



March 18, 2014

ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Englishman River Water Service Water Intake, Treatment Plant and Supply Mains Project, Parksville, BC

Submitted to:

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FINAL REPORT



Report Number: 1314770018-002-R-Rev0

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Executive Summary

At the request of CH2MHill, Golder Associates Ltd. (Golder) conducted on behalf of the Englishman River Water Service an archaeological overview assessment for the proposed Water Intake, Treatment Plant, and Supply Mains Project (the Project) between Parksville and Nanaimo, British Columbia. The Project is part of a joint venture to meet the locally imposed health authority conditions of completing a new water intake and treatment plant, and to expand the drinking water supply system with the City of Parksville, the Regional District of Nanaimo and the Town of Qualicum Beach.

The Project Area, as defined in this report, consists of a proposed approximately 250 metre (m) long surface water intake, an approximately 9.5 hectare (ha) water treatment plant, and approximately 18 kilometre (km) of new or upgraded watermain supply lines, including an approximately 2.8 km of new or upgraded watermain supply lines along an alternate route. The Project Area has been divided into three parts, Sections 1, 2 and 3 (Figure 1). A preliminary field reconnaissance was also conducted within Section 1, but not Sections 2 and 3.

This archaeological overview assessment consists of a review of readily available data regarding local and regional prehistory, history, ethnography, and the environment of the Project Area. The purpose of the overview is to identify locations of potential archaeological sensitivity and to develop an archaeological risk management strategy for proceeding with the Project. The overview provides recommendations regarding the need for, and scope of, further archaeological work, including archaeological impact assessment conducted under a *Heritage Conservation Act* permit issued by the Archaeology Branch at the Ministry of Forests, Lands and Natural Resource Operations.

There is one previously registered archeological site within the Project Area (DhSb-41), and six previously registered archaeological sites located within 250 m of the Project Area (DhSb-6, DhSb-22, DhSb-23, DhSb-26, Dhsb-50 and DhSa-26). In addition, areas with high potential to contain undocumented archaeological sites are located within the Project Area, including along the banks of the Englishman River and associated tributaries, along Enos Lake and Enos Creek, along an unnamed creek that flows into Nanoose Bay, and along high ridges with good view points. As the proposed development has the potential to impact archeological sites that are located within the Project Area, an archaeological impact assessment is recommended for select portions of Section 1, archaeological monitoring at registered site DhSb-41 and a preliminary field reconnaissance along Sections 2 and 3.



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1.0 INTRODUCTION

At the request of CH2MHill, Golder Associates Ltd. (Golder) conducted on behalf of Englishman River Water Service (ERWS) an archaeological overview assessment (AOA) for the proposed Water Intake, Treatment Plant and Supply Mains Project (the Project). The Project is part of a joint venture to meet the locally imposed health authority conditions of completing a new water intake and treatment plant, and to expand the drinking water supply system with the City of Parksville, the Regional District of Nanaimo and the Town of Qualicum Beach.

The Project Area, as defined in this report, consists of a proposed approximately 250 m long surface water intake, an approximately 9.5 ha water treatment plant, approximately 18 km of new or upgraded watermain supply lines, including approximately 2.8 km of new or upgraded watermain supply lines along an alternate route (Figure 1). The AOA consisted of a desktop study to assess the potential for archaeological sites to exist within the Project Area and to provide recommendations for the management of archaeological resources, where warranted.

This report summarizes the results of the assessment, and provides recommendations for further archaeological work. Section 2.0 reviews the current provincial legislation and policy for the protection of archaeological sites. Section 3.0 provides a description of the Project and Section 4.0 describes the location of the Project Area, including local and regional environmental characteristics and the cultural history of the region. Section 5.0 presents a summary of the methods employed in the analysis of the archaeological potential throughout the Project Area. Section 6.0 describes the results of the assessment. Section 7.0 provides recommendations for the future management of archaeological resources and locations of archaeological resource potential in the Project Area. Figures showing the Project Area can be found at the end of the report.

2.0 HERITAGE LEGISLATION

All archaeological sites on Provincial Crown or private land that predate AD 1846 are automatically protected under 1996 amendments to the *Heritage Conservation Act* (HCA). Certain sites, including burials and rock art sites, that have historical or archaeological value, are protected regardless of age. Site protection under the HCA does not necessarily negate impact; in some cases, development may proceed following an impact assessment or other mitigative actions.

Subsurface investigation of an archaeological site or investigation with the intent to locate a site requires a permit under Section 14 of the HCA. The Archaeology Branch, Ministry of Forests, Lands and Natural Resource Operations, is the provincial government agency responsible for administering the HCA, including issuing permits and maintaining a database of recorded archaeological sites. With the exception of impacts occurring under a Section 14 permit, any alteration to a known archaeological site must be permitted under Section 12 of the HCA. A Section 12 permit is held by the individual responsible for the site alteration and may include data recovery or mitigative requirements, such as monitoring or data sampling.



3.0 PROJECT DESCRIPTION

The Project Area includes new and upgraded watermain supply lines that proceed along approximately 18 km of existing E&N Railway right-of-way, roads and undeveloped areas. In addition, the potential footprints of the proposed water treatment plant along with the proposed intake location were also surveyed. During the PFR, the exact locations of the Aquifer Storage and Recovery (ASR) wells were unknown and thus were not included in this assessment. The Project Area is located on the central coast of Vancouver Island within the communities of Parksville and Nanoose (Figures 1).

Developments in Section 1 consists of the following: 1) a 9.5 ha water treatment plant; 2) a 250 x 25 m surface intake; 3) approximately 5.6 km of new or upgraded watermain supply lines along portions of Stanford Avenue, Martindale Road, along E&N Railway right-of-way and undeveloped areas; and 4) an alternate 2.8 km of new or upgrade watermain supply line along an alternate route that follows Butler Avenue, Martindale Road, and undeveloped areas.

Developments in Section 2 consist of approximately 3.3 km of new or upgraded watermain supply lines along portions of Claudet Road, Stewart Road, Nuttal Drive and undeveloped areas

Developments in Section 3 consist of approximately 6.1 km of new or upgraded watermain supply lines along portions of Transtide Drive, Collingwood Drive, and undeveloped areas.

Previous disturbances within the Project Area include past construction activities related to the E&N Railway, roads, sidewalks, culverts, ditches, trails and other utilities. However, there are substantial segments of the Project Area that remain relatively undisturbed from past development activities, including portions located along the Englishman River.

For this Project, it is our understanding that subsurface construction activities are unavoidable. Proposed development activities may include grading, and excavating to accommodate the water treatment plant, surface intake and water mains, to unknown depths.

3.1 Potential Impacts to Archaeological Sites

Alteration of the landscape can result in the damage or complete destruction of all or portions of archaeological sites. These alterations often involve the displacement of artifacts, resulting in the loss of valuable contextual information, or may involve the destruction of the artifacts and feature themselves, resulting in complete information loss. While these losses are usually permanent and irreversible, the effects can be offset through the implementation of effective mitigation procedures.

Construction and operational activities that would be considered to have a high impact on archaeological sites would include, but are not limited to: drilling, excavation, grading and levelling. Vegetation clearing involving the cutting of standing trees has the potential to destroy culturally modified trees (CMTs).



4.0 PROJECT AREA

4.1 Physical Setting

The Project Area is located on the east side of Vancouver Island, approximately 500 to 800 m south from the Ballenas Channel, and east towards Nanoose Bay, within the communities of Parksville and Nanoose, BC. The Project Area is located between 5 and 100 m above sea level, and crosses the Englishman River along with an associated tributary and is in close proximity to Enos Lake and Enos Creek. The Project Area is located in the Coastal Douglas-fir (CDF) Biogeoclimatic Zone (Nuszdorfer et al. 1991; Meidinger and Pojar 1991). The CDF Biogeoclimatic Zone is limited in extent, encompassing portions of southeast Vancouver Island, several of the islands in the Gulf of Georgia and Strait of Georgia, and a narrow strip of the adjacent Mainland (Nuszdorfer et al. 1991:82-83). The CDF lies within the rain shadow of the Vancouver Island and Olympic mountains. As such, climate in the CDF is characterized by warm dry summers and mild wet winters; mean annual precipitation values are relatively low when compared with those of the adjacent Coastal Western Hemlock Biogeoclimatic Zone (Nuszdorfer et al. 1991:82-83).

Douglas-fir is the most common tree species found within CDF forests. Other common forest constituents include western redcedar, balsam, Garry oak, arbutus, and red alder. Western hemlock occurs infrequently within the CDF (Nuszdorfer et al. 1991:82-83).

4.2 Palaeo-environmental Setting

Sea levels on the coast of British Columbia have changed dramatically since deglaciation and the record of relative sea-level changes can vary greatly between specific locales (McLaren 2008). Sea level histories have been established for several coastal regions of British Columbia including Haida Gwaii (Fedje et al. 2006), Prince Rupert (Archer 1998; Archer and Friesen 2002; Clague et al. 1982; Fedje et al. 2006), the Dundas Island Group (McLaren 2008), the Kitimat Area (Clague 1984; Clague et al. 1982), the Central Coast Area (Apland 1982), within the Howe Sound Area (Reimer 2000), and within the southern Strait of Georgia Area (Hutchison 1992).

Clague et al. (1982) reports that sea levels were as much as 200 m above present levels during initial deglaciation about 13,000 years ago. At the beginning of the Holocene Epoch, sea levels dropped rapidly. This change, combined with isostatic rebound of submerged coastal lowlands, caused sea levels to reach a point approximately 12 m below present levels by about 8,000 years ago. Between 7,500 and 7,000 years ago, sea levels began to rise again, a trend that continued until between 5,500 and 5,000 years Before Present (BP), when a period of stability commenced. Clague et al. (1982) suggest that the sea had risen to within 2 m of its present level by 5,000 BP and that sea levels have remained relatively stable over the past 5,000 years, with local fluctuations limited to no more than 1 to 2 m.

For the Southern Strait of Georgia, Hutchinson (1992) has reconstructed the relative Holocene sea level change through radiocarbon dating of samples obtained from Victoria and to a lesser degree the Gulf Islands (e.g., Galiano and Salt Spring Islands). This study shows that the relative sea level must have dropped to 10 m below present day levels by the late Pleistocene or early Holocene (Hutchinson 1992:47) from a postglacial maximum of 75 m above sea level (asl) at roughly 13,000 uncorrected radiocarbon years (Mathewes et al. 1970). Relative sea level then rose to about 1 m above present day levels by 9,000 or 8,500 BP, before falling slowly to modern levels (Hutchinson et al. 2004:183).



Although a sea level history has not been established for the Parksville area, it is anticipated that sea levels have not remained static through time. Sea level change in the Parksville area is further supported by vast inland surficial deposits of clay, silts, sands and gravels associated with shoreline, delta and fluvial deposits within the Project Area, particularly in association with the Englishman River, and glacio-marine deposits inland (Geological Society of Canada 1964). As site DhSb-41 (see Section 4.0 below) is an inland midden site that is associated with glacio-marine and delta deposits, it may correspond to a time of raised sea levels.

4.3 Previous Archaeological Work

Numerous archaeological assessments have been undertaken in the vicinity of the Project Area, some of which are discussed below. Most of these assessments were conducted on behalf of public and private sector proponents in advance of residential and infrastructure developments.

There is one registered archeological site within the proposed Project Area, DhSb-41. This site is located at the east end of the Segment 1 watermain supply line. In addition, there are six registered recorded archaeological sites located within 250 m of the Project Area: DhSb-6, DhSb-22, DhSb-23, DhSb-26, Dhsb-50 and DhSa-26. These archaeological sites are described below.

DhSa-26 is located approximately 225 m southeast of Section 3 along the north shore of Nanoose Bay. The location of the Giant Powder Company, cordite and various forms of dynamite was manufactured at this location in the early twentieth century for use in mining, land clearing and armaments. The facility consisted of over 129 buildings including a boarding house and separate housing for Euro-Canadian and Chinese labour, as well as 4.8 km of railroad track, three paved roads and associated utilities (Golder 1998). This 1,300 x 1,200 m site was first recorded in 1999 by Dady and Christensen (2000) during a non-permitted AIA for the Department of National Defence.

DhSb-6 is located approximately 225 m north of Section 2. The 15 x 60 m precontact site is situated along the south shore of Nuttal Bay. The site was recorded in 1963 by the Provincial Museum (non-permit), and revisited by Bjorn Simonsen in 1975 under *Heritage Inspection Permit* 1975-006 (Simonsen 1975). Four subsurface tests were excavated, with one containing crushed shell midden in a dark soil 40 cm depth below surface (dbs). The site is reported to be completely disturbed due to housing construction.

DhSb-22 is located approximately 97 m west of Section 2 along the eastern shore of Northwest Bay. The subsurface shell midden site was recorded by Denis Foster in 1975 under *Heritage Inspection Permit* 1976-006 (Foster 1975); with additional testing conducted in 2012 by Stantec under *Heritage Inspection Permit* 2012-041 as part of an AIA for Lot A on Claudet Road (Rohdin 2012). The precontact site measures 15 x 100 m. The 2012 reconnaissance and shovel testing did not identify any cultural material.

DhSb-23 is located approximately 225 m west of Section 2 along the eastern shore of Northwest Bay. The precontact site was recorded by Denis Foster in 1975 under *Heritage Inspection Permit* 1975-006 (Foster 1975), with additional work in 1995 by I R Wilson under *Heritage Inspection Permit* 1995-131 (IR Wilson 1995). The site measures 17 x 68 m and consists of a surface scatter of shell midden deposits, with associated fire cracked rock. No subsurface testing has been conducted at this site.



DhSb-26 is located approximately 245 m north of Section 2 along the southern shore of Nuttal Bay. The site was recorded by Denis Foster in 1975 under *Heritage Inspection Permit* 1975-006 (Foster 1975). The precontact site measures 5 x 70 m, and consists of subsurface shell midden in an undeveloped residential lot.

DhSb-41 is located within the Project Area at the east end of the Section 1 watermain supply line. The precontact archaeological site is situated in a small section of undeveloped land between Highway 4 and the E&N Railway, 60 m northwest of Highway 19. The site was recorded in 1995 by Millennia Research Ltd under *Heritage Inspection Permit* 1995-036 (Chatan and Eldridge 1995). The site measures 27 x 15 m, and consists of disturbed shell midden deposits and a recent bark stripped arbutus tree. The site has likely been impacted by highway construction activities, ongoing erosion and forest clearing activities.

DhSb-50 is located approximately 230 m northeast of the north end of the watermain supply line in Section 1 along the west bank of the Englishman River, approximately 230 m northeast of the east end of Stanford Avenue. The site was recorded in 2009 under *Heritage Inspection Permit* 2009-288 by I R Wilson Consultants Ltd. (Kanipe and Hall 2009). The precontact site measures 16.5 x 12.5 m, and consists of 16 pieces of lithic debitage found in imported fill.

4.4 Cultural Setting

According to the Consultative Areas Database (GeoBC 2014) maintained by the Ministry of Energy and Mines, the following First Nations have Aboriginal interests in the Project Area: Qualicum First Nation and Snaw-Naw-As (Nanoose) First Nation. These First Nations speak Island Halkomelem which is one of three different dialects of the Halkomelem language (Suttles 1990). The Halkomelem language is one of the five language groups that form part of the Central Coast Salish culture area that includes Squamish, Nooksack, Northern Straits, and Clallam (Suttles 1990). Halkomelem (or Hul'qumi'num) speakers can be found from Harrison Lake and the Fraser Canyon to the mouth of the Fraser River on the Mainland, across the Gulf Islands, and along the east shore of Vancouver Island (Suttles 1990).

Prior to contact with Euro-Canadians, these First Nation lived in relatively independent household groups, each of which had a main winter village, but who moved seasonally to undertake a variety of subsistence activities (Barnett 1955; Duff 1952; and Suttles 1990). Detailed information on Central Coast Salish culture, including social structure, political organization, demographics, treaties, material culture, medicine, life cycle, effects of disease, subsistence, ethnobotany, language, beliefs and customs, secret societies, food preparation, pastimes and other aspects can be found in: Barnett (1939, 1955), Mitchell (1968), and Suttles (1951, 1958, 1960, 1968, 1987, 1990).



5.0 METHODS

5.1 Background Research

Background research for the AOA included a review of readily available cultural and environmental data pertinent to the Project Area. This review included both published and unpublished sources regarding local and regional history, archaeology, and the environment. The Provincial Heritage Register (PHR) was reviewed to determine whether any recorded archaeological sites are present within the Project Area. As part of the background research, surficial geology maps were also referenced to identify palaeo-shorelines, delta and fluvial deposits, as well as other inland surficial features.

5.2 Preliminary Field Reconnaissance

The PFR consisted of a visual inspection of Segment 1 of the Project Area to refine the archaeological potential as identified in the background review and to identify surface archaeological materials or features. Traverse locations were tracked using a hand-held GPS and digital photographs were taken of the general Project Area, including significant terrain features such as river crossings. The focus of the PFR was on areas identified during the background review as having high archaeological potential; however, areas of low archaeological potential were also traversed by foot or vehicle to confirm the results. As ERWS is unsure of the exact location for the proposed wastewater treatment plant, intake structure, and watermain supply lines, an approximately 40 m buffer was subject to the PFR, 20 m on either side of the E&N Railway and edge of pavement associated with roads (Figures 2 to 5).

5.3 Assessment of Archaeological Potential

Expected archaeological site types in the vicinity of the Project Area include, but are not limited to, the following: shell midden, lithic and faunal artifacts, faunal materials and/or human remains. Other types of sites such as rock cairns, surface and sub-surface lithic scatters, house floors, food processing pits and/or hearths are known to the region, as well as culturally modified trees (CMTs).

Some factors considered indicative of archaeological potential include the following: level or nearly level terrain near fresh water features; proximity to previously recorded archaeological sites; well-drained terrain; areas along documented transportation corridors such as historical trails; landforms that provide good vantage points or defensive positions; forest stands older than 1846 AD; and locations identified during the ethnographic review such as Aboriginal place names. Topographical and micro-topographical features, such as promontories, small rises or subtle changes in elevation, knolls, ridges, caves and rock shelters and terraces are also considered to have archaeological potential.

Factors generally considered to constrain potential for protected archaeological sites include: steep or rough terrain, particularly areas in excess of 100 m from a hydrological feature; poorly drained terrain; massively disturbed areas (i.e., previously excavated locations where imported gravel is used for fill); and unbroken slope.



6.0 RESULTS

Review of readily available cultural and environmental data from the Project Area identified several areas of high archaeological potential within all three sections in the development. These locations are summarized by section below.

6.1 Section 1

The terrain within Section 1 varies from relatively level to gently sloping and hummocky, with a forest cover of Douglas-fir and western redcedar. The most significant aquatic feature in this section is the Englishman River that both the proposed and alternate rights-of-way traverse, and an old river bed associated with the Englishman River. Surficial geology maps indicate glacio-marine sediments of clay, silts, sands, gravel and discontinuous bedrock, and fluvial deposits associated with an old river channel. During the PFR, disturbances were observed within 10 m of the paved edge of the existing roads and the E&N Railway.

A PFR of Section 1 was conducted on February 6, 2014 by Heather Pratt and Chris Baker (Golder), with the assistance of Aaron Kennedy of Qualicum First Nation. Snaw-Naw-As was also invited to provide a community member, but was unable to participate. The following is a summary of the results from the PFR on Section 1; which has been divided into 12 segments of arbitrary lengths. Segment lengths are based on data obtained during the AOA and PFR; and similarities in terrain, type of disturbances, aquatic features and archaeological potential.

6.1.1 Segment 1

Location: Segment 1 is situated at the eastern end of Section 1 and proceeds from the junction of Cape Cod Drive and Highway 19 west for approximately 120 m, partially following the E&N Railway. Segment 1 contains previously registered archaeological site DhSb-41 (Figure 2; Appendix A: Photographs 1 and 2).

Terrain Description: Segment 1 is located in the vicinity of previous industrial developments including Highway 19, the E&N Railway, and power lines. Terrain is heavily disturbed with ditches along both sides of Highway 19. Graded, berm and fill material was observed and assumed to be associated with construction of Highway 19 and the E&N Railway. Evidence of disturbance associated with existing infrastructure extends into the forest, including a chain-link fence and a 5 m drainage ditch, in a low-lying area situated between the Highway 19 and E&N Railway right-of-ways. Vegetation is dominated by an understory of various invasive species including Himalayan blackberry, prickly rose and scotch broom. Forest cover included immature Douglas-fir, western redcedar, red alder and arbutus. Sediments observed in exposures near the tree line, were thin to non-existent close to the existing infrastructure, and were light brown in colour, and sandy in texture, with gravel.

Archaeological Potential: The registered location of archaeological site DhSb-41 was revisited during the PFR. The site was recorded during an AIA of Highway 19, and it is very likely the site was destroyed during construction. No evidence of past subsurface tests or evaluated units was identified; several mature arbutus trees were examined for cultural modification (i.e., bark stripped); however, no CMTs were found. No evidence of surface midden deposits was identified in the recorded location of the archaeological site.

Segment 1 is considered to contain areas of high archaeological potential due to the potential for buried archaeological deposits associated with DhSb-41.



6.1.2 Segment 2

Location: Segment 2 proceeds from the west end of Segment 1, along the E&N Railway for approximately 1.3 km towards Herring Gull Road. The area to the north and south of the E&N Railway was investigated (Figure 2; Appendix A: Photograph 3).

Terrain Description: Terrain is gently undulating and sloped to the north at 5 to 7%, with a maximum slope of 15%. Terrain is broken by the existing E&N Railway right-of-way, and an artificial ditch exists to the north, adjacent to Herring Gull Road. Berm, push and fill material associated with the E&N Railway exists 5 to 10 m on either side of the E&N Railway. Forest cover consists of immature Douglas-fir, western redcedar, with a ground cover of mosses and sword fern. No exposures were observed to indicate soil type.

Archaeological Potential: Segment 2 is considered to have low archaeological potential. The area to the north and south of the existing E&N Railway is heavily disturbed, and areas with intact soils and sediments are featureless, and gently sloped, with no aquatic features in the vicinity. No evidence of cultural materials was observed during the PFR.

6.1.3 Segment 3

Location: Segment 3 proceeds where the Project Area leaves the E&N Railway and enters undeveloped forest cover. It then crosses the Englishman River, and joins with Martindale Road on the west side of Englishman River. This section is approximately 461 m long (Figures 2 and 3; Appendix A: Photographs 4 and 5).

Terrain Description: Terrain is generally hummocky and gently sloped to the southwest, and then levels out towards the banks of the Englishman River. The east bank of the river sits approximately 8 to 10 m above the water line, with a rocky shore below. The west side of the river consists of a series of step terraces, with a sandy shoreline. Vegetation consists of mosses and sword fern with a forest cover of immature Douglas-fir, red alder and western redcedar. Exposures along the river consist of silts, sands, gravels and river cobbles.

Observed Archaeological Potential: Segment 3 is considered to have high archaeological potential, particularly in association with the step terraces along the east and west banks of the Englishman River, and a ridge 125 m from the east bank of the river. No evidence of cultural materials was observed during the PFR.



6.1.4 Segment 4

Location: Segment 4 proceeds along the west bank of the Englishman River, where the Project Area meets with Martindale Road and follows the existing road north for approximately 1.78 km (Figures 3 and 4; Appendix A: Photograph 6).

Terrain Description: Terrain is generally flat and featureless, as Segment 4 has been disturbed from the existing road construction. In general, the area 5 to 10 m east and west of the road has been disturbed by push material from the road and includes drainage ditches on both sides of the road. Residential properties line most of Segment 4, with existing homes within 50 m of the road. Residential properties were likely affected by disturbance factors that include grading and placement of fill material associated with their construction. In areas where intact sediments exist, terrain is hummocky, generally flat and featureless with no discernable aquatic features. Forest cover, which is sporadic, consists of immature western redcedar and Douglas-fir. Aquatic features include the Englishman River which is between 100 m and 300 m from the road. No exposures were observed to indicate soil type.

Observed Archaeological Potential: Segment 4 is considered to have low archaeological potential based on existing disturbances within the road right-of-way and from residential construction, as well as the continuously hummocky, featureless terrain in areas not subject to disturbance, and the distance to the Englishman River. No evidence of cultural materials was observed during the PFR.

6.1.5 Segment 5

Location: Segment 5 is approximately 779 m long and proceeds towards the northern end of Martindale Road to the junction with Stanford Avenue, and then continues west along Stanford Avenue (Figure 4; Appendix A: Photograph 7).

Terrain Description: Terrain is generally flat and featureless, with a gentle slope to the south; much of the area has been disturbed from development within the existing road right-of-way. There is an unnamed creek running roughly southwest to northeast crossing Martindale Road through a culvert, where it then flows into the Englishman River approximately 100 m to the east. Water was stagnant during the survey on the west side of the road, with thick patches of willow marking the creek channel on the east side of the road. Small patches of immature Douglas-fir and western redcedar remain in the area. In general the area 5 to 10 m east and west of the road has been disturbed by push material from the road and has destroyed much of the remaining banks of the unnamed creek. The same unnamed creek also appears to be closely associated with a forested and unbuilt section on Stanford Avenue. A ridge approximately 30 m northwest of Martindale Road, on the north side of the unnamed creek was observed. No exposures were observed to indicate soil type.

Archaeological Potential: Segment 5 is considered to have high archaeological potential based on the presence of the unnamed creek, the potential for intact deposits along the ridge and forested portions along Stanford Avenue. No evidence of cultural materials was observed during the PFR.



6.1.6 Segment 6

Location: Segment 6 proceeds for approximately 1.2 km along Stanford Avenue to the west end of the Project Area right-of-way (Figure 4; Appendix A: Photograph 8).

Terrain Description: Terrain is generally flat and featureless and is associated with the existing road right-of-way. In general, the first 5 to 10 m north and south of the road has been disturbed by existing infrastructure associated with the road, including drainage ditches, power lines, sidewalks and residential structures. Intact sediments are unlikely due to agricultural activities and the large amount of disturbances resulting from residential construction. Sporadic forest cover consists of immature western redcedar and Douglas-fir. No aquatic features were observed within Segment 6. No exposures were observed to indicate soil type.

Archaeological Potential: Segment 6 is considered to have low archaeological potential based on disturbances that resulted from residential development, construction of the road, installation of the power polls, and other residential infrastructure like sidewalks, as well as the distance to aquatic features. No evidence of cultural materials was observed during the PFR.

6.1.7 Segment 7

Location: Segment 7 is the area around the proposed surface water intake (Figure 2; Appendix A: Photograph 9).

Terrain Description: Segment 7 is located on the east bank of the Englishman River. This area was not subject to a PFR, photos were provided during a prior geotechnical visit. The AOA suggest flat to gently sloping terrain, and defined banks along the Englishman River. Forest cover is consistent with other areas in the Project Area with immature Douglas-fir, western redcedar and red alder. Disturbances include existing concrete structures and cobble and boulder fill along the banks of the river.

Observed Archaeological Potential: Segment 7 is considered to have high archaeological potential, due to the proximity to the Englishman River, and the potential for intact cultural deposits.

6.1.8 Segment 8

Location: Segment 8 is along the alternate route, and proceeds west from the proposed water treatment plant for approximately 560 m towards the Englishman River (Figures 2 and 3; Appendix A: Photographs 10 and 11).

Terrain Description: Terrain varies, but includes flat featureless areas associated with the water treatment plant in the east, and gently sloping terrain to the west. Disturbances include scraped and push material associated with the industrial area around the proposed water treatment plant site, as well as a large open pit aggregate mine. The forested area to the west is gently sloped, hummocky, with a forest cover of immature western redcedar, Douglas-fir, red alder, and a ground cover of sword fern and mosses. Soils appear to be light brown in colour, with a texture of sands, gravels and cobbles, as evident in the open aggregate mine. No aquatic features were observed.

Archaeological Potential: Segment 8 is considered to have low archaeological potential. This section has been heavily disturbed from industrial activities, and the undisturbed portion is generally hummocky, with no defined landforms, and is more than 200 m from the Englishman River. No evidence of cultural materials was observed during the PFR.



6.1.9 Segment 9

Location: Segment 9 proceeds for approximately 270 m along the alternate route, east and west of the Englishman River (Figures 2 and 3; Appendix A: Photographs 12 and 13).

Terrain Description: Terrain consists of flat, featureless terrain associated with the banks of the Englishman River. On the east river bank, terrain is flat, hummocky, and 5 to 8 m above the river. Forest cover consists of immature western redcedar, Douglas-fir, red alder and cherry, with a ground cover of sword fern and mosses. Along the western river bank, residential structures and a concrete culvert have disturbed much of the area. Push piles associated with residential properties were observed along the west bank, which were 8 to 10 m above the river. Intact deposits may still be present under push piles. Sediment exposures along the bank of the river indicate soils were brown in colour, with a silty and sandy texture. River cobbles were observed along the river's edge.

Archaeological Potential: Segment 9 is considered to have high archaeological potential, particularly along the east bank of the Englishman River where intact, undisturbed soils and sediments were recorded. No evidence of cultural materials was observed during the PFR.

6.1.10 Segment 10

Location: Segment 10 proceeds for approximately 440 m along the alternate route on Butler Avenue (Figure 5).

Terrain Description: Terrain is generally flat and featureless, as much of it has been disturbed from the existing road and residential construction. In general, the area 5 to 10 m east and west of the road has been disturbed by push material with drainage ditches present on both sides of the road. Residential properties line most of Segment 10, within 50 m of the road. The area was likely affected by disturbance factors that include grading and fill material associated with house construction. In areas where intact sediments exist, terrain is hummocky, generally flat and featureless with no discernable aquatic features. Forest cover is sparse, but consists of immature western redcedar and Douglas-fir. No exposures were observed to indicate soil type.

Archaeological Potential: Segment 10 is considered to have low archaeological potential based on existing disturbances within the road right-of-way and the close by residential properties, along with the lack of aquatic features. No evidence of cultural materials was observed during the PFR.



6.1.11 Segment 11

Location: Segment 11 proceeds along an undisturbed area situated between Butler Avenue and Despard Avenue, on the alternate route. The length is approximately 996 m (Figures 3 and 5; Appendix A: Photograph 14).

Terrain Description: Terrain is gently undulating and sloped to the northeast at 3 to 7%. Terrain and forest cover remain generally unchanged through Segment 11. Forest cover consists of immature western redcedar, Douglas-fir and red alder, with an understory of mosses and sword fern. A potential historical trail proceeds adjacent to Segment 11. No aquatics were observed, however surficial geology maps suggest fluvial deposits in the east portion of Segment 11, related to an old channel of the Englishman River. No discernable topographic features were observed within the Project Area, and no sediment exposures were observed. The Englishman River, as it currently flows, is 275 m from the east end of Segment 11.

Archaeological Potential: Segment 11 is considered to have high archaeological potential based on the potential for intact cultural material related to the fluvial deposits, and the presence of a trail. No evidence of cultural materials was observed during the PFR.

6.1.12 Segment 12

Location: Segment 12 proceeds for approximately 533 m along the alternate route on Martindale Road (Figure 5).

Terrain Description: Terrain is generally flat and featureless, as much of it has been disturbed from the existing road and residential construction. In general, the area 5 to 10 m east and west of the road has been disturbed by push material, with drainage ditches present on both sides of the road. Residential properties line portions of Segment 12, within 50 m of the road. The area was likely affected by disturbance factors that include grading and fill material associated with house construction. In areas where intact sediments exist, terrain is hummocky, generally flat and featureless with no discernable aquatic features. Forest cover, where present, consists of immature western redcedar and Douglas-fir. The closest aquatic feature is the Englishman River, which is approximately 180 m east of the eastern end of Segment 12. No exposures were observed to indicate soil type.

Archaeological Potential: Segment 12 is considered to have low archaeological potential based on existing disturbances within the road right-of-way and the close by residential properties, along with the lack of aquatic features. No evidence of cultural materials was observed during the PFR.



6.2 Section 2

The terrain within Section 2 is undulating, with gentle to moderate slopes. Forest cover is believed to consist of immature Douglas-fir and western redcedar. Aquatic features include Ballenas Channel 800 m to the north. Surficial geology includes glacio-marine sediments of clay, silts, sands, gravel and discontinuous bedrock. Disturbances likely exist in areas within 10 m of existing roads. A portion of the watermain supply line in Section 2 is also located within 100 m of registered archaeological site DhSb-22.

During the desktop review, areas of high archaeological potential were observed within Section 2 of the Project Area. Specifically, areas of high potential would include portions of the development located within 100 m of DhSb-22, as well as undeveloped areas within the Project right-of-way where intact soils and sediments may exist. A PFR was not conducted within Section 2.

6.3 Section 3

The terrain within Section 3 is undulating, with gentle to moderate slopes; areas of steeper terrain exist in proximity to Nanoose Hill. Forest cover consists of immature Douglas-fir and western redcedar. Aquatic features included Nanoose Creek approximately 250 m to the southwest, Bonell Creek approximately 500 m to the southwest, and an unnamed creek which passes through the west end of Section 3. Enos Lake is within 25 m of the watermain supply line right-of-way; and the watermain supply line crosses Enos Creek, as well as an unnamed creek that drains into northwest corner of Nanoose Bay. Surficial geology maps indicate glacio-marine sediments of clay, silts, sands, gravel and discontinuous bedrock. Disturbances likely exist within 10 m of existing roads. The east end of Section 3 is also located within 225 m of the registered archaeological site DhSa-26, the location of the Giant Powder Company.

Areas of high archaeological potential exist within Section 3 of the Project Area, particularly portions of the development located within 100 m of DhSa-26, in areas within 50 m of aquatic features such as creeks and lakes, and in undeveloped locations where intact soils and sediments may exist. A PFR was not conducted within Section 3.



7.0 RECOMMENDATIONS

Recommendations were formulated based on the results of this AOA and PFR. There is one registered archaeological site in the Project Area, and six previously registered archaeological resources within 250 m of the development. In addition, several locations of high archaeological potential have been identified in the Project area. It has also been demonstrated that proposed developments in the Project Area can adversely affect archaeological resources. These effects can include direct and indirect impacts to archaeological resources from construction and operation of the Project.

Because of the high archaeological potential within the Project Area and the potential effects of the development to archaeological sites, the findings support the conclusion that further archaeological assessment is warranted prior to development proceeding. Considering these factors, Golder makes the following recommendation:

- An AIA should be undertaken prior to land altering development in areas of high archaeological potential located in Section 1 of the Project Area (see Figure 1). An AIA should be conducted in accordance with Archaeology Branch Guidelines by a qualified archaeologist under a Section 14 *Heritage Conservation Act* permit.
- A PFR should be undertaken in Sections 2 and 3 of the Project Area (see Figure 1).

The objectives of the AIA would include the following: (1) identify, record, and assess archaeological sites located within the Project Area; (2) identify and evaluate possible impacts by the proposed development to these archaeological sites; and (3) recommend appropriate impact management actions. With the exception of avoidance, mitigative measures cannot be determined until archaeological assessment, including sub-surface testing has been implemented. Where archaeological sites are identified that might be subject to direct or indirect effects from construction and/or maintenance activities, these areas may require further assessment, investigation or management measures.

The objectives of the PFR would be to refine the archaeological potential as identified in the background review and to identify surface archaeological materials or features. Where locations of high archaeological potential are identified in unavoidable conflict with the development, additional archaeological assessment may be recommended, including AIA.



8.0 LIMITATIONS AND USE OF REPORT

This report was prepared for CH2MHill, and is specific to the proposed development described herein. The study was not specifically designed to address issues of traditional aboriginal use of the Project Area and does not constitute a traditional use study. This report was written without prejudice to issues of aboriginal rights and or title. We trust the information contained in this report is sufficient for your present needs.

9.0 CLOSURE

We trust the information provided here is satisfactory for your present needs. Should you require additional information or clarification, please do not hesitate to contact the undersigned at your earliest convenience.

GOLDER ASSOCIATES LTD.

Chris Baker, M.Sc., RPCA
Archaeologist

CB/BH/asd/lmk

Ben Hjermstad, M.A.
Associate, Senior Archaeologist

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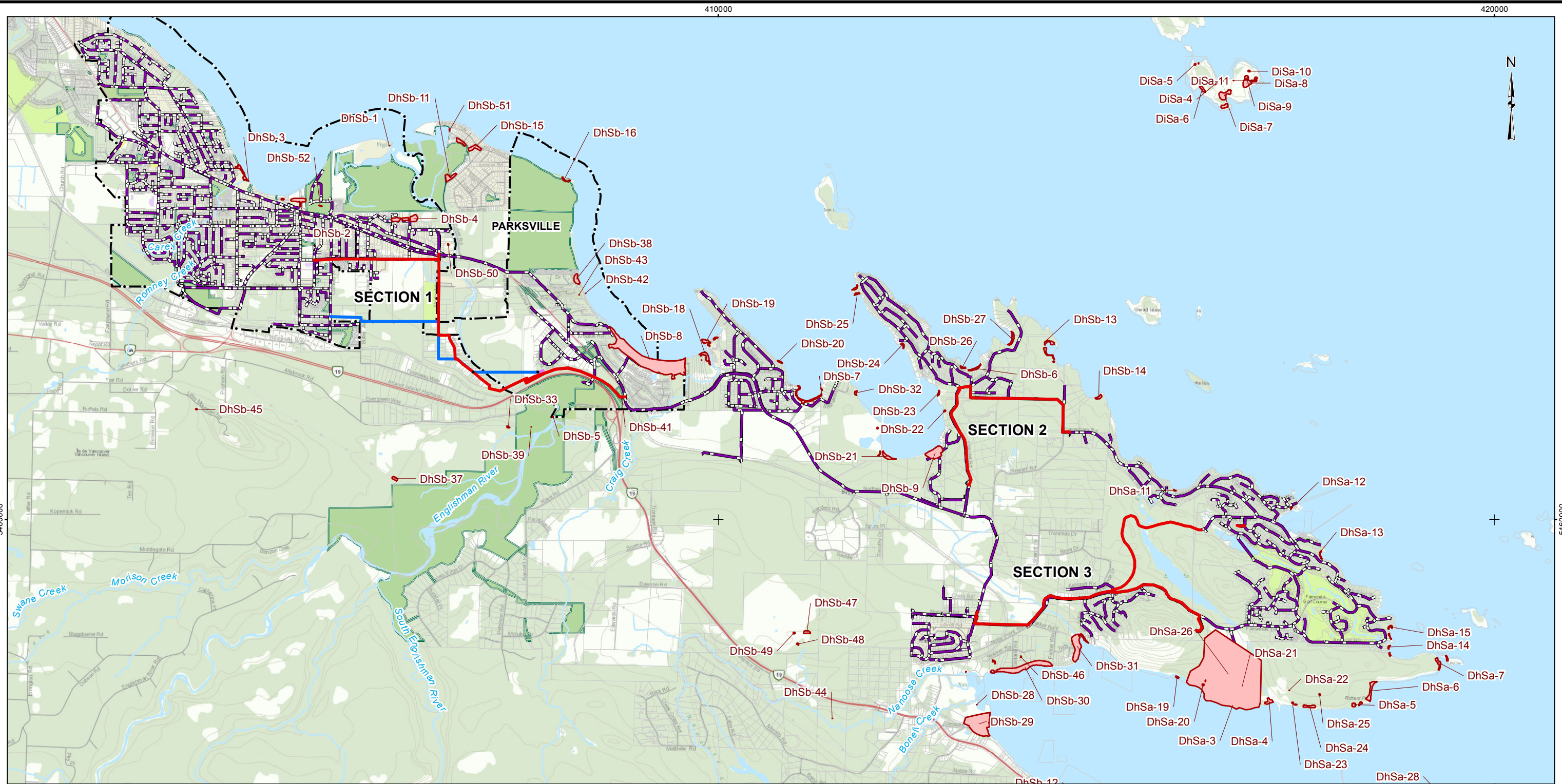
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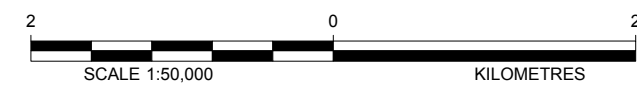


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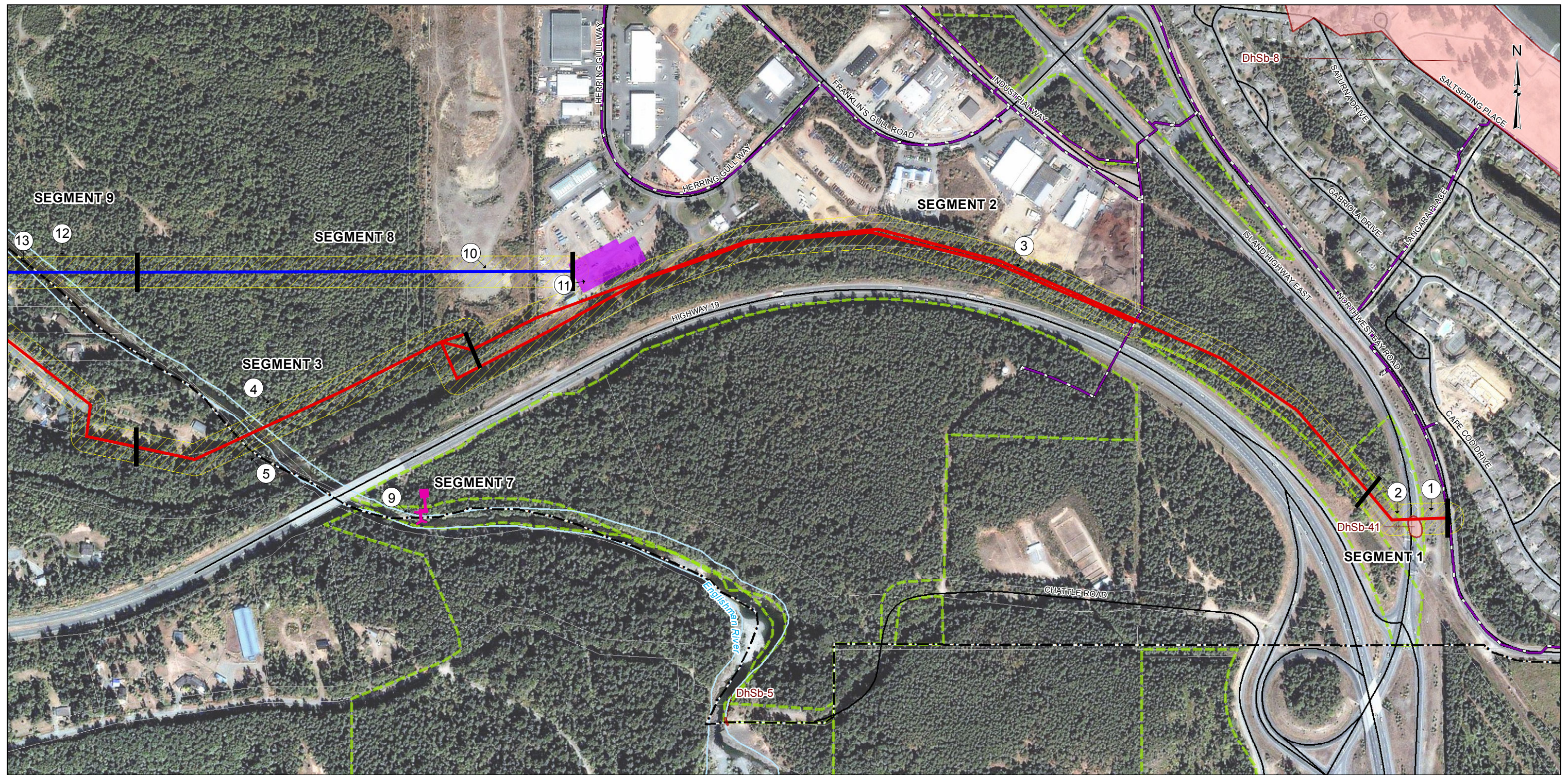
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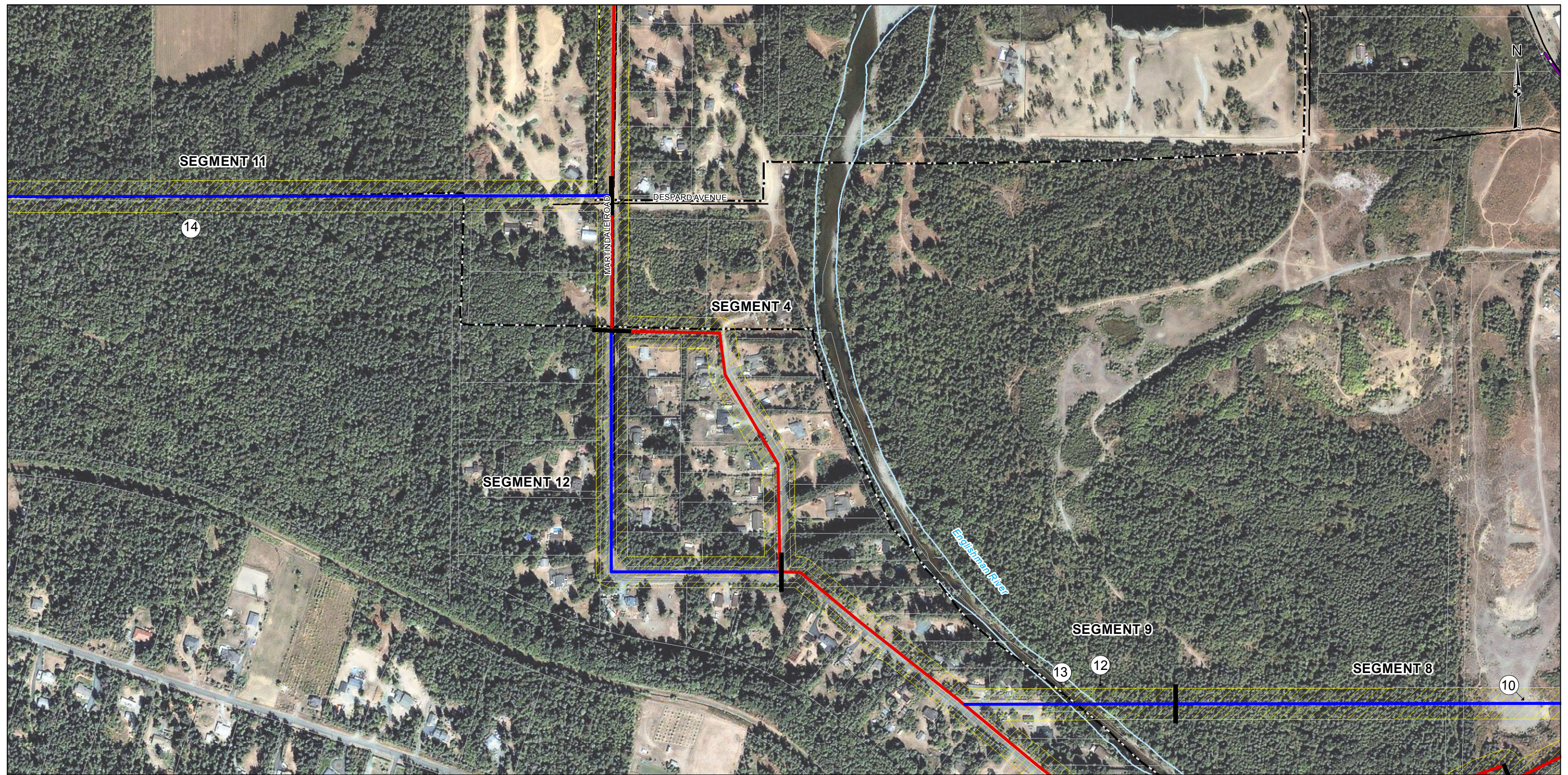
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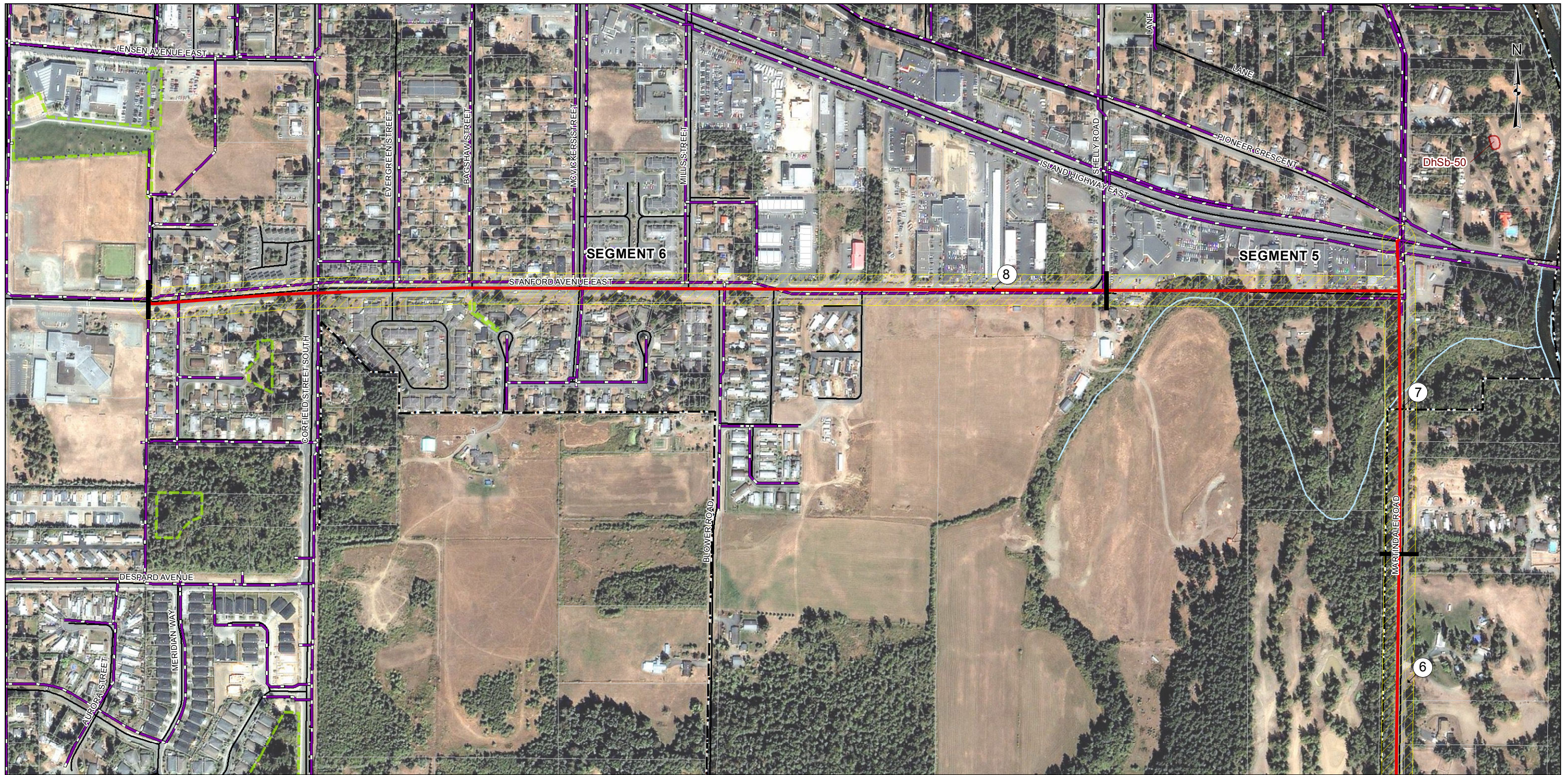
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








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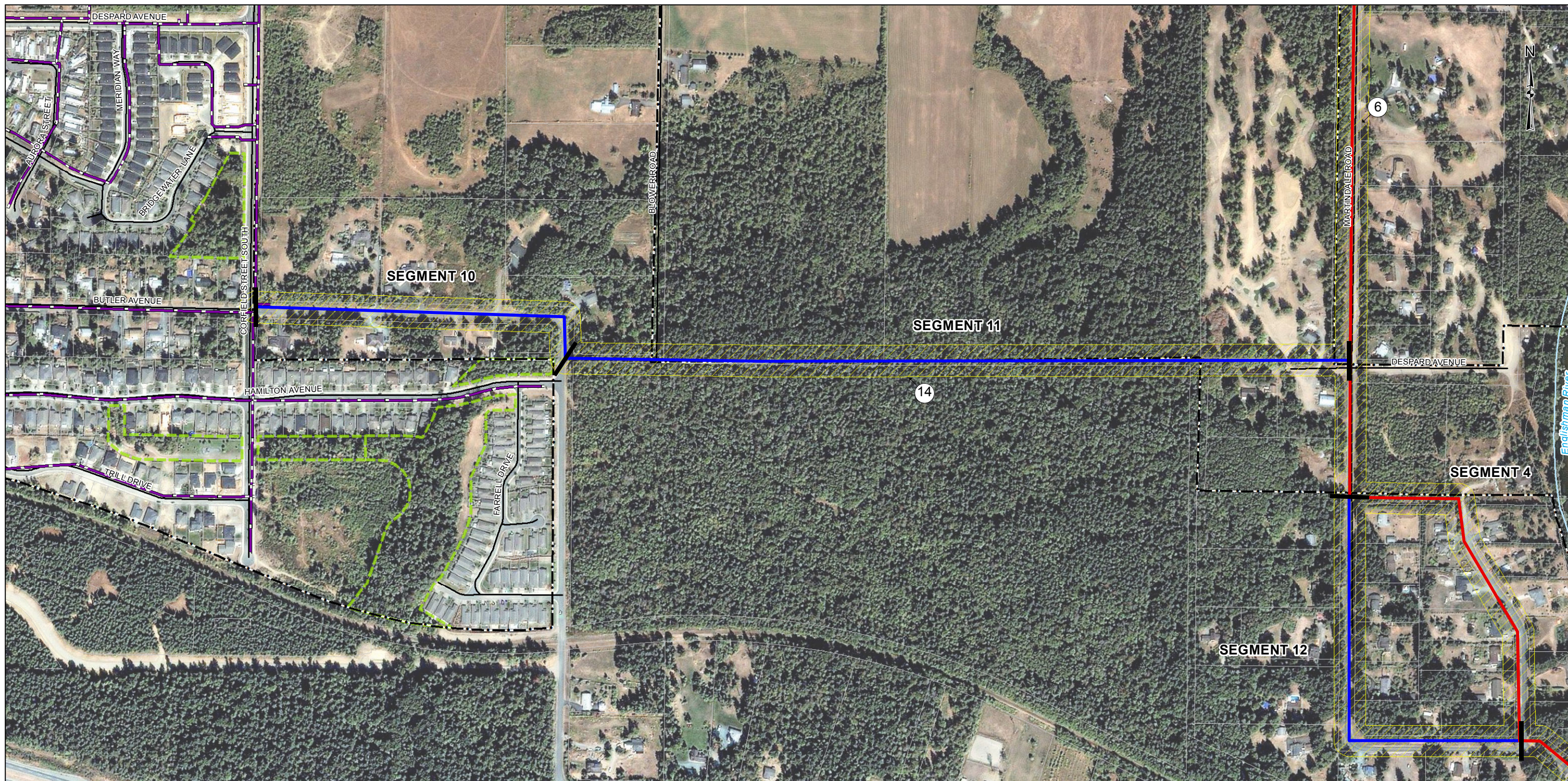
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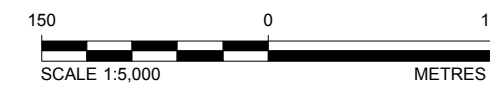


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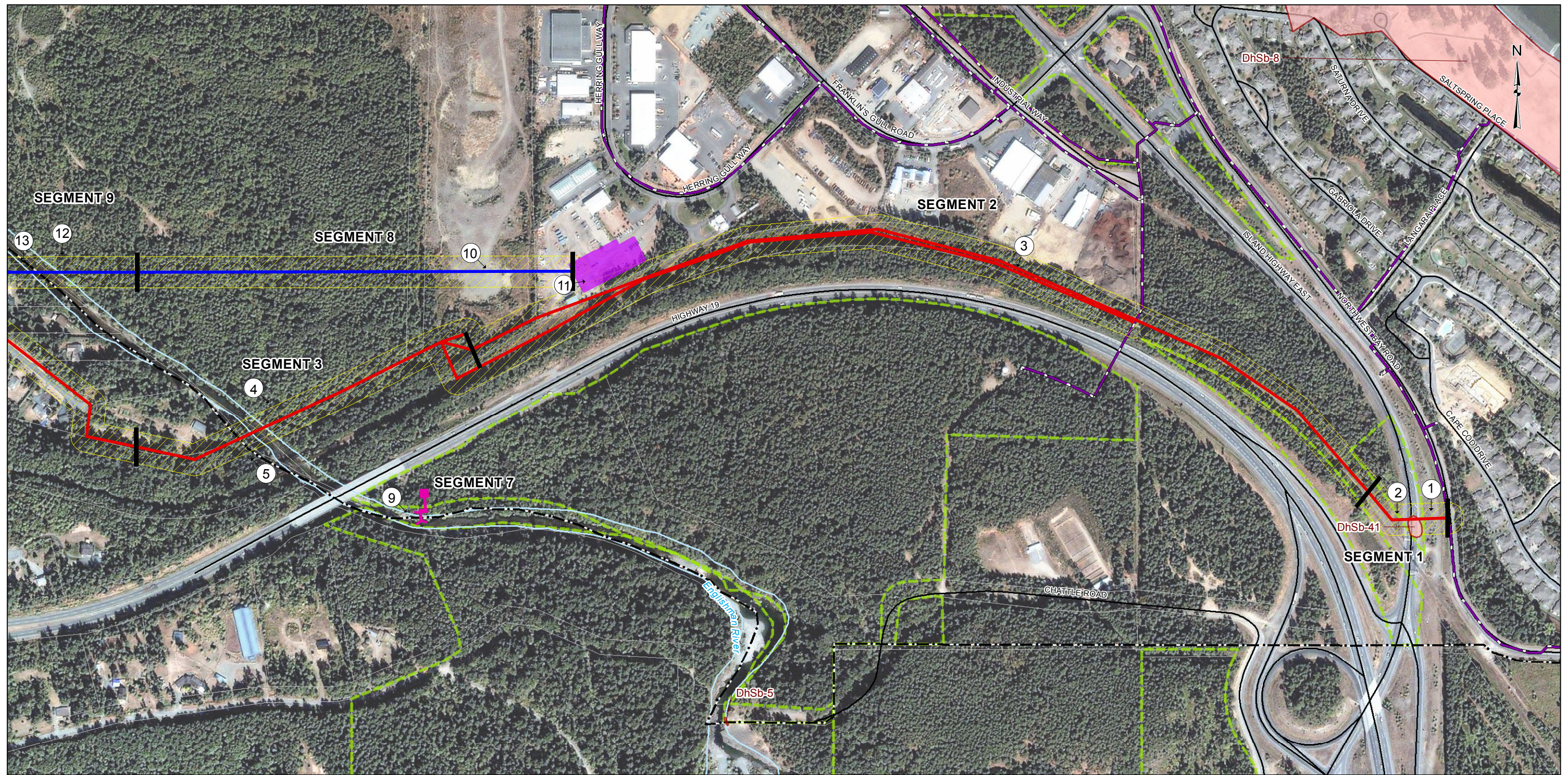
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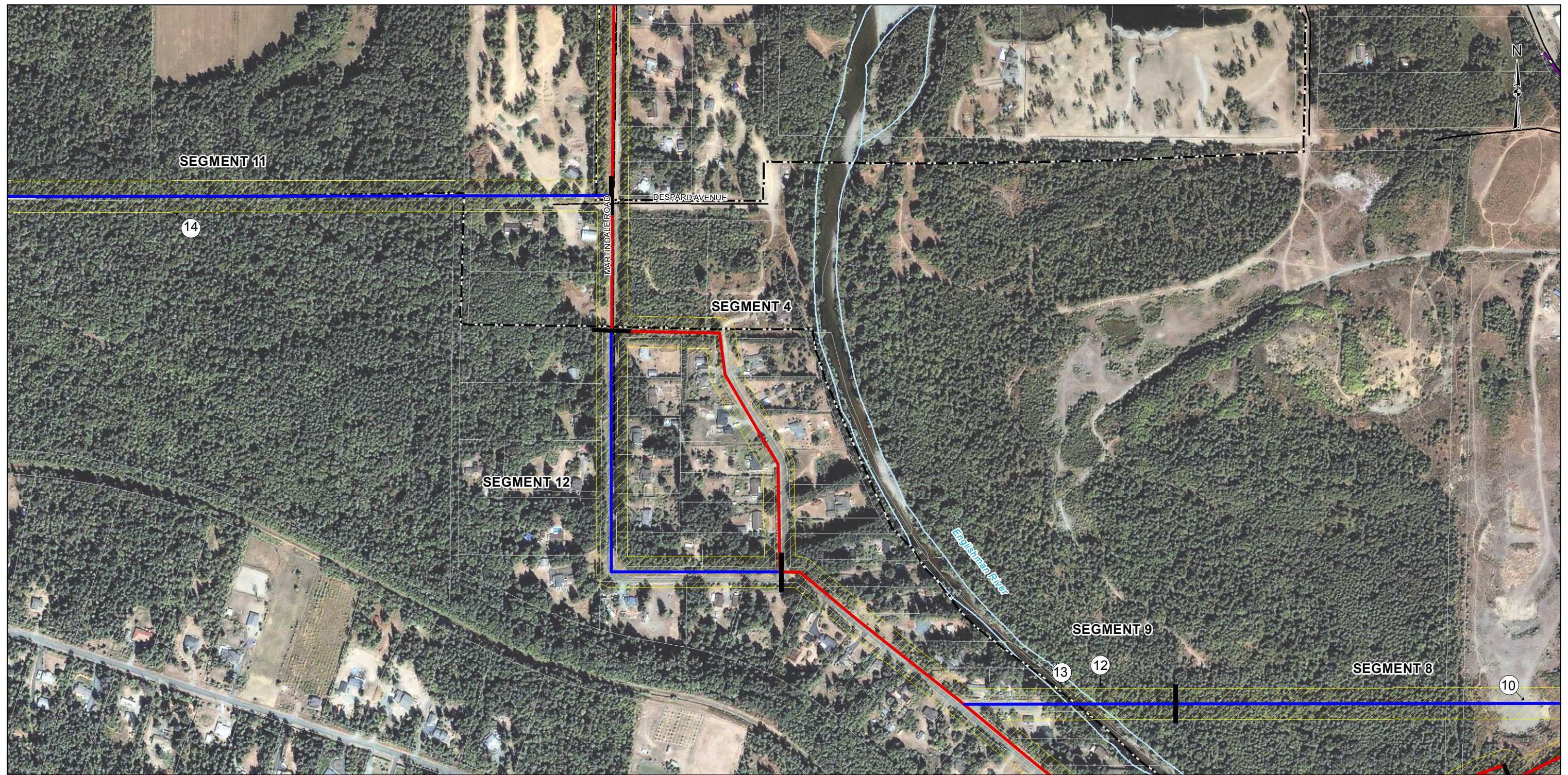
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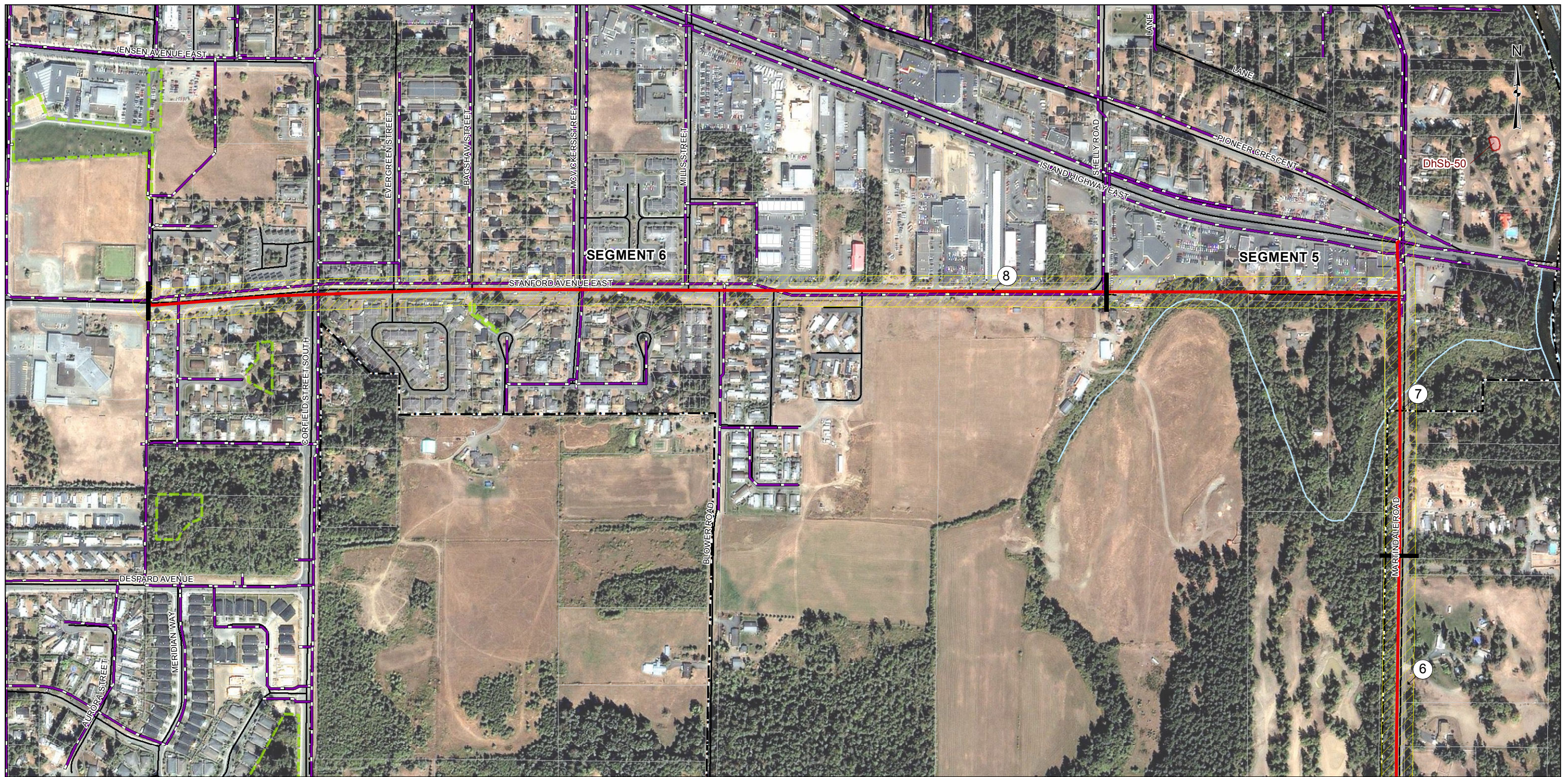
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- WATER TREATMENT PLANT
- WATERBODY

REFERENCE

1. ROAD AND LOT DATA PROVIDED BY CITY OF PARKSVILLE AND THE REGIONAL DISTRICT OF NANAIMO
 2. WATERCOURSE AND WATERBODY DATA PROVIDED BY CANVEC DEPARTMENT OF NATURAL RESOURCES, GOVERNMENT OF CANADA.
 3. WATER MAIN DATA PROVIDED BY KERR WOOD LEIDAL LTD
 4. ARCHAEOLOGY PROVIDED BY BC MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCES.
 5. BASE IMAGERY PROVIDED BY SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY
- DATUM: NAD83 PROJECTION: UTM ZONE 10



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|----------------|---|-----------------|---------------------------------------|
| PROJECT | CH2MHILL ENGLISHMAN RIVER WATER SERVICE INTAKE PARKSVILLE, BC | | |
| TITLE | PRELIMINARY FIELD RECONNAISSANCE AREA | | |
| | PROJECT | 13-1477-0018 | FILE No. |
| | DESIGN | CB 03 MAR. 2014 | SCALE AS SHOWN REV. 0 |
| | GIS | AD 03 MAR. 2014 | |
| | CHECK | CB 10 MAR. 2014 | |
| | REVIEW | BH 10 MAR. 2014 | |
| | | | FIGURE: 3 |

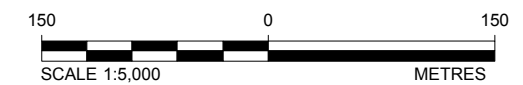


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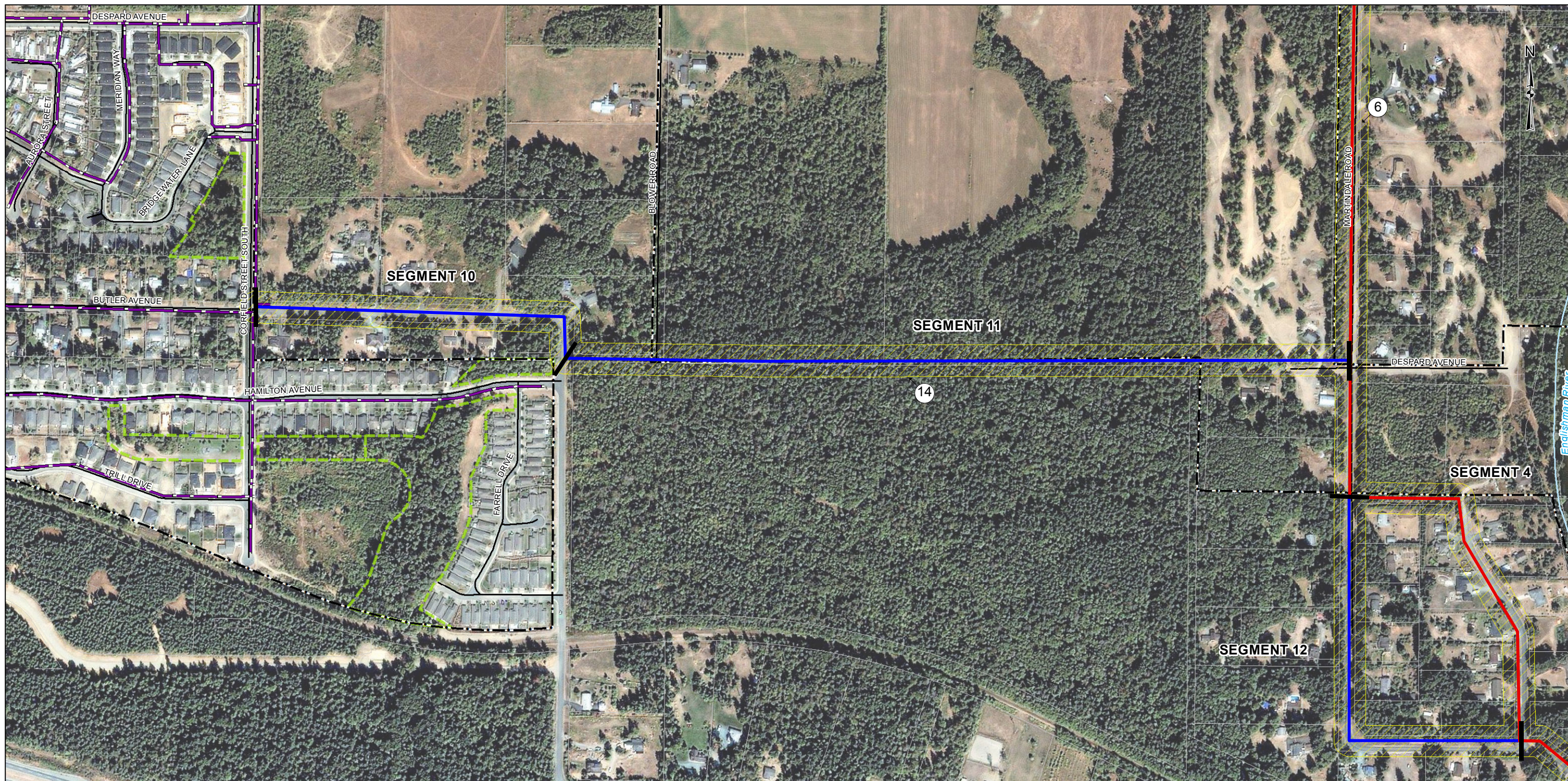
- PHOTOGRAPH LOCATION
- EXISTING WATER MAIN
- ROAD
- WATERCOURSE
- CITY BOUNDARY
- LOT BOUNDARY
- PARK
- PRELIMINARY FIELD RECONNAISSANCE SURVEY AREA
- RECORDED ARCHAEOLOGICAL SITE
- WATER INTAKE
- WATER TREATMENT PLANT
- WATERBODY

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- DATUM: NAD83 PROJECTION: UTM ZONE 10



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| PROJECT | CH2MHILL ENGLISHMAN RIVER WATER SERVICE INTAKE PARKSVILLE, BC | | |
| TITLE | PRELIMINARY FIELD RECONNAISSANCE AREA | | |
| | PROJECT | 13-1477-0018 | FILE No. |
| | DESIGN | CB 03 MAR. 2014 | SCALE AS SHOWN REV. 0 |
| | GIS | AD 03 MAR. 2014 | |
| | CHECK | CB 10 MAR. 2014 | |
| | REVIEW | BH 10 MAR. 2014 | |
| | | FIGURE: 4 | |

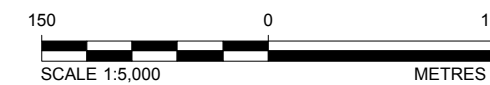


LEGEND

- PHOTOGRAPH LOCATION
- EXISTING WATER MAIN
- ROAD
- WATERCOURSE
- CITY BOUNDARY
- LOT BOUNDARY
- PARK
- PRELIMINARY FIELD RECONNAISSANCE SURVEY AREA
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- DATUM: NAD83 PROJECTION: UTM ZONE 10



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| | PROJECT | 13-1477-0018 | FILE No. |
| | DESIGN | CB 03 MAR. 2014 | SCALE AS SHOWN |
| | GIS | AD 03 MAR. 2014 | REV. 0 |
| | CHECK | CB 10 MAR. 2014 | FIGURE: 5 |
| REVIEW | BH 10 MAR. 2014 | | |



APPENDIX A

Photographs



APPENDIX A
Photographs



Photograph 1: Looking west along proposed watermain supply route in Segment 1.



Photograph 2: Looking south towards disturbed ground surface in vicinity of archaeological site DhSb-41 in Segment 1.



APPENDIX A
Photographs



Photograph 3: Looking southeast along E&N Railway right-of-way in Segment 2.



Photograph 4: Looking northwest along east bank of Englishman River in Segment 3.



APPENDIX A

Photographs

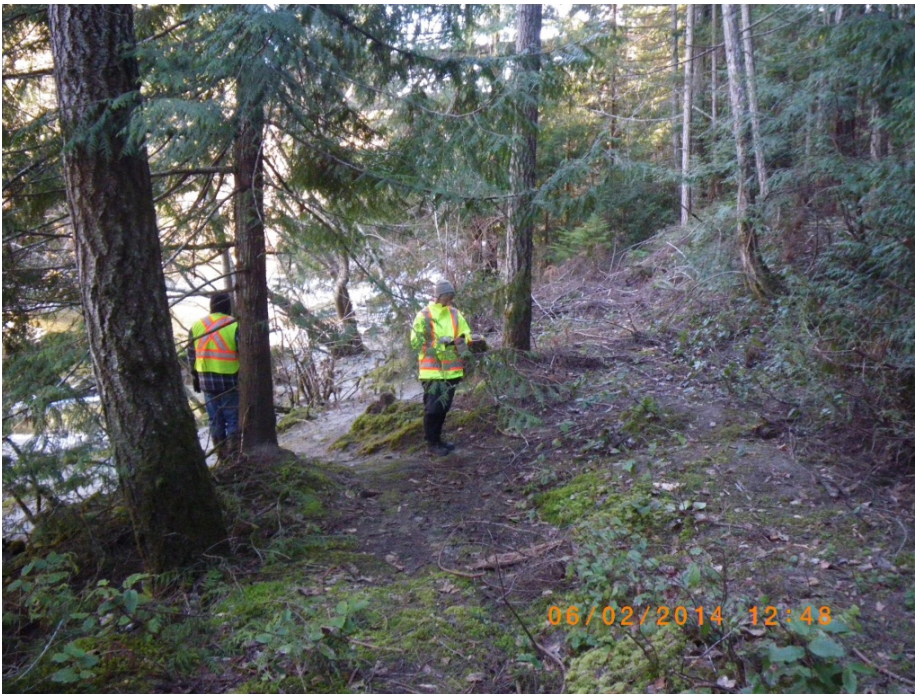


Figure 5: Looking southeast along western bank of Englishman River in Segment 3.



Figure 6: Looking south along Martindale Road in Segment 4.



APPENDIX A

Photographs



Figure 7: Looking north along west side of Martindale Road in Segment 5.



Figure 8: Looking west along Stanford Avenue in Segment 6.



APPENDIX A Photographs



Figure 9: Looking towards proposed surface intake at Segment 7.



Figure 10: Looking west towards aggregate pit along alternate route in Segment 8.



APPENDIX A
Photographs



Figure 11: Looking northeast towards the industrial area and in the vicinity of the Water Plant site.



Figure 12: Looking northeast along eastern shore of Englishman River in Segment 9.



APPENDIX A
Photographs



Figure 13: Looking northeast at concrete culvert on west shore of Englishman River in Segment 10.



Figure 14: Looking west along proposed alternate water main route in Segment 11.

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