ANTIQUUS Archaeological Consultants Ltd.
23021 - 132nd Ave • Maple Ridge, B.C. • V4R 0A8 • Tel: 604-467-3497 • antiquus@shaw.ca

June 30, 2022

HCA Heritage Inspection Permit 2021-0396

Mr. Ryan Blackburn,
Archaeology Branch,
Victoria, B.C.

Re: Interim Summary Results and Recommendations Report for Recently Investigated and Tested Sections of Impact Zones Related to Various Upgrades to a Section of Cedar Drive in Coquitlam, and Summary of Proposed Development Scheduled to Commence in mid-2022; HCA Permit 2021-0396

Dear Mr. Blackburn,

Antiquus has just recently completed the first phase of field investigations relating to several specific sections of ROW road improvement and upgrading for a portion Cedar Drive in Coquitlam (Figure 1). This has involved intensive shovel testing and deep machine (backhoe) testing programs carried out on several occasions in February, April, and May of 2022. A summary of the subsurface testing results is provided below, as are a proposed development plan and schedule, and recommendations for future archaeological management relating to the proposed development activities. The City of Coquitlam would like to start construction activities in mid-2022.

Introduction and Background

The City of Coquitlam is currently in the initial stages of upgrading and new construction along a 1.5 km-long section of Cedar Drive in northwest Coquitlam (Figure 1). There are several development phases to the proposed upgrading and construction, and this interim report only relates to seven specific sections of the road upgrade ROW and related facilities as indicated in Figures 1, 2, 6, 10, 11, 15, 24, and 25. They have been identified as **"Development Areas" 1 to 7.** Their general descriptions, archaeological inspection results, and management results are presented below.

Note that some sections of the southwestern half of the road upgrade ROW (Figure 1) were **not** inspected during this first phase of archaeological investigations since proposed construction within these areas will not occur until late 2023 or 2024. We were focused primarily on inspecting those areas where road construction is already underway, and areas where construction is proposed to commence in mid-2022.

While Partington Creek passes along the west side of Cedar Drive within the entire length of the road upgrade ROW study area, this channel is artificial and did not exist in this location pre-contact period times. The present channel was created when Cedar Drive was constructed, and it serves to collect precipitation runoff and seepage from the steep to moderate slopes to the immediate west, and also diverts water from the natural channel of Partington Creek at the very NE end of the road upgrade ROW (Figures 25 and 30). The moderate to steep slopes to the west

of Cedar Drive contain many small gullies and rivulets in a moderately dense forest, and moving groundwater passing under Partington Creek and Cedar Drive accumulates on the SE side of the road bed where it reaches the gently sloping valley bottom floor.

It is important to note that all of the impact zones lie within or immediately beside Cedar Drive, which skirts the very western perimeter of Pitt Polder on the west side of Pitt River. Cedar Drive occupies the edge of a marshy lowland area that, prior to construction of dikes in the 1890s, coincided with the approximate Spring and early Summertime high-water shoreline of Pitt River floodplain when water levels were at their highest. For a good portion of the warmer months of the year, the study area would have been inundated with meltwater from Pitt River, and even after the retreat of floodwater, it would have remained a marshy wet-land during the drier months of the year. Cedar Drive was constructed along the edge of this old shoreline where peat and organic deposits were thinner and drier, but it still required importation of sand and gravel fill to provide a stable surface for the road-bed. Even though the study area is protected by dikes today, the areas adjacent to Cedar Drive along the natural margin of Pitt Polder remain quite wet and boggy due to water seeping underground from Partington Creek on the north/west side of Cedar Drive, and heavy rainfall during the wetter months of the year.

Considering the pre-dike seasonal high flood-water levels, it is clear that most of Cedar Drive was constructed just below the extinct high-water level, and not along a stable habitable shoreline feature. Deep machine testing along the study area consistently encountered thick layers of peat and organics overlying early Holocene fluvial sands and silts that rest on glacial clay at depths of 1.75 to 3.0 m below surface. However, it is possible that some sections along lower ephemeral shoreline levels were visited and/or occupied for short durations. Archaeological site potential was considered to be “medium” for the majority of the length of study area owing to its periphery to the extinct marsh shoreline. While local drainage patterns on Burke Mountain have been altered in several locations within and adjacent to the study area, natural groundwater flowing downslope from the west side of Cedar Drive would have saturated the new road bed in many locations during most of the year, thus the majority of the areas lying within the new road ROW would not have regularly attracted people in significant numbers for any extended duration in pre-Contact Period times. Although outside the study area impact zones, it should be noted that the gently sloping and occasional small terraced areas lying immediately north of Cedar Drive and Partington Creek that are above the extinct high-water flood level are much more likely to contain the remains of small field camps or small villages.

The section of existing Cedar Drive lying between Victoria Drive and 4170 is quite narrow compared to other local surface roads, and there are plans to upgrade and widen this road ROW in about six years. Prior to any upgrading and construction along this section of Cedar Drive, it will be subjected to a detailed archaeological field inspection sometime in 2026 or so.

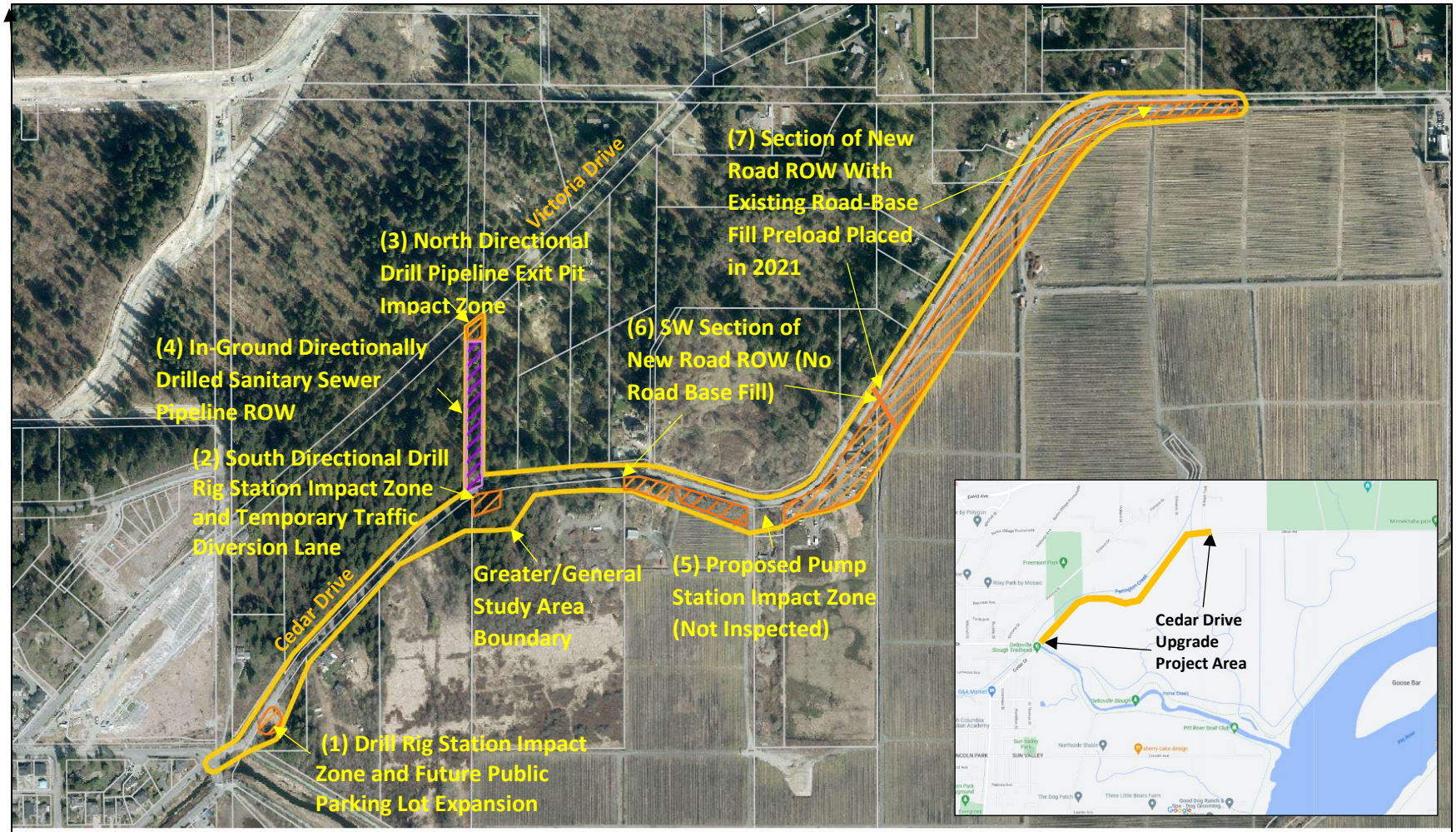

Figure 1. Mid-Range map of the Cedar Drive upgrade project study area showing location of Development Areas 1 to 7 that were inspected in early 2022.

It is important to note that road-base gravel preloading began in the northeastern 1/3 of the new road ROW in 2021 before the HCA permit was issued (Figures 26 to 29). This work was initiated by the City of Coquitlam. As a result, 2022 shovel testing was not conducted within this section of the ROW since it was already capped with a thick layer of road-base fill. However, deep machine testing was conducted immediately adjacent to and within portions of the presently pre-loaded ROW (Figures 2, 25, 27, 28 and 31 to 33).

The objective of this interim report is to provide stakeholders with recent field inspection information and management recommendations that will allow several specific development projects to commence starting in July, 2022. Details are provided in the sections below, and in Appendices I to IV.

Proposed/Ongoing Development Details, Archaeological Inspection Results, and Management Recommendations

A brief summary account of each of the individual proposed and ongoing development activities and impact zones are presented below, and they are number-referenced according to the specific areas shown in Figure 1. Anticipated start-dates are also presented with each specific development activity. The archaeological impact assessment results methods and results are also summarily described, and subsurface testing details are provided in Appendices I to IV). Comments and management recommendations for each of the proposed development activity areas are also presented.

<u>Development Area 1</u>: Proposed Directional Drill Rig Station Excavations and Future Expansion and Upgrades to Existing Parking Lot at 4110 Cedar Drive, SW End of Cedar Drive Upgrade ROW

Description of Impact Zone and Proposed Development:

Development Area 1 is located on the east side of Cedar Drive at the SW end of the road upgrade project study area where Cedar Drive intersects with Victoria Drive (Figures 1, 2 and 3 to 5). It is a D-shaped flat grass-covered area between Cedar Drive and the present public parking lot, and occupies an area measuring 35 m N-S by 20 m E-W (Figure 2). It lies adjacent to a dense forest to the east, Partington Creek on the west side of Cedar Drive, and Deboville Slough a short distance to the south. Since Deboville Slough is salmon-bearing, archaeological site potential was considered "medium" for this location. During the late Fall to early Summer, this location becomes saturated and the water table is only about 35 to 40 cm below the ground surface (BS). This was readily evident during our shovel testing and machine testing at this location (see below and Appendices I to IV). This area was previously impacted by vegetation removal and machine levelling, presumably when the public parking lot was constructed.

Currently proposed land-altering developments will include machine excavation of a placement station for a directional drilling rig in the north-central aspect of the grassy area, and eventual future expansion and upgrading of the existing parking lot that lies to the east (Figures 2 to 5). The drill rig station location will occupy and impact an area measuring 10 m N-S by 7 m E-W by 1.0 m deep, and it is likely that the peripheral grassy area will be subjected to machine traffic and some removal and/or displacement of the upper 10 to 20 cm of organics. **The drill rig pad is scheduled to be constructed and put into operation in July, 2022 when ground conditions are drier and the water table is lower.** Upgrading of the public parking lot will occur in the future.

Figure 2. Aerial image map of proposed directional drill rig station impact zone and eventual public parking lot expansion inspected in February (shovel testing) and May (machine test) 2022.

Subsurface Test Placement and Results:

A total of 11 shovel tests (**STs 1 to 11**) were placed at 5 m intervals throughout the central aspect of the grassy area in February 22, 2022 (Figures 2 to 4). Descriptive details and photographs of completed tests are presented in Appendices I and II. The saturated deposits encountered in these shovel tests consisted mostly of a mix of sandy silt and organics in the uppermost 35cm BS, and from 35 to 50 cm BS a silt mix was encountered, and was presumed to be sterile. Bottoms of all tests filled with water during and after being dug, and indicated a relatively high water table in this location (Appendix II). All recovered matrices were passed through 6 mm mesh, and the process was slow due to their saturated nature. ***No pre-contact period cultural materials were encountered during the shovel testing program.*** This is not surprising given the boggy saturated nature of the local environs that would have not been favorable for human occupation or use during the wetter months of the year. During the drier months, this locality may have been briefly visited to exploit plant and animals.

One deep machine test (**MT 27**) measuring 2.25 m E-W by 1.25 m N-S by 2.0 m deep was dug in the northeast edge of the grassy area on May 13, 2022 (Figures 2 and 5; Appendices III and IV). We had hoped to place this machine test within the area designated for the directional drill rig station impact zone, but the ground with the grassy area was too saturated for the backhoe to travel across without getting stuck, and it could not be effectively dug from on top of Cedar Drive since the bucket could not reach down that far. We selected the closest location, which was a few meters east of the proposed drill rig station (Figures 2 and 5). Excavation revealed that the uppermost 60 cm BS is a moderately compact sandy silt with high organic content (hand-raked and closely inspected), from 60 to 130 cm BS it is a loose orange brown peat (hand raked and closely inspected), from 130 to 160 cm BS it is a moderately loose orange-brown sandy silt (hand-raked and closely inspected) and from 160 to 200 cm BS it is a compact grey marine/late glacial clay. In many respects the stratigraphy is consistent with most of the other machine tests we placed along Cedar Drive. ***No pre-contact period cultural materials were encountered in machine test (MT) 27.***

Recommended Management:

Since no pre-contact period cultural deposits were encountered during the subsurface testing programs in this location, we recommend that land-altering activities related to the installation of the proposed directional drill rig station be allowed to proceed without any further formal archaeological fieldwork. Visual monitoring of land-altering activities is not recommended. However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering **activities** ***in the event that something obvious is encountered*** (see Appendix V). If this area is eventually impacted by expansion of the public parking lot, we support this same recommendation management. It is our opinion that this specific location is associated with a relatively high water table level that likely also existed there in the distant past, rendering it rather undesirable for any pre-contact period occupation or significant use. The boggy environs may also explain why this location was not included in the existing parking lot plan. There are many more adjacent slightly sloping and much drier loci above the valley bottom to the west side of Partington Creek/Cedar Drive that would have been more attractive for short-term occupation or use. ***Construction activities for the directional drilling station are scheduled to commence in July, 2022.***

Figure 3. A February 22, 2022, view of shovel testing in progress in the grassy area at the existing parking lot at 4110 Cedar Drive at the SW end of the upgrade project ROW, looking northeast. This marshy area will be impacted by a directional drill rig station and eventual public parking lot expansion.

Figure 4. Another February 22, 2022, view of shovel testing in progress in the grassy area at the existing parking lot at 4110 Cedar Drive at the SW end of the upgrade project ROW, looking north. This boggy area will be impacted by a directional drill rig station, and eventual public parking lot expansion.

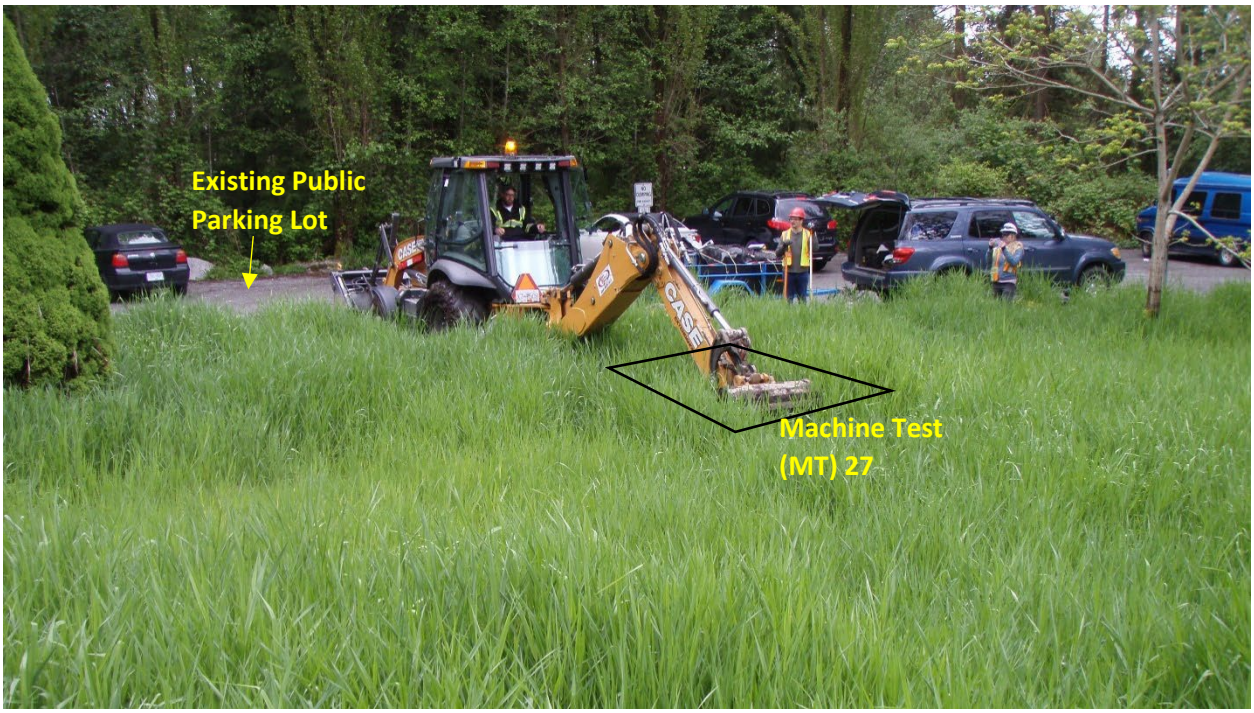

Figure 5. A May 13, 2022 view of the grassy area at the existing parking lot just prior to machine testing, looking southeast. Machine Test (MT) 27 was excavated in this location (see Figure 2). The water table is quite high in this location and tests filled quickly with water while being dug.

<u>Development Area 2</u>: "South" Directional Drill Rig Station, Laydown Area, Sanitary Sewer Connection Hub, and Associated Temporary Traffic Diversion Lane at 4150 Cedar Drive

Description of Impact Zone and Proposed Development:

Development Area 2 is located on the south side of Cedar Drive within a recently cleared, moderately forested, boggy area that is a temporary lease within 4150 Cedar Drive (Figures 1, 6 and 7). A directional drill station and associated peripheral laydown area, a sanitary sewer connection hub within the existing Cedar Drive road-bed, and a temporary traffic diversion lane are currently proposed for this location (Figures 6 and 7). The somewhat irregularly outlined collective impact zone occupies an area measuring about 30 m N-S by 30 m E-W (Figure 6). It lies within a moderately dense forest on the south side of Cedar Drive and trees and vegetation were removed in early 2022 prior to our field inspection. During the winter and Spring, this location becomes saturated and the water table is only about 35 cm below the ground surface (BS). This was made evident during our shovel testing at this location in early 2022 (see below and Appendices I and II).

There are several proposed land-altering projects proposed within this development area. The first involves machine excavation of a station for a directional drilling rig in the north-central aspect of the cleared area that will occupy and impact an area measuring 7.5 m N-S by 7.5 m E-W by 1.0 m deep (Figures 6 and 7). It is referred to as the "south" drill rig station. The area immediately surrounding the drill rig station to the south and east will be used for material laydown while the drill rig is in operation, and will be subjected to some machine disturbance to remove a

few tree stumps and low vegetation, and level the ground surface. **The drill rig pad is scheduled to be constructed and put into operation in July, 2022 when ground conditions are drier and the water table is lower.**

A second development activity will involve excavation of a sanitary sewer pipeline hub/manhole directly within the existing Cedar Drive road-bed about 10 m north of the proposed drill rig station impact zone (Figure 6). This will impact existing road bed deposits and the excavated hole will measure approximately 2 m x 2 m by 2.5 m deep (below the road surface). **Machine excavations for this pipe line connection hub/manhole will be dug sometime in mid-2022.**

The third development proposed for Location 2 is construction of a temporary single-lane traffic diversion road that will pass along the immediate south side of Cedar Drive (Figures 6 and 7). This lane will divert traffic around the southern lane of existing Cedar Drive where the abovementioned sanitary sewer hub/manhole will be installed. This temporary road bed will measure about 45 m long by 7 m wide (Figure 6). Construction will involve removal of several large tree stumps and upper organics, and placement of imported sterile fill on top to create the roadbed. When the diversion lane is no longer needed, the fill will be removed for use elsewhere in the road upgrade project ROW. **Importation and placement of fill to create the temporary diversion road will occur sometime in mid-2022.**

Subsurface Test Placement and Results:

On February 22, 2022, a total of 13 shovel tests (**STs 12 to 24**) were placed at 5 m intervals throughout the central aspect of the area cleared for the directional drill rig station and associated laydown area, and along the southern edge of the proposed temporary diversion road ROW (Figure 6). Descriptive details and photographs of completed tests are presented in Appendices I and II. The saturated deposits encountered in these shovel tests consisted mostly of a mix of sandy silt with high organic content with the uppermost 35cm BS, and from 35 to 50 cm BS a medium grey-brown clay/silt mix was encountered, and was presumed to be sterile. Bottoms of all tests filled with water during and after being dug, and indicated a relatively high water table in this location (Appendix II). All recovered matrices were passed through 6 mm mesh, and the screening process was slow due to their saturated nature. ***No pre-contact period cultural materials were encountered during the shovel testing program.*** This is not surprising given the boggy saturated nature of this general location that would have not been favorable for any significant human occupation or use during the wetter months of the year.

It is important to note that no deep machine testing was conducted in Development Area 2, but an attempt was made to test the proposed drill rig station impact zone on May 13, 2022. The backhoe operator descended from Cedar Drive onto the proposed diversion lane ROW in order to reach the proposed drill rig station impact zone when it immediately became stuck in the soft, thick, wet, organic-rich soil that occupies this general area. As a result, digging a machine test hole was not possible in this location. After a long series of complex manoeuvres the machine managed to extract itself from the muck and get back on Cedar Drive. This experience reinforced our previous conclusion that this wet area was also quite wet in pre-contact period times since it was at the edge of a large bog occupied by marshy forest. In our opinion, the shovel testing program sufficiently indicates that this location was not favorable for any intensive or extended

pre-contact period human use or occupation due to the wet high-organic uppermost soil deposits. Again, it should be noted that this location may have been briefly visited by pre-contact period people during the drier Summer and Fall to exploit local resources, and it is possible that the occasional item was discarded or lost during those forays. Perishable organic artifacts (e.g., basketry, cordage, wooden tools) incorporated in anaerobic boggy environments as a result of use, loss or discard can sometimes be well-preserved (see Appendix V), and there is a low possibility that such items may exist in this area, or at other locations within the new road upgrade project impact zones.

Recommended Management:

Since no pre-contact period cultural deposits were encountered during the shovel testing program conducted in Development Area 2, we recommend that land-altering activities related to the installation of the proposed directional drill rig station, construction and use of the material laydown yard, digging of the sanitary sewer pipe hub on Cedar Drive, and construction of the single-lane diversion road be allowed to proceed without any further formal archaeological fieldwork. Subsequent archaeological visual monitoring of land-altering activities relating to these facilities is not recommended. However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered during construction (see Appendix V).

This specific location is associated with a relatively high water table level that likely also existed there well into the distant past, making it unattractive for any pre-contact period human occupation or significant use. There are many more adjacent slightly sloping and much drier areas above the valley bottom to the north side of Partington Creek/Cedar Drive that would have been more attractive for short-term occupation or use. ***Construction activities for the directional drilling station, materials laydown area, sanitary sewer hub excavation, and temporary diversion road are scheduled to commence in July, 2022.***

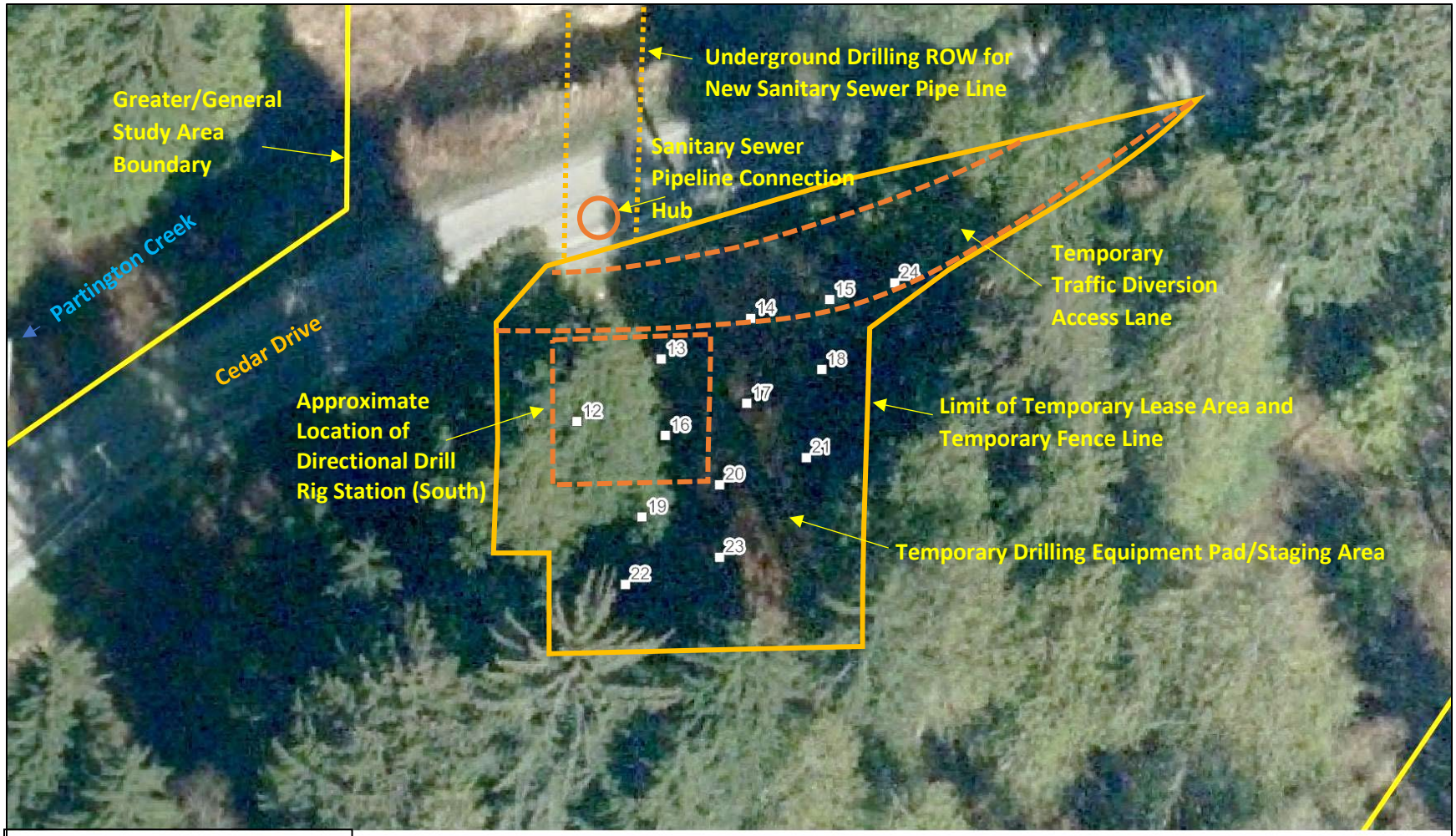

Figure 6. Aerial image map of part of 4150 Cedar Drive showing shovel tests and proposed impact zones for the location of drill rig station, road diversion, staging area and south end of underground sanitary sewer pipeline ROW.

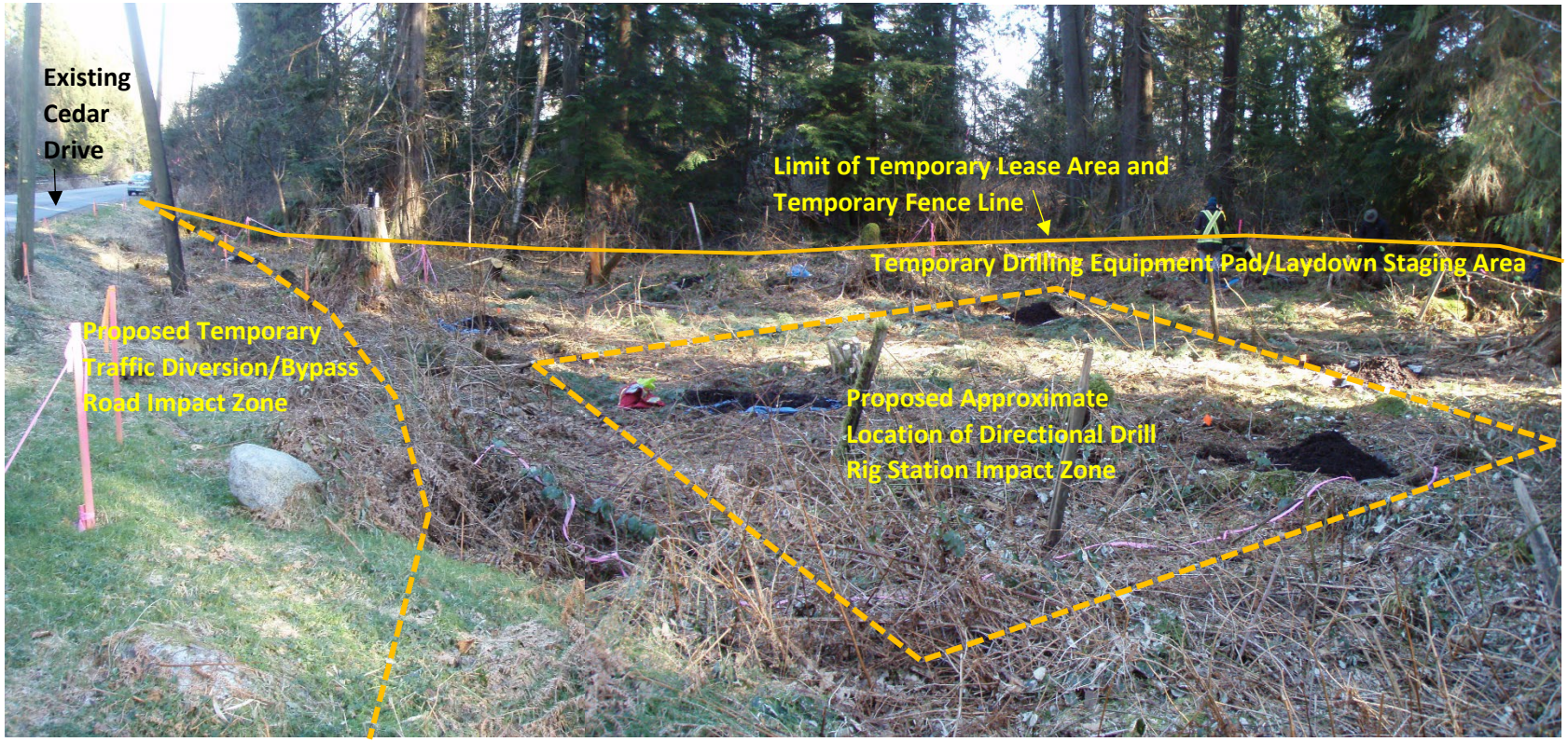

Figure 7. A February 23, 2022 general view of the area proposed for a temporary road diversion/bypass lane and general location where directional drill rig will be set up near the southeastern end of the proposed sanitary sewer pipeline (see Figure 6). Looking northeast.

<u>Development Area 3:</u> "North" Directional Drill Exit Pit Impact Zone on Victoria Drive

Description of Impact Zone and Proposed Development:

Development Area 3 lies on the immediate south side of Victoria Drive at the northern end of the proposed new sanitary sewer pipeline (Development Area 4) that will extend south from Victoria Drive to Cedar Drive (Figures 1 and 8). We have referred to it as the **"north" directional drilled pipeline exit pit,** and it involves a proposed machine excavated pit that will measure about 3.0 m x 3.0 m by 3.0 m deep within an area beside Victoria Drive that is currently occupied by several large standing trees and tree stumps on moderately-sloping terrain (Figure 8). This hillside contains numerous small runoff stream channels and emergent springs that flow southwest into the artificial channel of Partington Creek beside Cedar Drive. As a result, the hillside contains some small dry raised areas beside many small active streams, seeps and associated marshy terrain during the wetter months of the year. The directionally drilled pipeline exit impact zone will be subjected to some machine disturbance to remove a few trees, stumps and low vegetation, and to level the ground surface where the exit pit will be placed. ***The directional drilled pipeline exit pit is scheduled to be excavated in July, 2022 when ground conditions are drier.*** It will be coeval with the operation of the drill rig station in Development Area 2.

Figure 8. A February 22, 2022, view of Development Area 3 showing the currently proposed location for placing the "north" directional drilled pipeline exit pit (center photo) on the south side of Victoria Drive at the north end of the proposed sanitary sewer pipeline (Development Area 4), looking southwest. This location slopes moderately to the southeast.

Visual Ground Surface Inspection Results:

On February 22, 2022 Mike Rousseau visually inspected the "north" directional drilled sanitary sewer pipeline exit pit location on Victoria Drive (Figure 8). It was concluded that this specific location has **low** pre-contact period archaeological site potential as it is located on moderately sloped terrain in the middle of a large hillside, and it lacks any nearby permanent (year-round) aquatic features that commonly attracted people in the past. Based on this assessment, no shovel testing was deemed necessary for the "north" drill rig impact zone. The large trees that stand within and adjacent to this proposed impact zone were visually inspected for any indications of having been modified (i.e., culturally modified trees [CMTs]) prior to AD 1846, but none were observed. Several large tree stumps exist in this location and elsewhere on the adjacent hillside (see Figure 8), and they likely relate to selective tree harvesting in the late 1800s or early 1900s.

Recommended Management:

For Development Area 3, we recommend that land-altering activities related to the installation of the exit pit for proposed directional drilled sanitary sewer pipeline be allowed to proceed without any further formal archaeological fieldwork. Subsequent archaeological visual monitoring of land-altering activities relating to this drill rig station is not recommended by Antiquus. However, please note that Kwikwetlem First Nation has requested that impacts to this location be visually monitored by one of their field technicians during land-altering activities, and minimal subsurface testing. This request could be easily accommodated and arranged, and the results can be included in the final report.

Also, the ***development management and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered during land-altering construction activities*** (see Appendix V). ***Construction activities for the directional drilled pipeline exit pit are scheduled to commence in July, 2022.***

<u>Development Area 4</u>: Proposed Sanitary Sewer Pipeline Installation from Victoria Drive to Cedar Drive

Description of Impact Zone and Proposed Development:

Development Area 4 is a proposed sanitary sewer pipeline that will extend N-S between the "north" drill rig station location (Development Area 3) on Victoria Drive in the north, and the "south" drill rig station location (Development Area 2) on Cedar Drive in the south (Figures 1, 6 and 8). The pipeline ROW extends approximately 200 m N-S through slightly to moderately sloping terrain on a prominent southwest-facing hillside that contains many small streams, seeps and marshy areas during the wetter months of the year. The pipeline will be installed entirely by underground directional drilling and inserting a 40 cm diameter pipeline between the "north" and "south" drill rig stations at depths varying between 2.0 and 3.0 m below the ground surface. Since the entire pipeline will be installed well below the ground surface on a predominantly moderately-sloped hillside, it does not pose any direct threat of impact to Holocene-age deposits lying between the drill station locations.

Visual Ground Surface Inspection Results:

While no trees, surface vegetation or uppermost natural soil/sediment deposits will be disturbed within the sanitary sewer pipeline, Mike Rousseau visually inspected the ground surface and large trees

within the proposed ROW. Within the ground surface pipeline ROW it was noted that there are a few small gently-sloping loci beside small seasonal streams and seeps, but none of these locations are deemed to have greater than low archaeological site potential. Culturally modified trees (CMTs) potentially predating AD 1846 were also sought, but none were observed. Several large tree stumps exist in this location and elsewhere on the adjacent hillside, and they likely relate to selective tree harvesting during the late 1800s or early 1900s.

Recommended Management:

For Development Area 4, we recommend that deep underground directional drilling related to installation of the proposed sanitary sewer pipeline be allowed to proceed without any further formal archaeological fieldwork. Construction activities for the directional drilling station, materials laydown area, sanitary sewer hub excavation, and temporary diversion road are scheduled to commence in July, 2022.

<u>Development Area 5</u>: Proposed Gravity Force Main Sanitary Pump Station at 4180 Cedar Drive

Description of Impact Zone and Proposed Development:

Development Area 5 is the location of a proposed gravity force main **Sanitary Pump Station** that will be constructed on the immediate south side of Cedar Drive and east of a N-S trending access road at the north end of 4180 Cedar Drive (Figures 1, 9, 10, 14 and 16). A 2008 Google Earth aerial image of this locality prior to recent development in this general area along Cedar Drive indicates that this specific location once contained several large trees, and what appears to be a small drainage feature and/or marshy environs. This location is currently occupied by a 35 m N-S by 25 m EW by 4.0 m high rectangular pile of imported sand and gravel pre-load that was placed there in 2021 (Figures 9, 10 and 16). The purpose of the sand preload is to compact the underlying natural and previously imported fill deposits prior to construction of the pump station. After construction, the proposed pump station structure will eventually occupy an area measuring approximately 25 m N-S by 25 m E-W and the foundation will be dug into the present ground to a depth of 2.0 m below surface. In mid-2022, the sand preload from this location will be removed and added to a selected section of the new road ROW preload that already exists in Development Area 7 (see description of Development Area 7 below and Figures 24 to 29). Immediately subsequent to removal of the preload, a **"wet well"** measuring approximately 7 m N-S by 7 m E-W by 10.0 m deep will be machine excavated in the southeast corner of the proposed pump station structure impact zone footprint (Figure 10). Other small-scale short-term machine excavations relating to various construction phases for the pump station will follow. ***Construction activities associated with the sanitary pump station construction will begin in late 2022.***

Inspection Results:

Since the entirety of the sanitary forcemain pump station impact zone is presently capped with 4.0 m of preload sand fill, an archaeological inspection or subsurface testing of this specific location has not yet been possible (Figures 9 and 10). Machine Tests (MTs) 1 to 3 placed immediately west of the pump station location, and MTs 25 and 26 were placed on the west side (Figures 10, 11 and 14 to 16), and these results are presented below for Development Area 6. These machine tests indicate that a significant amount of imported fill (average 2.0 m thick) was previously added to this general area and it is very likely that a thick layer of imported fill also lies below the sand preload pile.

Figure 9. A panoramic view of the large pile of sand and gravel preload that currently occupies the location selected for the sanitary force main pump station (Development Area 5) at 4180 Cedar Drive, looking southeast. The sand and gravel preload will be removed in June, 2022 and transported to Development Area 7 (see below) where it will be placed on top of existing similar preload deposits within the new road ROW.

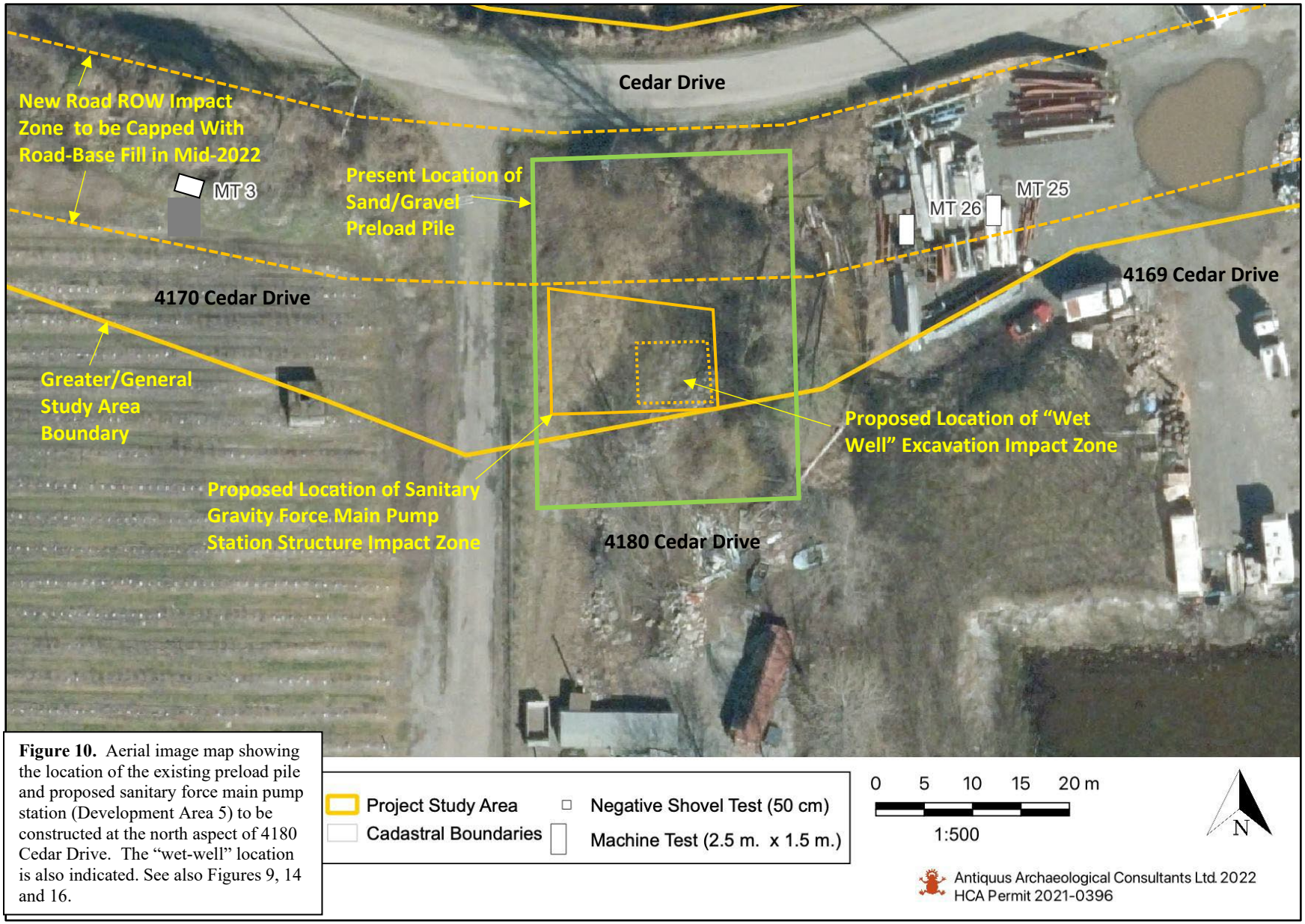

Figure 10. Aerial image map showing the location of the existing preload pile and proposed sanitary force main pump station (Development Area 5) to be constructed at the north aspect of 4180 Cedar Drive. The "wet-well" location is also indicated. See also Figures 9, 14 and 16.

Recommended Management:

For development activities proposed for Development Area 4 (Sanitary Force Main Pump Station) we recommend that:

(1) ***The proposed removal of the sand/gravel preload pile presently occupying the proposed pump station should be allowed to proceed as planned in mid-2022*** as it does not involve any impacts to the underlying ground. Based on our machine testing to the immediate west and east, it is reasonable to presume that a thick layer of previously imported fill lies under the preload. The overlying sand/gravel preload material will be transported and added to a selected section of the existing new road ROW that already contains preload (Development Area 7) (Figures 24 to 29).

(2) Following removal of the sand/gravel preload from this location, the ***machine excavations for the proposed "wet-well" impact zone (Figure 10) should be allowed to proceed provided that it be visually monitored by a qualified archaeologist and an attending First Nation archaeological field technician.*** This specific impact location could not be subjected to any previous subsurface machine testing, and visual monitoring of the "wet-well" excavation would provide information about the nature of the sediments and imported fill presently lying under the preload pile. Other subsequent lesser machine land-altering activities will be required during construction of the pump station, and if they exceed the depth of the currently known fill deposits, some additional visual monitoring may be required for the underlying natural sediments. The results of all ensuing visual monitoring at the pump station will be presented in the final report.

(3) ***If no pre-contact period cultural deposits are encountered during the visual monitoring of the "wet-well" machine excavations or other related lesser machine excavation episodes, then we recommend that the construction of the remainder of the sanitary force main pump house should be allowed to proceed without any further formal archaeological fieldwork.*** However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered during construction (see Appendix V). ***Construction activities for the proposed pump station are scheduled to commence in mid-2022.***

<u>Development Area 6</u>: Proposed Section of New Road Construction on the South side of Cedar Drive through 4170, 4180 and 4169 Cedar Drive

Description of Impact Zone and Proposed Development:

Development Area 6 is defined as a 400 m-long by 25 m wide section of new road construction that will extend along the immediate south side of Cedar Drive through the northern aspects of 4170, 4180 and 4169 Cedar Drive (Figures 1 and 12 to 23). Development Area 5 (sanitary pump station) lies in the approximate middle and immediately south of this new road ROW at 4180 Cedar Drive (Figure 10). For the sake of descriptive convenience, the descriptions for proposed development within portions of 4170 and 4169 are presented separately. Development Area 6 has experienced a high intensity of previous disturbance related to agriculture, road construction, deposition of large quantities of imported fill, and residential use (Figures 14 to 23). A new house is currently being constructed on an artificial raised area about 30 m southeast of the proposed pump station.

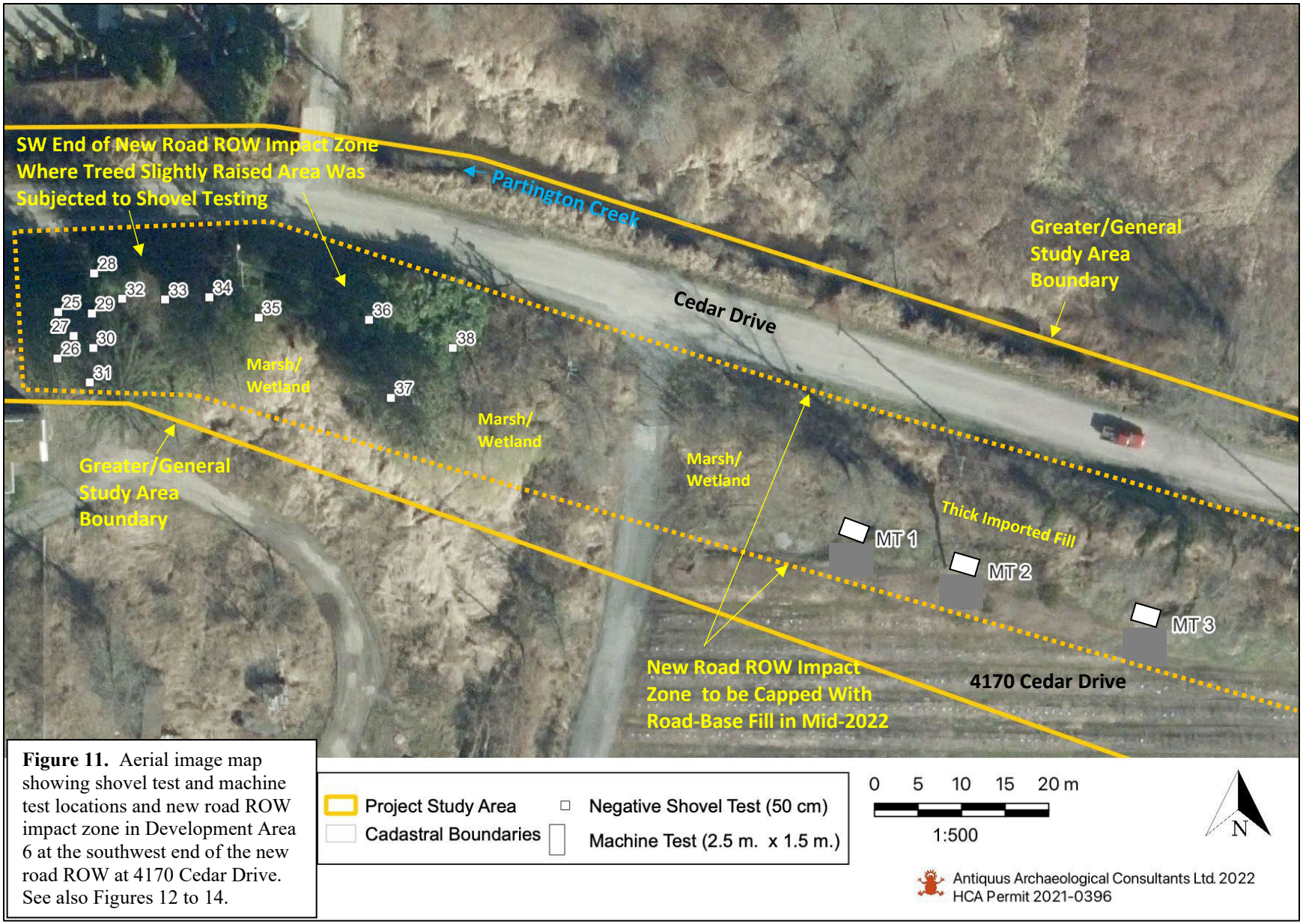

Figure 11. Aerial image map showing shovel test and machine test locations and new road ROW impact zone in Development Area 6 at the southwest end of the new road ROW at 4170 Cedar Drive. See also Figures 12 to 14.

Figure 12. A general view of shovel testing underway in a recently de-vegetated raised treed area at the very western end of the proposed new road ROW impact zone in Development Area 6 where site potential was considered to be medium. Shovel tests 25 to 38 were placed in this area, which will be capped with road-base fill in mid-2022. The new road ROW will end and merge with existing Cedar Drive in the upper center of the photo. Note marsh/wetland in lower left of photo. See also Figures 11 and 13.

4170 Cedar Drive

The terrain at the very western end of Development Area 6 at the north end of 4170 Cedar Drive is characterized by a 50 m-long slightly raised area on the south side of Cedar Creek that still contains several large cedar trees and stumps within the new road ROW (Figures 11 to 13). This area was considered to have medium archaeological site potential due to its slightly higher elevation and presence of mature trees, and it was subjected to shovel testing (STs 25 to 38) (Figures 11 and 12). This section of new road ROW was recently cleared of trees and dense understory vegetation prior to our inspection to allow subsurface testing (Figures 12 and 13). No ground disturbance occurred during vegetation removal.

Immediately adjacent and south of this slightly elevated area the ground is very boggy and is a marshy wetland that supports dense willows, skunk cabbage and other aquatic-adapted plants (Figures 11 to 13). This 80 m-long, low-lying marshy area was considered to have low archaeological site potential and no subsurface testing was conducted there as it was completely saturated and inundated with shallow surface water at the time of our inspection.

Figure 13. A general view of the proposed new road ROW lying between the south end of the proposed new road ROW (foreground) and the proposed pumping station (upper-center) at 4170 Cedar Drive, looking east. This marsh/wetland section in the foreground was saturated with water and thus was not subjected to any shovel or machine testing due to excessive water and assessed low archaeological site potential.

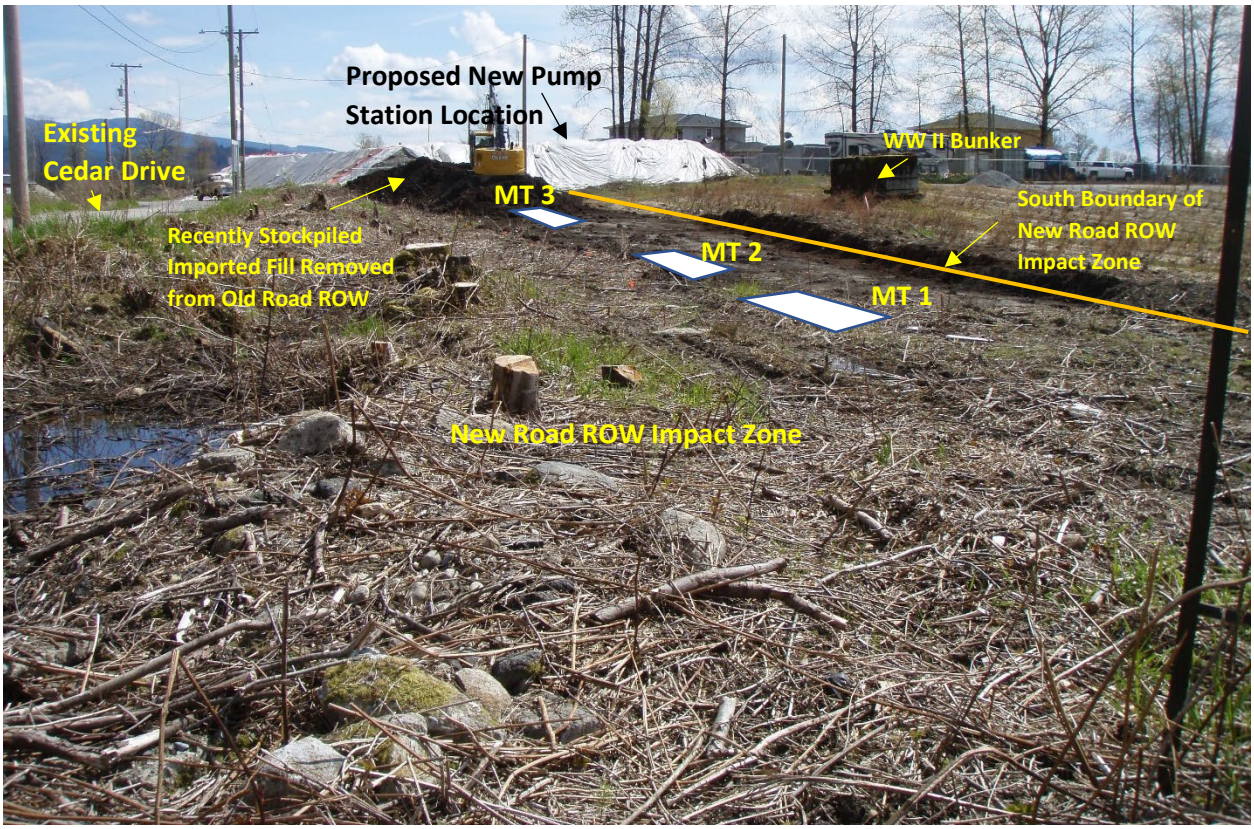

Figure 14. A view of the extensively infilled section of proposed new road ROW lying west of proposed sanitary force main pump station location (sand pile covered in plastic in upper left). Machine tests (MT) 1 to 3 were placed in this location (see also Figures 11 and 20). Note standing surface water in ditch (left), and reputed WW II bunker in upper right.

The 60 m-long section of new road ROW lying between the marshy lowland and the proposed pump station to the east was slightly higher than the boggy lowland owing to a large quantity of imported fill revealed by Machine Tests 1 to 3 (Figures 14 and 20; Appendices III and IV). Prior to our field inspection, several small trees and dense riparian vegetation were removed from along the northern edge of this section (Figure 14). A large E-W trending berm of imported soil measuring about 50 m long by 4 m wide by 1 m high lying directly within the southern edge of the new road ROW west of the proposed sanitary pump station was removed and stockpiled with a backhoe prior to conducting archaeological machine testing (Machine Tests 1 to 3) (Figure 14). A passing local resident related to us that there was once a barn in this location in the early 1900s, but we found no direct structural evidence for it during the machine testing. An E-W access road once paralleled Cedar Drive through this location, and the road bed was readily evident when the topsoil berm was removed. While not in the proposed impact zone, the cube-shaped top of a WW II bunker lies about 15 m south of the southern edge of the proposed new road ROW (Figure 14).

Proposed development and land-altering activities associated with the section of new road ROW at 4170 includes additional tree, stump and vegetation removal at the very west end, some machine grading and levelling, and placement of 2.0 m high sand/gravel preload over the existing ground for the new road bed. ***Roadbed preparation and imported fill preloading will occur in mid-2022.***

4169 Cedar Drive

The 175 m-long heavily-developed east half of the proposed new road ROW and drainage channel within Development Area 6 at 4170 Cedar Drive is characterized by a surface landscape that consists of a natural low-lying wetland and slightly sloping terrain beside Cedar Drive that has been capped by a large quantity of imported fill deposited in many locations at various times over the last 100 years (Figures 15 to 19). There are several existing residential and farming structures and large trees directly within the northern part of this new road ROW section that occupy artificially raised terrain beside Cedar Drive (Figures 15 to 19), and a new house is being constructed in the southern part about 30 m SE of the proposed sanitary force main pump station (Figure 19). Access roads and parking areas occupy a significant portion of the proposed new road and drainage channel ROWs. At the very northeast end of Development Area 6 north of the existing house is a slightly raised area that was infested with blackberry bushes that were cleared for us prior to our field inspection (Figure 21).

Since a significant portion of the eastern half of Development Area 6 has experienced many previous episodes of capping with thick layers of sand, gravel, hog-fuel and sawdust over the years and there are several standing buildings, shovel testing (STs 39 to 67) was only possible in the northeast aspect of this section within the low-lying marshy area in the pasture south of the existing house, in the yard east of the house, and in the slightly raised area north of the house (Figures 15, 17 and 19; Appendices I and II). To investigate the natural deposits below the thick layers of imported fill south of the house, Machine Tests (MTs) 23 and 24 were excavated, and MTs 25 and 26 were placed close to each other a few metres east of the proposed sanitary force main pump station (Figures 15, 22 and 23; Appendices III and IV).

Several large trees and all currently standing buildings and foundations will be removed by heavy machinery from the east end of the proposed new road and drainage channel ROWs**. *It is anticipated that demolition and tree removal will commence in mid-2022.*** Given the impacts to the ground that will occur as a result of the tree and structure foundation removal, some machine levelling of the adjacent imported fill deposits will be required before the sand/gravel preload for the road-bed can be placed on the present ground surface. This will likely occur immediately following removal of the trees and structures. Machine excavation of a 10 m-wide drainage channel between the east side of Cedar Drive and the new road ROW in the northeast aspect of the study area at 4169 Cedar Drive (Figure 15) will also impact imported fill and natural deposits up to a depth of 2.0 m below the present ground surface. ***Channel excavation will occur in late 2022 or in 2023.***

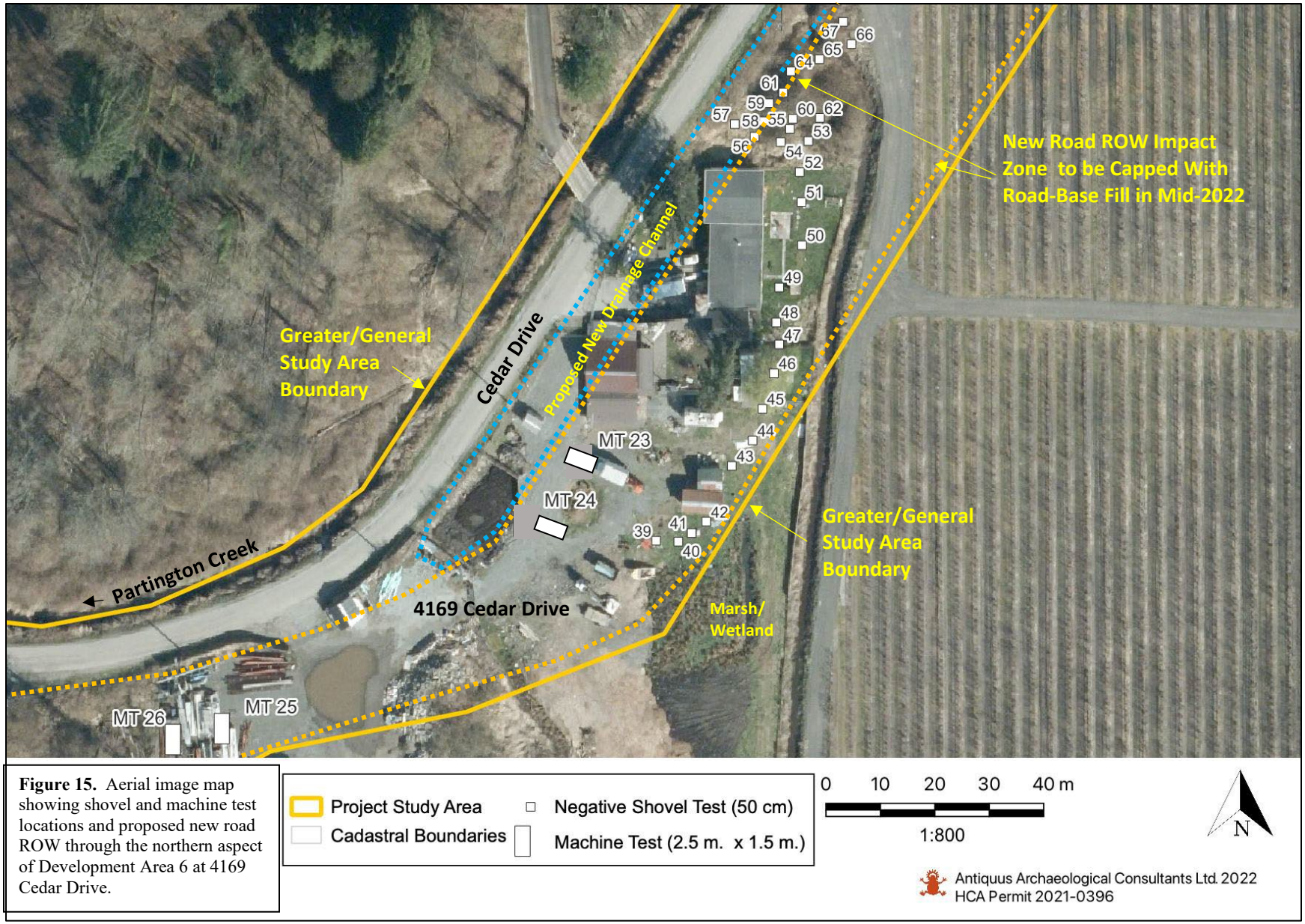

Figure 15. Aerial image map showing shovel and machine test locations and proposed new road ROW through the northern aspect of Development Area 6 at 4169 Cedar Drive.

Figure 16. View of section of new road ROW in the southwestern aspect of the new road ROW through 4169 Cedar Drive showing location of proposed new sanitary force main pumping station (Development Area 5) and proposed impact zone, looking southwest. Locations of machine tests (MTs) 25 and 26 are also shown in upper center of photo. Most of this area was capped with imported sand and gravel fill. The non-capped natural ground surface is a soggy marsh/wetland. Some infilling of this area will be required before the sand/gravel preload road-bed can be placed over this area.

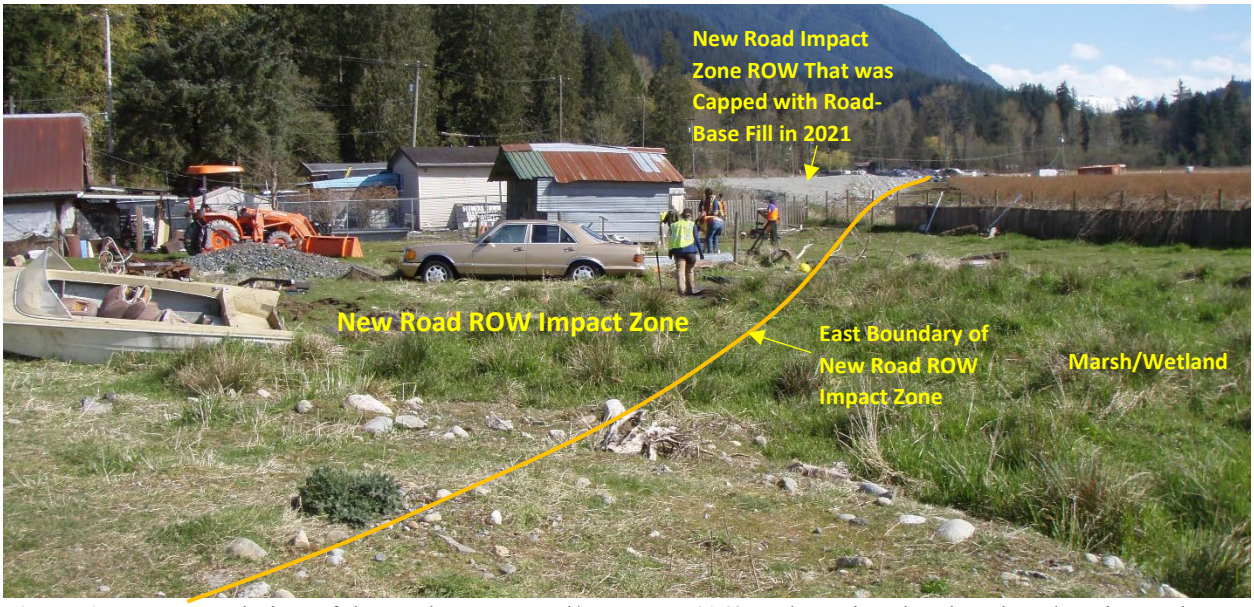

Figure 17. A general view of the northeastern yard/pasture at 4169 Cedar Drive showing shovel testing underway (center photo) in the low-lying accessible (uncapped) marsh/wetland deposits within the new road ROW, looking north. Note obvious fill deposits in foreground and around the structures. All the buildings and vehicles in the upper left will be removed and some levelling will occur prior to capping the ROW with imported road-base fill. This is expected to occur in mid-2022.

Figure 18. Another general view of the northeastern yard/pasture at 4169 Cedar Drive within the new road ROW, looking northeast. All the buildings and vehicles will be removed prior to some levelling and subsequent capping the ROW with imported road-base fill, which is expected to occur in mid-2022.

Figure 19. A view of the north end of the yard/pasture at 4169 Cedar Drive within the new road ROW (upper right), looking southwest from the very southwest end of the road-base fill (foreground). This area will be capped with road-base in mid-2022 after the buildings etc. are removed.

Subsurface Test Placement and Results for Development Area 6:

4170 Cedar Drive

The slightly raised area along the edge of the lowlying marsh at very west end of the west half of Development Area 6 in the northern aspect of Lot 4170 was subjected to **shovel testing** on April 13, 2022 (Figures 11 to 13). As it was a slightly raised landform with large trees, it was considered to have medium archaeological site potential. This location coincides with the proposed merger of existing Cedar Drive and the new road ROW (Figures 1, 11 and 12). A total of 14 standard shovel tests (STs 25 to 38) were systematically and judgementally placed (Figure 11) to secure a sample of the raised deposits beside a marshy area where several large trees were growing. Detailed results of the shovel testing program in this location are presented in Appendices I and II. In general, most of the tests indicated that from 0 to 20cm BS the matrix is a compact medium brown sandy silt with organics; from 20 to 50 cm BS it is a compact dark brown/grey silt and sand with high organics. Some tests were dug to 60 cm BS, and all of the shovel tests rapidly filled with water during excavation. All removed matrices were screened through 6 mm mesh, and the process was slow due to saturation. The presence of recent historic refuse in the deposits indicates that the raised areas with the large trees was artificial and was comprised of imported fill. ***No pre-contact period cultural deposits were encountered in STs 25 to 38.*** We contend that this area was properly tested, and indicated the presence of a thick layer of imported fill lying on top of saturated organic-rich deposits.

No subsurface shovel or machine testing was conducted in the low-lying saturated marshy area at the west end of Development Area 6 due to heavily saturated upper sediments and standing water in some sections (Figures 11 to 14). Archaeological site potential was considered to be low in this location, as it is obvious that this specific area remains boggy year-round.

On April 13, 2022, three **machine tests** (MTs 1 to 3) measuring 4.0 m E-W x 2.5 m N-S by 3.5 m deep were placed in the proposed new road ROW that was once occupied by a farm access road lying west of the proposed sanitary force main pump station (Figures 11, 14 and 20). After attempting to dig 1 shovel test in this location, it became readily apparent to us that this raised area was already capped with a thick layer of fill to construct the previous farm access road bed, and this test was abandoned. We deemed that machine testing would be more appropriate for assessing the nature and depth of the fill and underlying natural deposits in this location. MT 1 was spaced 10 m from MT 2, and MT 3 was placed 15 m east of MT 2 (Figures 11, 14 and 20). Detailed descriptive results and photographs of these machine tests are provided in Appendices III and IV. All three tests revealed similar stratigraphy, with 0 to 2.0 m BS being a hard grey mix of clay, silt, gravel and recent construction refuse (imported fill) that was not visually inspected because it was clearly imported from another location at an unknown time (mid-1900s?). From 2.0 m to 3.2 m BS the matrix is a loose brown/black/orange peat/organics and sawdust mix that had experienced some disturbance and it was hand-raked and closely inspected by a crew of three persons. From 3.2 m to 3.5 m BS the matrix is a firm homogenous grey marine/late glacial clay considered to be basal sterile. Groundwater seeped out of the sides of all three machine tests. ***Despite close inspection of the highly organic zone at 2.0 to 3.2 m BS, no pre-contact period cultural materials were identified.*** This was the only stratum that was deemed to have any potential for containing archaeological deposits. Screening of this high organic layer was not possible nor necessary. As previously mentioned, this specific location was identified as once containing a barn, but we did not encounter any direct evidence for it during the machine testing.

Figure 20. Location of machine tests (MT) 1 to 3 placed within area lying west of the proposed pumping station at the very southwestern end of the proposed new road bed construction at 4170 Cedar Drive, looking west from beside the proposed pumping station location towards the proposed merger of Cedar Drive and the new road ROW. Deep machine testing revealed an abandoned hard-packed farm access road bed lying on top of a very thick deposit of imported fill that rests on a deeply buried deposit of waterlogged peat and other organics consistent with a marshy/boggy environment (dark matrices). Archaeological site potential is considered to be low in this location, as it would have been a marshy/boggy low-land prior to being capped with imported fill. This section of new road ROW will be capped with sand/gravel road-base fill in mid-2022.

4169 Cedar Drive

On April 14, 2022 and again on April April 20, 2022, the marginal lowlying "natural" non-capped marshy pasture and yard areas lying inside and along the eastern edge of the proposed new road ROW in the northeastern aspect of Development Area 6 at 4160 Cedar Drive were subjected to a mix of judgemental and systematic **shovel test placements** (Figures 15, 17 and 18). Specific selected areas included slightly raised ground surfaces that were not capped with any obvious fill, and we avoided a few saturated locations with surface water.

Fourteen shovel tests (STs 39 to 52) were placed to the south and east of the existing house on April 14, 2022 to sample the slightly raised deposits along the edge of the boggly low-land (Figures 15 and 17). Detailed results of this shovel testing program conducted in this location are presented in Appendices I and II. While the stratigraphy varied somewhat between some tests owing to localized uppermost imported fill deposits, most of the tests indicated that the "natural" deposits from 0 to 20 cm BS is a mixed compact medium brown and dark brown silt and organics (screened), and from 20 to 50/60 cm BS it is a compact grey-brown silt and clay mix (screened). The test holes filled with water during and after being dug (Appendix II). Upon completion of this set of tests, we concluded that the natural deposits lying within and along the eastern edge of the proposed new road ROW were likely saturated and part of a low-land marshy field in pre-contact period times, thus archaeological site potential is considered to be low in this location. ***No pre-contact period cultural deposits were identified in STs 39 to 52.***

On April 20, 2022 we dug **another 15 shovel tests (STs 53 to 67)** in a small raised area measuring about 30 m NE-SW by 25 m NW-SE lying immediately north of the house and south of the existing road-base preload at the northeastern end of Development Area 6 (Figures 15 and 21). This location was cleared of dense blackberry bushes just prior to our visit, revealing an undulating ground surface with a moderate amount of scattered recent domestic and industrial refuse. The eastern edge of this location will be impacted by new road construction, and the western edge will be impacted by excavation of the new drainage channel between existing Cedar Drive and the new road ROW (Figures 15 and 21). Shovel tests were placed somewhat systematically at approximate 5 m intervals over this area as the hummocky terrain allowed. Stratigraphy encountered in most of the shovel tests was fairly consistent. From 0 to 50 cm BS it is a moderately compact black/dark brown silt with high organic content (screened) that contained a moderate density of domestic and industrial refuse that attests to having been imported and dumped over this area sometime during the mid- to late1900s. From 40 to 70 cm BS there is a compact saturated medium grey-brown silt and clay mix (screened) with some organics that is consistent with natural low-lying boggy sediments encountered to the south. The bottoms of most of the tests filled with water during and after being dug (Appendices I and II). ***No pre-contact period cultural deposits were identified in STs 53 to 67.*** This area was a marshy low-land in pre-contact period times, and would not have been suited for any significant human occupation or use.

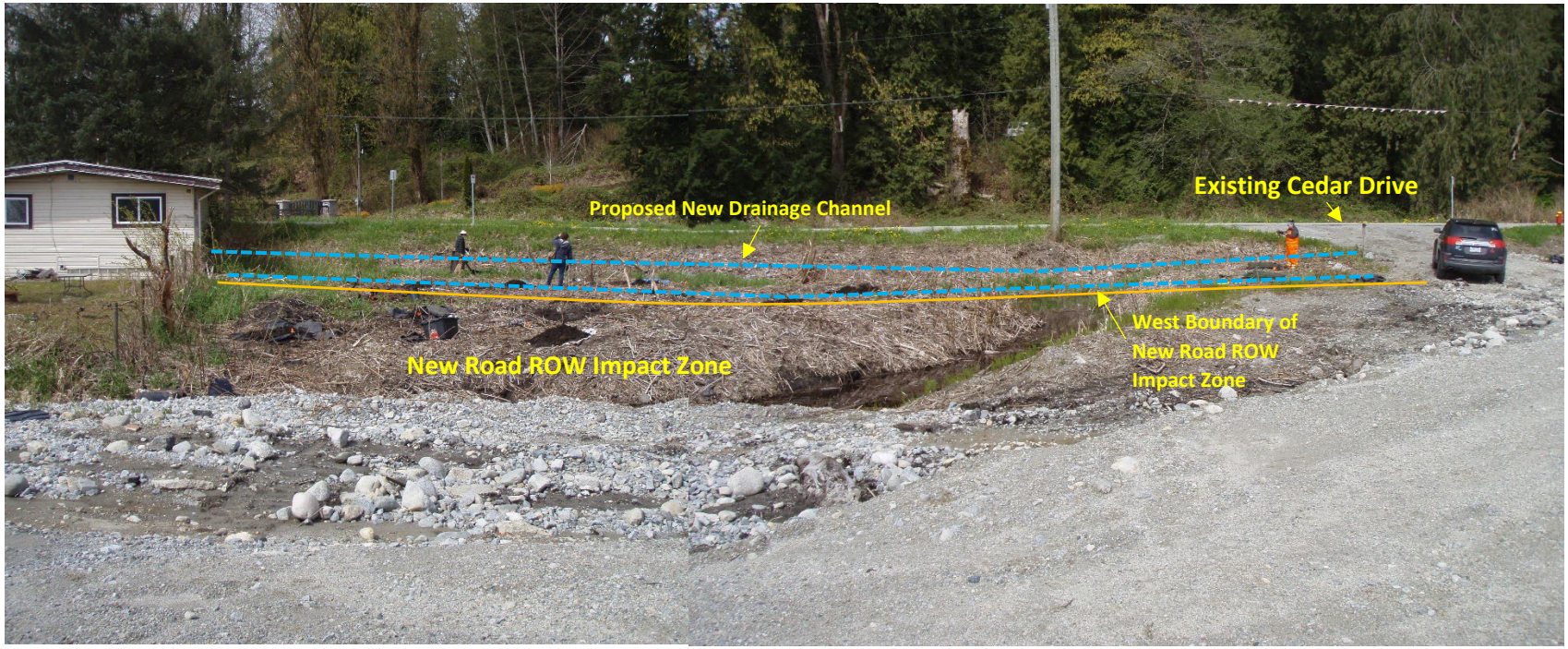

Figure 21. View of small area at the north end of 4169 Cedar Drive (left) and the south end of the road-base fill section of the ROW (right) with shovel testing in progress, looking west. Fifteen shovel tests (STs 53 to 67) were placed in this area, revealing that it is a former wet marshland that was built up by being capped with about 40 to 50 cm of imported fill containing a moderate quantity of domestic and industrial refuse. Note existing drainage ditch in the center of the photo. This location will be capped with road-base fill in mid-2022. See also Figure 15.

Four **machine tests (MTs 23 to 26)** were excavated in two separated locations at 4169 Cedar Drive on May 13, 2022 (Figures 15 and 22; Appendices III and IV). **MTs 23 and 24** were dug within the proposed new road ROW approximately 12 m apart in the pasture small lying south of the existing house where it could be readily seen that a considerable quantity of fill had been placed there sometime in the mid- to late 1900s (Figures 17, 18 and 22). These two machine tests were dug with a backhoe and they measured 2.0 m x 1.25 m x 1.75 m deep (Appendices III and IV). These two machine tests were dug to determine the thickness and nature of the overlying fill, and to expose, describe and inspect the underlying natural non-fill deposits. **MT 23** revealed that from 0 to 50 cm BS the matrix is a moderately loose yellow-grey sand (imported fill); from 50 to 60 cm BS there is a moderately loose silt and sand mix fill (hand-raked and closely inspected); from 60 to 120 cm BS there is a loose orange brown sawdust and organic rich imported fill; from 120 to 160 cm BS there is a moderately loose brown-black silty fluvial sand with some organics (hand-raked and closely inspected); and from 160 to 180 cm BS there is compact grey marine/late glacial basal sterile clay. **MT 24** revealed that from 0 to 40 cm BS the matrix is a moderately loose yellow-grey sand and gravel (imported fill); from 40 to 120 cm BS there is a loose orange brown sawdust fill; from 120 to 160 cm BS there is a moderately loose orange-brown silty fluvial sand (hand-raked and closely inspected); and from 160 to 170 cm BS compact grey marine/late glacial clay is present.

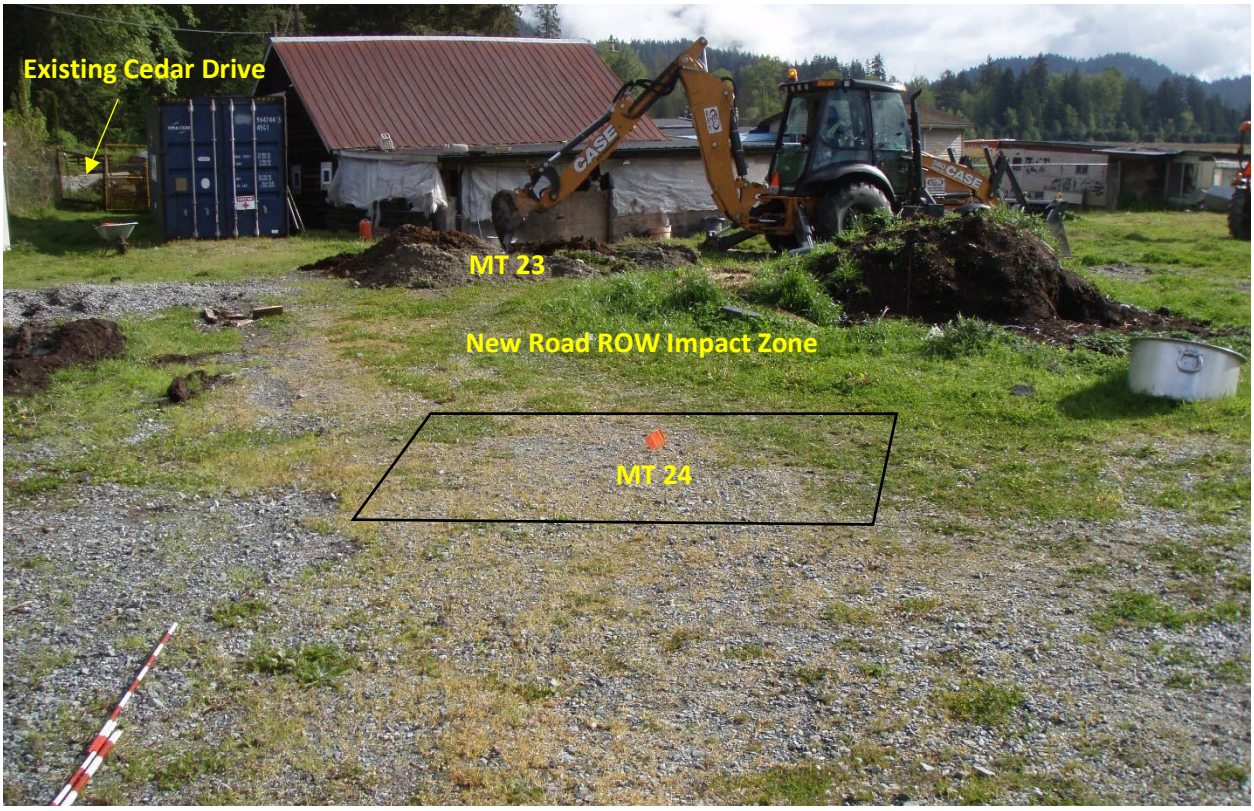

Figure 22. A May 13, 2022, view of the north-central yard/pasture at 4169 Cedar Drive within the new road ROW, showing the location of MT 23 (in process of being excavated) and MT 24 (unexcavated in foreground), looking northeast. This section of the yard/pasture was capped with a thick layer of fill (Figures 17 and 18), therefore machine testing was required. This area will be capped with road-base in mid-2022.

During excavation of MT 23 and 24, water seeped into the test holes at a rapid rate, indicating significant groundwater flow in this immediate area. These two machine tests indicate that approximately 160 cm of imported fill was placed over organic rich sandy silt fluvial deposits such as would be expected at or near the edge of a boggy low-land. ***Despite thorough raking and visual inspection of the lower sandy silt sediments, no pre-contact period cultural materials were encountered in MTs 23 or 24.*** Archaeological site potential is considered to be low for the lower deposits, as this area would not have been very well suited for human occupation or use during the pre-contact period, as it would have been a soggy wetland for most of the year.

On May 13, 2022, **MTs 25 and 26** were placed approximately 12 m apart within the proposed new road ROW a few metres east of the proposed sanitary force main pump station in the central aspect of Development Area 6 (Figures 15, 16 and 23; Appendices III and IV). It was readily apparent prior to machine testing that this location has been capped with a thick layer of imported fill, as it is raised about 1.0 m above the capped terrain to the northeast and non-local sand, gravel, cobbles and boulders are exposed on the current ground surface (Figures 16 and 23). MTs 25 and 26 were dug with a backhoe to determine the thickness and nature of the overlying fill, and to expose, describe and inspect the underlying natural non-fill deposits. **MT 25** measured 2.0 m x 1.25 m x 2.0 m deep, revealing that from 0 to 190 cm BS the matrix is a moderately loose mix of grey sand, gravel, cobbles and boulders (imported fill) and from 190 to 200 cm BS a compact grey marine/late glacial clay was encountered. No sediments removed from this test required close inspection as they were exclusively imported fill resting on top of sterile clay. This suggests that any natural organic (peat) or silt/sand deposits were removed from above the clay prior to being capped with imported fill. **MT 26** measured 2.5 m x 1.5 m by 2.8 m deep, and from 0 to 270 cm BS the matrix is a moderately loose mix of grey sand, gravel, cobbles and boulders (imported fill), and from 270 to 280 cm BS there is a compact grey marine/late glacial clay. No sediments were suitable for close inspection, as the imported fill rests directly on top of sterile clay.

Recommended Management for Development Area 6:

The areas selected for shovel testing and machine testing within Development Area 6 lie within the proposed new road ROW and/or new drainage channel in the northeastern aspect of this section of the study area (Figures 11 and 15). None of the subsurface tests intersected through natural sediments deemed to have medium or greater archaeological site potential, and they consistently indicate direct stratigraphic evidence for a boggy marshy low-land environment prevailing in this section of the study area during the pre-contact period. It is our opinion that this area would not have been occupied, visited or used with any significance or regularity during pre-contact period times owing to a wet-land environment during most of the year when precipitation rates were high.

For Development Area 6, we recommend that:

(1) ***All land-altering ground preparation machine activities involving removal of existing residential and farm buildings and foundations, removal of trees stump and vegetation, and activities relating to the importation and placement of sand/gravel preload within the new road ROW in Development Area 6 at 4170 and 4169 Cedar Drive should be allowed to proceed without any further formal archaeological fieldwork.*** Subsequent archaeological visual

monitoring of land-altering activities relating to these construction activities not recommended. ***However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered during construction*** (see Appendix V).

(2) ***All land-altering machine activity related to the clearing and excavation of the new drainage channel lying between existing Cedar Drive and the new road ROW in the northeastern aspect of Development Area 6 at 4169 Cedar Drive should be allowed to proceed without any further formal archaeological fieldwork.*** Subsequent archaeological visual monitoring of land-altering activities relating to these construction activities not recommended. ***However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered during construction*** (see Appendix V).

Removal of trees, structures and ground surface preparation prior to importation and placement of the imported sand/gravel road-bed fill are scheduled to commence in July, 2022.

Figure 23. Excavation of MT 25 underway within the proposed new road ROW about 20 m east of the proposed sanitary force main pump station within the southwestern aspect of 4169 Cedar Drive, looking northeast. It is proposed that this area will be capped with road-base fill in mid-2022.

Inspection Area 7: Resumption of Placement of Sand/Gravel Road Base Deposits on Existing Preload, and Excavation of a Large Drainage Channel in NE Section of New Road ROW at 4300 Oliver

Description of Impact Zone and Proposed Development:

Inspection Area 7 is a 600 m-long by 30 m wide section of new road ROW and drainage channel that occupies the northeastern portion of the project study area on the east side of Cedar Drive, extending from 4169 Cedar Drive in the south to near the intersection with Gilleys Trail in the north (Figures 24 to 30). This section of road and ditch occupies relatively flat, slightly southeastward sloping/draining terrain along the western edge of the valley bottom. A small drainage ditch presently flows southwest between existing Cedar Drive and the new road ROW, and Partington Creek flows on the west side of Cedar Drive (Figures 24, 25, 27, 28 and 30). There is also a drainage culvert that passes under the new road ROW (Figure 28). During our visual inspections of the ground surface immediately beside the new road ROW in February and April, 2022, it was obvious that a 40 to 50 cm thick layer of imported fill had been placed on both sides of the sand/gravel preload. These peripheral areas were somewhat raised, but the adjacent blueberry field to the east was well saturated with water and there were many areas with standing shallow surface water (Figures 26 and 29).

Prior to placement of the existing sand/gravel road bed pre-load within the new 25 m -wide road ROW in 2021, the impact zone was occupied by rowed blueberry bushes and was subjected to routine agricultural husbandry activities (Figures 24 to 26). The imported pre-load at the very northeastern end of the new road ROW is about 3 m thick, but in the remaining majority of the ROW to the south the pre-load is about 1.0 m thick. The new road construction involved removal of the blueberry plants, laying down a geotextile fabric over the existing ground surface, and then placing the sand/gravel on top to the desired thickness. Pre-loading of this section of the ROW is considered to be an important aspect of road construction, as the underlying natural deposits contain a significant quantity of organics that need to be compressed and stabilized for more than one year before final road construction can occur on top. ***The current intent is to resume placement of additional sand/gravel pre-load on top of the existing pre-load deposits within the new road ROW starting in mid-2022.*** This will involve removal of the pre-load deposits currently resting on the area designated for the sanitary force main pump station (Development Area 5) and applying it to a short section of the new road ROW, and importation and placement of extra-local sand/gravel pre-load to complete construction of the new road bed.

The small drainage ditch currently lying between Cedar Drive and the new road ROW will be significantly expanded to a width of about 10 m to create a drainage channel that will manage water draining from the west side of Cedar Drive (Figures 24, 25, 27, 28 and 30). The new channel will be machine excavated to a depth of 2.0 m below the present ground surface. ***Excavation and construction of the new drainage channel is scheduled for 2023.*** The proposed drainage channel expansion impact zone was subjected to a ground surface inspection, a shovel testing program in one area, and a machine testing program during our April, 2022 investigations.

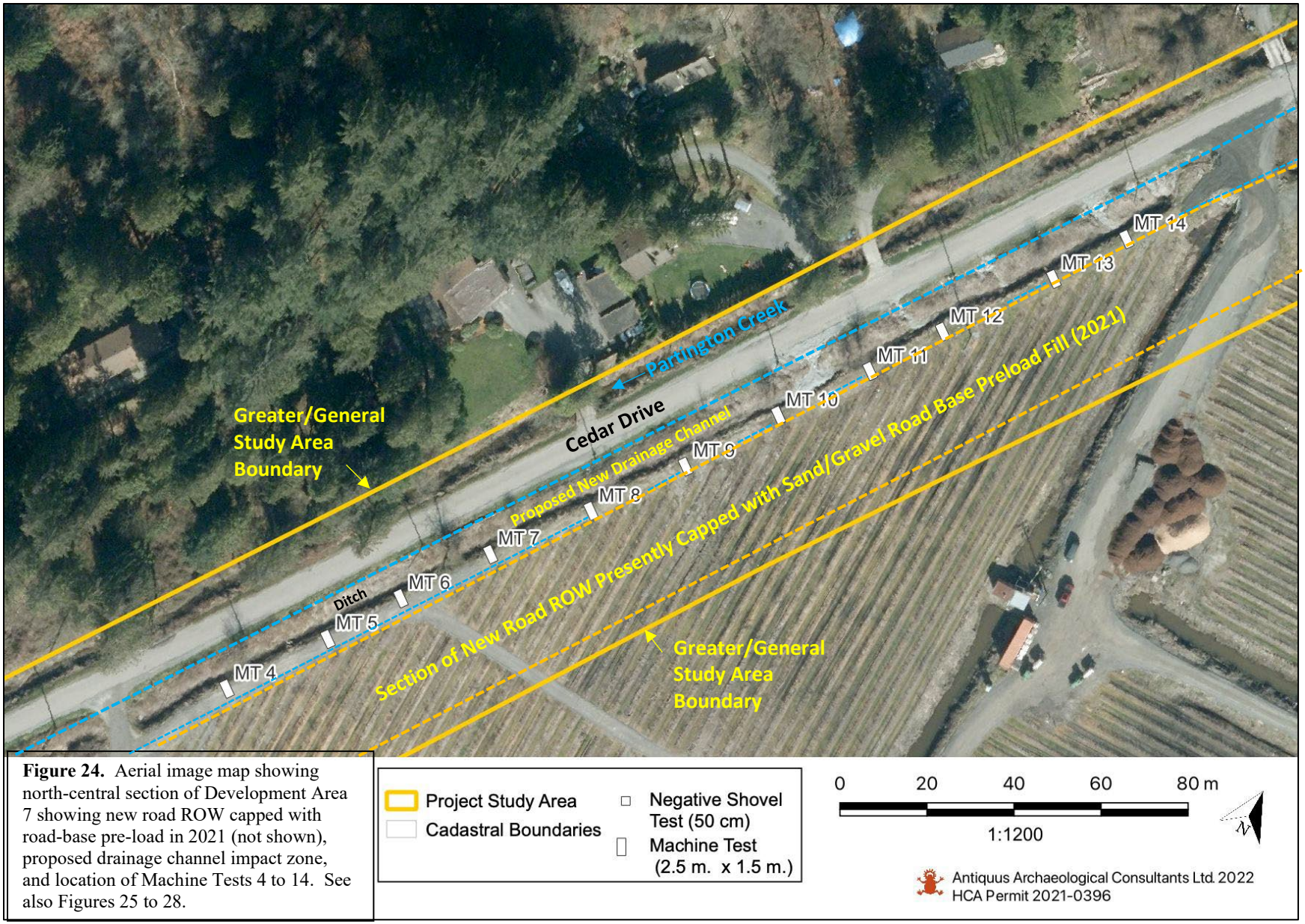

Figure 24. Aerial image map showing north-central section of Development Area 7 showing new road ROW capped with road-base pre-load in 2021 (not shown), proposed drainage channel impact zone, and location of Machine Tests 4 to 14. See also Figures 25 to 28.

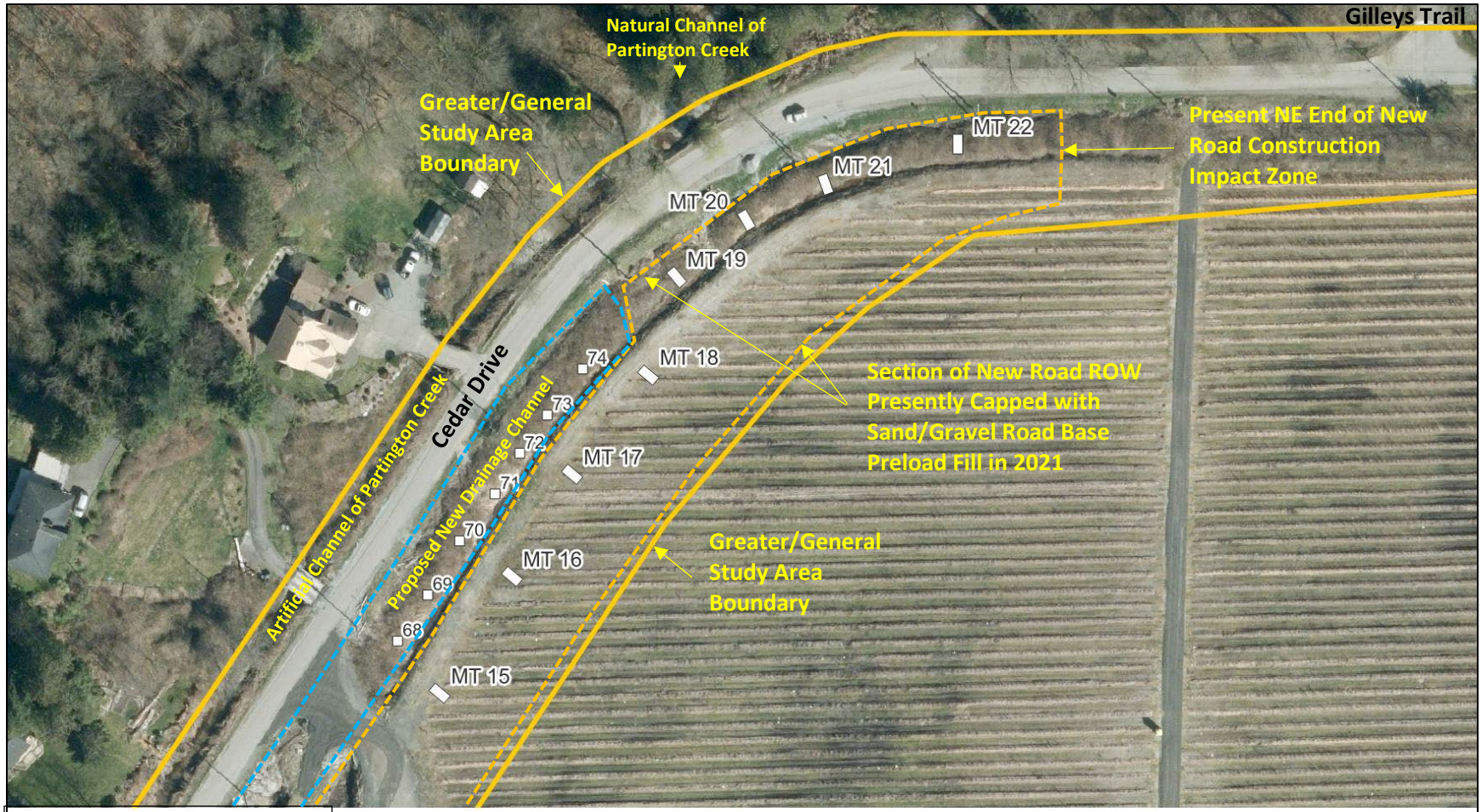

Figure 25. Aerial image map showing the NE section/end of the new road ROW in Development Area 7 that was capped with road-base pre-load in 2021 (not shown in photo), proposed drainage channel impact zone, Shovel Tests 68 to 74, and location of Machine Tests 4 to 14. See also Figures 29 and 30.

Figure 26. A February 22, 2022 general view of the east side of the northern 2/3 of new road ROW in Development Area 7 showing road-bed that was capped with sand/gravel road-bed pre-load fill in 2021, looking northeast. This section will be capped with an additional 1.0 m of road-base fill in mid-2022. Note standing water in saturated natural and imported fill deposits in lower right that indicate a high water table.

Figure 27. A February 22, 2022, general view of the west side of the north-central section new road ROW (upper right) in Development Area 7 showing section of new road-bed capped with pre-load fill in 2021 (right), looking northeast. This section will be capped with an additional 1.0 m of road-base fill in mid- to late 2022. A new drainage channel will be dug between existing Cedar Drive (upper left) and the new ROW. The area immediately west (left) of the road-bed in the center of the photo was subjected to machine testing (MTs 4 to 14) (Figures 24 and 25; Appendices III and IV).

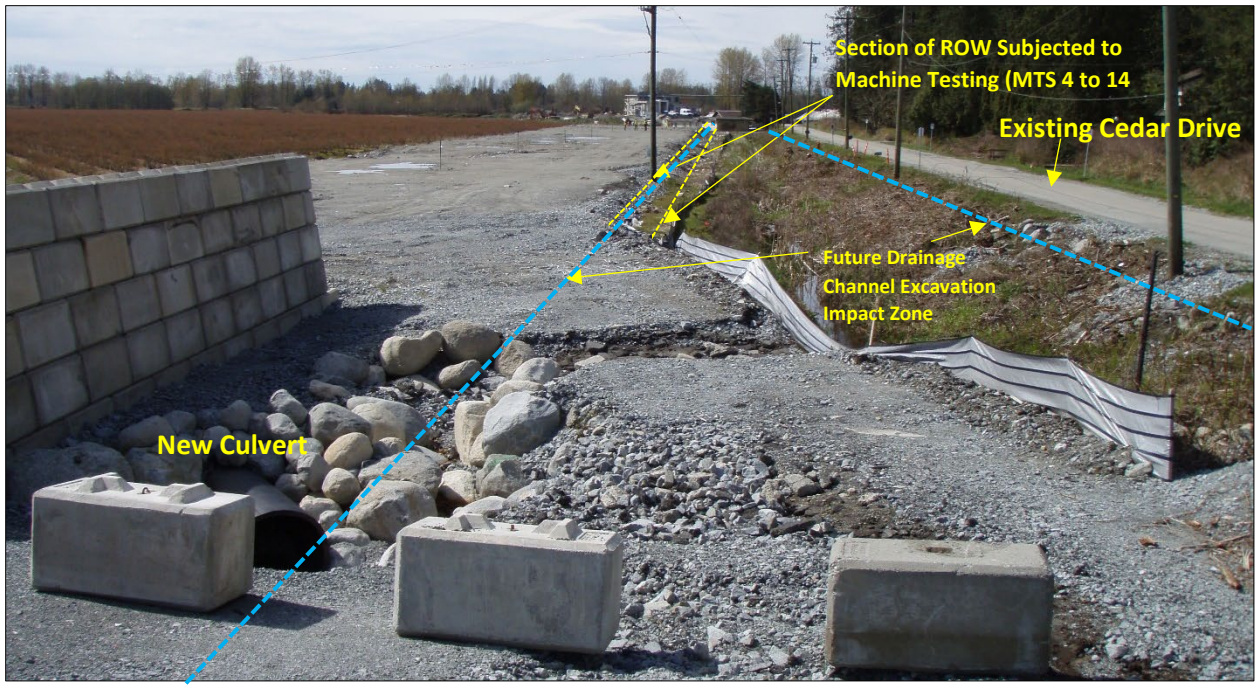

Figure 28. An April 19, 2022, view of the north-central section of Development Area 7 showing section along the west side of the new road ROW that was subjected to machine testing (MTs 4 to 14), looking southwest. The new road bed will be subjected to additional road-base pre-load capping in mid-2022. A new 10 m-wide drainage channel will be excavated between existing Cedar Drive (upper right), and the new ROW (upper left).

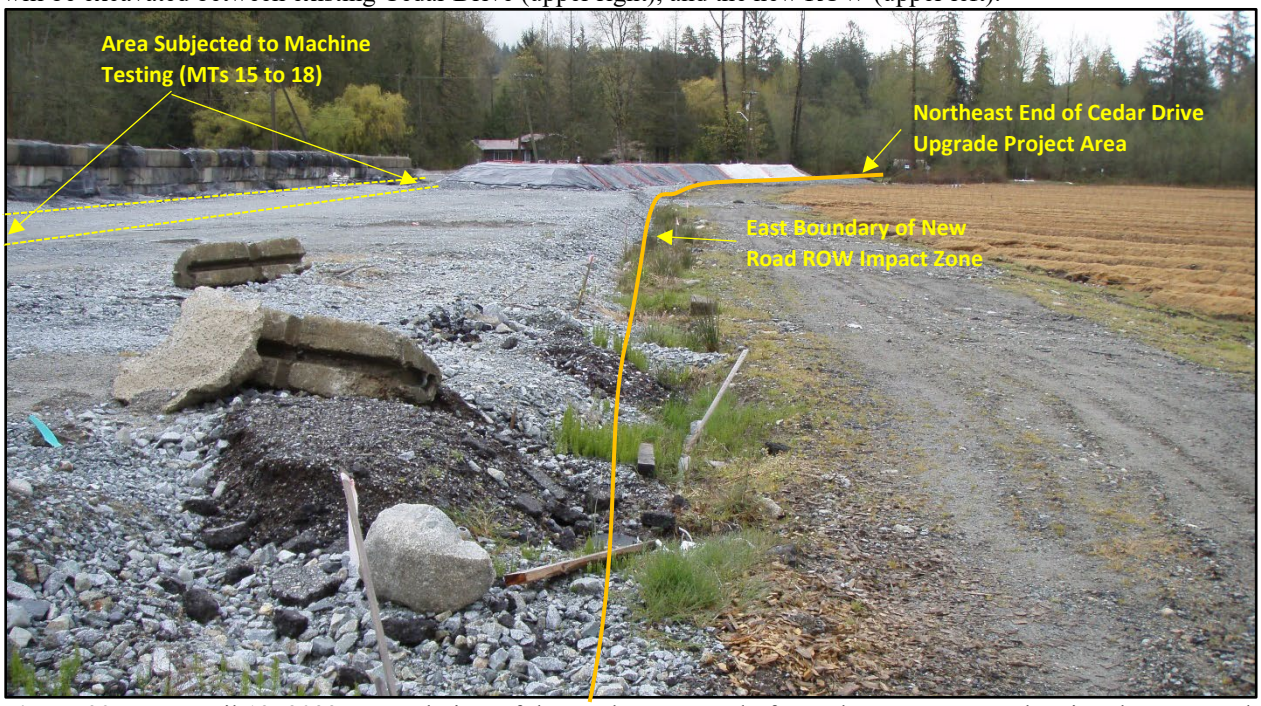

Figure 29. An April 13, 2022, general view of the northeastern end of Development Area 7 showing the new road ROW (left), and section that was subjected to machine testing (MTs 15 to 18) (see Figure 25), looking northeast. Additional placement of fill on the new road ROW (left) to match the height of the very northern section (upper-center) will occur in mid-2022. Note that the new farm access road constructed with imported sand/gravel fill in 2021and lies immediately east of the study area boundary. It allows far vehicles to travel along the western edge of the blueberry field without sinking into saturated boggy organic-rich deposits.

Ground Surface Inspection and Subsurface Testing Results:

On February 22, 2022, a **visual ground surface inspection** was conducted along the eastern edge of Development Area 7 (east edge of new road ROW) by Mike Rousseau and it was evident that about 50 cm thick layer of imported fill had been placed along the eastern edge of the new road pre-load ROW to construct a farm access road that lies immediately outside the project/study area (Figure 26 and 29). This new farm road was deemed necessary in order to keep farm equipment and other vehicles from sinking into the natural saturated organic matrix on the ground surface. ***The natural sediments along the eastern edge of the new farm road were briefly visually inspected, but no pre-contact period cultural materials were observed.***

On April 20, 2022, a crew of four visually inspected the exposed ground along the small drainage ditch that currently passes between Cedar Drive and the new road ROW (Figures 24, 25, 27, 28 and 30). The dense vegetation consisting mostly of blackberry bush and willows along the western edge of this ditch beside Cedar Drive was machine removed for us in early April so that we could inspect the freshly exposed ground and profiles afforded by the ditch channel banks. ***No pre-contact period cultural deposits were observed during this visual inspection along the ditch.***

On April 20, 2022, a **shovel testing** program involving 7 standard shovel tests (**STs 68 to 74**) was conducted in an area measuring approximately 90 m N-S by 10 m E-W lying on gently-sloping terrain between Cedar Drive and the new road ROW near the northeastern end of Development Area 7 (Figures 25 and 30; Appendices I and II). This specific area is considered to have medium archaeological site potential because of its proximity to the natural channel of Partington Creek about 50 m to the north. The surface of this area was machine-cleared of knotweed and blackberry bushes prior to our shovel testing program. Shovel tests were placed at approximate 10 m intervals, and were dug to terminal depths of 75 to 80 cm BS (Appendices I and II). While there was some minor variation in the nature and composition of the stratigraphic deposits, in general the uppermost 0 to 25 cm BS is a compact dark brown/ grey sandy silt with organics (screened); from 25 to 60 cm BS it is a compact dark brown/grey silty sand (screened); and from 60 to 80 cm BS it is a compact dark brown/grey fluvial sand (screened). The bottoms of these shovel tests filled with water while being dug. We encountered recent domestic and industrial refuse items in most of the shovel tests up to depths of 60 cm BS, indicating that the upper 60 cm consisted of imported fill and/or displaced local sediments that were placed over this area during construction of existing Cedar Drive. The underlying fluvial sand deposits appear to relate to a former natural channel or flood event relating to Partington Creek, as the present natural creek channel lies about 50 m to the north (Figure 25). The stratigraphy encountered in the shovel tests suggests that the majority of the sediments in this location have been heavily disturbed and relate to intensive machine activity related to the construction of Cedar Drive and excavation of the small drainage ditch to the immediate east. ***No pre-contact period cultural deposits were encountered in STs 68 to 74.*** Machine excavation of the new drainage channel will commence in 2023.

Figure 30. A view of April 20, 2022, shovel testing (STs 68 to 74) underway in a gently-sloping area near the northwestern end of Development Area 7 between existing Cedar Drive (upper left) and the new road ROW (upper right) where a proposed drainage channel will be machine excavated, looking northeast.

On April 14, 2022 a series of 11 **machine tests** (**MTs 4 to 14**) were excavated at approximate 20 m intervals along the very western edge of the existing new road ROW pre-load deposits within the proposed new drainage channel ROW in the southern half of Development Area 7 (Figures 24, 27 and 28; Appendices III and IV). Shovel testing was not possible in this general location due to past and present placement of imported fill deposits within the new road and drainage channel ROWs. These tests were placed to determine the nature and stratigraphic structure of natural and imported fill deposits lying within the proposed new drainage channel ROW that will be constructed along the western edge of the new road ROW. The tests were excavated by backhoe, and their average size was 2.25 m x 1.75 m x 2.25 m deep (BS), with some tests being dug to 2.5 m BS (Appendices III and IV). During excavation, the machine operator made an effort to separate major stratigraphic units into separate piles (i.e., upper imported fill deposits, the thick peat/organic layer, underlying sand and silt deposits, and basal clay) so that we could hand-rake and closely inspect the natural Holocene-age deposits for pre-contact period cultural deposits (Figures 31 and 32). It was quite obvious that the lowest natural sand and silt sediments were deposited in a fluvial environment, and the thick upper peat deposits were formed and accumulated along the edge of a boggy/marshy landscape. There was some variation between the nature and thicknesses of the strata encountered in these 14 machine tests, but they all exhibited a very similar composition and structure based on a common theme. Generally, from 0 to 40 cm BS the matrix is a compact grey/brown mix of silt, sand, gravel, cobbles that is obviously non-local imported fill; from 40 to 120cm BS there is a mottled brown/black/orange peat zone that was hand-raked and closely inspected; from 120 to 180 cm BS there is a loose orange-brown sand and silt mix that was hand-raked and closely inspected; and from 180 to 200 cm BS there is a hard grey marine/late glacial sterile clay. Most of the tests leaked groundwater below about 50 to 100 cm BS, and the bottoms of some tests filled up quite rapidly. This is no surprise given the wet and boggy nature of the local landscape.

Figure 31. A view of hand-raking and close inspection of "natural" sand/silt and peat sediments removed from below the imported fill in machine test (MT) 4, looking north. Note uppermost thick layer of imported fill deposits and underlying natural peat and fluvially-lain sand and silt in the test hole. The majority of the natural sediments were closely visually scrutinized, although the potential for them to contain any pre-contact period cultural deposits was considered to be low.

The visual inspection of the machine-excavated natural Holocene-age peat, silt, and sand sediments involved them being placed in separate piles according to basic "type" and then several crew members used garden rakes and spades to carefully and systematically displace and expose about 50% to 70% of each isolated matrix pile "type" (Figures 31 and 32). Screening of these selected deposits was not considered necessary, as these sediments are relatively homogenous and contain only the rare pea gravel or pebble inclusion, and therefore they were quite easy to rake through, expose, and inspect. Moreover, most of these lower natural sediments were very saturated, so passing them through screens would have taken considerable time, and would have been of questionable utility. Peat, of course, is impossible to screen. ***No pre-contact period cultural deposits were encountered in MTs 4 to 14. Machine excavation of the new drainage channel will commence in 2023.***

Figure 32. A view of hand-raking and close inspection of natural silt and peat sediments removed from machine test (MT) 12 in progress, looking northeast.

The natural depositional history exposed in MTs 4 to 14 attests that the lower early Holocene (12,000 to 5000 years BP) fluvially-lain sand and silt deposits that lie on top of the sterile clay were likely deposited along the edge of a broad, shallow, slow-moving river in a floodplain context, which seems quite reasonable given the close proximity of the main channel of Pitt River to the east. Seasonal high river levels and high tidal water levels coinciding to create lake-like expanses of water in the valley bottom were likely common throughout the Pitt Polder area during the early Holocene. Development Area 7 lies along the western margin of the valley bottom, and there may be one or more discernable high-water shoreline features somewhere on the moderate slopes that flank the west side of existing Cedar Drive where several recent residences and yards have been constructed (Figures 24 and 25). It is reasonable to conclude that these fluvial sediments have low potential for containing archaeological deposits, as they were laid in an active low-energy fluvial system, and they do not contain any stratigraphic indication of organics that indicate any stable dry land surfaces.

During the latter part of the Holocene (5000 to 250 years ago) there was a significant accumulation of a thick layer peat that formed directly above the fine fluvial silts (Appendix IV). This 50 to 70 cm thick peat zone is indicative of a well-saturated bog/marshland environment that occasionally flooded during the freshet seasons to provide some silt deposits and nourishment to bog-adapted flora. In some tests, sticks, branches, and even small tree trunks were encountered, indicating a marshland forest thrived in this location during the end of the Holocene, and likely prior to diking and clearing Pitt Polder in the 1890s. Not long ago, this locality probably resembled

the forested areas on east side of Cedar Drive in the southern end of the study area (Figures 6 and 7). During the latter part of the Holocene this location may have attracted pre-contact period people to hunt animals, or catch fish from Partington Creek to the northeast, but it would have been a boggy wet landscape that would not have encouraged any significant short or long-term occupation or use. The raised, drier, southeast-facing moderately sloping hillside and flat-topped bedrock outcrops lying on the west side of Cedar Drive would have been much more attractive for establishing camps or trails in this locality.

On April 19, 2022, another eight **machine tests (MTs 15 to 22)** were excavated at approximate 20 to 25 m intervals in the northeastern aspect (NE end) of Development Area 7 within and along the west and north edge of the new road ROW (Figures 25 and 33; Appendices III and IV). This immediate locality is very close to the natural channel of Partington where it meets Cedar Drive, and since this is a freshwater fish and salmon-bearing stream, it is quite possible that this area was occasionally visited during the pre-contact period during fishing, hunting and plant gathering forays. Archaeological site potential for this locality is considered to be medium. These eight tests were placed to determine the nature and stratigraphic structure of natural and imported fill deposits lying along the new road ROW that is capped with 1.0 to 3.0 m of imported sand/gravel fill. Tests were excavated by backhoe, and their average size was 2.0 m x 1.80 m x 2.0 m deep (BS), with some tests being dug to 2.5 m BS (Appendices III and IV). During excavation, the machine operator separated major stratigraphic units into separate piles (i.e., uppermost imported fill deposits, the thick peat/organic layer, underlying sand and silt deposits, and basal clay) so that we could hand-rake and closely inspect the natural Holocene-age deposits for pre-contact period cultural deposits (Figure 33).

Figure 33. A view of hand-raking and close inspection of sub-fill "natural" silt and peat sediments removed from machine test (MT) 16 in progress within the new road ROW that was capped in 2021, looking north.

There was some variation between the nature and thicknesses of the strata encountered in MTs 15 to 22, but they all exhibited a basic similarly in composition, structure, and depositional history (see Appendices III and IV). Note that stratum depth measurements were taken from the pre-2021 ground level below recently deposited sand/gravel road fill pre-load, and thicknesses varied from 70 to 150 cm depending on location. Specific descriptions, details and photos for each machine test are provided in Appendices III and IV. Generally, from 0 to 40/60 cm BS the uppermost deposit is a loose grey brown mix of silt, sandy silt that is clearly imported fill that relates to construction of Cedar Drive in the early 1900s; from 40/60 to 110/120 cm BS three is the distinctive brown/black/orange peat zone containing random sticks, branches and tree roots that was hand-raked and closely inspected; from 110/130 to 150/170 cm BS there is a firm well-sorted, relatively homogenous brown fluvial sand and silt mix that was hand-raked and closely inspected; and from 150/170 to 180/200 cm BS there is a hard grey marine/late glacial clay. This general stratigraphic pattern closely resembles those observed in MTs 4 to 14 to the south, and again attests that fluvial sand and silts carried in a low-energy fluvial environment were deposited over sterile glacial clay during the initial half of the Holocene, and a boggy/marshland forest succeeded and thrived in this locality for the latter half. Most of the tests leaked groundwater below about 50 to 100 cm BS, and the bottoms of some tests filled rapidly due to the wet and boggy nature of the local landscape.

The visual inspection of the machine-excavated natural Holocene-age peat, silt, and sand sediments involved them being placed in separate piles according to basic "type" and then several crew members used garden rakes and spades to carefully and systematically displace and expose about 50% to 70% of each isolated matrix pile "type" (Figures 31 to 33). Screening of these selected deposits was not considered necessary, as they relatively homogenous and contain only the rare pea gravel or pebble inclusion, and were quite easy to rake through, expose, and inspect. Moreover, most of these lower natural sediments were very saturated, so passing them through screens would have taken considerable time, and of questionable utility. Peat is impossible to screen, but easily raked through. ***No pre-contact period cultural deposits were encountered in MTs 15 to 22.*** Further capping of the existing road-bed in the new road ROW will commence in mid-2022.

Recommended Management in Development Area 7:

For Development Area 7 we suggest the following management recommendations.

(1) ***Resumption of placement of imported sand/gravel fill on top of the existing pre-loaded new road ROW in Development Area 7 should be allowed to proceed without any further formal archaeological fieldwork.*** Continued addition of road-bed fill will not affect any natural deposits lying underneath the existing fill as this is an additive process. Pre-load sand/gravel deposits currently existing at the proposed sanitary force main pump station (Development Area 5) will be removed and selectively placed within the new road ROW. An additional significant quantity of suitable extra-local sand/gravel will also be imported to add height to the new road bed. ***It is currently anticipated that pre-loading will resume in mid-2022.***

(2) ***Machine excavations for the proposed 400 m long by 10 m wide drainage channel that will be dug between existing Cedar Drive and the new road ROW and related culverting in Development Area 7 should be allowed to proceed without any further formal archaeological***

fieldwork. Visual monitoring of land-altering activities is not recommended. However, the developer and contracting machine operators should be aware of, and participate in, a "chance find management protocol" procedure during land-altering activities in the event that something obvious is encountered (see Appendix V). Note that the north end of this new drainage channel will not extend to the natural channel of Partington Creek that lies 20 m to the north and is deemed to have medium archaeological site potential. ***Machine excavation of the drainage channel and installation of several culverts are scheduled to commence in mid-2022 or 2023.***

Summary of Recommended Management for Development Areas Inspected in Early 2022, and Closing Remarks

Early 2022 archaeological inspections conducted by Antiquus staff and First Nation field technicians from Kwikwetlem First Nation and Katzie First Nation for several specific proposed development impact zones associated with the Cedar Drive Upgrade Project in Coquitlam involved ground surface inspections, subsurface shovel testing and deep machine testing. These inspections are the first phase of the archaeological resource identification and management program that is being initiated by the City of Coquitlam. The inspections relate to specific land-altering activities that will begin in mid-2022 and continue into 2023. Necessary permits were sought and obtained from the Archaeology Branch and local First Nation agencies, and Antiquus consulted regularly with Kwikwetlem First Nation representatives during the various field inspection episodes.

Seven "Development Areas" were defined for specific sections of the proposed Cedar Drive Upgrade Project based on the general nature of proposed development type(s), terrain and location (Figures 1, 2, 6, 10, 11, 15, 24 and 25). Antiquus used this approach for the sake of organizational, descriptive and management efficacy and convenience. It is important to note that most of the southwestern half of the study area along existing Cedar Drive has yet to be inspected for archaeological resource concerns, and this section will be covered in the next phase of archaeological fieldwork to be conducted in late 2022 or early 2023.

Starting in mid-2022, the City of Coquitlam intends to: start the directional drilling for the sanitary sewer pipeline installation in Development Areas 1 to 4; remove the existing sand/gravel pre-load and machine excavation of a "wet-well" relating to the proposed sanitary sewer pump station in Development Area 5; remove of trees, stumps, existing structures within the new road and drainage channel ROWs in Development Area 6; place imported road-bed fill on top of the new road ROW in Development Areas 6 and 7; and machine excavate a 10 m-wide drainage channel with associated culverts in Development Areas 6 and 7. Some of these activities will continue into July and August when ground conditions will be the driest.

No pre-contact period archaeological materials and/or deposits were encountered in the seven "Development Areas" inspected during the initial half of 2022. For the majority of these proposed impact zones, we recommend that land-altering activities and/or capping with fill should be allowed to proceed without any further formal (in-field) archaeological management. The exception is the proposed machine excavation of the "wet-well" within the proposed sanitary force main pump station impact zone where we recommend that visual monitoring by an archaeologist and First Nation technician should be carried out when the "wet-well" is being excavated (see Development Area 5; Figures 9 and 10). ***Other smaller specific locations related to the pump station construction may be subjected to visual monitoring during land-altering activities as construction progresses.***

Also, we strongly recommend that City of Coquitlam management personnel overseeing development activities and all machine operators working on the road upgrade impact zones should be aware of, and adhere to, a "chance find management protocol" in the event that any obvious cultural deposits are encountered during land-altering activities. A chance find management protocol document prepared by Antiquus specifically for the Cedar Drive Upgrade Project is presented in Appendix V. While our sub-surface testing investigations were considered appropriate and effective for sampling surface-accessible natural deposits within impact zones, some areas could not be sub-surface tested due to inaccessibility to the natural terrain (i.e., areas capped with thick layers of imported fill or occupied by standing structures). ***We fully acknowledge that there is always a low probability that isolated randomly discarded pre-contact period items, or even a small very low-density site, could lie within the proposed impact zones.*** A chance find management protocol procedure will help to ensure that any obvious archaeological deposits will be properly identified and managed appropriately.

Please note that Kwikwetlem First Nation's archaeologists (Brown and Oakes Archaeology) currently offers and provides an "Archaeology and Cultural Heritage Awareness/ Archaeology Chance Find Training" program that educates developers and machine operators as to the physical nature of typical archaeological cultural materials, deposits and features, and the proper procedure that should be followed after a suspected encounter with archaeological resources. They have indicated that they would like to provide this training to the project managers and machine operators. In my opinion, taking advantage of their program would probably be beneficial.

The contents of this interim letter report will also be reviewed by local First Nation agencies, and they may, or may not, support our above recommendations or comments. Kwikwetlem First Nation has already reviewed a draft version of this interim report and they have indicated that they would like to request that visual monitoring be conducted during land-alteration at locations where natural deposits will be impacted. Their requested monitoring program has yet to be formally discussed between the stakeholders. We will work with the Kwikwetlem First nation and City of Coquitlam towards developing and implementing a final management plan that will be acceptable to all parties involved.

We are requesting that you review the content of this interim letter report for the early 2022 field inspections, and then prepare a letter of approval that will allow the City of Coquitlam to begin or resume their development activities within Development Areas 1 to 7 according to management recommendations and comments I have provided herein. Of immediate concern is the resumption of road-base fill placement in the new road ROW, and installation of the directional drilling pipeline exit and entry locations.

If you have any questions regarding the results or recommendations presented in this interim letter report please contact me.

Regards,

Mike Rousseau
Antiquus Archaeological Consultants Ltd.
cc: Kwikwetlem First Nation, Katzie First Nation, Musqueam First Nation

APPENDIX I.
CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 1	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey sand and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 34.
ST 2	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey sand and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 35.
ST 3	February 22, 2022	45cm	55cm BS	**0 to 55cm BS**: compact medium brown sandy silt with high organic content (screened); no sand or clay encountered. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 36.
ST 4	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey clay/silt. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 37.
ST 5	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey clay/silt. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 38.
ST 6	February 22, 2022	45cm	45cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey clay/silt. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 39.
ST 7	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey clay/silt. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 40.
ST 8	February 22, 2022	45cm	45cm BS	**0 to 45cm BS**: compact medium brown sandy silt with high organic content (screened); No sand or clay encountered. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 41.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 9	February 22, 2022	45cm	40cm BS	**0 to 35cm BS**: compact medium brown sandy silt with high organic content (screened); **35 to 40 cm BS**: compact grey clay/silt (screened). Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 42.
ST 10	February 22, 2022	45cm	45cm BS	**0 to 40cm BS**: compact medium brown sandy silt with high organic content (screened); **40 to 45 cm BS**: compact grey clay/silt (screened). Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 43.
ST 11	February 22, 2022	45cm	50cm BS	**0 to 50cm BS**: compact medium brown sandy silt with high organic content (screened); No sand or clay encountered. Bottom of test filled with water during and after being dug.	Placed in parking lot expansion area at SW end of the Cedar Drive upgrade project ROW. **No pre-contact period cultural deposits.**	Figures 2, 44.
ST 12	February 22, 2022	45cm	70cm BS	**0 to 50cm BS**: compact dark brown - black silt with very high organic content (screened); **50 to 70 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 45.
ST 13	February 22, 2022	40cm	70cm BS	**0 to 50cm BS**: compact dark brown - black silt with very high organic content (screened); **50 to 70 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 46.
ST 14	February 22, 2022	45cm	45cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 45 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 47.
ST 15	February 22, 2022	45cm	60cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened) lots of broken glass associated; **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 48.
ST 16	February 22, 2022	45cm	60cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 49.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 17	February 22, 2022	45cm	65cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 65 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 50.
ST 18	February 22, 2022	45cm	50cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 50 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 51.
ST 19	February 22, 2022	45cm	60 cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 52.
ST 20	February 22, 2022	45cm	50cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 50 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 53.
ST 21	February 22, 2022	45cm	60cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 54.
ST 22	February 22, 2022	40cm	50cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 50 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 55.
ST 23	February 22, 2022	45cm	60cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 56.
ST 24	February 22, 2022	45cm	65cm BS	**0 to 35cm BS**: compact dark brown - black silt with very high organic content (screened); **35 to 60 cm BS:** Medium grey brown silty clay (screened). Bottom of test filled with water during and after being dug.	Placed in area to be impacted by a temporary traffic diversion lane and pipe line drill rig station. **No pre-contact period cultural deposits.**	Figures 6, 57.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 25	April 13, 2022	45cm	60cm BS	**0 to 20cm BS**: compact dark brown - black sandy silt with organics (screened); **20 to 60 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 58.
ST 26	April 13, 2022	45cm	40cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 40 cm BS:** compact dark brown/grey silt and sand (screened) at **40cm BS** a grey sand was encountered. Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figure 11; No photo of completed shovel test.
ST 27	April 13, 2022	45cm	60cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 60 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 59.
ST 28	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 50 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figure 11; No photo of completed shovel test.
ST 29	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 50 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Lots of recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 60
ST 30	April 13, 2022	45cm	50cm BS	**0 to 15cm BS**: compact medium brown sandy silt with organics (screened); **15 to 18cm BS**: loose grey sand (screened); **18 to 50 cm BS:** compact dark brown/grey silt and sand with lots of cobbles (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figure 11. No photo of completed shovel test.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 31	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 50 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 61.
ST 32	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 50 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figure 11. No photo of completed shovel test.
ST 33	April 13, 2022	45cm	40cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 40 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 62.
ST 34	April 13, 2022	45cm	60cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 60 cm BS:** compact grey clay and sand mix (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 63.
ST 35	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 50 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figure 11. No photo of completed shovel test.
ST 36	April 13, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics and lots of roots (screened); **20 to 50 cm BS:** compact dark brown/grey root infested silt and sand with peat inclusions (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 64.
ST 37	April 13, 2022	45cm	40cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 40 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered at all depths. **No pre-contact period cultural deposits.**	Figures 11, 65.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 38	April 13, 2022	45cm	40cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 40 cm BS:** compact dark brown/grey silt and sand (screened). Appears to be mostly imported fill. Bottom of test filled with water during and after being dug.	Placed at very southwest end of proposed new road ROW preload section in raised treed area. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 11. No photo of completed shovel test.
ST 39 **UTM: 10U 0520144E; 5459587N**	April 14, 2022	40cm	60cm BS	**0 to 15cm BS**: compact medium brown silt and gravel with organics (screened); **15 to 60 cm BS:** compact medium brown/grey silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 120 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 66.
ST 40 **UTM: 10U 0520148E; 5459586N**	April 14, 2022	45cm	50cm BS	**0 to 15cm BS**: compact medium brown silt with organics (screened); **15 to 60 cm BS:** compact medium brown/grey silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 120 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15. No photo of completed shovel test.
ST 41 **UTM: 10U 0520151E; 5459539N**	April 14, 2022	45cm	70cm BS	**0 to 40cm BS**: compact medium brown and dark brown silt and organics (screened); **40 to 70 cm BS:** compact mottled dark brown and grey silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 120 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 67.
ST 42	April 14, 2022	45cm	50cm BS	**0 to 40cm BS**: compact medium brown and dark brown silt and organics (screened); **40 to 50 cm BS:** compact mottled dark brown and grey silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 120 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 68.
ST 43	April 14, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown silt and organics (screened); **20 to 50 cm BS:** compact medium brown silt mixed with wood chips/sawdust (screened) imported fill. Bottom of test filled with water during and after being dug.	Placed in residential yard about 80 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15. No photo of completed shovel test.
ST 44	April 14, 2022	45cm	70cm BS	**0 to 20cm BS**: compact light brown and medium brown silt and organics (screened); **20 to 50 cm BS:** compact medium brown-grey wood chips/ sawdust (screened) imported fill. Bottom of test filled with water during and after being dug.	Placed in residential yard about 80 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 69.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 45	April 13, 2022	50cm	60cm BS	**0 to 10cm BS**: compact medium brown and dark brown silt with organics (screened); **10 to 50 cm BS:** compact mottled grey/medium brown silt and some clay (screened). Appears to be mostly imported fill. **50 to 60cm BS:** compact grey clay. Bottom of test filled with water.	Placed in residential yard about 80 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 46	April 14, 2022	45cm	50cm BS	**0 to 10cm BS**: compact medium brown silt with organics (screened); **10 to 15cm BS:** medium brown wood chips/sawdust; **15 to 40cm BS:** compact medium brown wood chips and silt (screened). Appears to be mostly imported fill. **40 to 50 cm BS:** compact mottled grey and dark brown silt and clay. Bottom of test filled with water.	Placed in residential yard about 80 m south of existing new road ROW preload section. Some recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 70.
ST 47	April 14, 2022	50cm	60cm BS	**0 to 20cm BS**: compact dark brown silt with organics (screened); **20 to 60 cm BS:** compact grey sand, silt, clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 60 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 48	April 14, 2022	45cm	50cm BS	**0 to 30cm BS**: compact dark brown silt and organics (screened); **30 to 50 cm BS:** compact dark brown and grey brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 60 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 71.
ST 49	April 14, 2022	45cm	50cm BS	**0 to 20cm BS**: compact medium brown and dark brown silt and organics (screened); **20 to 50 cm BS:** compact grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 60 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 50	April 14, 2022	45cm	60cm BS	**0 to 20cm BS**: compact medium brown and dark brown silt and organics (screened); **20 to 60 cm BS:** compact grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 60 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 72.
ST 51	April 14, 2022	50cm	50cm BS	**0 to 20cm BS**: compact medium brown and dark brown silt and organics (screened); **20 to 50 cm BS:** compact grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 50 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 52	April 13, 2022	45cm	60cm BS	**0 to 30cm BS**: compact dark brown/black silt and organics (screened); **30 to 60 cm BS:** compact grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in residential yard about 50 m south of existing new road ROW preload section. Recent refuse encountered. **No pre-contact period cultural deposits.**	Figures 15, 73
ST 53	April 20, 2022	45cm	60cm BS	**0 to 40cm BS**: compact dark brown silt and organics (screened); 4**0 to 60 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 74.
ST 54	April20, 2022	45cm	60cm BS	**0 to 40cm BS**: compact dark brown silt and organics (screened); 4**0 to 60 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 55	April 20, 2022	45cm	60cm BS	**0 to 40cm BS**: compact dark brown silt and organics (screened); 4**0 to 60 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 56	April 20, 2022	45cm	50cm BS	**0 to 40cm BS**: compact dark brown silt and organics (screened); 4**0 to 50 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 57	April 20, 2022	45cm	70cm BS	**0 to 50cm BS**: compact black/dark brown silt and organics (screened); 4**0 to 70 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 75.
ST 58	April 20, 2022	40cm	70cm BS	**0 to 50cm BS**: compact black/dark brown silt and organics (screened); 4**0 to 70 cm BS:** compact medium grey-brown silt and clay mix (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15. No photo of completed shovel test.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 59	April 20, 2022	45cm	50cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 76
ST 60	April 20, 2022	45cm	50cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 77
ST 61	April20, 2022	45cm	50cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 62	April 20, 2022	45cm	50cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 78.
ST 63	April 20, 2022	45cm	50cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 64	April 20, 2022	45cm	85cm BS	**0 to 85cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 79
ST 65	April 20, 2022	50cm	45cm BS	**0 to 45cm BS**: compact dark brown/black silt and organics (screened); Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 66	April 20, 2022	45cm	80cm BS	**0 to 40cm BS**: compact medium brown/black silt with pebbles, cobbles and organics (screened); **40 to 70cm BS**: compact dark brown-medium brown silty sand (screened); **70 to 80cm BS**: compact brown cedar wood chips and sawdust.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 15, 80
ST 67	April 20, 2022	45cm	75cm BS	**0 to 50cm BS**: compact dark brown/black silt and organics (screened); **50 to 70cm BS**: medium-brown/dark brown silty sand (screened). Bottom of test filled with water during and after being dug.	Placed in area immediately south of existing new road ROW preload section and north of residential yard. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figure 15; No photo of completed shovel test.
ST 68	April20, 2022	45cm	70cm BS	**0 to 5cm BS**: loose brown wood chips and branches (screened); **5 to 30cm BS:** loose light brown and medium brown sandy silt (screened); **30 to 65cm BS:** compact medium brown/dark brown sandy silt with some cobbles (screened); **65 to 70cm BS:** compact dark brown/grey sand (screened).	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 81.
ST 69	April 20, 2022	45cm	65cm BS	**0 to 25cm BS:** compact dark brown/ grey sandy silt with organics (screened); **25 to 60cm BS:** compact dark brown/grey silty sand (screened); **60 to 65cm BS:** compact dark brown/grey fluvial sand (screened). Bottom of test filled with water while being dug.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 82
ST 70	April 20, 2022	45cm	80cm BS	**0 to 25cm BS:** compact dark brown/ grey sandy silt with organics (screened); **25 to 60cm BS:** compact dark brown/grey silty sand (screened); **60 to 80cm BS:** compact dark brown/grey fluvial sand (screened). Bottom of test filled with water while being dug.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 83.
ST 71	April 20, 2022	45cm	70cm BS	**0 to 25cm BS:** compact dark brown/ grey sandy silt with organics (screened); **25 to 60cm BS:** compact dark brown/grey silty sand (screened); **60 to 80cm BS:** compact dark brown/grey fluvial sand (screened). Bottom of test filled with water while being dug.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 84

Continued…

CEDAR DRIVE UPGRADE 2022 SHOVEL TEST DESCRIPTIONS LOG (Continued).

Shovel Test Number	Excavation Date	Shovel Test Diameter	Terminal Depth (cm BS)	Stratigraphic Unit Descriptions	Comments	Photo/Figure
ST 72	April 20, 2022	45cm	75cm BS	**0 to 30cm BS**: compact medium brown sandy silt with organics (screened); **30 to 65cm BS**: compact medium brown/grey silty sand (screened); **65 to 75cm BS**: compact grey fluvial sand. Bottom of test filled with water while being dug.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 85.
ST 73	April 20, 2022	45cm	75cm BS	**0 to 20cm BS**: compact medium brown sandy silt with organics (screened); **20 to 40cm BS:** compact medium brown silt (screened); **40 to 50cm BS**: compact grey coarse fluvial sand (screened); **50 to 75cm BS**: dark brown fluvial silty sand.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 86.
ST 74	April20, 2022	45cm	40cm BS	**0 to 20cm BS**: compact medium brown/grey silty sand with organics (screened); **20 to 40cm BS:** compact medium brown/dark brown silt (screened). Large tree root encountered and excavation halted.	Placed in area between existing road and new road ROW preload section near NE end of project ROW. Recent refuse encountered at several depths. **No pre-contact period cultural deposits.**	Figures 25, 87.

APPENDIX II. Post-Excavation Photos of Shovel Tests Placed in Selected Sections of the Cedar Drive Upgrade Impact Zone ROW.

Figure 34. ST 1.

Figure 35. ST 2.

Figure 36. ST 3.

Figure 37. ST 4.

Figure 38. ST 5.

Figure 39. ST 6.

Figure 40. ST 7.

Figure 41. ST 8.

Figure 42. ST 9.

Figure 43. ST 10.

Figure 44. ST 11.

Figure 45. ST 12.

Figure 46. ST 13.

Figure 47. ST 14.

Figure 48. ST 15.

Figure 49. ST 16.

Figure 50. ST 17.

Figure 51. ST 18.

Figure 52. ST 19.

Figure 53. ST 20.

Figure 54. ST 21.

Figure 55. ST 22.

Figure 56. ST 23.

Figure 57. ST 24.

Figure 58. ST 25.

Figure 59. ST 27.

Figure 60. ST 29.

Figure 61. ST 31.

Figure 62. ST 33.

Figure 63. ST 34.

Figure 64. ST 36.

Figure 65. ST 37.

Figure 66. ST 39.

Figure 67. ST 41.

Figure 68. ST 42.

Figure 69. ST 44.

Figure 70. ST 46.

Figure 71. ST 48.

Figure 72. ST 50.

Figure 73. ST 52.

Figure 74. ST 53.

Figure 75. ST 57.

Figure 76. ST 59.

Figure 77. ST 60.

Figure 78. ST 62.

Figure 79. ST 64.

Figure 80. ST 66.

Figure 81. ST 68.

Figure 82. ST 69.

Figure 83. ST 70.

Figure 84. ST 71.

Figure 85. ST 72.

Figure 86. ST 73.

Figure 87. ST 74.

APPENDIX III.

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
Machine Test 1	10U; 0531113E; 5454400N	2.5m NS x 4m EW x 3.5m BS	April 13, 2022	**0 to 2.0m BS**: Hard grey mix of clay, silt, gravel and recent construction refuse (imported fill); **2.0m to 3.2m**: loose brown/black/orange peat/organics and sawdust mix (some disturbance), this organic layer was hand-raked and closely inspected; **3.2m to 3.5m**: firm grey marine/late glacial clay.	Area once reportedly occupied by a barn in early 1900s; within previous road ROW**; No Pre-Contact period archaeological deposits.**	Figures 11, 14, 20, 88.
MT 2	10U; 0519966E; 5459561N	2.5m NS x 4.0m EW x 3.5 m BS	April 13, 2022	**0 to 1.75m BS:** Hard grey mix of clay, silt, gravel and recent construction refuse (imported fill); **1.75 to 3.0m**: loose brown/black/orange mix of peat and sawdust (some disturbance), this organic layer was hand-raked and closely inspected; **3.0 to 3.5m BS**: compact grey marine/late glacial clay.	Area once reportedly occupied by a barn in early 1900s; within previous road ROW; **No Pre-Contact period archaeological deposits.**	Figures 11, 14, 20, 89.
MT 3	10U; 0519986E; 5459556N	2.5m NS x 4.25m EW x 3.5m BS	April 13, 2022	**0 to 2.0m BS:** Hard grey mix of clay, silt, gravel and recent construction refuse (imported fill); **2.0 to 3.25m**: loose brown/black/orange mix of peat and some sawdust (some disturbance; this organic layer was hand-raked and closely inspected.); **3.25 to 3.5m BS**: compact grey marine/late glacial clay.	Area once reportedly occupied by a barn in early 1900s; within previous road ROW**; No Pre-Contact period archaeological deposits.**	Figures 11, 14, 20, 90.
MT 4	10U; 0520198E; 5459713N	3.0m NS x 2.0m EW x 2.25 m BS	April 14, 2022	**0 to 50cm BS**: Compact grey mix of silt, sand, gravel, cobbles (imported fill); **50 to 90cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **90 to 150cm BS**: loose orange brown sand with some silt that was hand raked and closely inspected; **150 to 225cm BS**: hard grey marine/late glacial clay.	Test placed on north side of the southwest end of new road ROW preload area within proposed drainage channel impact zone; **No Pre-Contact period archaeological deposits.**	Figures 24, 91.
MT 5	10U; 0520209E; 5459736N	2.5m NS x 1.75m EW x 1.70 m BS	April 14, 2022	**0 to 60cm BS**: Compact grey mix of silt, sand, gravel, cobbles (imported fill); **60 to 110cm BS**: brown/black/orange peat zone with some brown silt that was hand-raked and closely inspected; **110 to 170cm BS**: hard grey marine/late glacial clay.	Test placed on north side of the southwest end of new road ROW preload area within proposed drainage channel impact zone; **No Pre-Contact period archaeological deposits.**	Figures 24, 92.

Continued…

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG (Continued).

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
MT 6	10U; 0520224E; 5459750N	2.5m NS x 2.0m EW x 2.0m BS	April 14, 2022	**0 to 60cm BS**: Compact grey mix of silt, sand, gravel, cobbles (imported fill with concrete slabs); **60 to 130cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **130 to 180cm BS**: loose orange-brown sand and silt mix that was hand -raked and closely inspected; **180 to 200cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the SW end of new road ROW preload area within proposed channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 93.
MT 7	10U; 0520231E; 5459771N	2.5m NS x 1.75m EW x 2.3m BS	April 14, 2022	**0 to 40cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **40 to 120cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **120 to 180cm BS**: loose orange-brown sand and silt mix that was hand -raked and closely inspected; **180 to 230cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the SW end of new road ROW preload area within proposed drainage channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 94.
MT 8	10U; 0520245E; 5459792N	2.5m NS x 1.75m EW x 2.0m BS	April 14, 2022	**0 to 40cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **40 to 120cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **120 to 180cm BS**: loose orange-brown sand and silt mix that was hand -raked and closely inspected; **180 to 200cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the SW end of new road ROW preload area within proposed channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 95.
MT 9	10U; 0520261E; 5459809N	2.0m NS x 1.75m EW x 2.0m BS	April 14, 2022	**0 to 30cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **30 to 90cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **90 to 160cm BS**: loose grey-brown sand and silt mix that was hand -raked and closely inspected; **160 to 200cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the SW end of new road ROW preload area within proposed channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 96.
MT 10	10U; 0520275E; 5459828N	2.0m NS x 1.75m EW x 1.9m BS	April 14, 2022	**0 to 30cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **30 to 120cm BS**: brown/black peat zone that was hand-raked and closely inspected; **120 to 150cm BS**: loose grey-brown sand and silt mix that was hand -raked and closely inspected; **150 to 190cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the SW end of new road ROW preload area within proposed channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 97.
MT 11	10U; 0520291E; 5459846N	2.0m NS x 1.75m EW x 1.8m BS	April 14, 2022	**0 to 40cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **40 to 120cm BS**: brown/black peat zone that was hand-raked and closely inspected; **120 to 160cm BS**: loose orange-brown sand and silt mix that was hand -raked and closely inspected; **160 to 180cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the new road ROW preload area within proposed channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 98.

Continued…

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG (Continued).

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
MT 12	10U; 0520298E; 5459865N	2.0m NS x 1.5m EW x 2.4m BS	April 19, 2022	**0 to 50cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill) with some recent refuse included; **50 to 65cm BS**: loose grey sand and gravel (imported fill); **65 to 160cm BS**: brown/black/orange peat zone with some silt and sand from 150 to 160cm BS that was hand-raked and closely inspected; **160 to 240cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the new road ROW preload area within proposed drainage channel impact zone**; No Pre-Contact period archaeological deposits.**	Figures 24, 99.
MT 13	10U; 0520314E; 5459890N	2.5m NS x 1.75m EW x 2.5m BS	April 19, 2022	**0 to 40cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill) with some recent refuse included; **40 to 70cm BS**: loose grey sand and gravel (imported fill); **70 to 160cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **160 to 200cm BS**: moderately compact fluvial grey-brown sand and silt mix with some clay that was hand-raked and closely inspected; **200 to 250 cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the new road ROW preload area within proposed drainage channel impact zone**; No Pre-Contact period archaeological deposits encountered.**	Figures 24, 100.
MT 14	10U; 0520325E; 5459904N	2.5m NS x 1.7m EW x 2.5m BS	April 19, 2022	**0 to 30cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **30 to 80cm BS**: compact dark brown sand and gravel (imported fill); **80 to 170cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **170 to 220cm BS**: compact grey-brown fluvial sand and silt mix with some clay that was hand-raked and closely inspected; **220 to 250 cm BS**: hard grey marine/late glacial clay.	Test placed on N side of the NE aspect of the new road ROW preload area within proposed drainage channel impact zone**; No Pre-Contact period archaeological deposits encountered.**	Figures 24, 101.
MT 15	10U; 0520353E; 5459940N	2.5m NS x 1.75m EW x 1.8m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 70 cm thick. 0 to 60cm BS**: Compact grey/brown mix of silt, sand, gravel, cobbles (imported fill) with asphalt chunks included; 6**0 to 110cm BS**: brown/black/orange peat zone with random sticks and a tree trunk, sediment was hand-raked and closely inspected; **110 to 160cm BS**: compact brown fluvial sand and silt mix that was hand-raked and closely inspected; **160 to 180 cm BS**: hard grey marine/late glacial clay.	Test placed on the NE aspect new road ROW preload area within new road ROW impact zone**; No Pre-Contact period archaeological deposits encountered.**	Figures 25, 102.
MT 16	10U; 0520374E; 5459960N	2.0m NS x 1.75m EW x 1.7m BS	April 20, 2022	**Measurements taken from below recently deposited road fill preload, which was 130 cm thick. 0 to 40cm BS**: Moderately compact grey/brown mix of silt, sand, gravel, cobbles (imported fill); **40 to 110cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **110 to 150cm BS**: compact brown fluvial sand and silt mix that was hand-raked and closely inspected; **150 to 170 cm BS**: hard grey marine/late glacial clay.	Test placed on the NE aspect new road ROW preload area within new road ROW impact zone**; No Pre-Contact period archaeological deposits encountered.**	Figures 25 103.

Continued…

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG (Continued).

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
MT 17	10U; 0520376E; 5459966N	2.0m NS x 1.75m EW x 2.0m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 140 cm thick. 0 to 30cm BS**: loose grey/brown mix of silt, sand, gravel, cobbles (imported fill); **30 to 120cm BS**: brown/black/orange peat zone that was hand-raked and closely inspected; **120 to 170cm BS**: compact medium brown fluvial sand and silt mix that was hand-raked and closely inspected; **170 to 200 cm BS**: hard grey marine/late glacial clay.	Test placed on the NE aspect new road ROW preload area within new road ROW impact zone**; No Pre-Contact period archaeological deposits**	Figures 25, 104.
MT 18	10U; 0520382E; 5459986N	2.0m NS x 1.75m EW x 2.0m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 130 cm thick. 0 to 70cm BS**: loose dark brown mix of silt, sandy silt (imported fill); **70 to 130cm BS**: brown/black/orange peat zone with random sticks and branches that was hand-raked and closely inspected; **130 to 160cm BS**: compact medium brown fluvial sand and silt mix that was hand-raked and closely inspected; **160 to 200 cm BS**: hard grey marine/late glacial clay.	Test placed on the NE aspect new road ROW preload area within new road ROW impact zone**; No Pre-Contact period archaeological deposits**	Figures 25, 105.
MT 19	10U; 0520408E; 5460022N	2.0m NS x 2.0m EW x 2.0m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 70 cm thick. 0 to 30cm BS**: loose dark brown mix of silt, sandy silt (imported fill); **30 to 110cm BS**: brown/black/orange peat zone with random sticks and branches and tree roots that was hand-raked and closely inspected; **110 to 160cm BS**: loose medium grey- brown fluvial sand and silt mix that was hand-raked and closely inspected; **160 to 200 cm BS**: hard grey marine/late glacial clay.	Test placed on the north edge of the very NE aspect new road ROW preload area**; No Pre-Contact period archaeological deposits encountered.**	Figures 25, 106.
MT 20	10U; 0520421E; 5460035N	2.0m NS x 2.0m EW x 1.6m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 150 cm thick. 0 to 40cm BS**: loose grey brown mix of silt, sandy silt (imported fill); **40 to 100cm BS**: brown/black/orange peat zone with random sticks and branches and tree roots that was hand-raked and closely inspected; **100 to 140cm BS**: firm brown fluvial sand and silt mix that was hand-raked and closely inspected; **140 to 160 cm BS**: hard grey marine/late glacial clay.	Test placed on the north edge of the very NE aspect new road ROW preload area**; No Pre-Contact period archaeological deposits encountered.**	Figures 25, 107.
MT 21	10U; 0520437E; 5460046N	2.0m NS x 2.0m EW x 1.6m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 150 cm thick. 0 to 30cm BS**: loose grey brown mix of silt, sandy silt (imported fill); **30 to 60cm BS**: compact medium brown sandy silt (imported fill); **60 to 90cm BS**: loose orange grey fluvial sand that was hand-raked and closely inspected; **90 to 140cm BS**: brown/black/orange peat that was hand-raked and closely inspected; **140 to 160 cm BS**: hard grey marine/late glacial clay.	Test placed on the north edge of the very NE aspect new road ROW preload area**; No Pre-Contact period archaeological deposits encountered.**	Figures 25, 108.

Continued…

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG (Continued).

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
MT 22	10U; 0520473N; 5460059E	2.0m NS x 1.75m EW x 2.0m BS	April 19, 2022	**Measurements taken from below recently deposited road fill preload, which was 150 cm thick. 0 to 60cm BS**: compact medium brown sandy silt (imported or locally displaced fill); **60 to 100cm BS**: compact medium brown fluvial sandy silt with some pea gravel and small pebbles that was hand-raked and closely inspected; **100 to 200cm BS**: brown/black/orange peat with occasional stick and small branch that was hand-raked and closely inspected; **200 to 240cm BS:** loose brown fluvial sandy silt that was hand-raked and closely inspected; **240 to 260 cm BS**: hard grey marine/late glacial clay.	Test placed on the north edge of the very NE end of new road ROW preload area**; No pre-contact period archaeological deposits encountered.**	Figures 25, 109.
MT 23	10U; 0520132E; 5459601N	2.0m NS x 1.25m EW x 1.8m BS	May 13, 2022	**0 to 50cm BS**: moderately loose yellow-grey sand (imported fill); **50 to 60 cm BS:** moderately loose organic silts and sand (hand-raked and closely inspected); **60 to 120cm BS**: loose orange brown sawdust fill; **120 to 160cm BS**: moderately loose brown-black silty sand with some organics (hand-raked and closely inspected); **160 to 180cm BS**: compact grey marine/late glacial clay.	Test placed south of the existing preloaded road ROW in center of ROW within pasture/yard; **No pre-contact period deposits.**	Figures 15, 22, 110.
MT 24	10U; 0520122E; 5459590N	2.0m NS x 1.25m EW x 1.7m BS	May 13, 2022	**0 to 40cm BS**: moderately loose yellow-grey sand and gravel (imported fill); **40 to 120 cm BS:** loose orange brown sawdust fill; **120 to 160cm BS**: moderately loose orange-brown silty sand (hand-raked and closely inspected); **160 to 170cm BS**: compact grey marine/late glacial clay.	Test placed south of the existing preloaded road ROW in center of ROW within pasture/yard; **No pre-contact period deposits.**	Figures 15, 22, 111.
MT 25	10U; 0520067E; 5459552N	2.0m NS x 1.25m EW x 2.0m BS	May 13, 2022	**0 to 190cm BS**: moderately loose grey sand, gravel, cobbles (imported fill); **190 to 200cm BS**: compact grey marine/late glacial clay. No sediments were suitable for close inspection; all imported fill on top of sterile clay.	Test placed in center of road ROW about 15 m east of the pump house preload pile; **No pre-contact period deposits.**	Figures 15, 16, 23, 112.
MT 26	10U; 0520058E; 5459550N	2.5m NS x 1.25m EW x 2.8m BS	May 13, 2022	**0 to 270cm BS**: moderately loose grey sand, gravel, cobbles and boulders (imported fill); **270 to 280cm BS**: compact grey marine/late glacial clay. No sediments were suitable for close inspection; all imported fill on top of sterile clay.	Test placed in center of road ROW about 8 m east of the pump house preload pile; **No pre-contact period deposits.**	Figures15, 16, 23, 113.

Continued…

CEDAR DRIVE UPGRADE 2022 MACHINE TEST DESCRIPTION LOG (Continued).

Machine Test Number	UTM Waypoint	Dimension and Max Depth (BS)	Excavation Date	Stratigraphic Unit Descriptions	Comments	Photo/Figure
MT 27	10U; 0519423E; 5459303N	2.25m NS x 1.25m EW x 2.0m BS	May 13, 2022	**0 to 60cm BS**: moderately compact sandy silt with high organic content (hand-raked and closely inspected); 6**0 to 130 cm BS:** loose orange brown peat (hand raked and closely inspected); **130 to 160cm BS**: moderately loose orange-brown sandy silt (hand-raked and closely inspected); **160 to 200cm BS**: compact grey marine/late glacial clay.	Placed in grassy area adjacent to present public parking lot at SW end of road upgrade ROW. **No pre-contact period deposits.**	Figures 2, 5, 114.

APPENDIX IV.

PHOTOS OF MACHINE TESTS DUG IN SELECTED SECTIONS OF THE CEDAR DRIVE ROAD UPGRADE R-O-W IN 2022

Figure 88. View of Machine Test (MT) # 1 looking west. Test location is shown in Figures 11, 14 and 20.

Figure 89. View of Machine Test (MT) 2 looking west. Test location is shown in Figures 11, 14 and 20.

Figure 90. View of Machine Test (MT) 3 looking west. Test location is shown in Figures 11, 14 and 20.

Figure 91. View of Machine Test (MT) 4 looking north. Test location is shown in Figure 24.

Figure 92. View of Machine Test (MT) 5 looking north. Test location is shown in Figure 24.

Figure 93. View of Machine Test (MT) 6 looking north. Test location is shown in Figure 24.

Figure 94. View of Machine Test (MT) 7 looking north. Test location is shown in Figure 24.

Figure 95. View of Machine Test (MT) 8 looking north. Test location is shown in Figure 24.

Figure 96. View of Machine Test (MT) 9 looking north. Test location is shown in Figure 24.

Figure 97. View of Machine Test (MT) 10 looking north. Test location is shown in Figure 24.

Figure 98. View of Machine Test (MT) 11 looking north. Test location is shown in Figure 24.

Figure 99. View of Machine Test (MT) 12 looking north. Test location is shown in Figure 24.

Figure 100. View of Machine Test (MT) 13 looking north. Test location is shown in Figure 24.

Figure 101. View of Machine Test (MT) 14 looking north. Test location is shown in Figure 24.

Figure 102. View of Machine Test (MT) 15 looking north. Test location is shown in Figure 25.

Figure 103. View of Machine Test (MT) 16 looking north. Test location is shown in Figure 25.

Figure 104. View of Machine Test (MT) 17 looking north. Test location is shown in Figure 25.

Figure 105. View of Machine Test (MT) 18 looking north. Test location is shown in Figure 25.

Figure 106. View of Machine Test (MT) 19 looking north. Test location is shown in Figure 25.

Figure 107. View of Machine Test (MT) 20 looking north. Test location is shown in Figure 25.

Figure 108. View of Machine Test (MT) 21 looking north. Test location is shown in Figure 25.

Figure 109. View of Machine Test (MT) 22 looking north. Test location is shown in Figure 25.

Figure 110. View of Machine Test (MT) 23 looking north. Test location is shown in Figures 15 and 22.

Figure 111. View of Machine Test (MT) 24 looking north. Test location is shown in Figure 15 and 22.

Figure 112. View of Machine Test (MT) 25 looking north. Test location is shown in Figures 15, 16 and 23.

Figure 113. View of Machine Test (MT) 26 looking north. Test location is shown in Figures 15, 16 and 23.

Figure 114. View of Machine Test (MT) 27 looking north. Test location is shown in Figures 2 and 5.

APPENDIX V

ARCHAEOLOGICAL RESOURCE "CHANCE FIND MANAGEMENT PROTOCOL" (CFMP) FIELD MANUAL

For Land-Altering Activities to be Conducted Within Construction Impact Zones Relating to the Cedar Drive Upgrade Project in Coquitlam, B.C.

Prepared for:

City of Coquitlam
3000 Guildford Way
Coquitlam, BC
V3B 7N2

Prepared by:

ANTIQUUS ARCHAEOLOGICAL CONSULTANTS LTD.
23021 – 132 Avenue,
Maple Ridge, B.C.,
V4R 0A8

June 30, 2022

TABLE OF CONTENTS

Page

LIST OF FIGURES

KEY AGENCY AND PERSONNEL CONTACT INFORMATION

Agency or Company	Main Contact Person	Phone Number/ Email Address
***Antiquus Archaeological Consultants Ltd.**	**Mike Rousseau** (Senior Archaeologist)	(604) 467-3497 antiquus@shaw.ca
Archaeology Branch, Victoria	**Paula Thorogood** (Director of Archaeological Operations (Archaeology Branch) **Nathan Friesen** (Supervisor of Archaeological Permitting and Assessment, Archaeology Branch)	(250) 953-3334 Paula.Thorogood@gov.bc.ca (250) 953-3306 Nathan.P.Friesen@gov.bc.ca
	Ryan Blackburn (Project Officer, Archaeology Branch)	(236) 478-2545 Ryan.S.Blackburn@gov.bc.ca
Kwikwetlem First Nation	**Nicole Oakes** **Jessica Blesch** (Brown and Oakes Archaeology/ KFN Archaeologists)	(778)-886-8200 nicole@brownoakesarch.com Jessica.Blesch@kwikwetlem.com fieldwork@kwikwetlem.com
City of Coquitlam	Nadeem Kazmi (Project Manager) Mark Zaborniak (Project Manager)	(604) 927-3517 nkazmi@coquitlam.ca (604-927-3502) mzaborniak@coquitlam.ca
Gemco Construction Ltd. (General Contractor)		(604) 888-4950

***Note: Agencies/Companies presented in red should be contacted immediately following an encounter with any suspected archaeological deposits.**

1.0 INTRODUCTION

This chance find management protocol (CFMP) document manual provides a guideline to follow in case archaeological materials are uncovered on a worksite without an experienced archaeological monitor present. ***Machine operators and any personnel involved with land-altering activities that have direct visual contact with the ground during construction should become familiar with the content of this manual, and keep a copy handy when engaging in any ground disturbances.***

Archaeological materials such as lithic (stone) tools, worked fauna (animal bones), and preserved basketry are non-renewable resources that can provide valuable information about local First Nation cultural heritage. Even small disturbances to a site can destroy the context needed to properly assess how people may have lived in a specific area many hundreds or thousands of years ago. The scientific and educational information we receive from a single site can never be replicated, and is highly significant to First Nation communities, archaeologists, the BC Provincial Government, and the general public. Any development activities that include ground alterations have the potential to adversely impact archaeological materials. This could even include areas that have been significantly disturbed in the past, or areas with imported construction fill that was transported from a different archaeological site.

We appreciate your company's cooperation in ensuring that any suspected fortuitous cultural materials that may be uncovered by ground disturbances are managed and handled properly.

Figure 1. Construction in progress within an archaeological site.

2.0 FIRST NATIONS CULTURAL HERITAGE

Since the widespread colonization of British Columbia in the mid 19th century, there has been continued destruction of indigenous culture, language and traditional ways of life. Today, the protection of First Nation Cultural Heritage plays a vital and meaningful role in rebuilding First Nation identity through knowledge, education and respect.

Indigenous Cultural Heritage is a broad term that encompasses traditional knowledge and archaeological materials to form meaningful ideas about First Nation collective identity. Cultural Heritage consists of things that can be seen and studied (like the artifacts collected in archaeological studies), and intangible traditional knowledge (like oral history, songs, and dance). There are over 200 individual First Nation groups in British Columbia alone, and each has a unique cultural heritage.

By equipping companies such as yours with the resources and education to properly identify and manage chance archaeological finds in the workplace, we can continue to contribute important information towards reconstructing past indigenous cultural heritage traits and histories, and where possible, preserve valuable archaeological deposit so that they remain intact into the future. Archaeological resources are very fragile and non-renewable, and once they are disturbed, their information value is severely lessened.

Figure 2. Small carved stone bowl found during construction monitoring at a site in 2018.

3.0. GENERAL CHANCE FIND PROTOCOL PROCEDURE

It is the responsibility of the site supervisor to ensure that the procedures outlined below are done according to the standards and procedures outlined in this document. It is important for all on-site workers to be familiar with, and understand the importance of this protocol and what archaeological materials and deposits look like (see Figures 3 to 11). Prior to initiation of any land-altering construction activities, all machine operators and management personnel should participate in a formal presentation/training seminar to gain a complete understanding of the expected protocol procedure. If there are any questions regarding the content of this CFMP, please contact Antiquus Archaeological Consultants Ltd. ***If any obvious cultural/archaeological materials are encountered, or their presence is suspected, please follow the guidelines below.***

1. **STOP ALL LAND-ALTERING WORK** in the vicinity that the cultural materials were uncovered (within immediate 20 m diameter area), cease all land-alterations. This includes heavy vehicle traffic. Secure the discovery location to prevent any further disturbance.

2. **CONTACT MANAGEMENT & ARCHAEOLOGISTS.** Immediately contact the on-site construction property superintendent, and then phone the consulting archaeologists (Antiquus Archaeological Consultants Ltd.). The archaeological consultant will get in touch with relevant First Nation agencies, the Archaeology Branch, and local RCMP and Coroner if necessary. Relevant agency and personnel contact information is presented on page 3.

3. **LEAVE MATERIALS WHERE YOU FIND THEM.** If possible, record the location of cultural materials you find with GPS and take pictures. Do not remove any artifacts, surrounding sediments or previously-removed backfill. ***Do not photograph suspected Ancestral human remains*** (see Section 4.0).

Once the following steps have been completed, an archaeologist and local First Nation representatives will arrange to inspect the suspected cultural material as soon as possible to determine if an archaeological site has indeed been uncovered. ***If the suspected archaeological materials are confirmed to be archaeological, the consultant, in consultation with local First Nation community members, will determine the extent and significance of the findings. Management strategies will then be discussed and formulated by the consultant, the Archaeology Branch and local First Nation agencies.*** Management and mitigative options will then be presented to the client for consideration. ***If any observed suspected cultural materials are found to be non-archaeological by the attending archaeologist, land-altering work can then resume as normal without further delay.***

4.0 PRE-CONTACT PERIOD HUMAN ANCESTRAL REMAINS PROTOCOL

If any ancestral human remains are encountered on the worksite it is extremely important to follow proper procedures to ensure remains are treated with respect and care no matter if they are intact or not. Human bones buried for prolonged periods may vary through shades of white, tan/beige, yellow/orange, and sometimes orange in colour; most limb and appendage elements are long and straight; most bones are fairly large compared to most other common indigenous and domesticated mammals (except cows and horses); and human bones are more likely to be intact, and tightly clustered in a small area (maximum of 1.5 m in diameter). Skulls and lower jaws are, of course, very distinctive, and in most cases are easily identified by the average person.

If human remains are suspected to be recent (i.e., non-archaeological), this is no longer an archaeological concern and the RCMP and forensic experts must be called to the site.

1. **STOP ALL LAND-ALTERING WORK** within at least 50 meters of where the human remains were uncovered. If possible, stop *all* work within job site until an archaeologist has assessed the remains and discussions have been made with local First Nation agencies.

2. **REPORT TO MANAGEMENT AND ARCHAEOLOGIST.** Immediately contact the site superintendent, and phone the consulting archaeologist who will get in touch with relevant First Nation agencies, clients, the Archaeology Branch, and RCMP if necessary. Contact information is presented on page 3.

3. **DO NOT DISTURB THE REMAINS.** Do not remove or handle any of the suspected remains, surrounding sediments, or previously removed backfill. Restrict access to the find. ***Do not photograph the suspected Ancestral remains.***

Once these steps have been completed, the archaeological consultant and local First Nation representatives will visit and closely inspect the suspected ancestral remains. ***The Archaeology Branch will be notified to discuss the situation and further management and required permitting for the encounter. Formulation and implementing appropriate management strategies will depend greatly on a combination of local First Nation Ancestral Remains Policies, and the BC Archaeology Branch's Found Human Remains Policy.*** Due to the sensitivity and detailed management procedures associated with Ancestral Remains, schedule and funding extensions should be anticipated.

5.0 ARCHAEOLOGICAL AND CULTURAL HERITAGE RESOURCES IN B.C.

An archaeological site is defined by the B.C. Archaeology Branch as "…the physical evidence of how and where people lived in the past" (https://www2.gov.bc.ca). There are over 50,000 known archaeological sites in B.C., with more newly recorded every year. Many people assume these sites can only be found in the remote and untouched areas of B.C. However, cultural materials have been found almost everywhere. Sites have been frequently recorded under highways, under industrial buildings and even in the backyards of typical suburban residences, albeit in a disturbed state. Most sites are located in raised and well-drained localities near sources of water, notably along rivers and beside lakes and streams. Some sites are small, being only about 2 m in diameter, and village sites can extend for several kilometers along the Fraser River.

All archaeological sites predating 1846 are automatically protected by the **Heritage Conservation Act** (see Section 8.0). Disturbance and investigation of archaeological sites must be carried out under the appropriate Archaeology Branch and local First Nation permits. Permit applications are usually completed by archaeological consultants on behalf of their clients.

Figure 3. Significant archaeological village site deposits (dark soil) found under a deconstructed industrial building in Maple Ridge (Photo Credit: Antiquus, 2000).

6.0 TYPICAL ARCHAEOLOGICAL SITE TYPES AND CULTURAL MATERIALS IN SOUTHWEST B.C.

The following section will serve as a reference guide, briefly outlining several common types of archaeological sites and cultural materials that ***may*** be exposed during your company's land-altering activities.

(1) Isolated, scattered and clustered buried lithics and artifacts such as lithic (stone) tools, lithic waste flake scatters, found either as isolated artifact finds or as low to high density scatters of lithic tools or lithic waste flakes (the by-product of lithic tool production) may be encountered and exposed during land-altering activities. Typical lithic material types found at sites in this area includes siliceous metasediments, cherts, basalt, dacite, andesite, quartzite and other similar types of stone material.

Figure 4. Some of the more obvious artifacts that may be seen during disturbances are projectile points. Used as spears, knives, or perforators, they are an interesting find and quite recognizable. They are important tools in dating archaeological sites because projectile points changed in design throughout the years.

Figure 5. Sometimes archaeological lithics can look like gravel crush. These bipolar core fragments often look like rocks you might see on the side of the road. To the discerning eye, the specific crushing and flaking is indicative of intentional flake and tool production.

Figure 6. Complete and fragmented bone and antler harpoon points. Rare, but significant finds. Usually found beside bodies of water as they were used as fishing tools.

Figure 7. Additional examples of utilized flakes and chipped stone tools that may be encountered during ground excavations. A good indication that you are looking at a lithic or a waste flake is if you notice sharp, chipped edges, and ripples (from impact of hammer stone) along the bottom (ventral) side of the stone flake.

Figure 8. Examples of larger ground stone tools. If you notice a cobble with obvious battering on one or more sides, or evidence of grinding and rounding along the sides, this may in fact be a tool.

(2) **<u>"Wet-Site" Artifacts made from wood and bark</u>** are sometimes found in permanently waterlogged anaerobic environmental contexts along the submerged edges of rivers, streams, ponds, marshes, bogs, etc. Commonly found items include complete and fragmented basketry, wooden wedges, rope and cordage made from cedar bark (Figure 9). Remains of "in-place" wooden structural elements used in the construction of fish weirs are sometimes encountered while digging within river and creek channels. From archaeological and ethnic perspectives these highly perishable items are very valuable since organic artifacts normally decay fairly rapidly in most non-saturated archaeological sites, and these items provide detailed information about past technologies and human activities. Some surviving specimens can be thousands of years old. If you suspect that wet-site artifacts have been encountered, halt all machine activity and advise the appropriate contact persons and agencies.

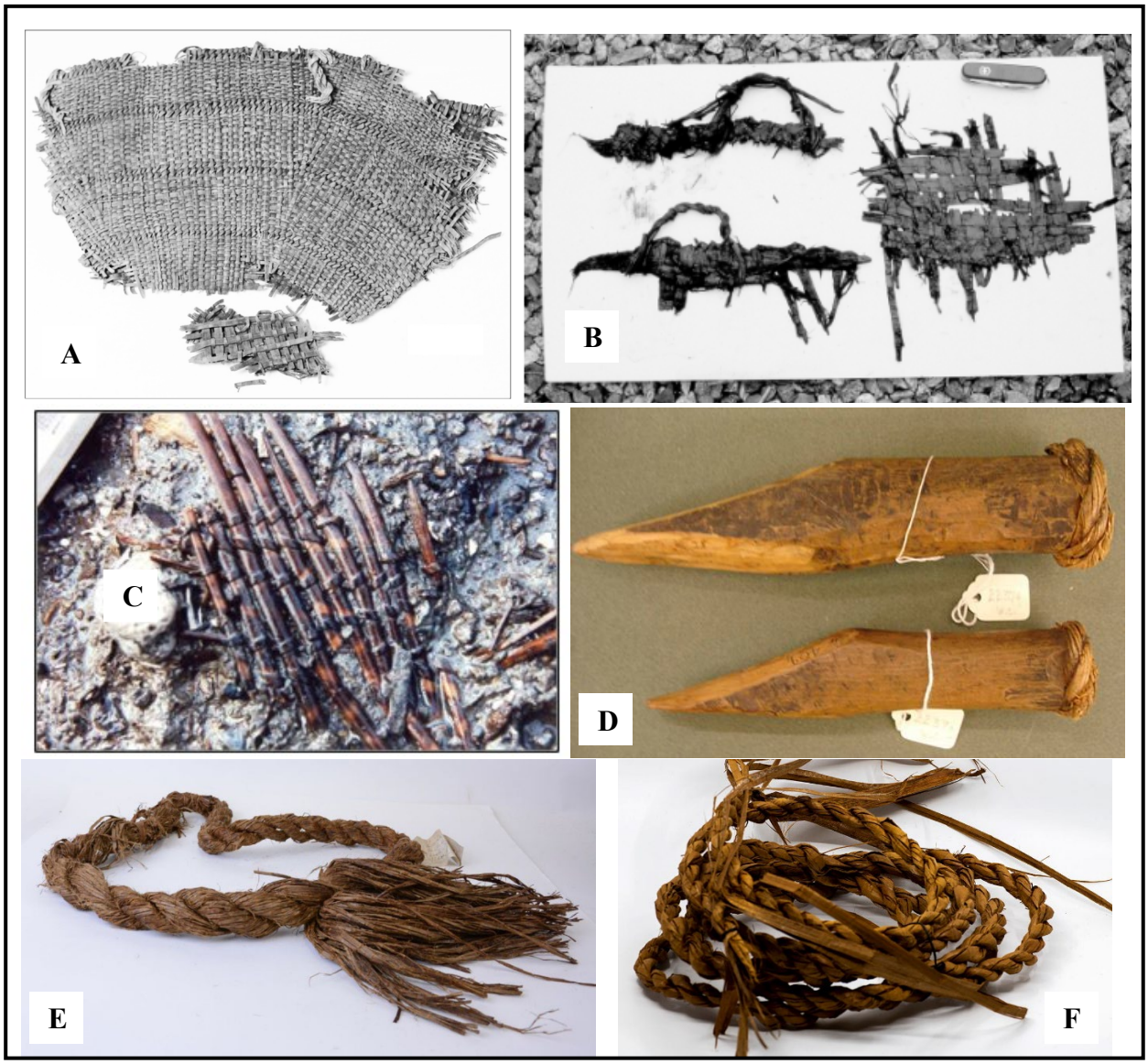

Figure 9. Examples of "wet-site" perishable artifacts found in water-logged contexts. Images A to C show portions of basketry; D shows wooden wedges with cedar cordage gromets; E and F are cedar bark rope/twine.

(3) Buried archaeological "features" (e.g., dark-stained mottled and lensed soils containing artifacts and other cultural materials, hearths and fire-pits, food storage and processing pits, dwelling foundations and floor deposits, scatters of fire-altered rock, etc.) that become exposed in the stratigraphy during the course of machine activities (Figure 10). These features are often conspicuous by their "non-natural" appearance, and association with dark-stained organic-rich soil horizons, lithic artifacts, fire-altered rock, and faunal remains (animal bones and/or mollusc shells).

Figure 10. Archaeological features such as hearths and individual house floors, are evident in the stratigraphy (Antiquus 2000).

(4) Culturally Modified Trees:

"A CMT *is a tree that has been altered by aboriginal people as a part of their traditional use of the forest. There are many kinds of CMTs in British Columbia. Examples include trees with bark removed, stumps and felled logs, trees tested for soundness, trees chopped for a pitch, etc."* – CMT Handbook, 2001

Archaeological CMTs are old-growth trees that have bark or planks stripped away. CMTs also originate from post-contact, historic sources. Dendrochronological techniques can be used to find out the exact date the bark was stripped from the tree. The tree will automatically be protected by the Heritage Conservation act if it dates to, or before, 1846.

Figure 11. Example of a CMT. (Antiquus 2020)

7.0 REPORTING

When archaeological deposits are encountered during development and an appropriate management plan has been formulated, discussed and undertaken, the consulting archaeologist is responsible for recording all related information and producing a report on the cultural materials uncovered during land-altering activities. Once completed, the consulting archaeologist will submit copies to all stakeholders and may recommend further management actions and any additional required permits.

8.0 LEGISLATION

The Heritage Conservation Act (HCA) legally protects all sites that predate 1846 on private and Crown Lands. ***As of March 2019, people are legally required to report discoveries of specified sites of objects with potential heritage value.*** Enforcement and Compliance may be called if archaeological sites are knowingly disturbed or vandalized. Additional information concerning legislation and archaeological resources is provided in the link below:

https://www.bclaws.ca/civix/document/id/complete/statreg/96187_01

It is important for all development companies attempt to read and understand this legislation if they perform any type of ground alterations within a known site or area deemed to have medium or greater archaeological site potential.

9.0 REFERENCES

Archaeology Branch (1999). Found Human Remains. On file with the Archaeology Branch, Victoria, B.C. From http://www.tca.gov.bc.ca/archaeology/policies/found_human_remains.htm

Archaeology Branch (2010). Heritage Conservation Act (RSBC 1996). On file with the Ministry of Tourism, Culture, and the Arts, Victoria, BC. From http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96187 _01 BCAPA (BC Association of Professional Archaeologists) (2010). Archaeology in British Columbia. From http://www.bcapca.bc.ca/archaeology.htm