87, 90, 94, 96.

[78] Ames and Maschner, *Peoples of the Northwest Coast*, 90.

[79] Ames and Maschner, *Peoples of the Northwest Coast*, 94.

[80] Ames and Maschner, *Peoples of the Northwest Coast*, 95.

chipped stone tools declined, although an expansion in woodworking tools occurs in the Late Pacific.[81]

Areas near water resources would have been used for habitation sites, fishing, gathering riverine and lacustrine plants, and hunting waterfowl. Upland areas would have been utilized for hunting terrestrial game and gathering plants. Precontact Native groups could have also traversed the study area while travelling to various locations during the seasonal round. There is a moderate to very high probability for archaeological resources in the study area based on the location of known sites in the greater vicinity and the DAHP predictive model, as previously discussed in Section 2.2.8.

4.2 Ethnographic Background

The study area is in the traditional territory of the Sammamish (now part of the Tulalip Tribes), Suquamish, and Duwamish, subgroups of the Southern Coast Salish.[82] The Southern Coast Salish was composed of two language groups, Twana and Lushootseed (further subdivided into Northern and Southern groups). The Sammamish, Suquamish, and Duwamish were part of the Southern Lushootseed dialect group.[83] These groups followed the general Southern Coast Salish subsistence and settlement pattern.

Aboriginal territory for the Sammamish included the eastern shoreline of Lake Washington, the shores of Lake Sammamish, and the Sammamish River Valley.[84] The Sammamish had strong affiliations with the Snoqualmie to the east and Duwamish to the west. On the east side of the Puget Sound, Suquamish territory extended from Seattle to southern Snohomish County, and they had affiliations with the Duwamish.[85] Duwamish territory included Seattle and areas around Lake Washington.[86]

Seasonal dwellings were situated near resource locations, such as areas for hunting game and gathering berries. These structures housed from two to ten families and were portable gable-roofed shelters with pole frames covered in mats or brush, and were easily transported.[87] Winter villages

[81] Ames and Maschner, *Peoples of the Northwest Coast*, 96.

[82] Leslie Spier, "Tribal Distribution in Washington," *General Series in Anthropology* No. 3 (Menasha, WI: George Banta Publishing Company, 1936), 42; and Suttles and Lane, "Southern Coast Salish," 486.

[83] Suttles and Lane, "Southern Coast Salish," 486.

[84] Edward S. Curtis, *The North American Indian*, 20 vols. (Cambridge, MA: n.p., 1913), 174; Spier, "Tribal Distribution," 34.

[85] Curtis, *North American Indian*, 174; George Gibbs, "Tribes of Western Washington and Northwestern Oregon," in *Contributions to North American Ethnology* (Washington, DC: Government Printing Office, 1877), 179; Spier, "Tribal Distribution," 34; and John Reed Swanton, *Indian Tribes of Washington Oregon and Idaho*, Bulletin 145 of the Bureau of American Ethnology (Washington, DC: Smithsonian Institution, 1952), 48.

[86] Hermann Haeberlin and Erna Gunther, "The Indians of Puget Sound," *University of Washington Publications in Anthropology* 4, no. 1 (1930): 8; and Spier, "Tribal Distribution," 34.

[87] Haeberlin and Gunther, "Indians of Puget Sound"; Suttles, "Environment"; and Suttles and Lane, "Southern Coast Salish," 491, 493–494.

featured multiple family dwellings consisting of cedar planks attached to heavy wooden frames. Winter houses typically had a single-pitch, shed-roof style that housed extended families.[88]

The Sammamish, Suquamish, and Duwamish collected subsistence and material resources based on seasonal availability. Small task groups traveled to seasonal camps to hunt, fish, and gather plants. Staples of the Southern Coast Salish diet included terrestrial game such as deer (*Odocoileus hemionus*), elk (*Cervus elephas*), and bear (*Ursus americanus*). Salmon and other fish, waterfowl, and shellfish were also important provisions.[89] Traps, weirs, dip and trawl nets, gaff hooks, harpoons, and leister were used to catch fish in rivers. In saltwater, seines, gill nets, and trolling were used. Meat and fish were dried, boiled in water-tight baskets, or roasted in a large pit or on a spit over a fire.[90] Shellfish were roasted on long sticks slanted over a fire on the beach or smoked and strung on buckskin for winter storage.[91]

Roots, bulbs, nuts, and sprouts were frequently used plants. A large variety of berries, including blackberry, elderberry, salmonberry, thimbleberry, blackcap, salal berry, huckleberry, and blueberry, were noted by Gunther.[92] Plant foods were eaten fresh or dried either by the sun or spread on cedar bark over a fire, for winter storage. Blackberries, salal and huckleberries were mashed, mixed with blackcaps, molded into two-inch round forms, called tuckams, and dried.[93] Hazelnuts were stored in the shells in caches near the winter villages. Camas was cooked, dried, and stored in maple leaf-lined baskets in trees.[94] Additionally, wild carrots, camas or wapato, hazelnuts, and occasionally acorns were used by native peoples in the area.[95] Plant materials were used not only for nutrition but also for mats, baskets, clothing, and dwellings.

4.3 Historic Context

4.3.1 Treaty of Point Elliott, 1850–1855

Euroamerican settlement in the Puget Sound region began in earnest after the passage of the Donation Land Act of 1850. By 1853, approximately 4,000 Euroamerican settlers resided in the

[88] Suttles and Lane, "Southern Coast Salish," 491, 493–494.

[89] Belcher, "Shellfish Utilization"; and Suttles and Lane, "Southern Coast Salish," 489.

[90] Haeberlin and Gunther, "Indians of Puget Sound," 23.

[91] Haeberlin and Gunther, "Indians of Puget Sound," 23–24.

[92] Erna Gunther, "Ethnobotany of Western Washington," *University of Washington Publications in Anthropology* 10, no. 1 (1945).

[93] Haeberlin and Gunther, "Indians of Puget Sound," 22.

[94] Haeberlin and Gunther, "Indians of Puget Sound," 22–23.

[95] Haeberlin and Gunther, "Indians of Puget Sound," 21.

southern Puget Sound, and they convinced Congress to create the Washington Territory.[96] Washington's first territorial governor, Isaac Stevens, arrived in Olympia in March 1853, tasked with creating treaties with the Native Americans in the region to make way for increasing Euroamerican settlement in western Washington. Several treaties were signed and more than 64 million acres of land were ceded in exchange for retention of fishing rights, title to circumscribed lands, and annuities. The Treaty of Point Elliott was signed in 1855, with Duwamish Chief Seattle, and the Sammamish and Suquamish Tribes among the signatories.[97] The Treaty of Point Elliott stipulated that native groups that traded lands to the United States would in return receive payment, services, and rights to traditional fishing and hunting grounds.[98] The treaty terms also stipulated that native groups were to relocate to the Tulalip Indian Reservation or the Port Madison Indian Reservation.[99] While many groups relocated, some resisted and stayed in their traditional lands.

The establishment of reservations and the subsequent migration forever changed the character of Washington territory and redefined the way native peoples interacted with the landscape.

4.3.2 Early Settlement and Agriculture, 1855–1887

Settlement on the east side of Lake Washington was sparse during the early settlement period. The first major settlement was in present day Newcastle after the discovery of coal veins nearby in 1863. Within a decade, Euroamerican settlement occurred all along the east side of Lake Washington and around Lake Sammamish, with small communities established at what are now Kirkland, Juanita, Redmond, Houghton, and Woodinville.[100] The USSG surveyor noted the presence of a few settlers along the Sammamish River in 1870.[101]

The earliest pioneers in the Kirkland area included James and Thomas Popham and the MacGregor family, who settled there in 1871.[102] They located their homesteads along the lake, and were soon joined by other families.[103] At least 100 homesteads were filed by the mid-1880s from Juanita Bay to Houghton.[104] Homesteaders were drawn by an abundance of timber and other resources including

[96] Carlos A. Schwantes, *The Pacific Northwest: An Interpretive History* (Lincoln: University of Nebraska Press, 1996), 95–106.

[97] "Treaty of Point Elliott, 1855," HistoryLink File #2629, historylink.org.

[98] Barbara Lane, *Identity and Treaty Status of the Duwamish Tribe of Indians*, prepared for the Department of the Interior and the Duwamish Tribe of Indians, 1975, p. 3, Special Collections, Allen Library, University of Washington, Seattle.

[99] Robert H. Ruby and John A. Brown, *A Guide to the Indian Tribes of the Pacific Northwest* (Norman: University of Oklahoma Press, 1992), 72.

[100] Lucile McDonald, *Lucile McDonald's Eastside Notebook: 101 Local History Vignettes* (Redmond, WA: Marymoor Museum, 1993), 22.

[101] USSG, *Field Notes of the Survey of the Subdivisional Lines and Meanderings of Lake Washington in Township No 26 E R. No 5 E Will Mer,* 1870, http://www.blm.gov/or/landrecords/survey/yNoteView1_2.php?R0007WA0547005500.

[102] Alan J. Stein, "Kirkland -- Thumbnail History," HistoryLink file #208, 1998, http://www.historylink.org.

[103] Arline Ely, *Our Foundering Fathers: the Story of Kirkland* (Kirkland, WA: Kirkland Public Library, 1975), 1–3.

[104] Ely, *Our Foundering Fathers*, 8; and Matthew W. McCauley, *A Look to the Past: Kirkland* (Auburn, WA: Scriptoria Publications, 2010), 20.

fish, game, freshwater clams, water chestnuts, and wapato, which had long sustained Native American tribes.[105] Typical ventures in the 1880s included logging, coal mining, and agriculture. Western Washington became a major hop-growing region in the early 1880s, after blight destroyed much of the crop in Europe. By 1882, King County farmers yielded approximately 300,000 pounds of hops.[106] An account by John George Kellert in 1886 indicates that at least 800 Native Americans and 120 Euroamericans were employed to pick hops and work in the kitchens at "Hop Ranch" near Lake Issaquah.[107]

4.3.3 Early Industry: 1888–1899

The expansion of railroad lines into the Pacific Northwest increased development throughout the Puget Sound. In the 1870s, the Northern Pacific Railroad had infuriated Seattle citizens by choosing to construct its western terminus south of Seattle in Tacoma. In response, Seattle investors cooperated to build their own local railroads, including the Seattle & Walla Walla Railroad, which extended as far north as the coal mines of Newcastle in South King County. A number of these small operations formed the basis for Northern Pacific's expansion into the region in the late 1890s, under the threat of competition from the Great Northern Railway and Union Pacific.[108]

This surge of development in the west also attracted industrialists from overseas. Peter Kirk, a British steel manufacturer, came to the United States and was persuaded by local promoter Leigh S. J. Hunt to establish a steel mill to manufacture railroad rails in what is now Kirkland (named in his honor).[109] Kirk and Hunt, along with their investors, established the Kirkland Land & Improvement Company in July 1888, which purchased over 5,000 acres on which to establish a new steel mill and a large, surrounding community. Kirk and Hunt envisioned a "Pittsburgh of the West," including a whole town for the mill's workers. Though optimism was high, the project faced numerous hurdles. For instance, the great Seattle Fire of 1889 left many local investors broke, leading the new operation to rely more heavily on out-of-state funding.

In 1890, one year after President Benjamin Harrison admitted Washington as the forty-second state in the Union, Kirk and Hunt platted the town of Kirkland and began constructing housing for their future employees.[110] The town's development was heavily promoted, spurring construction of a wool mill, sawmill, and brickyard along with houses and commercial buildings.[111] Kirk's British steel

[105] McCauley, *A Look to the Past*, 44.

[106] Greg Lange, "Hops Grown in Western Washington Become an Important World Crop by 1882." HistoryLink File #2003, 2001, http://www.historylink.org

[107] Ely, *Our Foundering Fathers*, 29.

[108] Heather M. MacIntosh, "Northern Pacific Railroad and Seattle Development," HistoryLink File # 1734, 1999, http://www.historylink.org.

[109] Ely, *Our Foundering Fathers*, 36; McCauley, *Look to the Past*, 184; McDonald, *Eastside Notebook*, 23, 26.

[110] Alan J. Stein, "Kirkland -- Thumbnail History," HistoryLink file #208, 1998, http://www.historylink.org.

[111] Ely *Our Foundering Fathers*, 37, 53

mill was not performing well at this time and had to shut down intermittently, inspiring some of his employees to follow him from England to Kirkland for work.

Kirk was committed to the construction of a mill town, but he could not foresee the economic collapse of 1893, which brought development to a standstill. Investors fled from the project, and Kirk was left with a partially completed mill and an unfinished community. His holdings in England were partly responsible for his recovery. Though he never completed the news steel mill, Kirk continued to live and work in Kirkland until the end of his life in 1916.[112]

Other industries were slow to locate to the area, but in 1891, Edward Eyanson moved his wool mill from Indiana to Kirkland, and it was soon turning a brisk trade.[113] Eyanson became especially successful after 1897, when he began provisioning gold miners headed to Alaska for the Klondike Gold Rush. The Gold Rush briefly solidified the mill as one of Kirkland's most successful early industries.[114]

The Klondike Gold Rush began officially in 1896, when gold was discovered in the Yukon. As described by the University of Washington in its digital archives, "On July 17, 1897, eleven months after the initial discovery of gold, the steamship Portland arrived in Seattle from Dawson with 'more than a ton of gold,' according to the *Seattle Post-Intelligencer*. With that pronouncement, the Klondike Gold Rush was on!"[115]

Seattle became the point of departure for miners planning to strike it rich. They needed supplies, and Seattle area merchants, including Eyanson, made them available. Though few miners found the riches they sought, some made a permanent home in Seattle, taking the new jobs created by the gold rush, or filling the jobs vacated by gold seekers. According to the National Park Service, "In 1890, Seattle's population was 42,837. By the turn of the century, that figure had almost doubled, and by 1910, the population had reached 237,194."[116]

Kirkland did not grow as quickly as Seattle, and it continued to struggle with industrial setbacks. For instance, the hop aphid (louse) was introduced in 1889, and by 1891an epidemic destroyed agricultural crops throughout the county.[117]

---

[112] Stein, "Kirkland -- Thumbnail History."

[113] Ely, *Our Foundering Fathers*, 87; McCauley, *Look to the Past*, 143; McDonald, *Eastside Notebook*, 126.

[114] McCauley, *Look to the Past*, 21, 148; McDonald, *Eastside Notebook*, 23.

[115] "The Klondike Gold Rush," University of Washington Digital Collections, http://content.lib.washington.edu/extras/goldrush.html

[116] "Determining the Facts: The Legacy of the Klondike Gold Rush," National Park Service, http://www.nps.gov/nr/twhp/wwwlps/lessons/55klondike/55facts4.htm.

[117] McDonald, *Eastside Notebook*, 23, 26; and Lange, "Hops Grown in Western Washington Become an Important World Crop by 1882."

4.3.4 The Twentieth Century

In spite of its early industrial history, Kirkland was recognized as a fine settlement site. The city incorporated in 1905, with a population of approximately 400, after making many street improvements as part of an effort to attract development. Improvements included grading and planking, building new sidewalks, and removing tree stumps from roadways.[118] The twentieth century saw slow and steady growth in Kirkland, though it was a dramatic time for Seattle and the surrounding region. The Klondike Gold Rush brought riches to Seattle, and in 1909, the city celebrated this historic event, hosting the Alaska-Yukon-Pacific Exposition on the site of the University of Washington campus.[119] Located on the western bank of Lake Washington, the fair brought throngs of tourists, nearly four million of them, to the lake and its picturesque banks, including towns like Kirkland on the east side.[120]

Both the First and Second World Wars led to great shifts in population for major cities like Seattle, bringing many new workers to the region. Many of them came from the Midwest and the South. Industry expanded for both wars, swelling local jobs in the area both before and after the nation's Great Depression.

The Great Depression, which lasted between approximately 1929 and 1939, was devastating for the nation as a whole, and for the Seattle region and King County. Tens of thousands lost their jobs or saw reduced hours and wages. In Kirkland, in 1935, Eyanson's successful wool mill was destroyed by fire.[121] Organized labor soon emerged in the region as a powerful force, and Hoovervilles, shanty towns, sprang up for those who had no other place to go. Under President Franklin D. Roosevelt, the West received substantial economic stimulus, emerging from the Depression as an industrial powerhouse at the start of World War II.[122]

The Second World War lifted the region out of the painful years of the Great Depression and brought major industrial expansion, swelling industrial giants like Boeing: "The National War Production Board in August 1942 revealed that up to July 1, 1942, more than $1 billion in contracts had been awarded Seattle's aircraft industry and $709 million had been awarded shipyards in Seattle."[123] Some of this work went to eastside corporations. "The Lake Washington Shipyard at

[118] Alan J. Stein, "Kirkland Incorporates on October 12, 1905," HistoryLink File #7508, 2005, http://www.historylink.org.

[119] "1909 Seattle," Expo Museum, http://www.expomuseum.com/1909/.

[120] "Alaska-Yukon-Pacific Exposition 1909: Seattle, Washington," AYPE Expo Community, http://www.aype.com.

[121] McDonald, *Eastside Notebook*, 126–127.

[122] David Wilma, "Depression, The Great, 1929–1939," HistoryLink File #3717, 2002, http://www.historylink.com.

[123] James R. Warren, "World War II Home Front on Puget Sound," HistoryLink File #1664, http://www.historylink.net.

Houghton, now annexed to Kirkland, employed 6,000 workers to repair dozens of merchant vessels and ferries during the war and to turn out ships for the Navy."[124]

In 1940, access to the lake's east side was improved with the construction of the first floating bridge, installed south of Bellevue. By the 1960s, when the second floating bridge was constructed, communities including Kirkland, Bellevue and Redmond had developed into a middle-class suburban community known as Seattle's Eastside. In 1968, Kirkland merged with Houghton. Kirkland then annexed much of Juanita in 1988. In 2011, Kirkland acquired the northern portion of Juanita, which includes the North Kirkland Community Center location.[125]

Juanita

Juanita was originally formed north of Kirkland. Early Juanita homesteaders included Martin Hubbard and Henry Goldmyer, both loggers who filed claims in 1870.[126] The community was called Hubbard at first, after the Martin W. Hubbard family. Martin Hubbard was also the first postmaster, with the postal office established on June 20, 1881, in the Hubbard house.[127] The community's name was changed to Juanita on April 30, 1886. Although the reason for the name change is not clear, it was reputed to have been chosen by Mary Jane Russell Terry, one of the early pioneers of Seattle, along with her husband Charles C. Terry.[128]

In the mid-1880s, Civil War veteran Dorr Forbes began logging the area and built a water-powered shingle mill on Juanita Creek, which burned in a fire in 1894.[129] Other homesteaders settled in the Juanita area around the same time. Many of the families in the Juanita area had emigrated from Finland, bringing with them Finnish traditions. Nearly every homestead in the "Finn Hill" section of Juanita had a sauna or bathhouse at the turn of the twentieth century. The Finns also came together to build a community social hall for monthly dances, plays, and programs.[130] The Finn Hill area is approximately ½ mi west of the North Kirkland Community Center.

The lack of bridge access from Seattle, on the west side of Lake Washington, to Juanita on the east side made travel between the two challenging. Most early travel routes were largely trails. One well-known trail led from Juanita to the gravel pit area by Juanita Slough. Another bore north and east to Woodinville, and a third ran from Juanita southeast to Redmond. One of the first road cuts went

[124] James R. Warren, "World War II Home Front on Puget Sound," HistoryLink File #1664, 1999, http://www.historylink.net.

[125] Stein, "Kirkland -- Thumbnail History."

[126] McCauley, *Look to the Past*, 44.

[127] Greg Lange, "Juanita Beginnings: Hubbard Post Office Opens on June 20, 1881," HistoryLink File #450, 1998, http://www.historylink.org.

[128] Lange, "Juanita Beginnings"; McDonald, *Eastside Notebook*, 26.

[129] McCauley, *Look to the Past*, 162; and McDonald, *Eastside Notebook*, 100.

[130] McDonald, *Eastside Notebook*, 218–219.

from the eastern shore of Lake Washington to what is now Redmond, traveling through a former homestead property owned by the Curtis family.[131] The Curtises were pioneers in the Juanita area and built ships and operated boats on Lake Washington for more than 50 years. The Curtis property was the site of the earliest shipbuilding on the east side of the lake and later became the Lake Washington Shipyards.[132]

Without modern roads and modern bridges, ferry service over Lake Washington was an important means of transportation. By 1892, daily passenger and cargo sailings to and from Seattle were common.[133] A passenger ferry was established in 1900 by King County between Kirkland and Madison Park.[134] Mail was also delivered via ship from Seattle.[135] One local ferry captain, John Anderson, not only ran the steamer *C. C. Calkins* but also built ships in Houghton.[136] In anticipation of the need for better transportation to the Alaska-Yukon Pacific Exposition of 1909 and the lure of excursions on Lake Washington for visitors, Anderson increased production, putting twelve boats into ferry service that summer.[137] The increase in ferry service was beneficial to the general Kirkland area. The first auto ferry, the *Lincoln*, was built by the Anderson shipyard and was in use by 1914.[138] By 1940, access to the eastside increased with the establishment of roads and the first lake bridge. Eventually, the ease of traveling by road prompted the decline of ferry use, and in 1968, the ferry *Leschi* made its last run.[139]

Lake Washington Ship Canal and Juanita Beach

Completion of the Lake Washington Ship Canal in 1917 had a major impact on communities on Lake Washington's east side. Although the canal was located in Seattle, it encouraged tourism and population growth. After the canal was finished, the water level of Lake Washington fell close to nine feet, rendering useless the early docks of Juanita and Kirkland.[140] In Juanita, the lowering of the lake exposed sandy soil on the north side of the bay. The Forbes family, which had once operated a shingle mill on their homestead property, opened access to their now sandy shoreline for recreational purposes in 1920, calling it Juanita Beach.[141] Soon thereafter, the family purchased

[131] Ely, *Our Foundering Fathers*, 14.

[132] Ely, *Our Foundering Fathers*, 13.

[133] Ely, *Our Foundering Fathers*, 75; and McCauley, *Look to the Past*, 21.

[134] McCauley, *Look to the Past*, 21.

[135] Ely, *Our Foundering Fathers*, 14, 78.

[136] Ely, *Our Foundering Fathers*, 89; and McCauley, *Look to the Past*, 98.

[137] McCauley, *Look to the Past*, 98.

[138] McDonald, *Eastside Notebook*, 56.

[139] McDonald, *Eastside Notebook*, 58.

[140] McCauley, *Look to the Past*, 106; and McDonald, *Eastside Notebook*, 64.

[141] McCauley, *Look to the Past*, 169; McDonald, *Eastside Notebook*, 181; and Alan J. Stein, "King County Purchases Juanita Beach in April 1956," HistoryLink File #4018, 2002, http://www.historylink.org.

additional property to increase the recreation area and planted cottonwood saplings for shade. By the mid-1920s, Juanita Beach featured a bathhouse, dressing rooms, a boardwalk, and picnic areas.[142]

The Juanita Beach recreation/resort venture was so popular that two other resorts were built on adjacent properties, with attendance peaking in 1935 and 1936. When attendance began to wane in the 1950s, both properties were sold to King County, one in 1956 and one in 1957. King County combined the properties and renamed them Juanita Beach Park. The south Juanita community was annexed to the City of Kirkland in 1988, and in 2002, the county transferred the park property to the City.[143] Presently, the county park on Juanita Bay is a combination of all three original beach resorts and is again a popular recreation area.[144]

North Kirkland Community Center

The North Kirkland Community Center building was constructed in a neighborhood featuring residences dating from as early as the 1930s, though most surrounding houses date from the 1960s and 1970s.[145]

The community center site changed over the years, with expanded parking appearing south of the building between 1990 and 1998, and playground equipment appearing east of 103rd Avenue during the same period.[146]

[142] McCauley, *Look to the Past*, 170, 173; and McDonald, *Eastside Notebook*, 180–81.

[143] Stein, "King County Purchases Juanita Beach."

[144] Lange, "Juanita Beginnings"; McCauley, *Look to the Past*, 178; McDonald, *Eastside Notebook*, 181; and Stein, "King County Purchases Juanita Beach."

[145] "Parcel Viewer 2.0," King County, 2013, http://gismaps.kingcounty.gov/parcelviewer2/.

[146] NETR Online, Historic Aerial for Kirkland, Washington area, 1990; and NETR Online, Historic Aerial for Kirkland, Washington area, 1998.

5. Probability of Finding Archaeological Sites within the North Kirkland Community Center Study Area

Environmental factors (e.g., close proximity to water and available food and material resources), the DAHP predictive model, and ethnographic and historic records suggest a moderate to very high probability of intact archaeological remains at the site of the North Kirkland Community Center. Precontact and ethnographic period resources that may be identified within the study area vicinity include trails, lithics (flakes of stone from tool making, cores or core fragments, and projectile points), and resource procurement or processing sites. Ethnographic-period resources would be similar to those associated with precontact sites, with the inclusion of Euroamerican goods.

Historic-period resources may include but are not limited to deposits of structural materials (e.g., window glass, brick fragments, nails, and milled wood); household items (e.g., metal or glass storage vessels, ceramics); or the remains of farming implements (e.g., machinery, metal or glass storage vessels).

6. Architectural Inventory

6.1 Inventory Methodology

To identify historic-era resources within one parcel of the project site, HRA conducted parcel research through the King County Assessor's office's online portal (see Table 6-1). Addresses are included for the eight properties that meet age requirements for the NRHP, the WHR or the King County Landmarks Register. Two more are within two years of meeting the age criteria for the King County Landmarks Register. Research through DAHP's WISAARD database found that two of these properties had been previously recorded, as noted below. However, the inventory forms for these two properties do not include eligibility determinations.

On July 1, 2014, HRA architectural historian Chrisanne Beckner visited the North Kirkland Community Center and photographed the eight historic-era resources within one parcel of the proposed project site. Beckner assessed these resources at a reconnaissance level for eligibility to the NRHP, WHR, and King County Landmarks Register under criteria associated with architectural character. Below is an evaluation of the eight historic-era buildings within the recommended APE.

6.2 Current Conditions

Currently, the North Kirkland Community Center faces east on 103rd Avenue NE. The building is in good condition, and its lot includes parking to the south and grassy picnic areas to the south and west. The playground is located east of 103rd Avenue NE. The playground is in good condition and includes shade trees, grassy lawns, and play equipment.

The community center and play areas are generally screened from nearby development by a combination of fencing, retaining walls, foliage, and open green space, suggesting that new construction on the site, as long as these privacy screens are maintained, would have a minimal effect on most surrounding properties.

6.3 Results

Table 6-1: Table of resources within the recommended APE.

Affected Parcels	Address	Year Built	Over 40 years old?	Notes
2926059101				Open Space Tmbr Land
2926059014	12421 103RD AVE NE	1974	Y	Existing Community Center
2926059187				Greenhse/Hrsry/Hort
7424110040				Park, Public (Zoo/Arbor), Kirkland
7424110030				Park, Public (Zoo/Arbor), Kirkland
7424110020				Park, Public (Zoo/Arbor), Kirkland
7424110010				Park, Public (Zoo/Arbor), Kirkland
2926059078				Park, Public (Zoo/Arbor), Kirkland
2926059225				Park, Public (Zoo/Arbor), Kirkland
1657500000		1984	N	
2926059281				Empty lot
2926059119		2008	N	
2926059141	10221 NE 124TH ST	1960	Y	Inventory form in WISAARD
2926059120		1993	N	
3558910820		1976	N	
3558910810		1976	N	
3558910800		1976	N	
3558910790	10320 NE 123RD PL	1974	Y	
2926059206	10404 NE 124TH ST	1939	Y	
1471650040		1981	N	
1471650030		1980	N	
7424110110		1976	N	
7424110050	12424 103RD AVE NE	1971	Y	
7424110060	12432 103RD AVE NE	1971	Y	
7424110070	12440 103RD AVE NE	1971	Y	
2926059244		1977	N	
2926059228		1983	N	
7940700140		1987	N	
2926059163	10125 NE 126TH ST	1966	Y	Inventory form in WISAARD
7701970000		1989	N	
1012100000		1980	N	
3896600000		1987	N	

6.3.1 12421 103rd Avenue NE

The 1974 North Kirkland Community Center building at 12421 103rd Avenue NE is irregular in plan, generally square with a projecting wing to the south. The building is located on a sloping hillside and is two stories tall. It is constructed on a concrete foundation, clad in T1-11 siding, with original wood windows and a modified hipped roof with deep eaves. The building is generally utilitarian in design with ornamentation limited to large, focal windows on the primary façade and long, narrow accent windows (Figure 6-1).

Figure 6-1. 12421 103rd Avenue NE in Kirkland, view northwest

Eligibility: The building meets the 40-year age criteria for listing in the King County Landmarks Register. It also possesses integrity of location, design, setting, materials, workmanship, feeling, and association. However, the building does not meet any other architectural criteria for listing in local, state, or national registers of historic places. It neither embodies the distinctive characteristics of a type, period, style, or method of design or construction, nor is it the work of a master. HRA recommends that the building is not eligible for listing in the landmarks list under criteria associated with its architectural qualities.

6.3.2 10221 NE 124th Street

The residence at 10221 NE 124th Street was constructed in 1960. The house is a modest ranch house, rectangular in plan, with a projecting garage. The house is screened from the street and from the community center lot by a hedge of mature foliage. It appears to be constructed on a concrete foundation, to be clad in horizontal wood boards, and to include aluminum windows. The house is topped by a side gabled roof with eaves (Figure 6-2).

This house is south of NE 124th Street and the lawns and parking lots of the existing community center.

Figure 6-2. 10221 NE 124th Street, view south.

Eligibility: The house meets the 50-year age criteria for listing in the NRHP. The residence at 10221 NE 124th Street is a modest ranch style residence with some of the character-defining features associated with ranch houses. It is rectangular in plan, a single story, with a shallow roof and deep eaves. It possesses good integrity. However, it does not appear to be a distinctive example of its type or style. The modest ranch house was commonly constructed throughout the nation in the mid-century, and this example resembles many others that retain excellent integrity throughout Washington. HRA recommends that this residence is not eligible for listing in the NRHP, the WHR, or the King County Landmarks list for its architectural characteristics as it is not a significant example of its type, is not the work of a master, and does not embody high artistic values.

6.3.3 10320 NE 123rd Place

This 1974 residence is entirely screened from NE 124th Street and the project area by a retaining wall and mature foliage. The house is oriented to the south, away from the project area. It faces a cul-de-sac to the south (Figure 6-3).

Figure 6-3. 10320 NE 123rd Place, view southeast

Eligibility: Because of visual barriers, including a retaining wall and large, mature foliage, as well as the house's orientation to the south, the residence at 10320 NE 123rd Place has no potential to be affected by the proposed project. Although it is technically within the recommended APE, HRA sees no potential for effect.

6.3.4 10404 NE 124th Street

This residence, constructed in 1939, is the oldest residential building within the recommended APE. The building is two stories tall, designed in a modest Monterey style with a dominant balcony. The first floor is clad in brick and the second floor in horizontal wood boards. The side-gabled roof shelters the porch and balcony and is supported by simple square, wood posts. The building retains some original wood windows, though most have been replaced by aluminum windows (Figure 6-4).

The community center play area is located directly west of the building. A portion of the building's north elevation is visible from the play area behind wooden fencing and mature foliage.

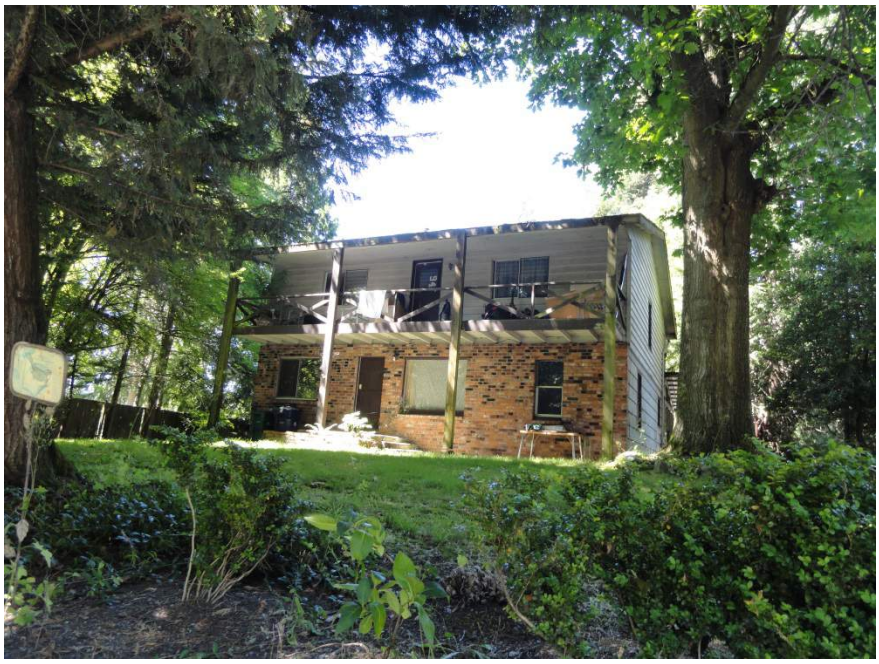


Figure 6-4. 10404 NE 124th Street, view northwest

Eligibility: The modest Monterey style residence at 10404 NE 124th Street features the character-defining balcony and a mix of cladding. However, the house has been greatly altered since it was constructed. Assessor's photos show that the house was constructed as 1.5-story residence that resembled a Cape Cod style house with a wide, shallow dormer. Because of alterations to plan, this house no longer retains integrity of design, materials, or workmanship and is recommended not eligible for listing in local, state, or national registers of historic places based on its architectural characteristics.

6.3.5 12424 103rd Avenue NE

This residential building, constructed in 1971, is a split entry with an attached garage on the north elevation. The house is built on a concrete foundation and is clad in aluminum or vinyl siding with aluminum windows. The house includes the character-defining central entry with a metal hood. The house is side-gabled with deep eaves (Figure 6-5).

This house is located near the northern boundary of the play area, across the street from the existing community center.

Figure 6-5. 12424 103rd Avenue NE, view east

Eligibility: The residence at 12424 103rd Avenue NE meets the age criteria for the King County Landmarks Register. The house is a good example of the split entry type that became common in the late twentieth century. However, excellent examples of the split entry type are found throughout the West, and this example is not particularly distinctive or significant. HRA would recommend that this building is not individually eligible for listing in the King County Landmarks Register based on its architectural characteristics, as it does not embody the distinctive characteristics of a type, period, style or method of design or construction.

6.3.6 12432 103rd Avenue NE

This residence, constructed in 1971, is a two-story split entry with a single story garage on the south elevation. The house includes some modest classical revival elements, including the two-story portico, supported in this example by brick columns, and the pedimented entry. The house sits on a concrete foundation, is clad in horizontal wood boards, and is topped by a side-gabled roof. Windows have been replaced with vinyl windows with interior grids (Figure 6-6).

Figure 6-6. 12432 103rd Avenue NE, view east

Eligibility: The residence at 12432 103rd Avenue NE meets the age requirement for the King County Landmarks list and appears to be a good example of the split-entry plan. However, the split entry type is common, and this example is not particularly distinctive or significant. The building retains its original cladding, including a wrapped exterior chimney, and its modest ornamental details, including the ornament at the entry. However, the replacement of original windows impacts the house's integrity. HRA would recommend that this residence is not individually eligible for listing in the King County Landmarks Register based on its architectural characteristics as it does not embody the distinctive characteristics of a type, period, style, or method of design or construction.

6.3.7 12440 103rd Avenue NE

This ranch house, constructed in 1971, is rectangular in plan, with an attached garage on the south elevation and an added carport on the primary elevation. The house sits on a concrete foundation, is clad in horizontal wood boards, and includes vinyl-framed sliding windows on the primary façade. The house is side gabled with deep eaves that project over the front porch (Figure 6-7).

The house is located east across 103rd Avenue NE from the community center building.

Figure 6-7. 12440 103rd Avenue NE, view east

Eligibility: The residence at 12440 103rd Avenue NE meets the age requirement for the King County Landmarks Register. The house is a good example of a modest ranch-style residence. It includes some character-defining features, including its horizontal emphasis and shallow roof with deep eaves. However, the ranch house is a common type and many good examples with excellent integrity are found throughout the West. This example is not particularly distinctive or significant, nor does it retain excellent integrity as its focal window and other windows have been replaced. HRA recommends that this house is not individually eligible for King County Landmarks list based on its architectural characteristics as it is not a significant example of its type or style.

6.3.8 10125 NE 126th Street

This residence, constructed in 1966, is difficult to assess as it is not entirely visible from the public right of way. It appears to be a two-story Garrison style ranch house with an overhanging second story. The house is constructed on a concrete foundation, is clad in horizontal wood boards with original wood windows on the bottom floor and vinyl-framed windows on the top floor (Figure 6-8).

The house is located to the northwest of the grassy lawns north and west of the community center.

Figure 6-8: 10125 NE 126th Street, view south

Eligibility: The Garrison style ranch house at 10125 NE 126th Street is shielded from the community center property by fencing and mature foliage. Like many of its neighbors, the house appears to retain some of its character-defining features, including its overhanging second story. However, this residential building is not a distinctive or significant example of its type, and some of its original windows have been replaced. HRA recommends that the building is not individually eligible for listing in local, state, or national registers of historic places for its architectural qualities.

7. Summary and Recommendations

7.1 Archaeological Resources

No systematic pedestrian transects or subsurface fieldwork were conducted for this project, as HRA was tasked with preparing a desktop analysis and in-depth background study of the property. No previously recorded archaeological resources have been identified within the study area location.

The locations of ethnographic places and other landmarks in the vicinity indicate food processing in settings near sources of water. The study area and surrounding region may have been used for travel and/or settlement during the precontact and ethnographic periods, due to its topography and proximity to water. Precontact and ethnographic Native American cultural resources could be in previously undisturbed areas below the ground surface. Precontact and ethnographic period resources could include lithic, bone, and shell artifacts.

The study area is in a Moderate to Very High Risk probability area for cultural resources. Should the Project move beyond the planning phase, HRA recommends pedestrian archaeological survey and subsurface shovel probing of the unpaved portions of the project area, per Washington State law (RCW 27.53.030).

7.1.1 Unanticipated Discovery of Archaeological Resources

In the event that archaeological deposits are inadvertently discovered during construction in any portion of the study area, ground-disturbing activities should be halted immediately, and the City should be notified. The City would then contact DAHP and the interested Tribes, as appropriate.

There are many types of archaeological materials that may be identified during construction activities. These may include, but are not limited to:

- Precontact archaeological materials (ethnographic period materials would include those indicated by precontact with the inclusion of some historic-period items):
    - Food remains of shells; bones of fish, birds, land and sea mammals;
    - Dark greasy midden soils--may or may not include fragmented shells, bone, or stone;
    - Fire hearths and earth ovens; thermally modified rocks;
    - Stone tools and flaking debris;
    - Antler or non-sawed bone fragments;
    - Charcoal concentrations and darkened earth;

- Fire-modified rock.

- Historic-period archaeological materials:
  - Low-fired and bisque ceramics with subdued colors, or blue/pink willow-like design; thick-bodied pieces indicating crockery;
  - Nontempered glass; violet-colored glass; stopper-topped glass jars or bottles; press-capped (cork gasket liner) heavy-walled soda or liquor bottles (not twist-top, thin-walled); zinc and vitreous glass-lidded glass canning jars with colored body;
  - Miscellaneous fragments of metal (or plated) clothing closures (hooks and eyes, and suspender fittings, but not zippers), shell buttons, fragments of Bakelite houseware, celluloid;
  - Sawed animal bone and fruit pits;
  - Enameled ironware;
  - Punch-opened and solder-sealed beverage cans; solder-sealed food tins (not thin-walled aluminum and welded steel cans);
  - Remnants of structures/foundations-wood, concrete;
  - Older automotive parts;
  - Knob-and-tube electrical insulators.

The City will take appropriate steps, including when necessary, consulting a professional archaeologist, to determine whether the discovery may be an archaeological site or isolated cultural item. The onsite supervisor will take reasonable steps to protect the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed or the discovery has been adequately protected.

7.1.2 Discovery of Human Remains

Any human remains that are discovered during construction of the Project will be treated with dignity and respect. The affected Native American Tribes are the Tulalip Tribes, Suquamish, and Duwamish Tribes.

If ground-disturbing activities encounter human skeletal remains during the course of construction, then all activity that may cause further disturbance to those remains **must** cease, and the area of the find must be secured and protected from further disturbance. In addition, the finding of human skeletal remains **must** be reported to the King County Medical Examiner **and** local law enforcement in the most expeditious manner possible. The remains should not be touched, moved, or further disturbed.

The King County Medical Examiner will assume jurisdiction over the human skeletal remains, and make a determination of whether those remains are forensic or non-forensic. If the King County Medical Examiner determines the remains are non-forensic, they will report that finding to DAHP. DAHP will then take jurisdiction over those remains and report them to the appropriate cemeteries and affected tribes. The State Physical Anthropologist will make a determination of whether the remains are Indian or non-Indian, and report that finding to any appropriate cemeteries and the affected tribes. DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

7.2 Architectural Resources

7.2.1 Eligibility for the National Register of Historic Places

There are no built resources within the recommended study area that appear to meet the criteria for listing in local, state, or national registers of historic places. However, depending on which regulatory agency becomes involved in the compliance/permitting processes (if any), further study may be required to make final recommendations under criteria other than those that focus solely on architectural qualities (e.g., if this becomes a Section 106 process, DAHP may request an intensive-level survey, which would mean that resources over 50 years old would need evaluation for NRHP eligibility under Criteria A, B, & D in addition to Criterion C).

7.2.2 Recommendations

No built resources within the recommended APE meet the requirements for listing in local, state, or national registers of historic places. Furthermore, the community center location has been devoted to public use since 1974. In the intervening years, surrounding residences have been screened from the community center by foliage, retaining walls, and green space. HRA recommends that the project has little to no potential to affect historically significant resources through either direct or indirect effects.

8. References Cited

Ames, K. M., and H. D. G. Maschner. *Peoples of the Northwest Coast, Their Archaeology and Prehistory*. London, England: Thames and Hudson Ltd., 1999.

Anderson Map Company. *Atlas of King County, Washington,*1907. http://www.historicmapworks.com/.

AYPE Expo Community. "Alaska-Yukon-Pacific Exposition 1909: Seattle, Washington." http://www.aype.com.

Barnosky, Cathy W. "A Record of Late Quaternary Vegetation from Davis Lake, Southern Puget Lowland." *Quaternary Research* 16 (1981): 221–239.

------. "Pleistocene and Early Holocene Environmental History of Southwestern Washington State, U.S.A." *Canadian Journal of Earth Sciences* 21, no. 6 (1983): 619–629.

------. "Late Quaternary Vegetation near Battle Ground Lake, Southern Puget Trough, Washington." *Geological Society of America Bulletin* 96 (1985): 263–271.

------, Patricia M. Anderson, and Patrick J. Bartlein. "The Northwestern U.S. during Deglaciation: Vegetation History and Paleoclimatic Implication." In *North America and Adjacent Oceans during the Last Deglaciation*, Vol. K-3, edited by W. F. Ruddiman and H. E. Wright, Jr., 289–321. Boulder, CO: Geological Society of America, 1987.

Beckner, Chrisanne, Jenny Dellert, and Heather Lee Miller. *Edith Moulton Park Project, City of Kirkland, King County, Washington*. Historical Research Associates, Inc., Seattle, WA. Submitted to Otak, Inc, 2014. On file with the City of Kirkland.

Belcher, William R. "Shellfish Utilization among the Puget Salish." Master's thesis, Western Washington University, 1985.

Broccoli, A. J., and S. Manabe. "The Effects of the Laurentide Ice Sheet on North American Climate during the Last Glacial Maximum." *Geographie physique et Quaternaire* XLI, no. 2 (1987): 291–299.

Brubaker, Linda B. "Climate Change and the Origin of Old-Growth Douglas-Fir Forests in the Puget Sound Lowland." In *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*, edited by Leonard F. Ruggiero, Keith B. Aubry, Andrew B. Carey, and Mark F. Huff, 17–24. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-286, 1991.

Bundy, Barbara. *Interstate 405 Corridor Survey: Phase III I-405, SR 520 to I-5 Improvement Project. Washington State Department of Transportation, Urban Corridors Office, Seattle, Washington*. 2009.

Curtis, Edward S. *The North American Indian*. 20 vols. Cambridge, MA: n.p., 1913.

DAHP. *Washington Heritage Register*. Olympia, WA: Department of Archaeology and Historic Preservation, 2014. http://www.dahp.wa.gov/washington-heritage-register.

------. *Cemetery Detail Report–Chapel of the Resurrection Mausoleum*, Olympia, WA: DAHP, n.d.a.

------. *Cemetery Detail Report–Saint Edwards Seminary Graveyard [Removed]*. Olympia, WA: DAHP, n.d.b.

Easterbrook, Don J. "Advance and Retreat of Cordilleran Ice Sheets in Washington, U.S.A." *Geographie physique et Quaternaire* 46, no. 1 (1992): 51–68.

Ely, Arline. *Our Foundering Fathers: the Story of Kirkland*. Kirkland, WA: Kirkland Public Library, 1975.

Expo Museum. "1909 Seattle." http://www.expomuseum.com/1909/.

Fallon, Mike, *I-405 Northbound MP 19.6 (45KI741) State of Washington Archaeological Site Inventory Form*, AMEC Earth and Environmental, Kirkland, WA, 2006.

Franklin, Jerry F., and C. T. Dyrness. *Natural Vegetation of Oregon and Washington*. N.p.: USDA Forest Service, General Technical Report PNW-8, 1973.

General Land Office (GLO) Land Patent Record-Bernard Crossen, 1873. BLM Serial Nr. WAOAA 068873. Bureau of Land Management, General Land Office Records.

------. Land Patent Record-Hiram Langdon, 1887. BLM Serial Nr. WAOAA 068976. Bureau of Land Management, General Land Office Records.

------. Land Patent Record-Annie H. Josten, 1889a. BLM Serial Nr. WAOAA 069085. Bureau of Land Management, General Land Office Records.

------. Land Patent Record-Rowland Langdon, 1889b. BLM Serial Nr. WAOAA 068991. Bureau of Land Management, General Land Office Records.

Gibbs, George. "Tribes of Western Washington and Northwestern Oregon." In *Contributions to North American Ethnology*, 157–361. Washington, DC: Government Printing Office, 1877.

Gunther, Erna. "Ethnobotany of Western Washington." *University of Washington Publications in Anthropology* 10, no. 1(1945): 1–62.

Haeberlin, Hermann, and Erna Gunther. "The Indians of Puget Sound." *University of Washington Publications in Anthropology* 4, no. 1(1930): 1–83.

Hilbert, Vi, Jay Miller, and Zalmai Zahir. *Puget Sound Geography: Original Manuscript from T. T. Waterman*. Seattle, WA: Lushootseed Press, 2001.

HistoryLink, "Treaty of Point Elliott, 1855" HistoryLink File #2629, historylink.org.

King County Historic Preservation Program. *Technical Paper No. 6: King County and City Landmarks List*. Revised August 2012.

Kroll Map Company. *Kroll's Atlas of King County, Wash*, 1912. http://www.historicmapworks.com/.

------. *Kroll's Atlas of King County, Wash. (T.26N, R5E, W.M.)*, 1926. http://www.historicmapworks.com/.

Kruckeberg, Arthur R. *The Natural History of Puget Sound Country*. Seattle: University of Washington Press, 1991.

Lane, Barbara. *Identity and Treaty Status of the Duwamish Tribe of Indians*. Report prepared for the Department of the Interior and the Duwamish Tribe of Indians, 1975. Special Collections, Allen Library, University of Washington, Seattle.

Lange, Greg. "Juanita Beginnings: Hubbard Post Office Opens on June 20, 1881." HistoryLink File #450, 1998. http://www.historylink.org.

------. "Hops Grown in Western Washington Become an Important World Crop by 1882." HistoryLink File #2003, 2001. http://www.historylink.org.

Larrison, Earl J. *Mammals of the Northwest: Washington, Oregon, Idaho, and British Columbia*. Seattle, WA: Seattle Audubon Society, 1967.

Le Tourneau, Philippe D. *Cultural Resources Monitoring of Microtunnel Access Shaft Excavations for King County's Juanita Bay Pump Station Replacement Project*. Letter Report to Wes Sprague, King County Department of Natural Resources and Parks, Wastewater Treatment Division, Seattle, WA, from BOAS, Inc., Seattle, WA. August 8, 2006.

MacIntosh, Heather M. "Northern Pacific Railroad and Seattle Development." HistoryLink File # 1734, 1999. http://www.historylink.org.

Metsker, Chas. F. *King County 1936*, 1936. http://historicmapworks.com

McCauley, Matthew W. *A Look To The Past: Kirkland*. Auburn, WA: Scriptoria Publications, 2010.

McDonald, Lucile. *Lucile McDonald's Eastside Notebook: 101 Local History Vignettes*. Redmond, WA: Marymoor Museum, 1993.

National Park Service. "Determining the Facts: The Legacy of the Klondike Gold Rush." http://www.nps.gov/nr/twhp/wwwlps/lessons/55klondike/55facts4.htm.

Nelson, Charles M. "Prehistory of the Puget Sound Region." In *Handbook of North American Indians*, edited by William C. Sturtevant, Vol. 7, *Northwest Coast*, edited by Wayne Suttles, 481–84. Washington, DC: Smithsonian Institution, 1990.

NETR Online, *Historic Aerial for Kirkland, Washington area*, 1936. http://www.historicaerials.com.

------. *Historic Aerial for Kirkland, Washington area*, 1968. http://www.historicaerials.com.

------. *Historic Aerial for Kirkland, Washington area*, 1980. http://www.historicaerials.com.

------. *Historic Aerial for Kirkland, Washington area*, 1998. http://www.historicaerials.com.

Pidwirney, Michael, and Scott Jones. *Structure of the Earth*. 2010. http://www.physicalgeography.net/fundamentals/10h.html.

Pielou, E. C. *After the Ice Age: The Return of Life to Glaciated North America*. Chicago, IL: University of Chicago Press, 1991.

Pojar, Jim, and Andy Mackinnon. *Revised-Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia, and Alaska*. Vancouver, BC: Ministry of Forests and Lone Pine Publishing, 1991.

Porter, Stephen C., and Terry W. Swanson. "Radiocarbon Age Constraints on Rates of Advance and Retreat of the Puget Lobe of the Cordilleran Ice Sheet during the Last Glaciation." *Quaternary Research* 50 (1998): 205–13.

Robbins, Jeffrey R., and Amy Dugas. *Proposed Sound Transit Regional Express Totem Lake Project Cultural Resource Assessment. Compliance Archaeology, LLC*. Submitted to Adolfson Associates, Incorporated, Seattle, WA, 2000.

Robinson, Joan M. *A Cultural Resources Survey of 116th Avenue NE from NE 124th Street to the Vicinity of the Metro Park and Ride Lot, and NE 124th Street between 100th Avenue NE and 116th Avenue NE*. Eastern Washington University, Cheney. Conducted for the King County Department of Public Works, 1983a.

------. *An Archaeological Reconnaissance of 100th Avenue NE, NE 124th St. to NE 145th St., Juanita Vicinity, King County*. Archaeological and Historical Services, Eastern Washington University, Cheney. Submitted to Washington State Department of Transportation, District 1, Mercer Island, 1983b.

Roedel, Kurt W., Leonard A. Forsman, Dennis E. Lewarch, and Lynn L. Larson. *Final Juanita Bay Pump Station and Force Mains Cultural Resources Overview and Assessment, King County, Washington*. Larson Anthropological Services Limited, Gig Harbor, WA. Submitted to King County Department of Natural Resources and Parks, Wastewater Treatment Division, Seattle, WA, 2003.

Ruby, Robert H., and John A. Brown. *A Guide to the Indian Tribes of the Pacific Northwest*. Norman: University of Oklahoma Press, 1992.

Ruddiman, W. F., and H. E. Wright, Jr. "North America and Adjacent Oceans during the Last Deglaciation." *Geological Society of America*. Boulder, CO: n.p., 1987.

Schwantes, Carlos A. *The Pacific Northwest: An Interpretive History*. Lincoln: University of Nebraska Press, 1986.

Shaw, Derek, and Brent Hicks. *Archaeological Resource Assessment for the 100th Ave. NE and 99th Place NE Sidewalks Improvement Project, City of Kirkland, King County, Washington*. Historical Research Associates, Inc., Seattle, WA. Submitted to SvR Design Company, Seattle, WA, 2008.

Sheridan, Mimi. *Historic Residential Properties in Kirkland, Washington DRAFT National Register Nomination*. Sheridan Consulting Group. Prepared for the King County Landmarks Program, Seattle, WA, 2001.

Snyder, Dale E., Philip S. Gale, and Russell F. Pringle. *Soil Survey of King County Area, Washington*. Washington DC: USDA Soil Conservation Service, 1973.

Soil Survey Staff. *Web Soil Survey*. Natural Resources Conservation Science, United States Department of Agriculture, 2014. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Spier, Leslie. "Tribal Distribution in Washington." *General Series in Anthropology*, No. 3. Menasha, WI: George Banta Publishing Company, 1936.

Stallings, Rachel J. *Edith Moulton Park Channel Stabilization Project, Archaeological and Cultural Resources Review (BOAS No. 9308 12)*. BOAS, Inc., Seattle, WA. Submitted to King County Surface Water Management Division, Seattle, WA, 1994.

Stein, Alan J., "Kirkland -- Thumbnail History," HistoryLink file #208, 1998. http://www.historylink.org.

------. "Kirkland Incorporates on October 12, 1905," HistoryLink File #7508, 2005. http://www.historylink.org.

------. "King County Purchases Juanita Beach in April 1956," HistoryLink File #4018, 2002. http://www.historylink.org.

Suttles, Wayne. "Environment." In *Handbook of North American Indians*, edited by William C. Sturtevant, Vol. 7, *Northwest Coast*, edited by Wayne Suttles, 16–29. Washington, DC: Smithsonian Institution, 1990.

Suttles, Wayne, and Barbara Lane. "Southern Coast Salish." In *Handbook of North American Indians*, edited by William C. Sturtevant, Vol. 7, *Northwest Coast*, edited by Wayne Suttles, 485–502. Washington, DC: Smithsonian Institution, 1990.

Swanton, John Reed. *Indian Tribes of Washington, Oregon and Idaho*. Bulletin 145 of the Bureau of American Ethnology. Washington, DC: Smithsonian Institution, 1952.

Thomas Brothers. *Map of Seattle*. Los Angeles, CA: Thomas Brothers Map Company, 1955.

Thompson, Gail. *Cultural Resources Assessment of Department of Transportation Park and Ride Lot at 132nd Street and 116th Street, near Kirkland, Washington*. Letter report to R.D. Howard, Washington State Department of Transportation, Issaquah, from the University of Washington, Seattle, 1978.

Thorson, Robert M. "Glacio-isostatic Response of the Puget Sound Area, Washington." *Geological Society of America Bulletin* 1 (1989): 1163–74.

United States Surveyor General (USSG), Field Notes of the Survey of Township 26 North, Range 5 East, Willamette Meridian. Olympia: Washington State Department of Natural Resources, 1859.

------. Field Notes of the Survey of the Subdivisional Lines and Meanderings of Lake Washington in Township No 26 E R. No 5 E Will Mer, 1870. http://www.blm.gov/or/landrecords/survey/yNoteView1_2.php?R0007WA0547005500.

------. General Land Office Map, Township 26 North, Range 5 East, Willamette Meridian. Olympia, WA: Washington State Department of Natural Resources, 1871. http://www.blm.gov/or/landrecords/survey/ySrvy1.php.

University of Washington Digital Collections. "The Klondike Gold Rush." http://content.lib.washington.edu/extras/goldrush.html.

Warren, James R. "World War II Home Front on Puget Sound," HistoryLink File #1664, 1999. http://www.historylink.net.

Washington State Department of Transportation, (WSDOT), *I-405, SR 520 to SR 522 Kirkland Nickel Project Historic, Cultural, and Archaeological Discipline Report and Supplemental Analysis Appendix M*. Washington State Department of Transportation, Olympia, 2005.

Waters, Michael R., Thomas W. Stafford, Jr., H. Gregory McDonald, Carl Gustafson, Morten Rasmussen, Enrico Cappellini, Jesper V. Olsen, Damian Szklarczyk, Lars Juhl Jensen, M. Thomas P. Gilbert, and Eske Willerslev. "Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington." *Science* 334 (October 2011): 351–53.

Whitlam, Robert. "Models of Coastal Adaptation: The Northwest Coast and Maritimes." In *The Evolution of Maritime Cultures on the Northeast and the Northwest Coasts of America*, edited by

Ronald J. Nash, 109–24. Burnaby, BC: Simon Fraser University Department of Archaeology Publications 11, 1983.

Whitlock, Cathy. "Vegetational and Climatic History of the Pacific Northwest during the last 20,000 Years: Implications for Understanding Present-Day Biodiversity." *Northwest Environmental Journal* 8 (1992): 5–28.

Wilma, David "Depression, The Great, 1929–1939." HistoryLink File #3717, 2002, http://www.historylink.com.

04

Civil Report

PREPARED BY KPFF CIVIL ENGINEERS

Civil Report

INTRODUCTION

There are two sites being studied for the siting of the Kirkland Aquatic, Recreation, and Community Center. The first is Juanita Beach Park, adjacent to NE Juanita Drive and 97th Ave NE. The second site is North Kirkland Community Center and Park, adjacent to 103rd Ave NE and NE 124th Street.

One building option is considered at the Juanita site, consisting of a two-story building with parking on three sides. Two options for stormwater treatment and discharge are provided at this site.

Two building options are considered at the North Kirkland site. Option 1 consists of a split ramp parking structure and three-story building. Both structures in this scheme are located to the west of 103rd Ave NE. Option 2 consists of a two-story parking garage at the west of the site and a two-story building that crosses 103rd Ave NE.

Per City of Kirkland stormwater treatment requirements, runoff from pollution generating surfaces such as the top levels of parking structures and parking lots needs to be treated for water quality with a treatment train. A treatment train involves having two water quality facilities in series.

A description of each site is provided below, with information on building finished floor, parking grades, water quality and detention, utility connections, and earthwork quantities. The site maps are intended to accompany this narrative and show preliminary layouts.

JUANITA – PERMEABLE PAVEMENT OPTION

BUILDING FINISHED FLOOR

The building finished floor was set to balance the earthwork cut and fill on the site. This set the lower finished floor elevation (FFE) at 35.5.

PARKING LOT

The parking lot consists of a 6-inch porous concrete layer over an 18-inch gravel base reservoir. Parking lot grades are set to best match existing grades. The south parking entrance comes up from 97th Ave NE to an elevation of 34.5. The north parking entrance comes up from 97th Ave NE to an elevation of 43.5.

WATER QUALITY AND DETENTION

Use of permeable pavement provides the required treatment by allowing parking lot stormwater to infiltrate on site. The depth of gravel base is intended to provide storage for the 100-yr storm over the parking lot footprint. A preliminary geotechnical investigation determined that the groundwater level in early August was 6.5 to 7.5 feet below grade and is estimated to be roughly 5 feet below grade during the winter months. Infiltration rates are estimated at .5 inches/hours.

The infiltration rate and depth to groundwater indicate that the use of porous paving and rain gardens for stormwater disposal are viable for this site. Further location specific infiltration rate analysis will need to be done as the design advances.

This option includes rain gardens around the building to store and infiltrate building runoff from a 100-yr storm event. Flows exceeding this capacity are discharged from the rain gardens through overflow pipes that connect to the downstream system in Juanita Beach Park. Preliminary information would indicate that a gravity connection can be made for the overflow pipe. Elevations of the existing utilities in NE Juanita Drive must be verified. The system in Juanita Beach Park has a flow capacity of 1.2 cfs, but existing flows are unknown. The system's ability to handle additional discharge must be verified with a study of the park's stormwater system. Feasibility of the rain gardens depends on groundwater depth and soil infiltration rates. These factors must be confirmed with a geotechnical investigation.

UTILITY CONNECTIONS

The sanitary sewer connection for the building will be to 97th Ave NE. Water and fire service connections will be from 97th Ave NE. A water loop will go around the building to provide flow to fire hydrants for fire protection.

EARTHWORK

Earthwork quantities listed below are initial approximations for the site. Thickness of the building slab and subgrade is assumed to be 1 ft. Thickness of the parking lot and gravel reservoir is assumed to be 2 ft. Depth of the pool excavation is assumed to be 8 ft. Foundation and rain garden excavations are not included.

Cut = 7,930 Cubic Yards
Fill = 8,370 Cubic Yards
Net Fill = 440 Cubic

JUANITA – SWALE OPTION

BUILDING FINISHED FLOOR

The building finished floor was set to balance the earthwork cut and fill on the site. This set the lower FFE at an elevation of 35.5.

PARKING LOT

Parking lot grades are set to best match existing grades and provide drainage to swales. The south parking entrance comes up from 97th Ave NE to an elevation of 35.5. The north parking entrance comes up from 97th Ave NE to an elevation of 43.5.

WATER QUALITY AND DETENTION

Parking lot runoff requires a water quality treatment train. This option uses swales followed by cartridge filters to treat parking lot runoff. All swales have 3:1 side slopes, longitudinal slopes of 1.5%, and a minimum 1ft depth.

The north parking lot is treated by a swale located at the northwest corner of the site. This swale slopes down to the west, has a length of 135 ft, and a bottom width of 4 ft. The west parking lot is treated by two swales located to the west of the parking. The two swales are sloped such that stormwater flows to a central collection point. The northern swale slopes down to the south, has a length of 130 ft, and a bottom width of 5 ft. The southern swale slopes down to the north, has a length of 130 ft, and a bottom width of 4.2 ft. Water from these three swales is treated by a filter with 18 cartridges before entering detention.

The east parking lot is treated by one swale located between the building and the south parking lot. This swale slopes down to the west, has a length of 125 ft, and a bottom width of 2.6 ft. At the end of this swale, stormwater continues to flow to the west in a conveyance channel and culvert under the walkway. The south parking lot is treated by a swale between the drop-off circle and the west parking lot. This swale flows down to the west, has a length of 120 ft, and a bottom width of 2.5 ft. Flow from these two swales is treated by a storm filter with 7 cartridges before entering detention.

With stormwater treatment preceding detention, both parking and building detention can be combined in one vault. This vault provides 91,000 cf of storage. Vault inside depth is 8.5 ft, with 6.5 ft for detention storage and 2 ft for freeboard and sediment storage. Inside dimensions of the vault are 100 ft by 130 ft. Outflow from detention is at an elevation below nearby storm mains and requires pumping. A 150 cf pump vault provides 5 minutes of storage for the 25-year discharge from the detention vault of 0.47 cfs. Water is pumped to an existing catch basin in NE Juanita Drive.

UTILITY CONNECTIONS

The sanitary sewer connection for the building will be to 97th Ave NE. Water and fire service connections will be from 97th Ave NE. A water loop will go around the building to provide flow to fire hydrants for fire protection.

EARTHWORK

Earthwork quantities listed below are initial approximations for the site. Thickness of the building slab and subgrade is assumed to be 1 ft. Thickness of the parking lot is assumed to be 1 ft. Depth of the pool excavation is assumed to be 8 ft. Detention tank excavation is included. Foundation and swale excavation are not included.

Cut = 9,220 Cubic Yards
Fill = 10,130 Cubic Yards
Net Fill = 910 Cubic Yards

NORTH KIRKLAND – OPTION 1

BUILDING FINISHED FLOOR

The building finished floors were set based on the point of access off 103rd Ave NE. Starting at an elevation of 132 at 103rd Ave NE, we came down at 2% for 50 ft and back up toward the building at 2% for 25 ft to the building entrance. This set the upper FFE at 131.5 and the lower FFE at 116.5 assuming 15 ft floor to floor. At this elevation, the lower level of the building is approximately 3 ft to 8 ft above existing grades at the west side of the building.

PARKING STRUCTURE

The elevation of the split ramp parking structure was set to provide natural ventilation. We came up from 103rd Ave NE to an elevation of 132.5 and back down to the middle deck elevation at 132. The garage is assumed to have 5% slopes on split ramps and 12 ft between decks. On the east side, the upper deck is set at an elevation of 144 and the lower deck at 120. The slope of the ramp in the east-west direction sets elevations on the western side of the garage at 138 for the upper deck, 126 for the middle deck, and 114 for the lower deck. The lower deck on the west side is approximately 7 ft to 10 ft above existing grades.

WATER QUALITY AND DETENTION

Parking garage runoff requires a water quality treatment train. We are proposing a wetvault followed by a cartridge filter. The parking garage vault provides detention and wetvault storage for the parking structure. Required parking detention is 13,400 cf and wetvault storage is 3,300 cf. Vault inside depth is 9.5 ft, providing 6 ft for detention storage, 1.5 ft for wetvault storage, and 2 ft for freeboard and sediment storage. Inside dimensions of the vault are 45 ft by 50 ft. The vault is set under the lower level of the parking structure to take advantage of the elevation difference between the garage and the existing grade. Vault outflow passes through a filter with 1 cartridge and discharges by gravity to a new pipe that runs north to NE 126th Street.

The second vault provides detention for the building and remainder of the site. Required site detention is 34,800 cf. Vault inside depth is 8 ft, with 6 ft for detention storage and 2 ft for freeboard and sediment storage. Inside dimensions of the vault are 65 ft by 90 ft. The vault is set under the lower floor of the building to take advantage of the space between the finished floor and existing grade. Vault outflow discharges by gravity to a new pipe that runs north to NE 126th Street.

UTILITY CONNECTIONS

The sanitary sewer connection for the building will be to NE 124th Street to allow the building to gravity discharge. It is assumed that drainage from the middle and lower levels of the parking structure will need to be treated and discharged to the sanitary sewer with a pump. A separate sanitary sewer connection will be made to 103rd Ave NE for the garage. The water and fire service connections for the building will be from 103rd Ave NE.

EARTHWORK

Earthwork quantities listed below are initial approximations for the site. Thickness of the building slab and subgrade is assumed to be 1 ft. Thickness of the parking garage slab and subgrade is assumed to be 1 ft. Depth of the pool excavation is assumed to be 8 ft. Detention tank excavations are included. Foundation excavations are not included.

Cut = 11,300 Cubic Yards
Fill = 6,690 Cubic Yards
Net Cut = 4,610 Cubic Yards

NORTH KIRKLAND – OPTION 2

BUILDING FINISHED FLOOR

The building finished floor elevations were set to meet grades of the parking structure. The grade comes up from the driveway on NE 124th Street to an elevation of 124.5 and back down to 124 on south end of the upper deck. Access from the parking to the building set the lower FFE of the building at an elevation of 124, and the upper FFE at 139. The lower FFE is approximately 25 ft to 28 ft below existing grades on the east side of the building.

PARKING STRUCTURE

The parking structure was set to provide access from NE 124th Street. The upper deck elevation is at an elevation of 124 at the south end and is sloped to an elevation of 120 at the north end. Assuming 12 ft floor to floor, the south end of the lower deck sits at an elevation of 112 and the north end at 108. The parking structure sits approximately 3.5 ft above existing grade at the northwest corner and 3 ft below at the southwest corner. The garage will need to be designed to support a fire truck with outriggers.

WATER QUALITY AND DETENTION

Parking garage runoff requires a water quality treatment train. We are proposing a wet vault followed by a cartridge filter. The parking garage vault provides detention and wetvault storage for the parking structure. Required parking detention is 35,600 cf and wetvault storage is 6,700 cf. Vault inside depth is 10.5 ft, providing 7 ft for detention storage, 1.5 ft for wetvault storage, and 2 ft for freeboard and sediment storage. Inside dimensions of the vault are 50 ft by 100 ft. The vault is located east of the parking garage for ease of construction and to ensure gravity discharge. Vault outflow passes through a filter with 1 cartridge and discharges to a new pipe that runs north to NE 126th Street.

The second vault provides detention for the building and remainder of the site. Required site detention is 34,800 cf. Vault inside depth is 9 ft, with 7 ft for detention storage and 2 ft for freeboard and sediment storage. Inside dimensions of the vault are 50 ft by 100 ft. The vault is located east of the parking garage for ease of construction. Vault outflow discharges to a new pipe that runs north to NE 126th Street.

UTILITY CONNECTIONS

This scheme requires relocation of utilities. The parking structure sits 20 ft west of the building to provide room for 10 ft spacing between water and sanitary lines and 5 ft clear space for the lines from the garage and the building. Due to space constraints, the relocated storm line from 103rd Ave NE is shown inside the garage along the eastern wall. The garage would have to be 30 ft from the building to have room to route the storm line outside the garage.

The sanitary sewer connection for the building will be to the relocated sanitary line. It is assumed that drainage from the lower level of the parking structure will need to be treated and discharged to the sanitary sewer with a pump. A separate sanitary sewer connection will be made to the relocated sewer line to serve the garage. The fire service and water connections for the building will be from the relocated water line.

EARTHWORK

Earthwork quantities listed below are initial approximations for the site. Thickness of the building slab and subgrade is assumed to be 1 ft. Thickness of the parking garage slab and subgrade is assumed to be 1 ft. Depth of the pool excavation is assumed to be 8 ft. Detention tank excavations are included. Foundation excavation is not included.

Cut = 48,420 Cubic Yards
Fill = 3,570 Cubic Yards
Net Cut = 44,850 Cubic Yards

PARKING

ROOF DRAIN

RAIN GARDEN
AREA = 1,540 SF

ROOF DRAIN

RAIN GARDEN
AREA = 3,780 SF

ROOF DRAIN

RAIN GARDEN
AREA = 4,850 SF

PROPOSED BUILDING SITE
FFE = 35.5'

ROOF DRAIN

RAIN GARDEN
AREA = 6,460 SF

WALKWAY

ROOF DRAIN

RAIN GARDEN
AREA = 1,580 SF

DROP-OFF

PARKING

6" POROUS CONCRETE
18" GRAVEL BASE RESERVOIR

EXISTING TENNIS
COURT
ELEVATION 29.0±

PARK BOUNDARY

DIRECT DISCHARGE TO CATCH
BASIN IN JUANITA BEACH PARK
ACROSS THE STREET

NE JUANITA DRIVE

BEACHFRONT PARK

97TH AVENUE NE

0 15 30 60
1 inch = 30 feet

NORTH

Juanita Beach Park Site - Permeable Pavement - Site Plan
07/21/14

THE Sports Management GROUP

SWALE LENGTH 135'
BOTTOM WIDTH 4.0'

PARKING

JUANITA CREEK

PROPOSED BUILDING SITE
FFE = 35.5'

STORM FILTER
18 CARTRIDGES
FLOW = 0.60 CFS

SWALE LENGTH 130'
BOTTOM WIDTH 5.0'

SWALE LENGTH 130'
BOTTOM WIDTH 4.2'

EXISTING TENNIS
COURT
ELEVATION 29.0±

PARK BOUNDARY

LENGTH = 130'
WIDTH = 100'
DEPTH = 8.5'

DETENTION VAULT
91,000 CF

PUMP VAULT
150 CF
5'x10'

WALKWAY

CULVERT

SWALE LENGTH 120'
BOTTOM WIDTH 2.5'

DROP-OFF

STORM FILTER
7 CARTRIDGES
FLOW = 0.23 CFS

SWALE LENGTH 125'
BOTTOM WIDTH 2.6'

PARKING

97TH AVENUE NE

NE JUANITA DRIVE

BEACHFRONT PARK

0 15 30 60
1 inch = 30 feet

NORTH

Juanita Beach Park Site - Swale - Site Plan
07/21/14

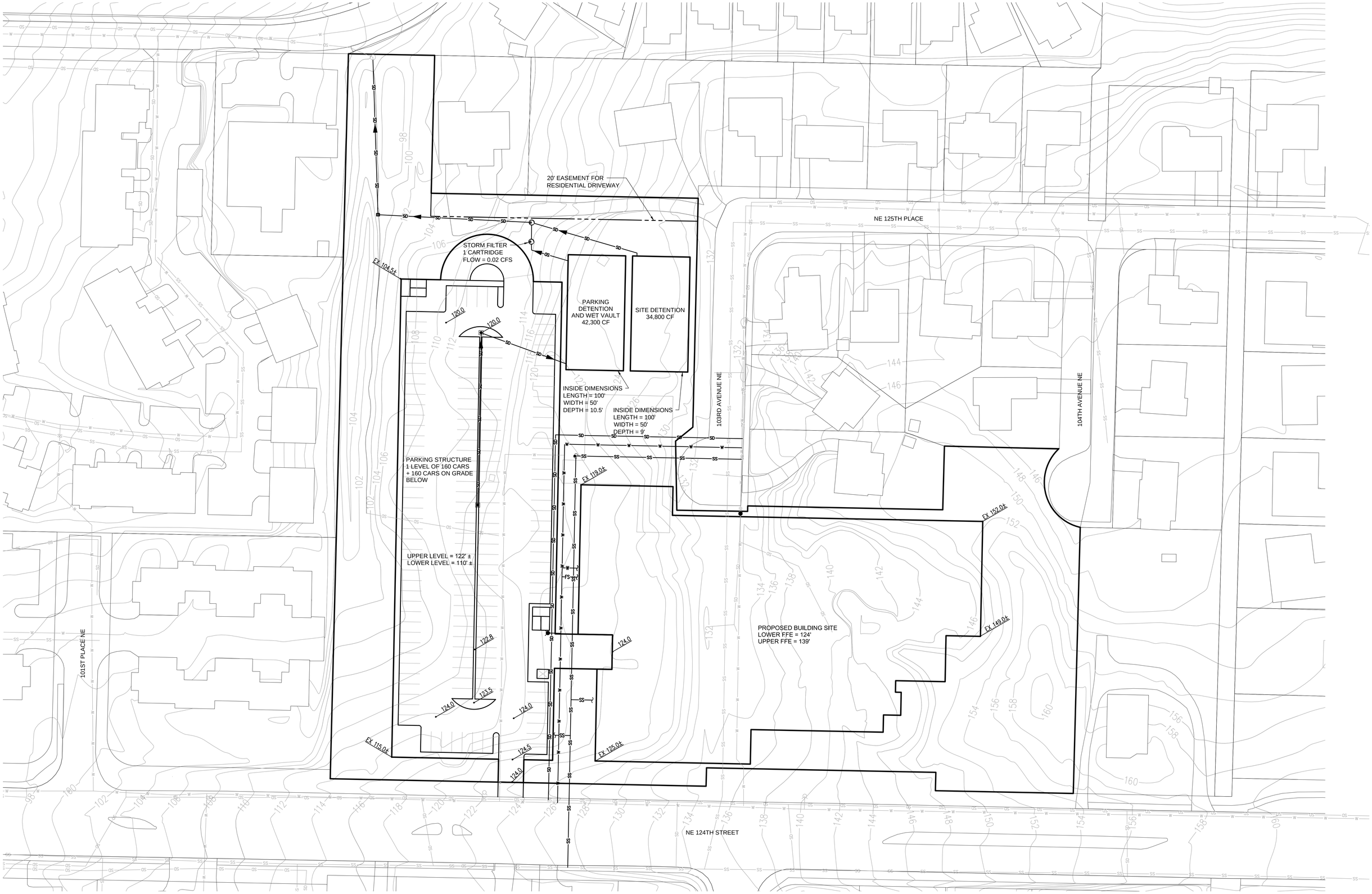
THE Sports Management GROUP

0 15 30 60
1 inch = 30 feet

NORTH

North Kirkland Site - Scheme 1 - Site Plan
07/22/14

THE Sports Management GROUP



0 15 30 60
1 inch = 30 feet

NORTH

North Kirkland Site - Scheme 2- Site Plan

07/22/14

THE Sports Management GROUP

05

Phase I Geotechnical Evaluation

PREPARED BY
AMEC ENVIRONMENT & INFRASTRUCTURE, INC.

PRELIMINARY GEOTECHNICAL SITE EVALUATION

Proposed Aquatics, Recreation and Community Center

Kirkland, Washington

Prepared for:

City of Kirkland Parks and Community Services
505 Market Street, Suite A
Kirkland, Washington 98033

Prepared by:

AMEC Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, Washington 98011

March 7, 2014

Project No. 4-917-17725-0

TABLE OF CONTENTS

FIGURES

PRELIMINARY GEOTECHNICAL SITE EVALUATION
Aquatic, Recreation and Community Center
Kirkland, Washington

PROJECT DESCRIPTION

The City of Kirkland is in the preliminary stages of selecting a site for a new community center at one of two potential sites located in the Juanita area of Kirkland. Preliminary development plans call for a new community center that may include a recreation pool, lap pool, locker rooms, banquet hall, gymnasium, fitness center, and other associated features. The lap pool would be either 25 yards or
50 meters long. The new center will either be approximately 78,000 square feet in plan area depending on whether the 50-meter competition pool is included or not.

This report evaluates the geotechnical considerations of two potential sites at the locations shown in Figure 1. The first site is at Juanita Beach Park, located at 9703 NE Juanita Drive; the new community center would be located on the north side of NE Juanita Drive. The second site is at the North Kirkland Community Center and Park, located at 12421 103rd Ave NE.

This report provides information about these two sites that the City of Kirkland will use to assist in selecting a site for the new community center. The conclusions and recommendations contained in this report are based on our understanding of the currently proposed utilization of the project sites, as derived from site aerial photos, site visit, geotechnical research, written information, and verbal information supplied to us. Consequently, if any changes are made in the currently proposed project, or if additional site information becomes available, we may need to modify our conclusions and recommendations contained herein to reflect those changes.

RESEARCH

AMEC Environment & Infrastructure, Inc. (AMEC) visited the two sites and reviewed readily available information during February 2014. Our research program included the following elements:

- A visual surface reconnaissance of both sites;
- A review of published geologic and seismologic maps and literature;
- Research of past AMEC geotechnical engineering studies near the vicinity of the proposed sites; and
- Research of exploration and well logs near the sites that were available from Washington State Department of Ecology and Department of Natural Resources.

SITE CONDITIONS

The following sections of text present our interpretations regarding surface, soil, groundwater, and seismic conditions at each project site.

DEVELOPMENT AND SURFACE CONDITIONS

The Juanita Beach Park site, displayed on Figure 2, is bounded by NE Juanita Drive to the south, 97th Avenue NE to the east and residential housing to the north and west. Located on the site are tennis courts in the southwest corner, a softball field along the central western edge, a one-story building in the northeast area, a paved parking lot in the southeast and a second softball field situated between the one-story building and parking lot. The remaining surface area is open space with grass and trees. The sites topography is generally flat.

The North Kirkland Community Center, displayed in Figure 3, is bounded by NE 124th Street to the south, 103rd Avenue NE to the east and residential housing to the north and west. The community center building, paved parking lot, and drive lanes are situated in the eastern half of the site, and a basketball court is located in the northwest area of the site. The southwest corner of the site is open space with grass. The sites topography generally slopes down to the northwest with an overall drop
in elevation of approximately 25 feet from the sites southeast corner to northwest corner.

SOIL CONDITIONS

The geologic units noted in the vicinity of each site on the geologic map “Geologic Map of the Kirkland Quadrangle, Washington” by James P. Minard (1993), are not specifically delineated but offer a general geologic overview. Subsurface exploration of each site would be required to specifically define the geologic units and soil matrix for each proposed community center site.

Juanita Beach Site

According to published geologic maps, soil conditions at the Juanita Beach are generally composed of Pleistocene glacial deposits consisting of Recessional Outwash. The Recessional Outwash is generally described as stratified sand and gravel, moderate to poorly graded, and well-bedded silty sands to clayey sands, generally grading coarser with depth. The depositional environment of Recessional Outwash is typically proglacial and ice-margin environments.

We reviewed nine boring and well logs from subsurface explorations near the Juanita Beach. Based upon our review of these reports, the site is generally composed of loose to medium dense Recessional Outwash sands to a depth of around 25 feet, which contain a variable amount of silt and/or clay with some possible interbedded silt or clay layers. The underlying soils appear to become dense below 25 feet from the ground surface. Some of the explorations encountered a variable thickness of fill near the surface.

AMEC performed a geotechnical investigation near the proposed site titled "*Preliminary Geotechnical Engineering Report – NE Juanita Drive & 98th Avenue NE*", dated April 20, 2001. The report pertains to the parcel located at the northwest corner of the intersection, which is approximately 500 feet east of Juanita Beach Park (Figure 2). Our explorations encountered 2 to 8 feet of fill, over soft silt 8 to 10 feet below ground surface. Below the silt, we encountered medium dense sand extending to a depth of 19 to 34 feet below the ground surface. Dense silty sand was present at greater depths.

North Kirkland Community Center Site

The North Kirkland Community Center site is mapped as Transitional Beds and Recessional Outwash. Transitional Beds are generally described as laminated to massive silt, clayey silt, and silty clay deposited in lowlands or proglacial lakes. These beds typically indicate the transition from a time of non-glacial and glacial deposition. Glacial Recessional Outwash is generally described as stratified sand and gravel, moderate to poorly graded, and well-bedded silty sands to clayey sands, generally grading courser with depth. The depositional environment of Recessional Outwash is typically proglacial and ice-margin environments.

We reviewed two geotechnical reports that included test pits ranging from 400 to 700 feet northwest and southwest from the North Kirkland Community Center. The test pits encountered Transitional Beds (Qtb) composed of silts, sands and silty sands.

AMEC performed a geotechnical investigation adjacent to the North Kirkland Community Center site for the City of Kirkland titled "*Pavement Surfacing Report - NE 124th Street*", dated March 6, 2008. The two borings nearest to the Kirkland Community Center were borings B-4 and B-5 (Figure 3). In boring B-4, we encountered 3.5 feet of loose fill, over stiff silt and medium dense sand (Transitional Beds). In boring B-5, we encountered 1 foot of medium dense fill over 5 feet of medium dense silty sand, underlain by medium stiff silt (Transitional Beds).

GROUNDWATER CONDITIONS

The groundwater information presented in this report is based on information available in the vicinity of the sites. Specific groundwater conditions for each proposed site location would require subsurface exploration to be performed. At all times of the year, groundwater levels would likely fluctuate in response to precipitation patterns, construction activities, site utilization, and other site influential factors such as water levels within nearby streams and drainages.

Juanita Beach

Available well logs in the vicinity reported the groundwater table between 5 to 17 feet below the ground surface. AMEC's preliminary geotechnical report for the parcel at the northwest corner of NE Juanita Drive and 98th Avenue NE encountered groundwater between 8 to 12.5 feet below the ground surface. Two well logs at the intersection of 93rd Avenue NE and Juanita Drive document artesian water pressure levels at 5 and 8 feet above the ground surface on April 25, 2002.

We anticipate that groundwater will be near the water level of the existing Juanita Creek on the west site of the site, approximately 5 feet below existing grades, and gradually deepen toward the east to about 10 feet below existing grades. We do not anticipate that artesian water pressures will be present within the Juanita Beach Park site.

North Kirkland Community Center

The closest test pit to the northwest of the site found groundwater seepage between the depths of 5.5 to 9 feet below ground surface.

We anticipate that groundwater levels will be approximately 5 feet below existing ground surface in the northwest corner of the site where site elevations are lowest and approximately 25 to 30 feet below existing ground surface on the southeast quadrant of the site where site elevations are highest. This assumes that the groundwater levels are static throughout the site.

SEISMIC CONDITIONS

The soils beneath the Juanita Beach Park site consist of soft silts, loose to medium dense sands, and dense gravels. The soils beneath North Kirkland Community Center consist of interbedded layers of medium dense sands and medium stiff silts. In accordance with 2012 *International Building Code* Table 1613.5.2, we preliminarily recommend using Site Class D for both sites (based on geologic maps, our explorations, and explorations by others).

The following maximum considered spectral accelerations should be used to determine the design response spectrum, per Figure 1613:

Spectral Acceleration for short periods (Ss):	125 percent of gravity (1.252g)
Spectral Acceleration for a 1-second period (S1):	48 percent of gravity (0.483g)

A value of 1.00 should be used for site coefficient F_a and 1.517 for site coefficient F_v for both sites.

We anticipate that the soils underlying the Juanita Beach Park may be subject to liquefaction in the event of an earthquake due the loose to medium dense nature of the sandy soils. If through site specific subsurface investigation, the soils underlying the site are determined to be liquefiable, seismic Site Class F will need to be used for design requiring a seismic site response analysis be performed. However, if the structure is designed having fundamental periods of vibration equal to or less than 0.5, a site response analysis does not need to be performed and the values stated above can be used for design.

CONCLUSIONS AND RECOMMENDATIONS

JUANITA BEACH PARK

Construction of a new aquatics, recreation and community center on the site appears feasible from a geotechnical standpoint, however ground improvement or deep foundations will probably be needed to support the building and prevent damage during an earthquake. Dewatering during excavation for the pool will probably be needed.

Existing Topsoil and Fill: There may be uncontrolled fill and/or thick deposits of topsoil at this site that will need to be removed.

Liquefaction Considerations: The soils underlying the site may be susceptible to liquefaction during a severe earthquake due to the loose nature of the sandy soils and presence of shallow groundwater. However, the risk of surface settlement and/or damage appears to decrease about 25 feet beneath the existing ground surface. Mitigation measures appear warranted for the proposed development to minimize the risk of surface settlements and damage.

Foundation Options: In our opinion, the new structures will likely need to be supported by a pile foundation to mitigate the risks of liquefaction induced settlement. Augercast concrete piles appear to be well-suited for supporting the proposed structure, due to their favorable combination of moderate capacity, low cost, and low-vibration installation technique. Alternatively, ground improvement methods could mitigate the risk of liquefaction. Aggregate piers offer the most advantages for the relative cost. Aggregate piers provide improvement of the loose to medium dense soils beneath the site to mitigate the potential for liquefaction and increase the allowable bearing capacity used in the design of spread footings. Spread footings for aggregate pier modified subgrade can be designed with a bearing capacity in the range of 3,500 to 5,000 pounds per square foot. We anticipate footings founded on aggregate piers will experience minimal long-term and liquefaction induced settlements.

Floor Options: If liquefaction induced settlements cannot be tolerated, we recommend that the floor slabs be supported on either piles or compacted aggregate piers as described

above. Floor slabs constructed on soils modified with compacted aggregate piers could be designed for a stiffness modulus ranging from 200 to 300 pounds per cubic inch (pci).

Stormwater Infiltration: Infiltration of stormwater would be limited to low volumes and slow flow rates due to the shallow groundwater table.

On-site Soil Reuse: The near-surface silty soils and fill that may be encountered are highly moisture-sensitive and susceptible to disturbance when wet. These soils will be very difficult to use as structural fill. The sands and gravels that would be encountered during excavation of the swimming pool could be used as structural fill in a broad range of weather conditions, although aeration might be needed to achieve an optimum moisture content during especially wet conditions or excavated from below the water table. To maximize the potential for reusing silty soils as structural fill, earthwork should be scheduled for periods of dry weather, such as that usually occurring during the summer and fall.

Temporary Dewatering: For the deep excavation for the pool, we recommend the groundwater levels be maintained at a depth of at least 2 ft below the base of the excavation. We anticipate this will require a series of dewatering wells. A sheet pile shoring system may be advantageous by reducing the amount of dewatering and the size of the excavation. Well construction and water from dewatering wells, any sumps, and runoff should be handled in accordance with applicable state and local requirements. At the termination of dewatering, all wells should be abandoned in accordance with Washington Administrative Code (WAC) 173-160.

Permanent Groundwater: Buoyant forces will need to be incorporated in the pool design, specifically for the case when the pool is empty. We recommend that a worst case scenario of a groundwater table at the existing ground surface be assumed for design. Alternatively, a drainage system to relieve hydrostatic uplift forces such as pop-up drains and/or pumps may be used when the pool is drained for maintenance.

NORTH KIRKLAND COMMUNITY CENTER

Construction of a new aquatic center on the site appears feasible from a geotechnical standpoint, however a large amount of grading will be needed due to the sloping topography.

Existing Topsoil and Fill: There may be uncontrolled fill from previous site grading. If encountered, uncontrolled fill may need extra effort to reuse or may need to be removed during grading.

Foundation Options: In our opinion, the new structures can be supported by conventional spread footings bearing upon properly prepared medium dense and medium stiff native soils. Spread footings for the existing dense native soils or new structural fill can be designed with a bearing capacity in the range of 2,000 to 3,000 pounds per square foot. Deeper foundations or ground improvement could be used to support higher loads.

Floor Options: We anticipate new structures will be able to use soil-supported slab-on-grade floors supported by dense native soil or structural fill.

Stormwater Infiltration: Infiltration of stormwater does not appear feasible due to the high silt content of the near-surface site soils and their relative density, which would, in our opinion, correspond to a very slow infiltration rate.

On-site Soil Reuse: Due to the large proportion of silt, the soils will be very difficult to use as structural fill. To maximize the potential for reusing the site soils as structural fill, earthwork should be scheduled for periods of dry weather, such as that usually occurring during the summer and fall.

Temporary Dewatering: For the deep excavations for the pools, particularly in the lower elevations of the site, we tentatively anticipate that the excavation can be adequately dewatered by series of internal ditches, sumpholes, and pumps if groundwater seepage is encountered.

Permanent Groundwater: Buoyant forces might need to be incorporated in the pool design, specifically for the case when the pool is empty. We recommend that a worst-case scenario of a groundwater table about 5 feet below existing ground surface be assumed for design. Groundwater elevations could be assumed to be lower if the structure is located towards the southeast section of the site. Alternatively, a drainage system to relieve hydrostatic uplift forces such as pop-up drains and/or pumps may be used when the pool is drained for maintenance.

RECOMMENDED ADDITIONAL SERVICES

After the specific locations, architectural layouts, and primary structural details of the buildings and associated structure locations have been established, we should perform a design-phase geotechnical evaluation. This type of evaluation will include advancing borings within the specific building footprint, conducting laboratory tests, performing geotechnical engineering analyses, and preparing a geotechnical engineering report.

CLOSURE

The preliminary conclusions and recommendations presented in this report are based, in part, on the information provided to us by the City of Kirkland Parks Department and a limited amount of available information in the vicinity of the sites. AMEC would be pleased to propose our scope of work for site specific explorations when needed.

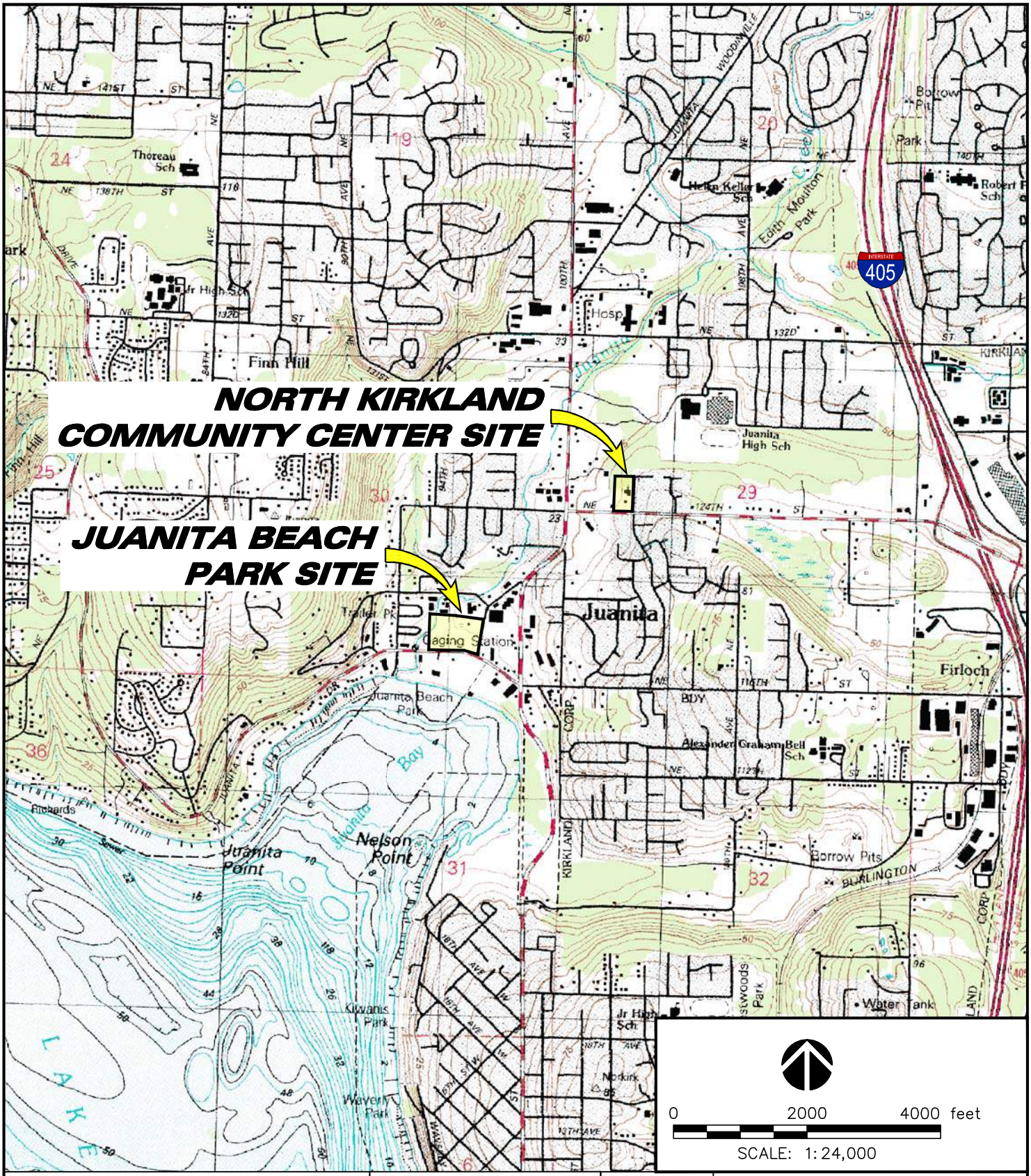
We appreciate the opportunity to be of service on this project. If you have any questions regarding this report, or any aspects of the project, please feel free to contact our office.

Sincerely,

AMEC Environment & Infrastructure, Inc.

Carlo Evangelisti, P.E.
Senior Engineer

Todd D. Wentworth, P.E., L.G.
Associate



AMEC Environment & Infrastructure 11810 North Creek Parkway North Bothell, WA, U.S.A. 98011-8201		CLIENT LOGO	CLIENT KIRKLAND PARKS DEPARTMENT	
PROJECT JUANITA AQUATIC CENTER, Kirkland, Washington		DWN BY: JRS	DATUM: NAD83	DATE: MARCH 2014
TITLE LOCATION MAP		CHK'D BY: KM	REV. NO.:	PROJECT NO: 4-917-17725-0
		PROJECTION: WA STATE PLANE	SCALE: AS SHOWN	FIGURE No. 1

C:\Users\jeffrey.sanders\appdata\local\temp\AcPublish_5844\17725-01.dwg – SITE PLAN – Mar. 04, 2014 8:56am – jeffrey.sanders

LEGEND

- HOLT DRILLING *(WELL REPORT)*
- SHANNON & WILSON *(WELL REPORT)*
- AMEC *(SOIL BORING)*
- KING COUNTY DNR *(WELL REPORT)*
- CASCADE DRILLING *(SOIL BORING)*
- SUBSURFACE LIC *(WELL REPORT)*

0 200 400

SCALE IN FEET

CLIENT LOGO

CLIENT: KIRKLAND PARKS DEPARTMENT

AMEC Environment & Infrastructure
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

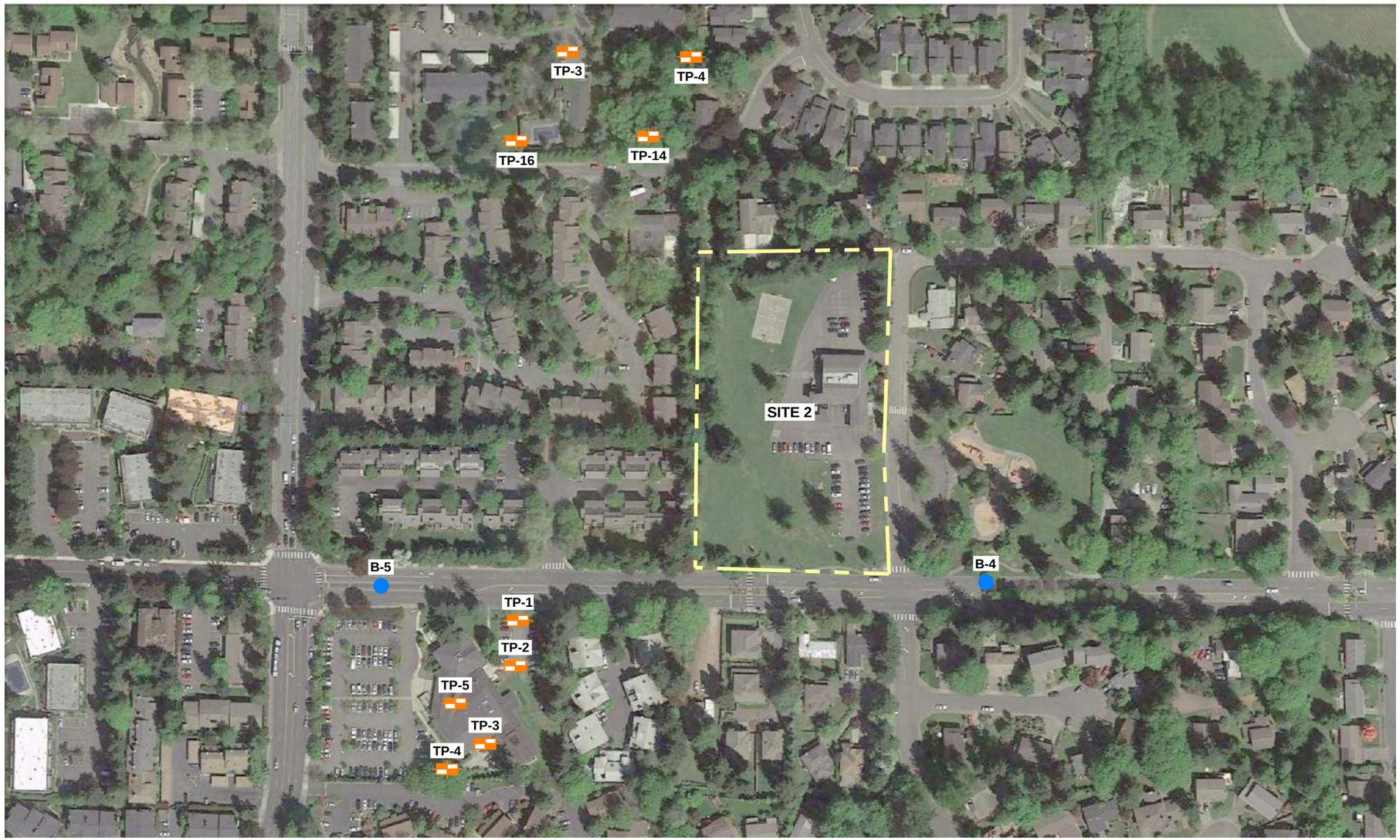
DWN BY:	JRS
CHK'D BY:	KM
DATUM:	NONE
PROJECTION:	NONE
SCALE:	AS SHOWN

PROJECT: JUANITA AQUATIC CENTER
Kirkland, Washington

TITLE: EXPLORATION DATA PLAN
JUANITA BEACH PARK

DATE:	MARCH 2014
PROJECT NO:	4-917-17725-0
REV. NO.:	
FIGURE No.	2

C:\Users\jeffrey.sanders\appdata\local\temp\AcPublish_5844\17725-02.dwg – SITE 1 – Mar. 04, 2014 9:10am – jeffrey.sanders



LEGEND

- AMEC *(SOIL BORING)*
- EARTH CONSULTANTS *(TEST PITS)*

0 200 400

SCALE IN FEET

CLIENT LOGO

CLIENT: KIRKLAND PARKS DEPARTMENT

AMEC Environment & Infrastructure
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

DWN BY:	JRS
CHK'D BY:	KM
DATUM:	NONE
PROJECTION:	NONE
SCALE:	AS SHOWN

PROJECT: JUANITA AQUATIC CENTER
Kirkland, Washington

TITLE: EXPLORATION DATA PLAN
KIRKLAND COMMUNITY CENTER

DATE:	MARCH 2014
PROJECT NO:	4-917-17725-0
REV. NO.:	
FIGURE No.	3

C:\Users\jeffrey.sanders\appdata\local\temp\AcPublish_5844\17725-02.dwg – SITE 2 – Mar. 04, 2014 9:12am – jeffrey.sanders

06

Phase II Geotechnical Evaluation

PREPARED BY
AMEC ENVIRONMENT & INFRASTRUCTURE, INC.

PRELIMINARY GEOTECHNICAL SITE EVALUATION

Proposed Kirkland ARC at Juanita Beach Park

Kirkland, Washington

Prepared for:

City of Kirkland Parks and Community Services
505 Market Street, Suite A
Kirkland, Washington 98033

Prepared by:

AMEC Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, Washington 98011

August 20, 2014

Project No. 4-917-17725-A

August 20, 2014
Project No. 4-917-17725-A

City of Kirkland Parks and Community Services
505 Market Street, Suite A
Kirkland, Washington 98033

Attention: Ms. Jennifer Schroder

Subject: Preliminary Geotechnical Site Evaluation
Kirkland ARC at Juanita Beach Park
Kirkland, Washington

Dear Ms. Schroder:

AMEC Environment & Infrastructure, Inc. (AMEC), is pleased to submit this report describing our preliminary geotechnical evaluation for developing a portion of Juanita Beach Park for the proposed Kirkland Aquatic, Recreation, and Community Center (Kirkland ARC). The purpose of our evaluation was to derive preliminary feasibility-level conclusions and recommendations concerning stormwater infiltration and building foundations. Due to the preliminary nature of this evaluation, a design-phase geotechnical engineering evaluation will be needed for final design.

The scope of work was described in our proposal letter dated July 24, 2014, which was authorized on August 7, 2014. This report has been prepared for the exclusive use of the City of Kirkland, Sports Management Consultants, and their consultants, for specific application to this project, in accordance with generally accepted geotechnical engineering practice.

SITE AND PROJECT DESCRIPTION

The City of Kirkland is in the preliminary stages of selecting a site for a new aquatic center at one of two potential sites. This report summarizes the geotechnical considerations at the Juanita Beach Park site. The site is located at 9703 NE Juanita Drive, Kirkland, Washington, as shown in Figure 1, and:

- Latitude 47.70, Longitude -122.21;
- Township 26 North, Range 5 East, Section 30, Southeast 1/4.

The new aquatic center would be located on the north side of NE Juanita Drive, as shown in the Site & Exploration Plan (Figure 2).

Figure 2 also shows the proposed development of the site. Preliminary development plans call for a new aquatic center that may include a leisure pool, lap pool, locker rooms, banquet hall, gymnasium, fitness center, and other associated features. The lap pool would be either 25 or 50 meters long. This report provides information about the Juanita Beach Park site that the City of Kirkland will use to assist in selecting a site for the new aquatic center. The conclusions and recommendations contained in this report are based on our understanding of the currently proposed utilization of the project site, our previous research of the site, and our recent field explorations. Consequently, if any changes are made in the currently proposed project, or if additional site information becomes available, we may need to modify our conclusions and recommendations contained herein to reflect those changes.

EXPLORATORY METHODS

We explored surface and subsurface conditions at the project site on August 8, 2014. Our exploration and testing program comprised the following elements:

- A visual surface reconnaissance of the site;
- Three borings (designated B-1 through B-3) advanced at strategic locations across the site.
- Laboratory analysis of selected samples.

Figure 2 depicts the approximate locations of the borings, and Table 1 provides the depths and elevations of the borings.

TABLE 1 - APPROXIMATE LOCATIONS, ELEVATIONS, AND DEPTHS OF EXPLORATIONS

Exploration	Functional Location	Surface Elevation (feet)	Termination Depth (feet)
B-1	Northeast Corner of Building	38	11.5
B-2	Southwest Corner of Building	32	21.5
B-3	Northwest Parking Lot	33	11.5

Elevations derived from map by Sports Management Group dated July 21, 2014

The specific number, locations, and depths of our explorations were selected in relation to the existing and proposed site features, under the constraints of surface access, underground utility conflicts, and budget considerations. We estimated the relative location of each exploration by measuring from existing features and scaling these measurements onto a layout plan supplied to us. We estimated the surface elevations by interpolating between topographic contour lines on the same map.

Consequently, the data listed in Table 1 and the locations depicted on Figure 2 should be considered accurate only to the degree permitted by our data sources and implied by our measuring methods.

It should be realized that the explorations performed for this evaluation reveal subsurface conditions only at discrete locations across the project site and that actual conditions in other areas could vary. Furthermore, the nature and extent of any such variations would not become evident until additional explorations are performed or until construction activities have begun. If significant variations are observed at that time, we may need to modify our conclusions and recommendations contained in this report to reflect the actual site conditions.

SOIL BORING PROCEDURES

Our exploratory borings were advanced with a hollow-stem auger, using a truck-mounted drill rig operated by an independent drilling firm working under subcontract to AMEC. A geologist from our firm continuously observed the borings, logged the subsurface conditions, and collected representative soil samples. Throughout the drilling operation, soil samples were obtained at 5-foot depth intervals by means of the Standard Penetration Test (SPT) per ASTM:D-1586. The resulting SPT values indicate the relative density of granular soils and the relative consistency of cohesive soils. All samples were stored in watertight containers and later transported to an independent laboratory for further visual examination and testing. After each boring was completed, the borehole was backfilled with a mixture of bentonite chips and soil cuttings to the ground surface.

The enclosed boring logs describe the vertical sequence of soils encountered in each boring, based primarily on our field classifications and supported by laboratory testing. Where a soil contact was observed to be gradational, our logs indicate the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. Groundwater depth estimates are based on the moisture content of soil samples, the wetted height on the drilling rods, and the water level measured in the borehole after the auger has been extracted.

SOIL CONDITIONS

The geologic units noted in the vicinity on the geologic map “Geologic Map of the Kirkland Quadrangle, Washington” by James P. Minard (1993), are not specifically delineated but offer a general geologic overview. According to Minard (1993), soil conditions at the Juanita Beach Park are generally composed of Pleistocene glacial deposits consisting of Recessional Outwash. The

Recessional Outwash is generally described as stratified sand and gravel, moderate to poorly graded; and well-bedded silty sands to clayey sands, generally grading coarser with depth. The depositional environment of Recessional Outwash is typically proglacial and ice-margin environments.

Our borings generally confirmed the mapped geologic soils. The site is generally composed of loose to medium dense Recessional Outwash sands and silty sands, with some interbedded silt or clay layers. Based upon our review of other exploration logs in the area, the soils appear to become dense below 25 feet from the ground surface. The enclosed exploration logs provide a detailed description of the soil strata encountered in our subsurface explorations, and Table 2 summarizes the approximate thicknesses, depths, and elevations of soil layers.

TABLE 2 - APPROXIMATE THICKNESSES, DEPTHS, AND ELEVATIONS OF SOIL LAYERS

Exploration	Thickness of Silty sand / sandy silt (feet)	Thickness of silty sand (feet)	Thickness of sand (feet)	Depth of Groundwater (feet)	Elevation of Groundwater (feet)
B-1	5.8	2.2	3.5+	7.6	30.5
B-2	6	5.5	11+	7.5[1]	24.5
B-3	3	NE	8.5+	6.5[1]	26.5

Elevations derived from map by Sports Management Group dated July 21, 2014
N/E not encountered within depth of exploration
[1] Boring was left open 15 to 20 minutes before water level was taken.

Our geotechnical laboratory tests revealed that soils in the upper 5 feet ranged from: silt with about 10 percent sand; to silty sand with about 30 percent fines (silt and clay). The sands encountered at deeper depths only had about 5 percent fines. The enclosed laboratory testing sheets graphically illustrate our test results, and Table 3 summarizes these results.

TABLE 3 - LABORATORY TEST RESULTS

Soil Sample	Moisture Content (percent)	Gravel Content (percent)	Sand Content (percent)	Silt/Clay Content (percent)	D10 (mm)
B-1 S-1 (5 ft)	27	0	9	91	N/A
B-2 S-1 (5 ft)	18	0	70	30	N/A
B-2 S-3 (15 ft)	25	0	75	5	0.18
B-3 S-1 (5 ft)	6	0	94	6	0.17

GROUNDWATER CONDITIONS

Groundwater measurements were taken within the bore holes on August 8, 2014. Measurement was taken immediately after drilling in B-1. In B-2 and B-3 the borehole was left open for about 30 minutes after drilling to allow the groundwater in the boring to stabilize somewhat prior to measuring. We found that groundwater was at approximately 7.5 feet below ground surface (bgs) on the west site of the site (elevation 30.5 feet), and about 6.5 feet bgs on the east portion of the site (elevation 24.5 feet), near the water level of Juanita Creek.

Because our explorations were performed during an extended period of generally dry weather, these observed groundwater conditions may closely represent the yearly low levels; somewhat higher levels probably occur during the winter and spring months. At all times of the year, groundwater levels would likely fluctuate in response to precipitation patterns, construction activities, and site utilization.

INFILTRATION CONDITIONS

Stormwater infiltration will be limited by the shallow groundwater table and the silty sand soils at the site. The seasonal high groundwater table could be within 5 feet of the existing ground surface, and the Department of Ecology 2012 Stormwater Management Manual for Western Washington (SWMMWW) recommends 5 feet of separation between the infiltration level and the groundwater table. Groundwater mounding analysis will be needed to determine the feasibility of infiltrating the site stormwater. For preliminary design considerations, we have estimated an infiltration rate for the soils in the upper 5 feet based on grain size distribution. Because the soils were too fine-grained to use the correlation method described in the SWMMWW, we used the Department of Ecology 2005 Stormwater Management in Western Washington manual. Based on Section 3.3.6, we recommend assuming a preliminary design infiltration rate of 0.5 inches per hour. In-situ testing and groundwater mounding analysis will need to be performed in order to determine a final design infiltration rate.

SEISMIC CONDITIONS

The loose to medium dense sands encountered below the groundwater table are susceptible to liquefaction during a large earthquake. If the soils underlying the site are determined to be liquefiable, seismic Site Class F will need to be used for design, requiring a seismic site response analysis be performed in accordance with the 2012 International Building Code Table 1613.5.2. However, according to ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*, if the structure is designed having fundamental periods of vibration equal to or less than 0.5 seconds, a site response analysis does not need to be performed and Site Class D can be used for design. In that case, the

following maximum considered spectral accelerations could be used to determine the design response spectrum, per Figure 1613:

Spectral Acceleration for short periods (S_s):	125 percent of gravity (1.252g)
Spectral Acceleration for a 1-second period (S_1):	48 percent of gravity (0.483g)

A value of 1.00 should be used for site coefficient F_a and 1.517 for site coefficient F_v.

CONCLUSIONS AND RECOMMENDATIONS

Design and construction of a new aquatic center on this site will have to account for a shallow groundwater table and soils that are susceptible to liquefaction during a large earthquake. The following conclusions and recommendations are provided to assist with feasibility and conceptual design of the project.

Liquefaction Considerations: Based on our preliminary review, the soils underlying the site may liquefy during a design-level earthquake, due to the loose sandy soils and presence of shallow groundwater. The foundation design will need to address these conditions in order to minimize the risk of settlement. The risk of liquefaction-induced lateral spreading toward Juanita Creek and possibly toward Lake Washington will need to be checked as part of final design.

Foundation Options: Structures will likely need to be supported by a deep foundation to mitigate the risk of liquefaction-induced settlement. Augercast concrete piles appear to be well-suited for supporting the proposed structure, due to their favorable combination of moderate capacity, low cost, and low-vibration installation technique. Alternatively, ground improvement methods could mitigate the risk of liquefaction. Assuming the thickness of potentially liquefiable soils is on the order of 25 feet, aggregate piers offer the most advantages for the relative cost. Aggregate piers provide improvement of the loose to medium dense soils beneath the site to mitigate the potential for liquefaction and increase the allowable bearing capacity used in the design of spread footings.

Floor Options: We recommend that the floor slabs be supported either on piles or a ground-improved subgrade, such as the aggregate piers described above.

Stormwater Infiltration: Infiltration of stormwater would be limited to low volumes and slow flow rates due to the shallow groundwater table and silty sand soils. Any stormwater infiltration systems will have to be very shallow in order to maintain an adequate vadose zone above the groundwater table. For conceptual design, we have estimated a long-term design infiltration rate of 0.5 inches/hour for the soils in the upper 5 feet. For more detailed design, in-situ testing and groundwater mounding analysis will be needed.

Temporary Dewatering: For the deep excavation for the pool, we recommend the groundwater levels be maintained at a depth of at least 2 ft below the base of the excavation. We anticipate this will require a series of temporary dewatering wells. Installation of a fully encircling sheet pile cofferdam,

with dewatering wells installed inside the cofferdam may be advantageous by reducing the volume of dewatering. It should be recognized that standard sheet piling is not water tight, and some additional seepage into the excavation should be anticipated, which would need to be handled with sumps and pumps. Well construction and water from dewatering wells, any sumps, and runoff should be handled in accordance with applicable state and local requirements.

Temporary Sloping and Shoring: Temporary excavations may be sloped according to WISHA requirements. For planning, we would classify site soils as Site Class C and assume temporary cut slope inclinations of 1.5H:1V or flatter. If these slopes cannot be accommodated, then temporary shoring would be required. A sheet pile shoring system would be feasible at this site with generally loose to medium dense sands. As mentioned previously, a sheet pile cofferdam surrounding the deep excavation would also assist temporary dewatering.

Permanent Groundwater: Buoyant forces will need to be incorporated in the pool design, specifically for the case when the pool is empty. We recommend that a worst case scenario of a groundwater table at the existing ground surface be assumed for design, with adequate weighting or anchoring of the structure. Alternatively, a drainage system to relieve hydrostatic uplift forces such as pop-up pressure relief drains and/or sump pumps may be used when the pool is to be drained for maintenance.

RECOMMENDED ADDITIONAL SERVICES

After the specific locations, architectural layouts, and primary structural details of the buildings and associated structure locations have been established, we should perform a design-phase geotechnical evaluation. This type of evaluation will include advancing borings within the specific building footprint, conducting laboratory tests, performing geotechnical engineering analyses, and preparing a geotechnical engineering report.

CLOSURE

The preliminary conclusions and recommendations presented in this report are based, in part, on the explorations that we performed for this study. If our design-phase geotechnical explorations reveal significant variations in subgrade conditions, we may need to revise these conclusions and recommendations. AMEC would be pleased to submit a proposal for a design-phase evaluation once a site has been selected and design is underway.

We appreciate the opportunity to be of service on this project. If you have any questions regarding this report or any aspects of the project, please feel free to contact our office.

Sincerely,

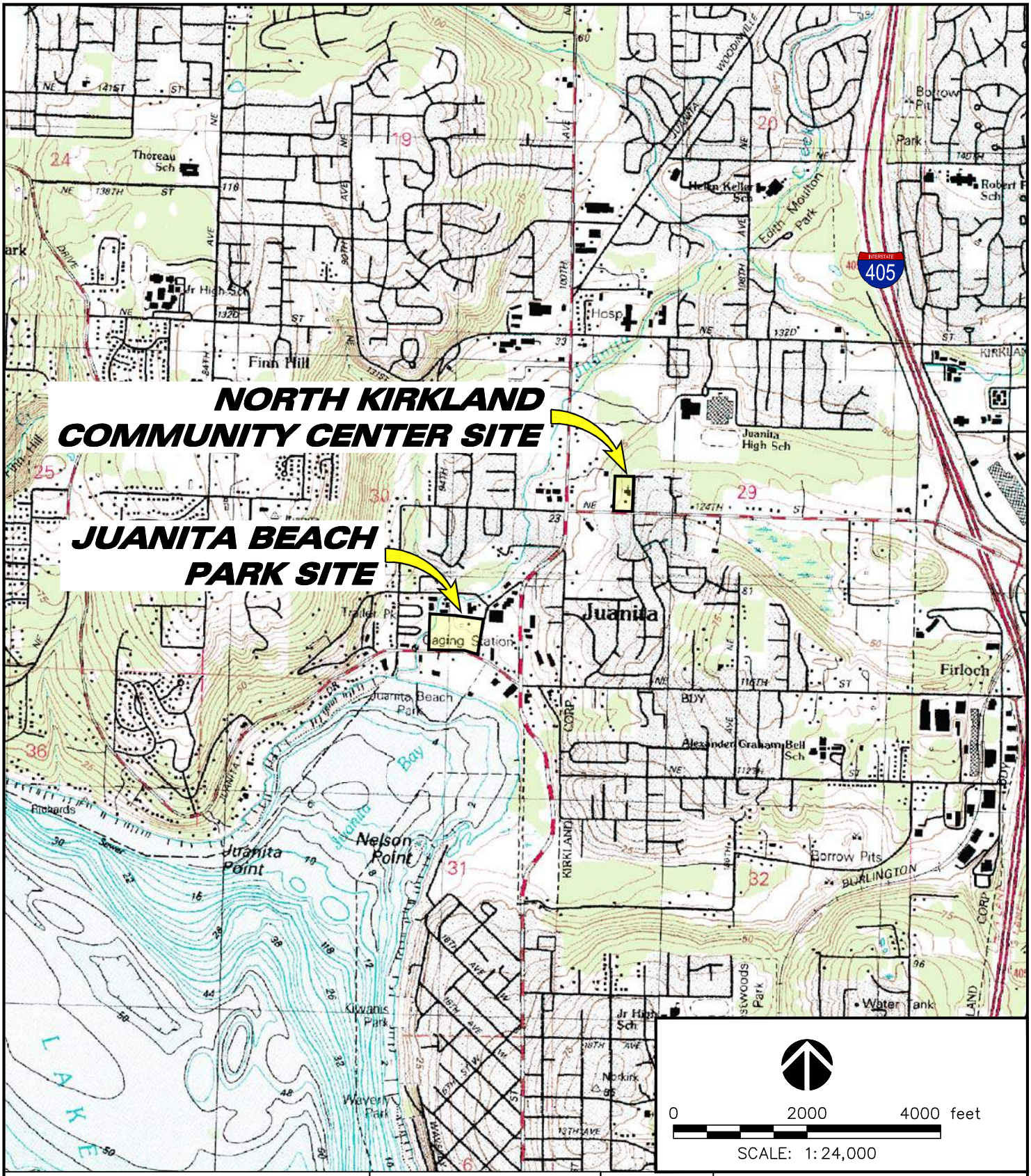
AMEC Environment & Infrastructure, Inc.

Todd D. Wentworth, P.E., L.G.
Associate

Pat Reed, L.E.G.
Senior Geologist

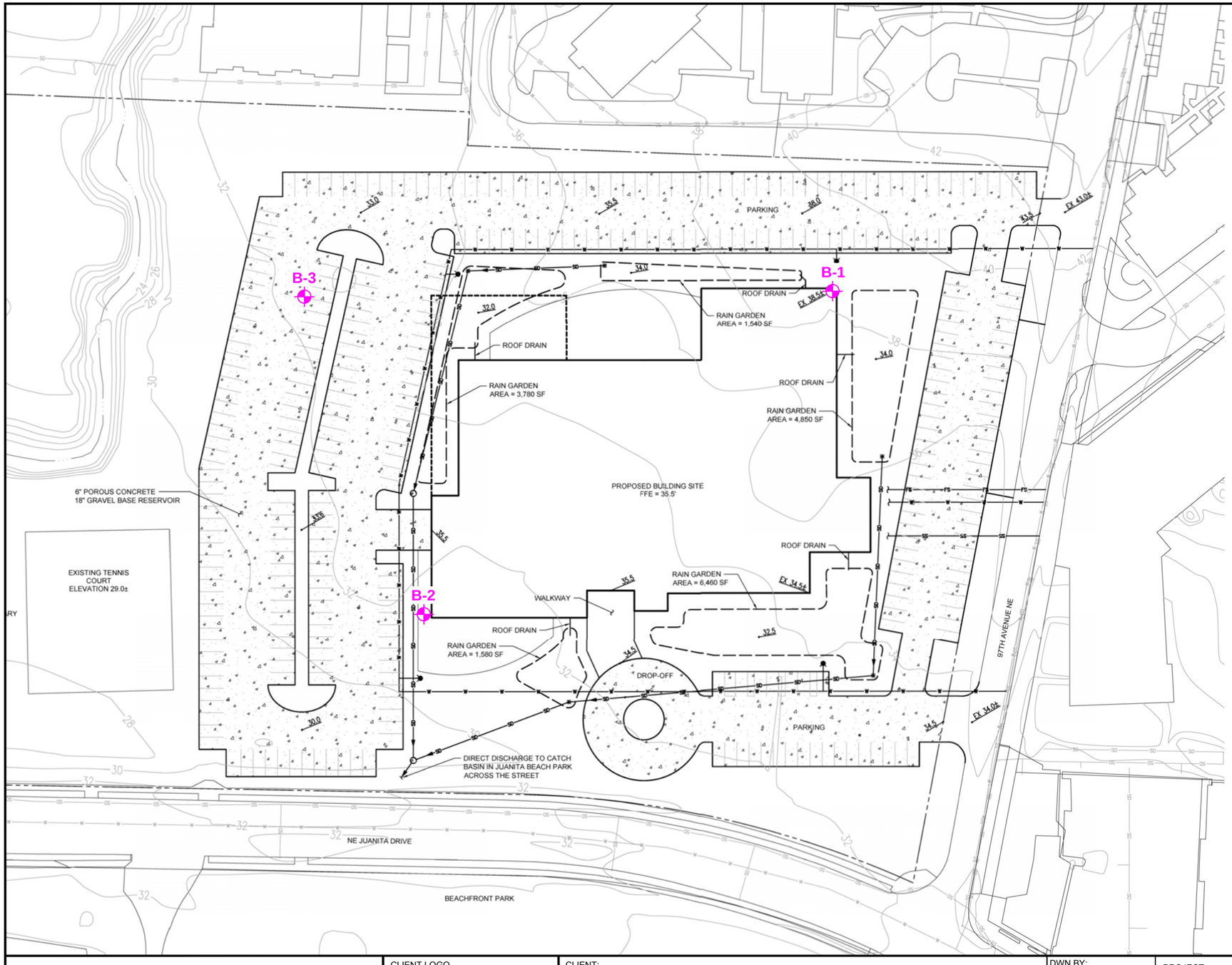
Reviewed by: James S. Dransfield, P.E.
Principal

Enclosures: Figure 1. Location Map
Figure 2. Site and Exploration Plan
Boring Logs B-1 through B-3
Grain Size Distribution Graphs



AMEC Environment & Infrastructure 11810 North Creek Parkway North Bothell, WA, U.S.A. 98011-8201		CLIENT LOGO	CLIENT KIRKLAND PARKS DEPARTMENT	
PROJECT JUANITA AQUATIC CENTER, Kirkland, Washington		DWN BY: JRS	DATUM: NAD83	DATE: MARCH 2014
TITLE LOCATION MAP		CHK'D BY: KM	REV. NO.:	PROJECT NO: 4-917-17725-0
		PROJECTION: WA STATE PLANE	SCALE: AS SHOWN	FIGURE No. 1

C:\Users\jeffrey.sanders\appdata\local\temp\AcPublish_5844\17725-01.dwg – SITE PLAN – Mar. 04, 2014 8:56am – jeffrey.sanders



LEGEND

B-3 — BORING NUMBER AND APPROXIMATE LOCATION

0 80 160

SCALE IN FEET

MAP PROVIDED BY THE SPORTS MANAGEMENT GROUP ON JULY, 21, 2014.

CLIENT LOGO

CLIENT: CITY OF KIRKLAND

AMEC
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

DWN BY:	JRS
CHK'D BY:	TDW
DATUM:	NONE
PROJECTION:	NONE
SCALE:	AS SHOWN

PROJECT: KIRKLAND ARC
JUANITA BEACH PARK SITE
Kirkland, Washington

TITLE: SITE AND EXPLORATION PLAN

DATE: AUGUST 2014
PROJECT NO: 4-917-17725-A
REV. NO.:
FIGURE No. 2

G:\91\17000\17725-A – Juanita Pool Replacement\17725-A-02.dwg – Layout1 – Aug. 19, 2014 9:09am – jeffrey.sanders

PROJECT: *Kirkland ARC -- Juanita Beach* JOB No. *4-917-17725* BORING No. *B-1*

Soil Description

Location: Adjacent to old house

Approximate ground surface elevation: 38.0 feet

DEPTH (feet) | USCS/USGS GRAPHICS | SAMPLE TYPE | SAMPLE NUMBER | GROUND WATER | PENETRATION RESISTANCE | Page 1 of 1 | TESTING

PENETRATION RESISTANCE: ▲ Standard; ##/## Blows over inches; △ Other; Blows per foot; 0 10 20 30 40 50

0

Soft, moist, reddish brown to tan SILT with scattered roots.

5

Loose,wet, olive to light tan, silty SAND, with interbeds of silt that are oxidized orange.

1.5% S-1

5

ATD

Medium dense, saturated, light olive gray SAND, weth some silt.

10

1.3% S-2

12

Boring terminated at approximately 11.5 feet

15

20

91 93

0 20 40 60 80 100

Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

ATD Groundwater level at time of drilling

Grain Size Analysis (% fines shown) Moisture Content (% shown)

amec

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Automatic Date drilled: *August 08, 2014* Logged By: *PLR*

Drilled by: *EDI*

BOTHELL_LOG FORMAT 2012 4_917_17725 KIRKLAND POOL GINT FILES.GPJ BOTHELL GEO 2010 B&TP.GDT 8/20/14

PROJECT: *Kirkland ARC -- Juanita Beach* JOB No. *4-917-17725* BORING No. *B-2*

Location: North center of park
Approximate ground surface elevation: 32.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Loose, moist, dark brown organic-rich silty SAND with leaf litter and roots.				
	Loose, moist tan silty SAND, no bedding.		1.5%	S-1	
5	Loose, wet tan SAND with some silt, disturbed bedding, oxidized orange in places. Note: boring left open 20 minutes to check groundwater.		1.5%	S-2	
10	Medium dense, saturated, olive gray, poorly graded SAND, bedded (2-4"). trace silt.		1.5%	S-3	
15	Grades to fine to medium grained SAND. Driller notes rough drill action at 15 feet. Moisture content low due to water drained prior to removal from sampler.		1.5%	S-4	
20	Boring terminated at approximately 21.5 feet				

PENETRATION RESISTANCE
▲ Standard ##/## Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

Page 1 of 1

TESTING

29 18

5 35

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

Observed groundwater level

Grain Size Analysis (% fines shown) Moisture Content (% shown)

amec

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Automatic Date drilled: *August 08, 2014* Logged By: *PLR*

Drilled by: *EDI*

BOTHELL_LOG FORMAT 2012 4_917_17725 KIRKLAND POOL GINT FILES.GPJ BOTHELL GEO 2010 B&TP.GDT 8/20/14

PROJECT: *Kirkland ARC -- Juanita Beach* JOB No. *4-917-17725* BORING No. *B-3*

Location: Northwest baseball field.
Approximate ground surface elevation: 32.5 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot 0–50)	TESTING
0	Loose, dry, tan, silty SAND with scattered fine organics (roots).						
5	Loose, wet, olive gray, poorly graded SAND with trace silt.		.9%	S-1	▼	● ▲9	6
	Note: boring left open 15 minutes to check groundwater.						
	Becomes medium dense, saturated.						
10			1.5%	S-2		▲16	
	Boring terminated at approximately 11.5 feet						
15							
20							

Page 1 of 1

LEGEND

- 2.00-inch OD split-spoon sampler
- ▼ Observed groundwater level
- Grain Size Analysis (% fines shown)
- Moisture Content (% shown)

MOISTURE CONTENT: 0 20 40 60 80 100 — Plastic Limit — Liquid Limit

amec

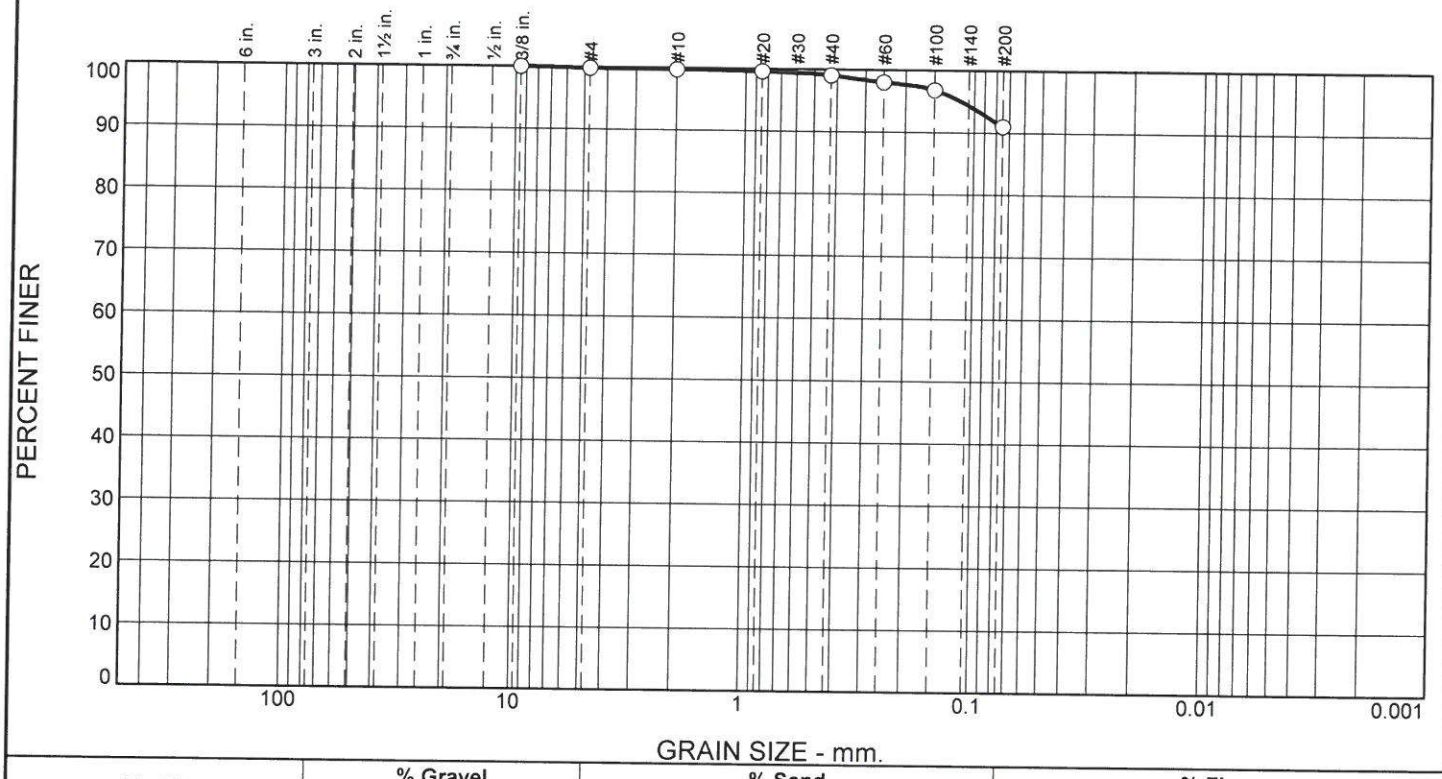
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Automatic Date drilled: *August 08, 2014* Logged By: *PLR*

Drilled by: *EDI*

BOTHELL_LOG FORMAT 2012 4_917_17725 KIRKLAND POOL GINT FILES.GPJ BOTHELL GEO 2010 B&TP.GDT 8/20/14

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.1	0.7	8.0	91.0	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	99.8		
#10	99.7		
#20	99.6		
#40	99.0		
#60	98.0		
#100	96.9		
#200	91.0		

* (no specification provided)

Material Description

Brown to gray clayey silt.

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample ID: 48997-A.
Natural Moisture Content (ASTM D-2216): 27.2%

Date Received: 8/13/14 **Date Tested:** 8/19/14

Tested By: Corbett Mercer

Checked By: Corbett Mercer

Title: Lab Manager

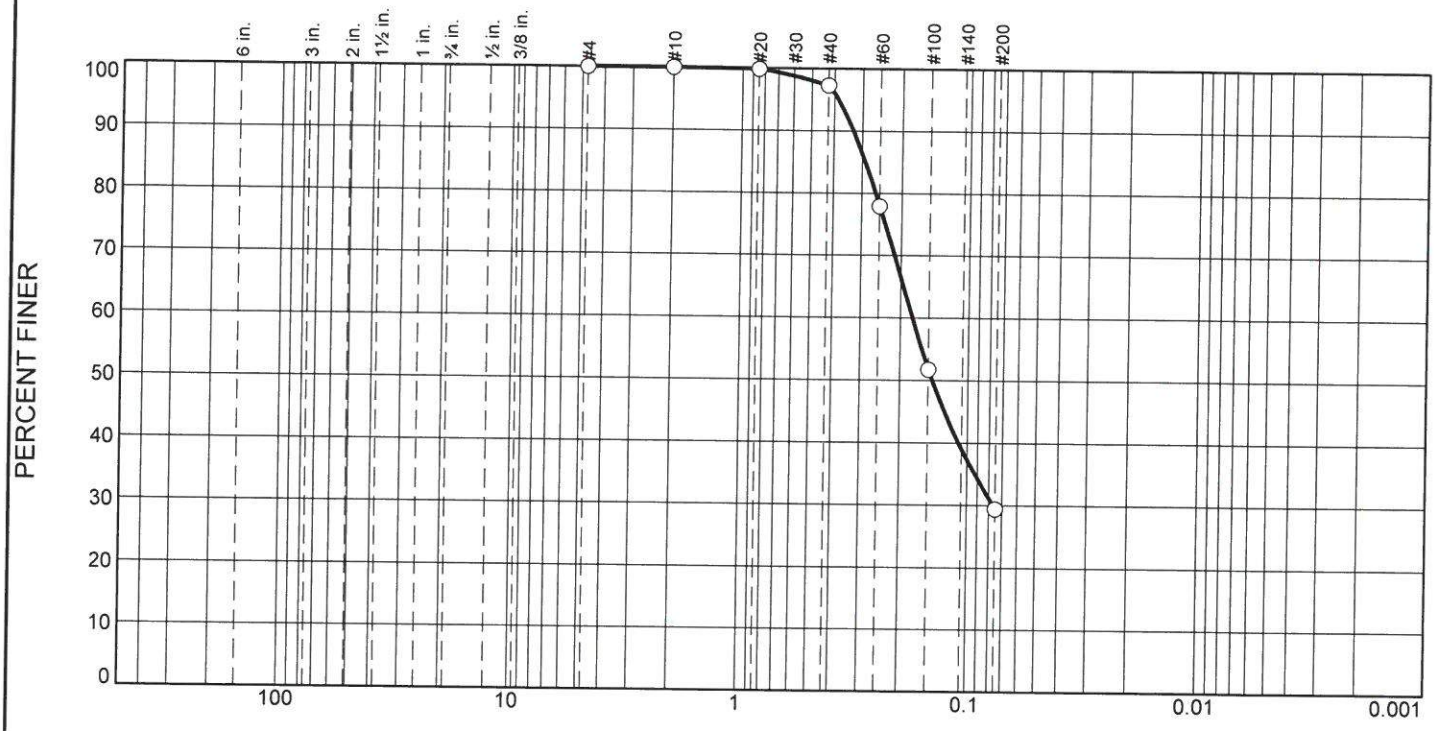
Location: Client Supplied; B-1
Sample Number: 48997-A **Depth:** 5' **Date Sampled:** 8/13/14

Krazan

Client: AMEC Environment & Infrastructure, Inc.
Project: Juanita Beach - Lab Testing

Project No: 09614271 **Figure**

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.7	67.8	29.5	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	100.0		
#20	99.8		
#40	97.3		
#60	78.0		
#100	51.7		
#200	29.5		

* (no specification provided)

Material Description

Yellowish-brown silty sand.

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.3292 D_{85}= 0.2907 D_{60}= 0.1776
D_{50}= 0.1442 D_{30}= 0.0766 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample ID: 48997-B.
Natural Moisture Content (ASTM D-2216): 17.6%

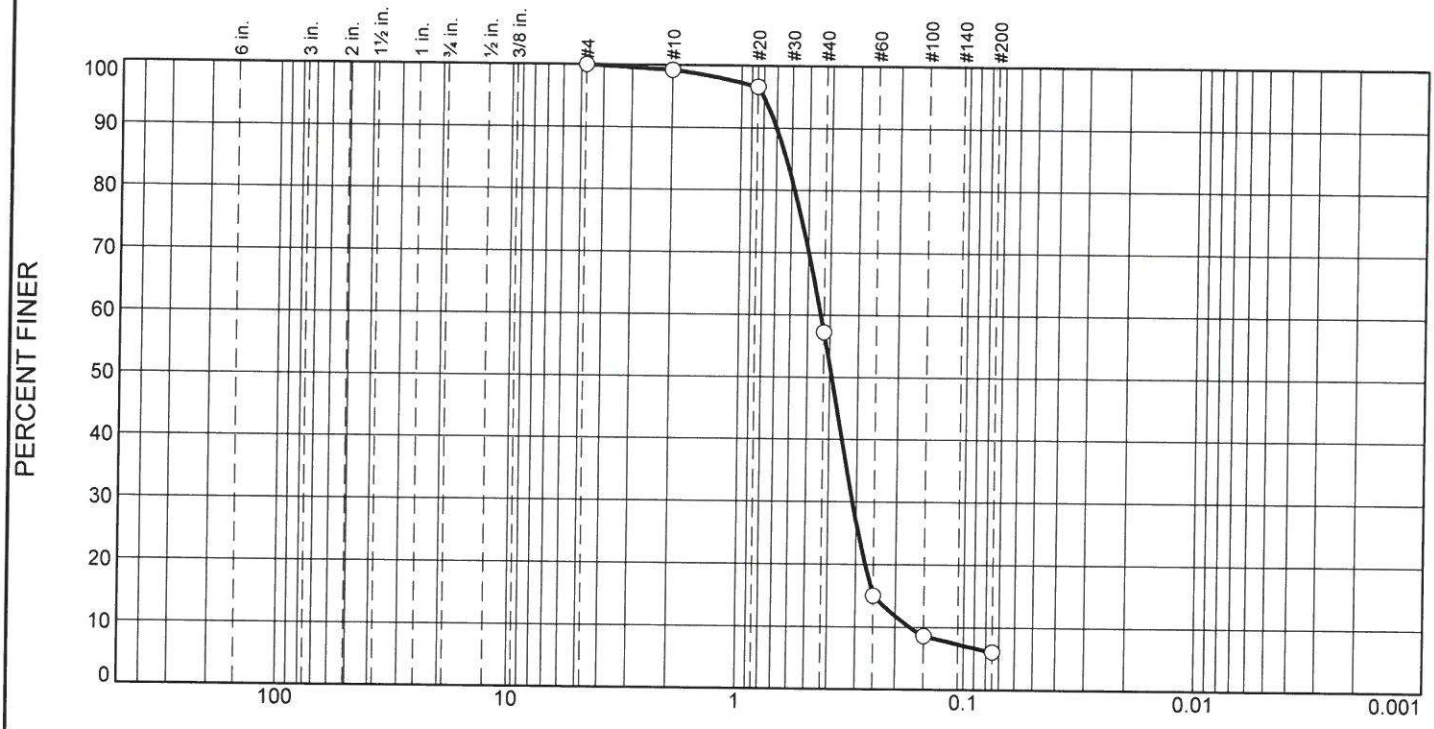
Date Received: 8/13/14 **Date Tested:** 8/19/14
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; B-2
Sample Number: 48997-B **Depth:** 5' **Date Sampled:** 8/13/14

Krazan

Client: AMEC Environment & Infrastructure, Inc.
Project: Juanita Beach - Lab Testing
Project No: 09614271 **Figure**

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	41.9	51.2	6.1	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.2		
#20	96.6		
#40	57.3		
#60	15.0		
#100	8.7		
#200	6.1		

* (no specification provided)

Material Description

Yellowish-brown poorly graded sand with silt.

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.7036 D_{85}= 0.6342 D_{60}= 0.4390
D_{50}= 0.3912 D_{30}= 0.3122 D_{15}= 0.2496
D_{10}= 0.1719 C_u= 2.55 C_c= 1.29

Remarks

Sample ID: 48997-C.
Natural Moisture Content (ASTM D-2216): 6.2%

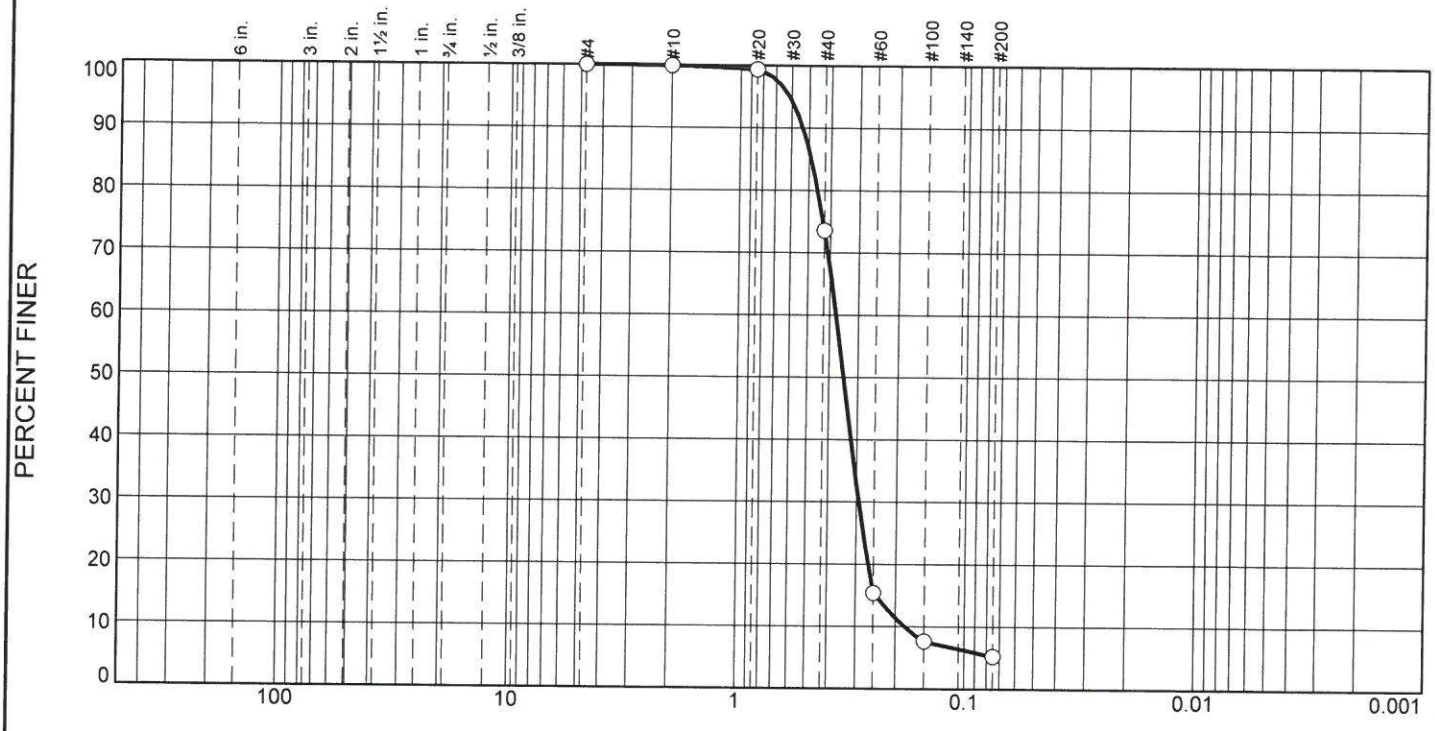
Date Received: 8/13/14 **Date Tested:** 8/19/14
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; B-3
Sample Number: 48997-C **Depth:** 5'
Date Sampled: 8/13/14

Krazan

Client: AMEC Environment & Infrastructure, Inc.
Project: Juanita Beach - Lab Testing
Project No: 09614271 **Figure**

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	26.3	68.3	5.3	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.3		
#40	73.6		
#60	15.4		
#100	7.7		
#200	5.3		

* (no specification provided)

Material Description

Olive-brown poorly graded sand with silt.

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.5361 D_{85}= 0.4901 D_{60}= 0.3751
D_{50}= 0.3456 D_{30}= 0.2925 D_{15}= 0.2452
D_{10}= 0.1821 C_u= 2.06 C_c= 1.25

Remarks

Sample ID: 48997-D.
Natural Moisture Content (ASTM D-2216): 24.5%

Date Received: 8/13/14 **Date Tested:** 8/19/14
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; B-2
Sample Number: 48997-D **Depth:** 15' **Date Sampled:** 8/13/14

Krazan

Client: AMEC Environment & Infrastructure, Inc.
Project: Juanita Beach - Lab Testing
Project No: 09614271 **Figure**

07

Conceptual Cost Plan

PREPARED BY
AECOM

Davis Langdon
An AECOM Company

CONCEPTUAL
COST PLAN

for

Kirkland Aquatic Center
Design Alternatives
Kirkland, Washington

August 11, 2014

Davis Langdon
An AECOM Company

August 11, 2014

Lauren Livingston
The Sports Management Group
2607 7th Street
Suite B
Berkeley, CA 94710

Kirkland Aquatic Center
Design Alternatives
Kirkland, Washington

Dear Lauren:

In accordance with your instructions, we enclose our Conceptual Cost Plan for the project referenced above.

We would be pleased to discuss this report with you further at your convenience.

Sincerely,

Davis Langdon, an AECOM Company 6031/7867

Enclosures

CONTENTS

BASIS OF COST PLAN

Cost Plan Prepared From	Dated	Received
Building & Site Plans		
Juanita	07.30.14	07.30.14
North Kirkland Option A	08.05.14	08.05.14
Civil Narrative	08.06.14	07.30.14
Facility Program	07.14.14	07.30.14

Discussions with the Project Designers

BASIS OF COST PLAN

Conditions of Construction

The pricing is based on the following general conditions of construction

A start date of September 2015

A construction period of 16 months

Design, Bid, Build procurement

There will not be small business set aside requirements

The contractor will be required to pay prevailing wages

The general contractor will have full access to the site during normal business hours

INCLUSIONS

This report considers costs associated with siting three potential configurations of a new 86,000sf aquatic & recreation center on two different sites in Kirkland.

One version of the project is considered at the Juanita beach site in downtown Kirkland. The North Kirkland site offers two potential adaptations of the facility: version A is a three story building on the site bounded by NE 124th Street and 103rd Ave NE; version B is a two story building which straddles 103rd Ave NE.

Our analysis indicates that building costs are relatively consistent between options but in combination with site costs, the North Kirkland B scheme is the most expensive facility option, followed by North Kirkland A and Juanita. This is primarily a result of the extensive cut/fill operations on the North Kirland site but site B also includes more structured parking and a higher volume of on site drainage retention.

INCLUSIONS

BIDDING PROCESS - MARKET CONDITIONS

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area. All unit rates relevant to subcontractor work include the subcontractors overhead and profit unless otherwise stated. The mark-ups cover the costs of field overhead, home office overhead and profit and range from 15% to 25% of the cost for a particular item of work.

Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors and general contractors, with a minimum of 4 bidders for all items of subcontracted work and 6-7 general contractor bids. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Davis Langdon has no control over the cost of labor, material, equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions at the time of bid, the statement of probable construction cost is based on industry practice, professional experience and qualifications, and represents Davis Langdon's best judgment as professional construction consultant familiar with the construction industry. However, Davis Langdon cannot and does not guarantee that the proposals, bids, or the construction cost will not vary from opinions of

EXCLUSIONS

Owner supplied and installed furniture, fixtures and equipment

Loose furniture and equipment except as specifically identified

Hazardous material handling, disposal and abatement

Testing and inspection fees

Architectural, design and project management fees

Assessments, taxes, finance, legal and development charges

Environmental impact mitigation

Builder's risk, project wrap-up and other owner provided insurance program

Land and easement acquisition

Cost escalation beyond a midpoint of May 2016

Security equipment and devices

Water recycling systems

UPS - by Owner

Utility connection charges and fees

Independent 3rd party MEP commissioning

OVERALL SUMMARY

	Gross Floor Area	$ / SF	$x1,000
North Kirkland A	86,700 SF	417.56	36,203
Juanita Beach	86,700 SF	374.68	32,485
North Kirkland B	86,700 SF	490.42	42,519

Alternates

Alternate 1: 50M Pool expansion	2,703
Alternate 2: Second Gymnasium	1,625
Alternate 3: Elevated jogging track	380
Alternate 4: Accessible roof deck	307
Alternate 5: Pool timers & scoreboard	109
Alternate 6: Pool bulkhead	306
Alternate 7: Elevated parking deck at Juanita	6,473
Deductive Alternate 1: 8 Lane Pool Option	-2,691

Please refer to the Inclusions and Exclusions sections of this report

NORTH KIRKLAND A AREAS & CONTROL QUANTITIES

Areas

	SF	SF	SF
Enclosed Areas			
Ground	38,507		
Upper	27,611		
Top	20,582		
SUBTOTAL, Enclosed Area		86,700	
Covered area			
SUBTOTAL, Covered Area @ ½ Value			
TOTAL GROSS FLOOR AREA			86,700

Control Quantities

				Ratio to Gross Area
Number of stories (x1,000)		3	EA	0.035
Gross Area		86,700	SF	1.000
Enclosed Area		86,700	SF	1.000
Covered Area		5,300	SF	0.061
Footprint Area		52,988	SF	0.611
Gross Wall Area		51,371	SF	0.593
Retaining Wall Area		15,163	SF	0.175
Finished Wall Area		36,208	SF	0.418
Windows or Glazing Area	25.00%	12,843	SF	0.148
Roof Area - Flat		58,287	SF	0.672
Roof Area - Sloping		0	SF	0.000
Roof Area - Total		58,287	SF	0.672
Roof Glazing Area		0	SF	0.000
Interior Partition Length		5,682	LF	0.066
Finished Area		86,700	SF	1.000
Elevators (x10,000)		1	EA	0.115

NORTH KIRKLAND A COMPONENT SUMMARY

	Gross Area:	**86,700 SF**	
		$/SF	$x1,000
1. Foundations		5.24	454
2. Vertical Structure		16.12	1,397
3. Floor & Roof Structures		28.92	2,507
4. Exterior Cladding		20.51	1,778
5. Roofing, Waterproofing & Skylights		5.67	491
Shell (1-5)		76.46	6,629
6. Partitions, Doors & Railings		17.04	1,477
7. Interior Development		25.06	2,173
Interiors (6-7)		42.10	3,650
8. Function Equipment & Specialties		39.99	3,467
9. Stairs & Vertical Transportation		2.60	225
Equipment & Vertical Transportation (8-9)		42.58	3,692
10 Plumbing Systems		11.05	958
11 Heating, Ventilating & Air Conditioning		31.55	2,736
12 Electric Lighting, Power & Communications		31.78	2,755
13 Fire Protection Systems		4.00	347
Mechanical & Electrical (10-13)		78.39	6,796
Total Building Construction (1-13)		**239.53**	**20,767**
14 Site Preparation & Demolition		5.20	451
15 Site Paving, Structures & Landscaping		60.76	5,268
16 Utilities on Site		1.73	150
Total Site Construction (14-16)		**67.69**	**5,869**
TOTAL BUILDING & SITE (1-16)		**307.22**	**26,636**
General Conditions	6.00%	18.43	1,598
Bonding & Insurance	2.00%	6.15	533
Contractor's Overhead & Profit or Fee	4.00%	13.28	1,151
PLANNED CONSTRUCTION COST	***August 2014***	**345.07**	**29,918**
Contingency for Development of Design	15.00%	51.76	4,488
Bid & Construction Contingency	0.00%	0.00	0
Escalation to Midpoint (May 2016)	5.22%	20.73	1,797
RECOMMENDED BUDGET	***September 2015***	**417.56**	**36,203**

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
1. Foundations				
Excavation				
Excavate to reduce level on sloping site - see site components				
Fill				
Backfill to building retaining walls	5,616	CY	30.00	168,480
Regular pad & strip foundations	52,988	SF	5.00	264,940
Subsurface drainage	1,047	LF	20.00	20,940
				454,360
2. Vertical Structure				
Columns and pilasters	173	T	3,200.00	553,600
Loadbearing walls	4,635	SF	40.00	185,400
Retaining walls	15,163	SF	40.00	606,520
Fireproofing on steelwork	173	T	300.00	51,900
				1,397,420
3. Floor and Roof Structure				
Floor on grade	52,988	SF	8.00	423,904
Suspended floors	33,712	SF	25.00	842,800
Flat roofs	58,287	SF	20.00	1,165,740
Fireproofing on steelwork	250	T	300.00	75,000
				2,507,444
4. Exterior Cladding				
Wall framing, furring and insulation	23,365	SF	10.00	233,653
Applied exterior finishes	23,365	SF	25.00	584,131
Windows and glazing	12,843	SF	55.00	706,351
Exterior doors, frames and hardware	25	EA	1,750.00	43,750
Fascias, bands, screens and trim etc.	36,208	SF	1.50	54,312
Soffits	5,299	SF	20.00	105,980

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Balustrades, parapets and screens	1	LS	50,000.00	50,000
				1,778,177

5. Roofing, Waterproofing & Skylights

Roofing - flat & pitched	58,287	SF	8.00	466,296
Roof lights	1	LS	15,000.00	15,000
Caulking and sealants	1	LS	10,000.00	10,000
				491,296

6. Partitions, Doors & Railings

Partition framing and cores	70,230	SF	15.00	1,053,450
Balustrades and rails	96	LF	250.00	24,000
Window walls and borrowed lights	1	LS	175,000.00	175,000
Interior doors, frames and hardware	150	EA	1,500.00	225,000
				1,477,450

7. Floor, Wall & Ceiling Finishes

Finishes allowances by program				
Vestibule/Entry	3,532	SF	40.00	141,280
Back of house/service/storage	10,470	SF	10.00	104,700
Lockers	5,449	SF	25.00	136,225
Offices	2,157	SF	15.00	32,355
Meeting	631	SF	15.00	9,465
Breakroom	378	SF	15.00	5,670
Gymnasium	8,830	SF	20.00	176,600
Fitness	6,307	SF	17.50	110,373
Wood floor activities	3,406	SF	25.00	85,150
Activity	1,135	SF	20.00	22,700
Community Hall/Special Events/Childwatch	6,938	SF	15.00	104,070
Arts & party rooms	3,658	SF	15.00	54,870
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Public washrooms	1,009	SF	35.00	35,315
				2,172,973

8. Function Equipment & Specialties

Protective guards, barriers and bumpers				
Prefabricated compartments and accessories	1	LS	80,000.00	80,000
Shelving and millwork	1	LS	100,000.00	100,000
Chalkboards, insignia and graphics, etc.	1	LS	35,000.00	35,000
Light and vision control	1	LS	45,000.00	45,000
Amenities and convenience items	1	LS	20,000.00	20,000
Special use equipment of all types				
Lockers	1	LS	150,000.00	150,000
Folding partitions	1	LS	125,000.00	125,000
Gym equipment	1	LS	50,000.00	50,000
Pools & equipment	1	LS	2,843,000.00	2,843,000
Bleachers	250	EA	75.00	18,750
				3,466,750

9. Stairs & Vertical Transportation

Staircase flights - floor to floor	4	EA	25,000.00	100,000
Elevators	1	EA	125,000.00	125,000
				225,000

10. Plumbing Systems

Sanitary fixtures and connection piping	125	EA	6,000.00	750,000
Water treatment, storage and circulation	1	LS	75,000.00	75,000
Surface water drainage	58,287	SF	1.00	58,287
Gas and fuel oil distribution	1	LS	75,000.00	75,000
				958,287

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
11. Heating, Ventilation & Air Conditioning				
HVAC allowances by program				
Vestibule/Entry	3,532	SF	38.00	134,216
Back of house/service/storage	10,470	SF	25.00	261,750
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	38.00	23,978
Breakroom	378	SF	35.00	13,230
Gymnasium	8,830	SF	30.00	264,900
Fitness	6,307	SF	32.00	201,824
Wood floor activities	3,406	SF	32.00	108,992
Activity	1,135	SF	35.00	39,725
Community Hall/Special Events/Childwatch	6,938	SF	30.00	208,140
Arts & party rooms	3,658	SF	32.00	117,056
Kitchen	1,261	SF	35.00	44,135
Natatorium	31,536	SF	33.00	1,040,688
Public washrooms	1,009	SF	27.00	27,243
				2,735,740
12. Electrical Lighting, Power & Communication				
Electrical allowances by program				
Vestibule/Entry	3,532	SF	42.00	148,344
Back of house/service/storage	10,470	SF	20.00	209,400
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	37.00	23,347
Breakroom	378	SF	30.00	11,340
Gymnasium	8,830	SF	25.00	220,750
Fitness	6,307	SF	30.00	189,210
Wood floor activities	3,406	SF	30.00	102,180
Activity	1,135	SF	40.00	45,400
Community Hall/Special Events/Childwatch	6,938	SF	35.00	242,830
Arts & party rooms	3,658	SF	35.00	128,030
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760
Public washrooms	1,009	SF	30.00	30,270
				2,755,164

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
13. Fire Protection Systems				
Fire sprinkler systems - complete	86,700	SF	4.00	346,800
				346,800
14. Site Preparation & Building Demolition				
Demolition of buildings & structures	1	LS	100,000.00	100,000
Site protective construction	141,904	SF	0.50	70,952
Site clearing and grading	141,904	SF	0.25	35,476
Excavate & stockpile on site	11,300	CY	12.00	135,600
Fill from stockpile	6,690	CY	8.00	53,520
Export	4,610	CY	12.00	55,320
				450,868
15. Site Paving, Structures & Landscaping				
Asphalt paving	3,774	SF	4.00	15,096
Curb & gutter	332	LF	15.00	4,980
Pedestrian paving	11,020	SF	10.00	110,200
Patio	279	SF	50.00	13,950
Structured parking	250	EA	15,000.00	3,750,000
Drainage	15,073	SF	1.00	15,073
Detention tanks	68,175	CF	8.00	545,400
Cartridge filter	1	LS	2,500.00	2,500
Lighting and power specialties	80,354	SF	1.00	80,354
Landscaping, fencing, etc	65,281	SF	2.00	130,562
New stoplight	1	LS	600,000.00	600,000
				5,268,115
16. Utilities on Site				
Site utilities				
New utilities	1	LS	150,000.00	150,000
				150,000

JUANITA BEACH AREAS & CONTROL QUANTITIES

Areas

	SF	SF	SF
Enclosed Areas			
Ground	64,602		
Upper	22,098		
SUBTOTAL, Enclosed Area		86,700	
Concourse Outdoor area			
SUBTOTAL, Outdoor Area			
TOTAL GROSS FLOOR AREA			86,700

Control Quantities

				Ratio to Gross Area
Number of stories (x1,000)		2	EA	0.023
Gross Area		86,700	SF	1.000
Enclosed Area		86,700	SF	1.000
Covered Area		6,460	SF	0.075
Footprint Area		64,602	SF	0.745
Gross Wall Area		41,642	SF	0.480
Retaining Wall Area		0	SF	0.000
Finished Wall Area		41,642	SF	0.480
Windows or Glazing Area	25.00%	10,411	SF	0.120
Roof Area - Flat		71,062	SF	0.820
Roof Area - Sloping		0	SF	0.000
Roof Area - Total		71,062	SF	0.820
Roof Glazing Area		0	SF	0.000
Interior Partition Length		4,682	LF	0.054
Finished Area		86,700	SF	1.000
Elevators (x10,000)		1	EA	0.115

JUANITA BEACH COMPONENT SUMMARY

		Gross Area:	**86,700 SF**	
			$/SF	$x1,000
1.	Foundations		8.31	721
2.	Vertical Structure		8.41	729
3.	Floor & Roof Structures		29.75	2,579
4.	Exterior Cladding		22.50	1,951
5.	Roofing, Waterproofing & Skylights		15.04	1,304
	Shell (1-5)		84.01	7,284
6.	Interior Partitions, Doors & Glazing		17.07	1,480
7.	Floor, Wall & Ceiling Finishes		25.06	2,173
	Interiors (6-7)		42.13	3,653
8.	Function Equipment & Specialties		39.99	3,467
9.	Stairs & Vertical Transportation		1.44	125
	Equipment & Vertical Transportation (8-9)		41.43	3,592
10.	Plumbing Systems		11.20	971
11.	Heating, Ventilating & Air Conditioning		31.55	2,736
12.	Electric Lighting, Power & Communications		31.78	2,755
13.	Fire Protection Systems		4.00	347
	Mechanical & Electrical (10-13)		78.53	6,809
	Total Building Construction (1-13)		**246.10**	**21,337**
14.	Site Preparation & Demolition		6.16	534
15.	Site Paving, Structures & Landscaping		20.52	1,779
16.	Utilities on Site		2.88	250
	Total Site Construction (14-16)		**29.57**	**2,563**
	TOTAL BUILDING & SITE (1-16)		**275.67**	**23,901**
	General Conditions	6.00%	16.54	1,434
	Bonding & Insurance	2.00%	5.51	478
	Contractor's Overhead & Profit or Fee	4.00%	11.91	1,033
	PLANNED CONSTRUCTION COST	***August 2014***	**309.64**	**26,846**
	Contingency for Development of Design	15.00%	46.45	4,027
	Bid & Construction Contingency	0.00%	0.00	0
	Escalation to Midpoint (May 2016)	5.22%	18.59	1,612
	RECOMMENDED BUDGET	***September 2015***	**374.68**	**32,485**

Item Description		*Unit*	*Rate*	*Total*
1. Foundations				
Pad & strip foundations	64,602	SF	5.00	323,010
Geopiers allowance	64,602	SF	5.00	323,010
Dewatering allowance	1	LS	50,000.00	50,000
Subsurface drainage	1,236	LF	20.00	24,720
				720,740
2. Vertical Structure				
Columns and pilasters	173	T	3,200.00	553,600
Loadbearing walls	3,090	SF	40.00	123,600
Fireproofing on steelwork	173	T	300.00	51,900
				729,100
3. Floor and Roof Structure				
Floor on grade	64,602	SF	8.00	516,816
Suspended floors	22,098	SF	25.00	552,450
Flat roofs	71,062	SF	20.00	1,421,240
Fireproofing on steelwork	295	T	300.00	88,500
				2,579,006
4. Exterior Cladding				
Wall framing, furring and insulation	31,232	SF	10.00	312,315
Applied exterior finishes	31,232	SF	25.00	780,788
Windows and glazing	10,411	SF	55.00	572,578
Exterior doors, frames and hardware	25	EA	1,750.00	43,750
Fascias, bands, screens and trim etc.	41,642	SF	1.50	62,463
Soffits	6,460	SF	20.00	129,200
Balustrades, parapets and screens	1	LS	50,000.00	50,000
				1,951,093

Item Description		*Unit*	*Rate*	*Total*
5. Roofing, Waterproofing & Skylights				
Roofing - flat & pitched	71,062	SF	18.00	1,279,116
Roof lights	1	LS	15,000.00	15,000
Caulking and sealants	1	LS	10,000.00	10,000
				1,304,116
6. Interior Partitions, Doors & Glazing				
Partition framing and cores	70,230	SF	15.00	1,053,450
Balustrades and rails	105	LF	250.00	26,250
Window walls and borrowed lights	1	LS	175,000.00	175,000
Interior doors, frames and hardware	150	EA	1,500.00	225,000
				1,479,700
7. Floor, Wall & Ceiling Finishes				
Finishes allowances by program				
Vestibule/Entry	3,532	SF	40.00	141,280
Back of house/service/storage	10,470	SF	10.00	104,700
Lockers	5,449	SF	25.00	136,225
Offices	2,157	SF	15.00	32,355
Meeting	631	SF	15.00	9,465
Breakroom	378	SF	15.00	5,670
Gymnasium	8,830	SF	20.00	176,600
Fitness	6,307	SF	17.50	110,373
Wood floor activities	3,406	SF	25.00	85,150
Activity	1,135	SF	20.00	22,700
Community Hall/Special Events/Childwatch	6,938	SF	15.00	104,070
Arts & party rooms	3,658	SF	15.00	54,870
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760
Public washrooms	1,009	SF	35.00	35,315
				2,172,973

Item Description		*Unit*	*Rate*	*Total*
8. Function Equipment & Specialties				
Prefabricated compartments and accessories	1	LS	80,000.00	80,000
Shelving and millwork	1	LS	100,000.00	100,000
Chalkboards, insignia and graphics, etc.	1	LS	35,000.00	35,000
Light and vision control	1	LS	45,000.00	45,000
Amenities and convenience items	1	LS	20,000.00	20,000
Special use equipment of all types				
Lockers	1	LS	150,000.00	150,000
Folding partitions	1	LS	125,000.00	125,000
Gym equipment	1	LS	50,000.00	50,000
Pools & equipment	1	LS	2,843,000.00	2,843,000
Bleachers	250	EA	75.00	18,750
				3,466,750
9. Stairs & Vertical Transportation				
Staircase flights - floor to floor	2	EA	25,000.00	50,000
Elevators	1	EA	75,000.00	75,000
				125,000
10. Plumbing Systems				
Sanitary fixtures and connection piping	125	EA	6,000.00	750,000
Water treatment, storage and circulation	1	LS	75,000.00	75,000
Surface water drainage	71,062	SF	1.00	71,062
Gas and fuel oil distribution	1	LS	75,000.00	75,000
				971,062
11. Heating, Ventilation & Air Conditioning				
HVAC allowances by program				
Vestibule/Entry	3,532	SF	38.00	134,216
Back of house/service/storage	10,470	SF	25.00	261,750
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	38.00	23,978

Item Description		*Unit*	*Rate*	*Total*
Breakroom	378	SF	35.00	13,230
Gymnasium	8,830	SF	30.00	264,900
Fitness	6,307	SF	32.00	201,824
Wood floor activities	3,406	SF	32.00	108,992
Activity	1,135	SF	35.00	39,725
Community Hall/Special Events/Childwatch	6,938	SF	30.00	208,140
Arts & party rooms	3,658	SF	32.00	117,056
Kitchen	1,261	SF	35.00	44,135
Natatorium	31,536	SF	33.00	1,040,688
Public washrooms	1,009	SF	27.00	27,243
				2,735,740

12. Electrical Lighting, Power & Communication

Electrical allowances by program				
Vestibule/Entry	3,532	SF	42.00	148,344
Back of house/service/storage	10,470	SF	20.00	209,400
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	37.00	23,347
Breakroom	378	SF	30.00	11,340
Gymnasium	8,830	SF	25.00	220,750
Fitness	6,307	SF	30.00	189,210
Wood floor activities	3,406	SF	30.00	102,180
Multi Purpose	1,135	SF	40.00	45,400
Community Hall/Special Events/Childwatch	6,938	SF	35.00	242,830
Arts & party rooms	3,658	SF	35.00	128,030
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760
Public washrooms	1,009	SF	30.00	30,270
				2,755,164

13. Fire Protection Systems

Fire sprinkler systems - complete	86,700	SF	4.00	346,800
				346,800

Item Description		*Unit*	*Rate*	*Total*
14. Site Preparation & Building Demolition				
Demolition of buildings & structures	1	LS	25,000.00	25,000
Relocate house	1	LS	75,000.00	75,000
Site protective construction	302,985	SF	0.50	151,493
Site clearing and grading	302,985	SF	0.25	75,746
Excavate & stockpile on site	9,220	CY	12.00	110,640
Fill from stockpile	9,220	CY	8.00	73,760
Imported fill	910	CY	25.00	22,750
				534,389
15. Site Paving, Structures & Landscaping				
Permeable concrete paving	100,508	SF	8.00	804,064
Curb & gutter	5,443	LF	15.00	81,645
Pedestrian paving	19,014	SF	6.00	114,084
Pool outdoor deck & patio	482	SF	50.00	24,100
Drainage	110,004	SF	1.00	110,004
Lighting and power specialties	238,383	SF	1.00	238,383
Landscaping, fencing, etc	128,379	SF	2.00	256,758
Right turn lane - 150' long	3,000	SF	50.00	150,000
				1,779,038
16. Utilities on Site				
Site utilities				
New utilities	1	LS	250,000.00	250,000
				250,000

NORTH KIRKLAND B AREAS & CONTROL QUANTITIES

Areas

	SF	SF	SF
Enclosed Areas			
Ground	66,242		
Upper	20,458		
SUBTOTAL, Enclosed Area		86,700	
Covered area			
SUBTOTAL, Covered Area @ ½ Value			
TOTAL GROSS FLOOR AREA			86,700

Control Quantities

				Ratio to Gross Area
Number of stories (x1,000)		2	EA	0.023
Gross Area		86,700	SF	1.000
Enclosed Area		86,700	SF	1.000
Covered Area		6,460	SF	0.075
Footprint Area		66,242	SF	0.764
Gross Wall Area		42,538	SF	0.491
Retaining Wall Area		10,807	SF	0.125
Finished Wall Area		31,731	SF	0.366
Windows or Glazing Area	25.00%	10,635	SF	0.123
Roof Area - Flat		72,866	SF	0.840
Roof Area - Sloping		0	SF	0.000
Roof Area - Total		72,866	SF	0.840
Roof Glazing Area		0	SF	0.000
Interior Partition Length		4,682	LF	0.054
Finished Area		86,700	SF	1.000
Elevators (x10,000)		1	EA	0.115

NORTH KIRKLAND B COMPONENT SUMMARY

	Gross Area:	**86,700 SF**	
		$/SF	$x1,000
1. Foundations		6.88	596
2. Vertical Structure		13.40	1,161
3. Floor & Roof Structures		29.87	2,589
4. Exterior Cladding		18.42	1,597
5. Roofing, Waterproofing & Skylights		15.42	1,337
Shell (1-5)		83.98	7,281
6. Interior Partitions, Doors & Glazing		16.76	1,453
7. Floor, Wall & Ceiling Finishes		25.06	2,173
Interiors (6-7)		41.83	3,626
8. Function Equipment & Specialties		39.99	3,467
9. Stairs & Vertical Transportation		1.44	125
Equipment & Vertical Transportation (8-9)		41.43	3,592
10. Plumbing Systems		11.22	973
11. Heating, Ventilating & Air Conditioning		31.55	2,736
12. Electric Lighting, Power & Communications		31.78	2,755
13. Fire Protection Systems		4.00	347
Mechanical & Electrical (10-13)		78.55	6,811
Total Building Construction (1-13)		**245.78**	**21,310**
14. Site Preparation & Demolition		17.97	1,558
15. Site Paving, Structures & Landscaping		92.46	8,017
16. Utilities on Site		4.61	400
Total Site Construction (14-16)		**115.05**	**9,975**
TOTAL BUILDING & SITE (1-16)		**360.83**	**31,284**
General Conditions	6.00%	21.65	1,877
Bonding & Insurance	2.00%	7.22	626
Contractor's Overhead & Profit or Fee	4.00%	15.58	1,351
PLANNED CONSTRUCTION COST	***August 2014***	**405.29**	**35,138**
Contingency for Development of Design	15.00%	60.80	5,271
Bid & Construction Contingency	0.00%	0.00	0
Escalation to Midpoint (May 2016)	5.22%	24.34	2,110
RECOMMENDED BUDGET	***September 2015***	**490.42**	**42,519**

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
1. Foundations				
Excavation				
Excavate to reduce level on sloping site - see site components				
Fill				
Backfill to working space	8,005	CY	30.00	240,150
Regular pad & strip foundations	66,242	SF	5.00	331,210
Subsurface drainage	1,253	LF	20.00	25,060
				596,420
2. Vertical Structure				
Columns and pilasters	173	T	3,200.00	553,600
Loadbearing walls	3,090	SF	40.00	123,600
Retaining walls	10,807	SF	40.00	432,280
Fireproofing on steelwork	173	T	300.00	51,900
				1,161,380
3. Floor and Roof Structure				
Floor on grade	66,242	SF	8.00	529,936
Suspended floors	20,458	SF	25.00	511,450
Flat roofs	72,866	SF	20.00	1,457,320
Fireproofing on steelwork	302	T	300.00	90,600
				2,589,306
4. Exterior Cladding				
Wall framing, furring and insulation	21,097	SF	10.00	210,965
Applied exterior finishes	21,097	SF	25.00	527,413
Windows and glazing	10,635	SF	55.00	584,898
Exterior doors, frames and hardware	25	EA	1,750.00	43,750
Fascias, bands, screens and trim etc.	31,731	SF	1.50	47,597
Soffits	6,624	SF	20.00	132,480
Balustrades, parapets and screens	1	LS	50,000.00	50,000
				1,597,102

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
5. Roofing, Waterproofing & Skylights				
Roofing - flat & pitched	72,866	SF	18.00	1,311,588
Roof lights	1	LS	15,000.00	15,000
Caulking and sealants	1	LS	10,000.00	10,000
				1,336,588
6. Interior Partitions, Doors & Glazing				
Partition framing and cores	70,230	SF	15.00	1,053,450
Window walls and borrowed lights	1	LS	175,000.00	175,000
Interior doors, frames and hardware	150	EA	1,500.00	225,000
				1,453,450
7. Floor, Wall & Ceiling Finishes				
Finishes allowances by program				
Vestibule/Entry	3,532	SF	40.00	141,280
Back of house/service/storage	10,470	SF	10.00	104,700
Lockers	5,449	SF	25.00	136,225
Offices	2,157	SF	15.00	32,355
Meeting	631	SF	15.00	9,465
Breakroom	378	SF	15.00	5,670
Gymnasium	8,830	SF	20.00	176,600
Fitness	6,307	SF	17.50	110,373
Wood floor activities	3,406	SF	25.00	85,150
Activity	1,135	SF	20.00	22,700
Community Hall/Special Events/Childwatch	6,938	SF	15.00	104,070
Arts & party rooms	3,658	SF	15.00	54,870
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760
Public washrooms	1,009	SF	35.00	35,315
				2,172,973

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
8. Function Equipment & Specialties				
Protective guards, barriers and bumpers				
Prefabricated compartments and accessories	1	LS	80,000.00	80,000
Shelving and millwork	1	LS	100,000.00	100,000
Chalkboards, insignia and graphics, etc.	1	LS	35,000.00	35,000
Light and vision control	1	LS	45,000.00	45,000
Amenities and convenience items	1	LS	20,000.00	20,000
Special use equipment of all types				
Lockers	1	LS	150,000.00	150,000
Folding partitions	1	LS	125,000.00	125,000
Gym equipment	1	LS	50,000.00	50,000
Pools & equipment	1	LS	2,843,000.00	2,843,000
Bleachers	250	EA	75.00	18,750
				3,466,750
9. Stairs & Vertical Transportation				
Staircase flights - floor to floor	2	EA	25,000.00	50,000
Elevators	1	EA	75,000.00	75,000
				125,000
10. Plumbing Systems				
Sanitary fixtures and connection piping	125	EA	6,000.00	750,000
Water treatment, storage and circulation	1	LS	75,000.00	75,000
Laboratory & industrial process services				
Surface water drainage	72,866	SF	1.00	72,866
Subsurface drainage and sewage ejection				
Gas and fuel oil distribution	1	LS	75,000.00	75,000
				972,866
11. Heating, Ventilation & Air Conditioning				
HVAC allowances by program				
Vestibule/Entry	3,532	SF	38.00	134,216
Back of house/service/storage	10,470	SF	25.00	261,750

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	38.00	23,978
Breakroom	378	SF	35.00	13,230
Gymnasium	8,830	SF	30.00	264,900
Fitness	6,307	SF	32.00	201,824
Wood floor activities	3,406	SF	32.00	108,992
Activity	1,135	SF	35.00	39,725
Community Hall/Special Events/Childwatch	6,938	SF	30.00	208,140
Arts & party rooms	3,658	SF	32.00	117,056
Kitchen	1,261	SF	35.00	44,135
Natatorium	31,536	SF	33.00	1,040,688
Public washrooms	1,009	SF	27.00	27,243
				2,735,740

12. Electrical Lighting, Power & Communication

Electrical allowances by program				
Vestibule/Entry	3,532	SF	42.00	148,344
Back of house/service/storage	10,470	SF	20.00	209,400
Lockers	5,449	SF	32.00	174,368
Offices	2,157	SF	35.00	75,495
Meeting	631	SF	37.00	23,347
Breakroom	378	SF	30.00	11,340
Gymnasium	8,830	SF	25.00	220,750
Fitness	6,307	SF	30.00	189,210
Wood floor activities	3,406	SF	30.00	102,180
Multi Purpose	1,135	SF	40.00	45,400
Community Hall/Special Events/Childwatch	6,938	SF	35.00	242,830
Arts & party rooms	3,658	SF	35.00	128,030
Kitchen	1,261	SF	40.00	50,440
Natatorium	31,536	SF	35.00	1,103,760
Public washrooms	1,009	SF	30.00	30,270
				2,755,164

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
13. Fire Protection Systems				
Fire sprinkler systems - complete	86,700	SF	4.00	346,800
				346,800
14. Site Preparation & Building Demolition				
Demolition of buildings & structures	1	LS	150,000.00	150,000
Site protective construction	208,387	SF	0.50	104,194
Site clearing and grading	208,387	SF	0.75	156,290
Excavate & stockpile on site	48,420	CY	12.00	581,040
Fill from stockpile	3,570	CY	8.00	28,560
Export	44,850	CY	12.00	538,200
				1,558,284
15. Site Paving, Structures & Landscaping				
Asphalt paving	18,140	SF	4.00	72,560
Curb & gutter	1,019	LF	15.00	15,285
Pedestrian paving	7,150	SF	10.00	71,500
Pool outdoor deck & patio	482	SF	50.00	24,100
Structured parking - lowest floor below grade	320	EA	20,000.00	6,400,000
Drainage	25,772	SF	1.00	25,772
Detention tanks	97,500	CF	8.00	780,000
Cartridge filter	1	LS	2,500.00	2,500
Lighting and power specialties	143,785	SF	1.00	143,785
Landscaping, fencing, etc	118,013	SF	2.00	236,026
Replace playpark	1	LS	50,000.00	50,000
Bridge to parking	1,300	SF	150.00	195,000
				8,016,528

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
16. Utilities on Site				
Site utilities				
New utilities	1	LS	50,000.00	50,000
Reroute utilities	1	LS	350,000.00	350,000
				400,000

	Quantity	*Unit*	*Rate*	*Total*
Alternate 1: 50M Pool expansion				
Reinforced concrete including excavation	5,800	SF	5.00	29,000
Subsurface drainage	175	LF	20.00	3,500
Columns and pilasters	12	T	3,200.00	37,120
Fireproofing on steelwork	12	T	300.00	3,480
Floor on grade	5,800	SF	8.00	46,400
Flat roofs	5,800	SF	20.00	116,000
Fireproofing steelwork	26	T	300.00	7,830
Wall framing, furring and insulation	6,038	SF	10.00	60,375
Applied exterior finishes	6,038	SF	25.00	150,938
Windows and glazing	1,509	SF	55.00	83,016
Exterior doors, frames and hardware	4	EA	1,750.00	7,000
Roofing	5,800	SF	15.00	87,000
Finishes allowances by program				
Natatorium	5,800	SF	35.00	203,000
Special use equipment of all types				
Pools & equipment	3,900	SF	175.00	682,500
Sanitary fixtures and connection piping	8	EA	6,000.00	48,000
Surface water drainage	5,800	SF	1.00	5,800
HVAC allowances by program				
Natatorium	5,800	SF	33.00	191,400
Electrical allowances by program				
Natatorium	5,800	SF	35.00	203,000
Fire sprinkler systems - complete	5,800	SF	4.00	23,200
Markups	35.92	%	1,988,558.13	714,305
				2,702,863
Alternate 2: Second Gymnasium				
Reinforced concrete including excavation	7,000	SF	5.00	35,000
Subsurface drainage	175	LF	20.00	3,500
Columns and pilasters	14	T	3,200.00	44,800
Fireproofing on steelwork	14	T	300.00	4,200
Floor on grade	7,000	SF	8.00	56,000
Flat roofs	7,000	SF	20.00	140,000
Fireproofing steelwork	32	T	300.00	9,450
Wall framing, furring and insulation	5,250	SF	10.00	52,500
Applied exterior finishes	5,250	SF	25.00	131,250
Exterior doors, frames and hardware	2	EA	1,750.00	3,500
Roofing	7,000	SF	15.00	105,000

	Quantity	*Unit*	*Rate*	*Total*
Finishes allowances by program				
Gymnasium	7,000	SF	20.00	140,000
Special use equipment of all types				
Gym equipment	1	LS	50,000.00	50,000
Surface water drainage	7,000	SF	1.00	7,000
HVAC allowances by program				
Gymnasium	7,000	SF	30.00	210,000
Electrical allowances by program				
Gymnasium	7,000	SF	25.00	175,000
Fire sprinkler systems - complete	7,000	SF	4.00	28,000
Markups	35.92	%	1,195,200.00	429,325
				1,624,525

Alternate 3: Elevated jogging track

ADD				
Suspended floors	4,400	SF	30.00	132,000
Balustrades and rails	450	LF	250.00	112,500
Track membrane finish	4,400	SF	8.00	35,200
Markups	35.92	%	279,700.00	100,470
				380,170

Alternate 4: Accessible roof deck

Deduct				
Flat roof structure	(6,180)	SF	20.00	(123,600)
Roofing	(6,180)	SF	15.00	(92,700)
Add				
Deck structure	6,180	SF	30.00	185,400
Waterproofing	6,180	SF	15.00	92,700
Pavers on pedestals	6,180	SF	25.00	154,500
Balcony railing	328	SF	250.00	82,000
Balcony access stairs	2	EA	15,000.00	30,000
Access lift	1	LS	25,000.00	25,000

	Quantity	*Unit*	*Rate*	*Total*
Power & lighting allowance	6,180	SF	5.00	30,900
Markups	35.92	%	(216,300.00)	(77,697)
				306,503

Alternate 5: Pool timers & scoreboard

Allowance				
Pool timers & scoreboard	1	LS	80,000.00	80,000
Markups	35.92	%	80,000.00	28,737
				108,737

Alternate 6: Pool bulkhead

Allowance				
Moveable bulkhead	1	LS	225,000.00	225,000
Markups	35.92	%	225,000.00	80,822
				305,822

Alternate 7: Elevated parking deck at Juanita

Add				
Additional elevated parking stalls	150	EA	30,000.00	4,500,000
Geopiers	52,500	SF	5.00	262,500
Markups	35.92	%	4,762,500.00	1,710,725
				6,473,225

	Quantity	*Unit*	*Rate*	*Total*
Deductive Alternate 1: 8 Lane Pool Option				
Reinforced concrete including excavation	(5,500)	SF	5.00	(27,500)
Subsurface drainage	(175)	LF	20.00	(3,500)
Columns and pilasters	(11)	T	3,200.00	(35,200)
Fireproofing on steelwork	(11)	T	300.00	(3,300)
Floor on grade	(5,500)	SF	8.00	(44,000)
Flat roofs	(5,500)	SF	20.00	(110,000)
Fireproofing steelwork	(25)	T	300.00	(7,425)
Wall framing, furring and insulation	(6,038)	SF	10.00	(60,375)
Applied exterior finishes	(6,038)	SF	25.00	(150,938)
Windows and glazing	(1,509)	SF	55.00	(83,016)
Fascias, bands, screens and trim etc.	(7,547)	SF	1.50	(11,320)
Roofing	(5,500)	SF	15.00	(82,500)
Finishes allowances by program				
Natatorium	(5,500)	SF	35.00	(192,500)
Special use equipment of all types				
Pools & equipment	(3,500)	SF	175.00	(612,500)
Sanitary fixtures and connection piping	(6)	EA	6,000.00	(36,000)
Surface water drainage	(5,500)	SF	1.00	(5,500)
HVAC allowances by program				
Natatorium	(5,500)	SF	45.00	(247,500)
Electrical allowances by program				
Natatorium	(5,500)	SF	45.00	(247,500)
Fire sprinkler systems - complete	(5,500)	SF	3.50	(19,250)
Markups	35.92	%	(1,979,823.44)	(711,167)
				(2,690,991)

COMPARISON SUMMARY

	North Kirkland A		Juanita		North Kirkland B	
	86,700 SF		86,700 SF		86,700 SF	
	$/SF	$x1,000	$/SF	$x1,000	$/SF	$x1,000
1. Foundations	5.24	454	8.31	721	6.88	596
2. Vertical Structure	16.12	1,397	8.41	729	13.40	1,161
3. Floor & Roof Structures	28.92	2,507	29.75	2,579	29.87	2,589
4. Exterior Cladding	20.51	1,778	22.50	1,951	18.42	1,597
5. Roofing & Waterproofing	5.67	491	15.04	1,304	15.42	1,337
Shell (1-5)	76.46	6,629	84.01	7,284	83.98	7,281
6. Interior Partitions, Doors & Glazing	17.04	1,477	17.07	1,480	16.76	1,453
7. Floor, Wall & Ceiling Finishes	25.06	2,173	25.06	2,173	25.06	2,173
Interiors (6-7)	42.10	3,650	42.13	3,653	41.83	3,626
8. Function Equipment & Specialties	39.99	3,467	39.99	3,467	39.99	3,467
9. Stairs & Vertical Transportation	2.60	225	1.44	125	1.44	125
Equipment & Vertical Transportation (8-9)	42.58	3,692	41.43	3,592	41.43	3,592
10. Plumbing Systems	11.05	958	11.20	971	11.22	973
11. Heating, Ventilating & Air Conditioning	31.55	2,736	31.55	2,736	31.55	2,736
12. Electric Lighting, Power & Communication	31.78	2,755	31.78	2,755	31.78	2,755
13. Fire Protection Systems	4.00	347	4.00	347	4.00	347
Mechanical & Electrical (10-13)	78.39	6,796	78.53	6,809	78.55	6,811
Total Building Construction (1-13)	**239.53**	**20,767**	**246.10**	**21,337**	**245.78**	**21,310**
14. Site Preparation & Demolition	5.20	451	6.16	534	17.97	1,558
15. Site Paving, Structures & Landscaping	60.76	5,268	20.52	1,779	92.46	8,017
16. Utilities on Site	1.73	150	2.88	250	4.61	400
Total Site Construction (14-16)	**67.69**	**5,869**	**29.57**	**2,563**	**115.05**	**9,975**
TOTAL BUILDING & SITE (1-16)	**307.22**	**26,636**	**275.67**	**23,901**	**360.83**	**31,284**
General Conditions	18.43	1,598	16.54	1,434	21.65	1,877
Bonding & Insurance	6.15	533	5.51	478	7.22	626
Contractor's Overhead & Profit or Fee	13.28	1,151	11.91	1,033	15.58	1,351
PLANNED CONSTRUCTION COST	**345.07**	**29,918**	**309.64**	**26,846**	**405.29**	**35,138**
Contingency for Design Development	51.76	4,488	46.45	4,027	60.80	5,271
Bid & Construction Contingency	0.00	0	0.00	0	0.00	0
Allowance for Rising Costs	20.73	1,797	18.59	1,612	24.34	2,110
RECOMMENDED BUDGET	**417.56**	**36,203**	**374.68**	**32,485**	**490.42**	**42,519**