Archaeological Testing at a Proposed Wind Farm Transmission Line near Sussex, NB

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Prepared for

Natural Forces

by

Jason Jeandron, MPhil.
Archaeological Prospectors
PO Box 393
Fredericton, NB
E3B 4Z9
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ABSTRACT

Between October 23rd and November 6th, 2018, archaeological testing took place at proposed structure locations along the transmission line for the Wocawson Wind Farm near Sussex, NB. Additionally, pedestrian surveys were undertaken to assess new locations for turbines and access roads associated with future construction activities. The excavation of test pits was undertaken to identify the presence of any artifacts, archaeological features of significance, or to determine if any potential exists for the presence of buried archaeological sites.

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INTRODUCTION

On behalf of Wocawson Energy Limited Partnership, Natural Forces commissioned the work of an archaeologist to mitigate the potential negative effects of construction activity surrounding the building of a wind farm and associated transmission line with access roads. As part of their planned construction activities associated with the proposed project, elevated terraces along with an alluvial valley floor were assessed for the presence of heritage resources and the potential for buried archaeological resources. The results from a previously reported pedestrian survey led to the excavation of test pits at selected structure locations. Newly sited turbine locations and an access road was also assessed.

PREVIOUS RESEARCH

Only one recorded archaeological site was previously registered at Archaeological Services New Brunswick within the vicinity of the proposed construction activities in the area surveyed. Site BkDh-1 lies approximately 3 km east of the proposed turbines.

The Borden system is a nation-wide, geographically based method for recording sites of archaeological value. In New Brunswick, each Borden block is 10 minutes of latitude by 10 minutes of longitude. Each of these blocks is referred to by a four-letter code, which describes the location of that particular block. Consequently, sites within each Borden block are numbered sequentially in the order in which they are reported. The Borden block that is of concern to this report is BkDh.

METHODS

The information presented in this report was gained through research of relevant documents found at Archaeological Services in Fredericton and published materials, including topographic and surficial geology maps & reports, aerial photographs, and LiDAR data. The field component included the excavation of standardised test pit (50 cm x 50 cm) with all excavated material passing through a bi-pedal screen mounted with 6 mm mesh. The excavated material was scrutinised for the presence of significant cultural material. Photographs of at least one wall and a stratigraphic profile was drawn for each test pit. The pedestrian survey involved walking the route of the proposed access road that follows an existing trail west of the transmission line, from Structure 18 to between Structures 12 and 15, as well as 4 new placements for turbines.

RESULTS

A review of early and modern aerial photographs (1945 8252/020, 8255/027, 8256/040) failed to indicate any extant cultural features of interest. The air photos and topographical mapping indicate that the assessed area of the proposed wind farm is sited across an area that has previously been forested (and to a lesser degree, farmed) and rests at an elevation of ~65-270 m asl. The wide floodplain of the Kennebecasis River was treeless in these early photographs and clearly illustrate the many abandoned channels of the stream. The nearby drainage channels, originating on the high ground where the turbines are sited, are deeply incised and were likely created by seasonal run-off, although minor amounts of water continue to drain through them. There is evidence that the area has been used for gravel extraction in the past, as identified by several pits in the near vicinity (e.g. between the turbines and the Kennebecasis River).

The surficial geology of the high ground, where the new turbine locations are proposed, is referred to as the Boss Point till (Pronk, A., Allard, S., and Boldon, R. 2005). Boss Point till consists of well-drained matrix, high in sand content (as much as 75%) with additional clay/silt. Four new locations for proposed turbines were assessed via pedestrian survey, as they were sufficiently distant enough from previously assessed locations to warrant a look. As with the turbine locations assessed earlier in the year, these new areas fail to elicit any likelihood that an archaeological site of significance will be present (see Figures 31-34).

As the elevation decreases along the transmission line, a series of terraces were noted in the initial pedestrian survey. The uppermost terrace, at ~140 m asl (see Figures 3-5) is quite level and suitable for habitation, overlooking the wide valley, particularly during the early post-glacial period, and is the proposed location for Structure 12. Due to its suitability for habitation that certainly could have attracted the ancestors of today's Wolastoqiyik, it was recommended for test excavation ahead of any construction activities. Based on the proposed plan for the erection of Structure 12, the excavation of seven standardised test pits (STPs) were scheduled at this location. The specific locations of each structure were laid out in advance (by a surveyor, using wooden stakes). The proximity of this structure was near the edge of a steep decline that ruled out the excavation of three of the STP's. However, four STPs were excavated on the more level areas which resulted in the recovery of a single stone flake, the by-product of making stone tools (see Figures 7 & 8).

After the discovery of this flake, in order to minimise the impact of an Indigenous site and additional work, NB Power decided to move the location of Structure 12 approximately 30 m north-west of the original placement. The new footprint required the excavation of 6 STPs (see Figures 26-28). All STPs excavated on this terrace had a high volume of rock (~50% of the matrix) in pebble, gravel and larger forms from the presumed shallow bedrock (both coarse conglomerate and tabular sandstone). While there was little expectation of high volumes of post-glacial material deposited at this elevation, to consider the potential movement of artifacts downwards from bio/cryo-turbation, STP's were generally excavated to ~50 cm deep below surface (dbs). No other artifacts were recovered at this location.

From structure locations 15-18, this approximately 550 m long section of the transmission line (from the edge of the modern floodplain to near the sharp rise in elevation to the south) is described as glaciofluvial outwash (deltaic, mainly sand and gravel)(Seaman, A., 1986). A pair of test pits were excavated at each of these four locations, to cover off the single 7 x 1 m trench to be excavated for each structure. The STPs at Structure 15 were excavated to 48 cm and 60 cm deep with a high water table. A compact, rocky bottom ended excavation without any artifacts recovered (see Figures 9 & 10). Structure 16's test pits ended just before 50 cm dbs with a primary matrix of silty-sand and ~30% gravel and pebbles. A high water table was also encountered here and the test pits were ended at a presumed till of compact base with a sharp increase in rock content (see Figures 11 & 12). At Structure 17, a nearby stream channel had a reasonable amount of running water in it (but may be seasonal drainage, now) and was less than 10 m away from the test pits. These STPs were excavated to ~1 m deep and failed to reached archaeological bottom. The entire column was comprised of sand (fluvially derived) with almost no rock content (see Figures 13 & 14). While the nearby stream channel is of a reasonable size, it seems unlikely to have produced this much alluvium; it's possible that this is an ancestral beach. At Structure 18, till was encountered below ~40 cm dbs (see Figures 16 & 17). One very notable and obvious feature near Structure 18 is the ancient river terrace pictured in Figure 15.

The more recent Kennebecasis River valley is over 400 m wide (along the transmission line route) and is clearly visible in the LiDAR data and surficial geology map (see Figures 4 & 5). In the early historic aerial photos, satellite imagery and the LiDAR data, the abandoned channels of the former location of the Kennebecasis River are visible. Portions of this modern valley are described as ancient alluvium (sand and gravel, some silt)(Seaman, A., 1986). Within this northern end, Structures 19-22 are proposed.

The stakes for Structure 19 were placed in a shallow, water-filled linear depression. While one test pit was offset ~3 m from one of the stakes, the nearest suitable place to excavated a test pit for the second location was over 5 m away and thus abandoned. The sole test pit here revealed a high content of gravel through most of the column (~50%) and ended at 50 cm in till or stream bottom (see Figures 18 & 19). Structure 20 is placed approximately 5 m south of another stream. The test pits at Structure 20 ended at ~50 cm dbs, at a very rocky bottom. The upper layers consisted of sandy-silt and sand with less than 5% gravel and pebbles (see Figures 20 & 21). At Structure 21, approximately 15 m south of the Kennebecasis River, two STP's were excavated in a former farmer's field (see Figures 21 & 22). Below what may be a plough zone, gravel content increased to ~60%. Till or stream bottom was reached between 53 and 63 cm dbs.

Immediately south of the Portage Vale Road (north of the Kennebecasis River), Structure 22 is laid out in a farmer's field. This section between the road and the nearby river is also suitable for Indigenous and early European occupation. This larger structure requires the mechanical excavation of 3 trenches (for poles and guy wires) and a total of 6 STPs (see Figures 24 & 25). These test pits ranged in depth from 51-67 cm dbs and included a discernible plough zone. A noticeable increase in the volume of rock ended the test pits. Aside from the single artifact recovered from Structure 12, no other significant artifacts or features were noted.

During this field visit, an access road of approximately 1.7 km distance was assessed (see Figures 29 & 30). This proposed access road travels predominately over glaciofluvial outwash (see Figure 5) and along the upper tread of a river terrace of the former location of the Kennebecasis River (see Figure 4). At least two streams cross the proposed access road, and are within wider valleys. These valleys may have been formed near the end of the last glaciation but the modern channels appear to run regularly and are certainly suitable to support habitation nearby.

If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.

CONCLUSIONS & RECOMMENDATIONS

Between October 23rd and November 6th, 2018, archaeological testing took place at proposed structure locations along the transmission line for the Wocawson Wind Farm near Sussex, NB. Additionally, pedestrian surveys were undertaken to assess new locations for turbines and access roads associated with future construction activities. A single artifact was recovered from the original placement of Structure 12. Subsequently, a new location was proposed for Structure 12, which failed to yield any other artifacts. Deep alluvium at Structure 17 meant that archaeological bottom was not attained in the test pit. And the proposed access road, west of the transmission line, almost entirely rests in areas of high potential for the presence of significant archaeological remains. As with the other assessed turbine locations, the latest four locations failed to elicit any archaeological potential.

Consequently, it is recommended that archaeological monitoring by a permitted archaeologist be in place for any ground disturbing activity (digging holes, grubbing, stump removal etc) around Structure 12, as the new placement is ~30 m from the recovered artifact. An archaeological monitor should also be present for the excavation of the trench for Structure 17, since the archaeological work there was incomplete. If any access issues are encountered trying to cross the erosional face of the former stream bank north of Structure 18, prior to any ground disturbing activity, consultation with a permitted archaeologist should occur. It is quite likely that some form a test pit excavation may need to precede that alteration. Similarly, the access road that runs west from Structure 18 and returns to the transmission line between Structures 12 and 15, is primarily on a landscape of elevated archaeological potential and comes in close proximity to significant features (former shorelines, streams etc), all of which are known draws for Indigenous habitation. While a dirt road (of varying quality) already exists in this location, it is expected that some modification will need to be made to accommodate the construction vehicles. Any ground disturbing activities should be discussed in advance, with a permitted archaeologist, to determine what course of action should take place (test excavation or monitoring). Any ground disturbing activity (grubbing, removing tree stumps, etc) in the areas previously identified as holding archaeological potential, should be vetted beforehand.

If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.

REFERENCES

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2005 *Surface materials of the Petitcodiac map area (NTS 21 H/14), southeastern New Brunswick.* New Brunswick Department of Natural Resources, Minerals, Policy and Planning Division. Plate 2005-18

Seaman, A.

1986 *Granular Aggregate Resources of Petitcodiac 21H/14*. Province of New Brunswick, Dept. of Natural Resources and Energy. Plate 86-222.

APPENDIX

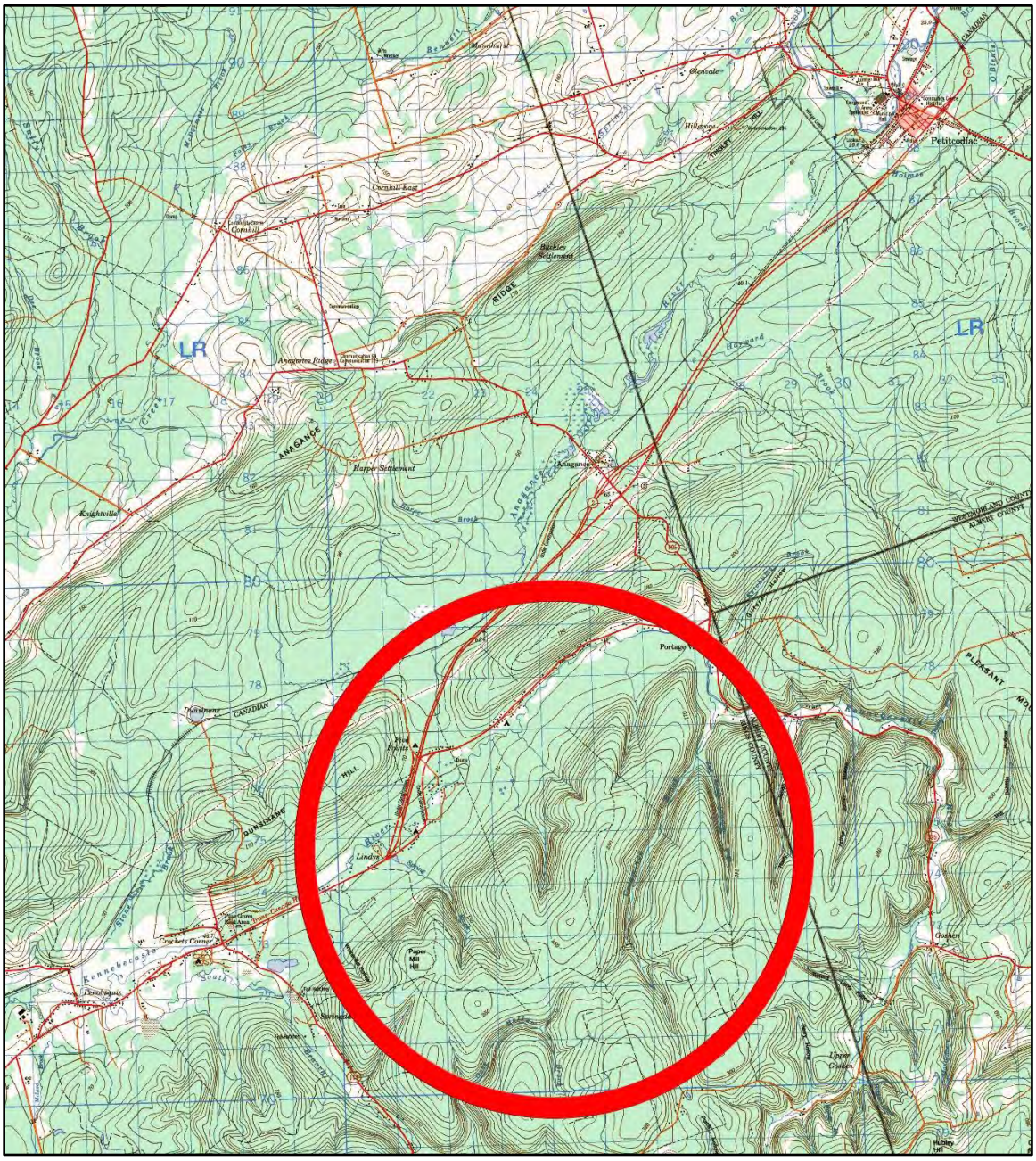

Figure 1: Approximate location of the proposed wind farm and transmission line (circled in red).

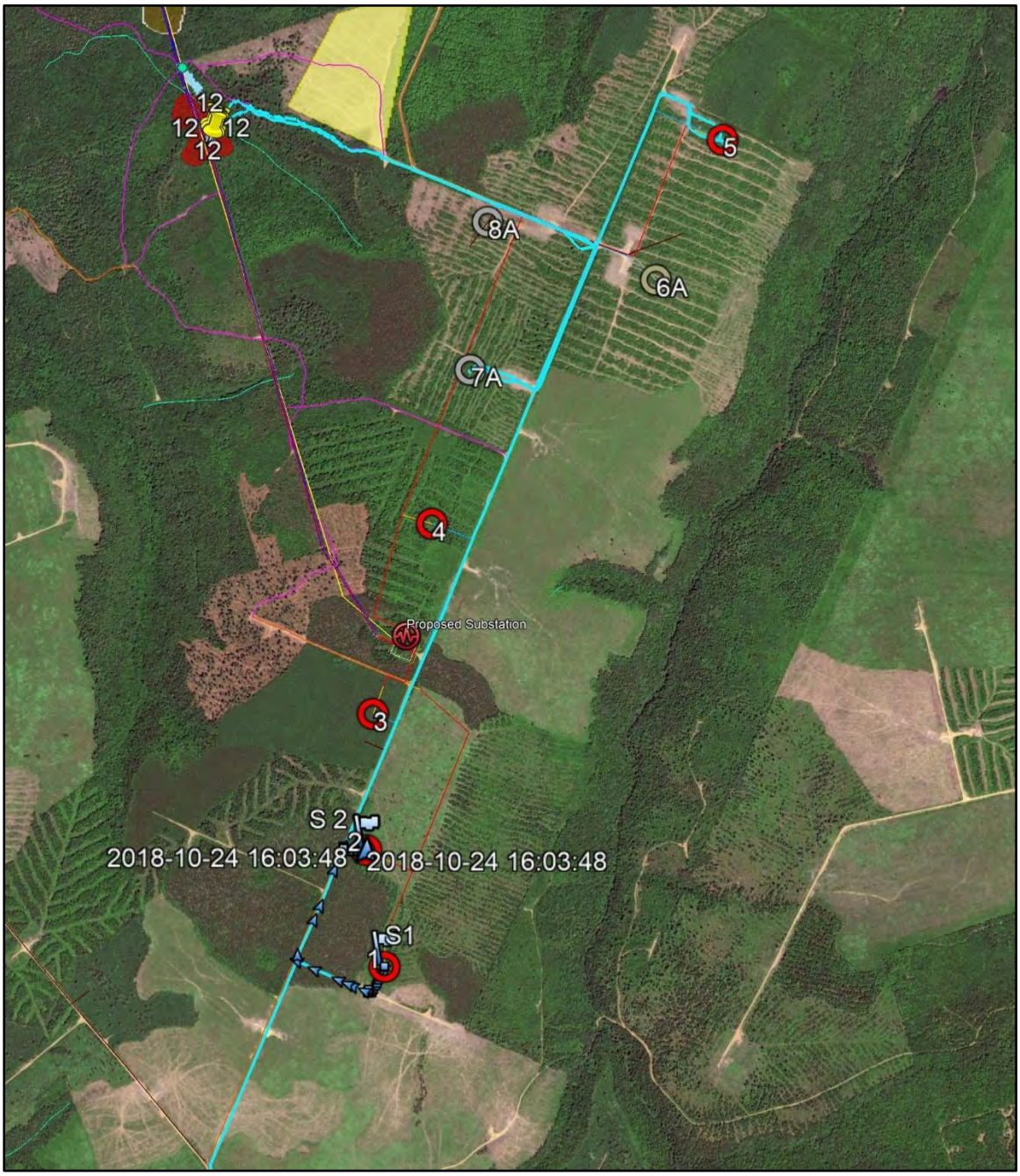

Figure 2: Updated turbine locations and track log.

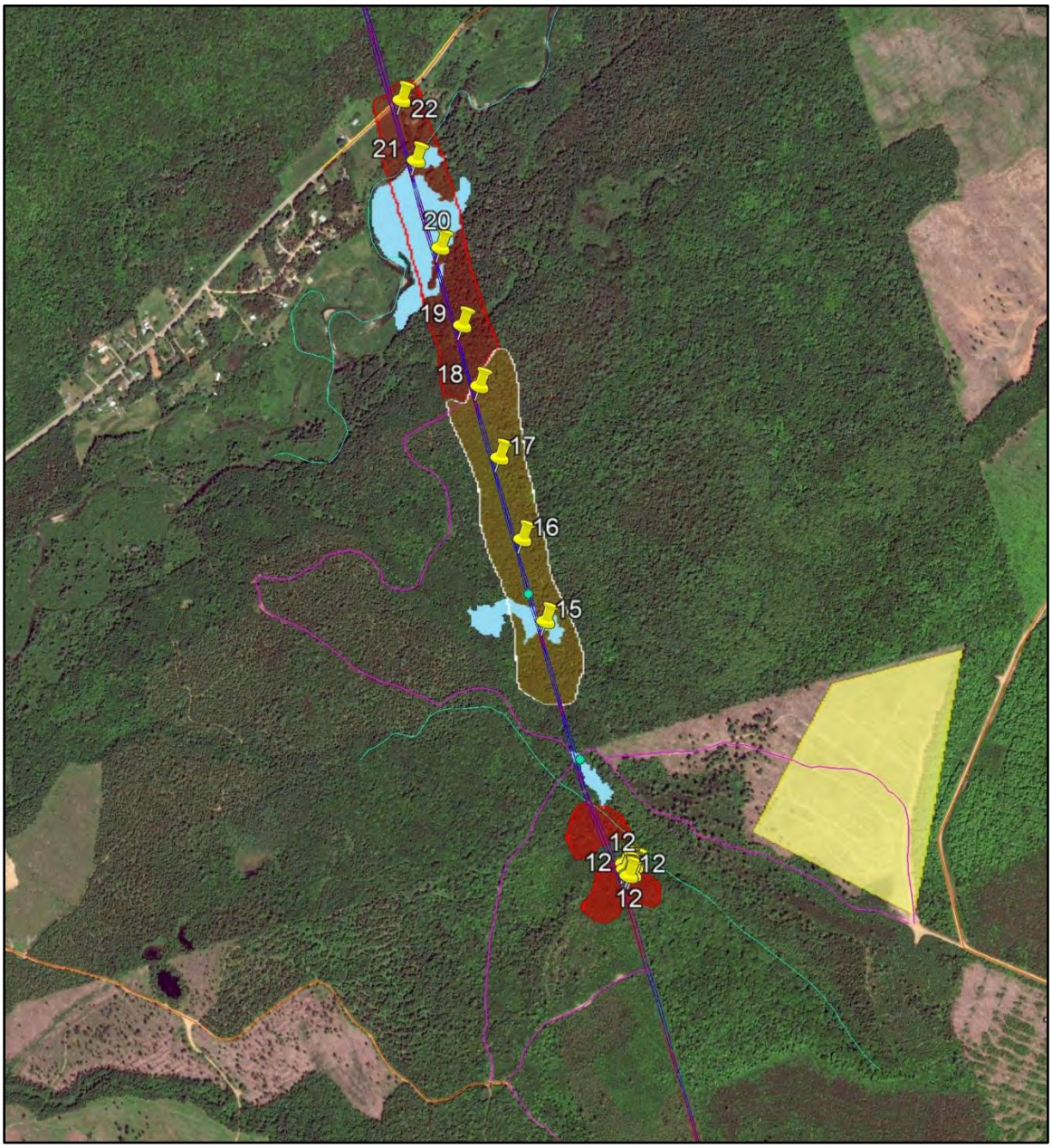

Figure 3: Structure locations along transmission line.

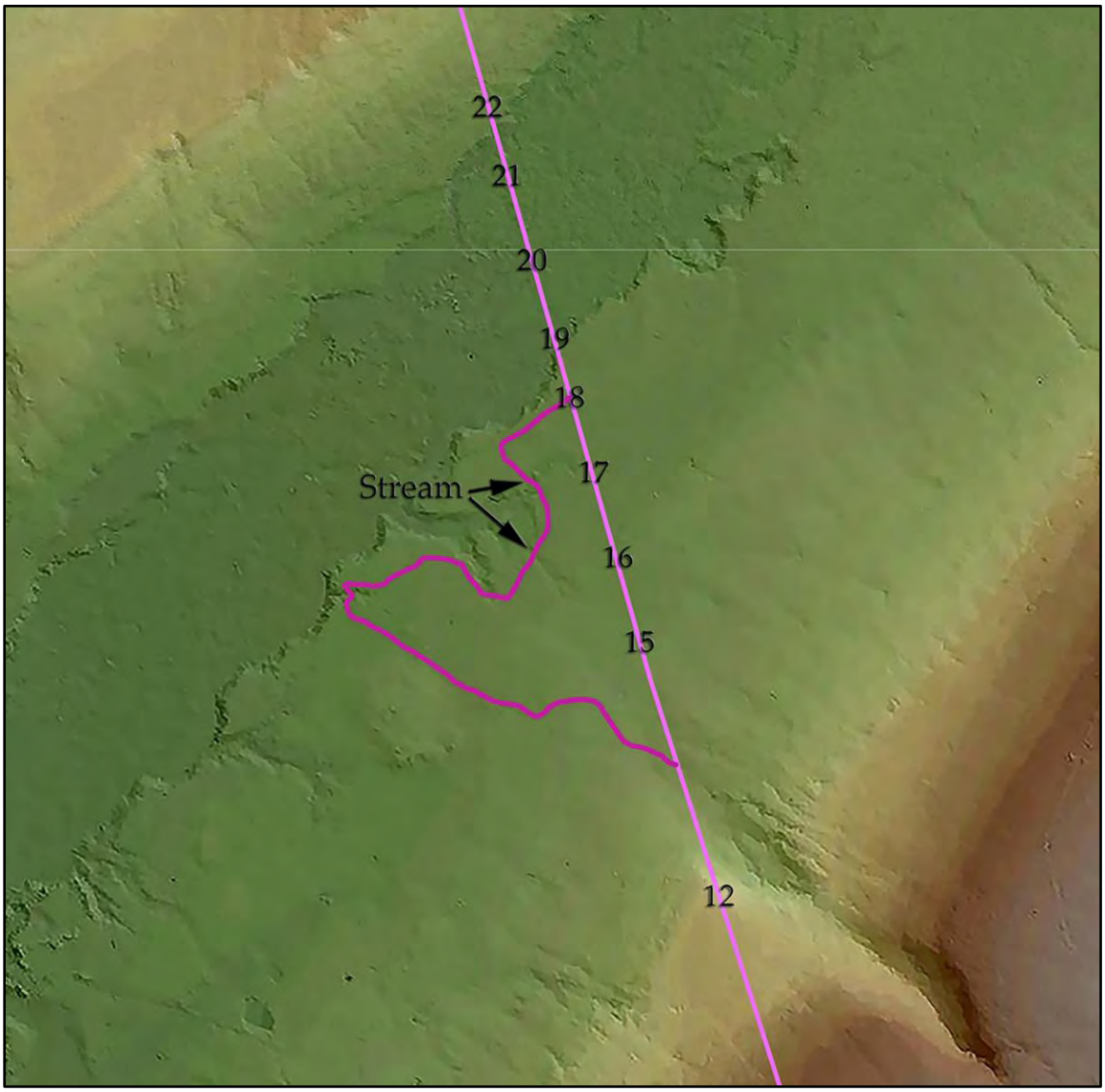

Figure 4: Approximate locations of transmission line structures and access road on LiDAR image.

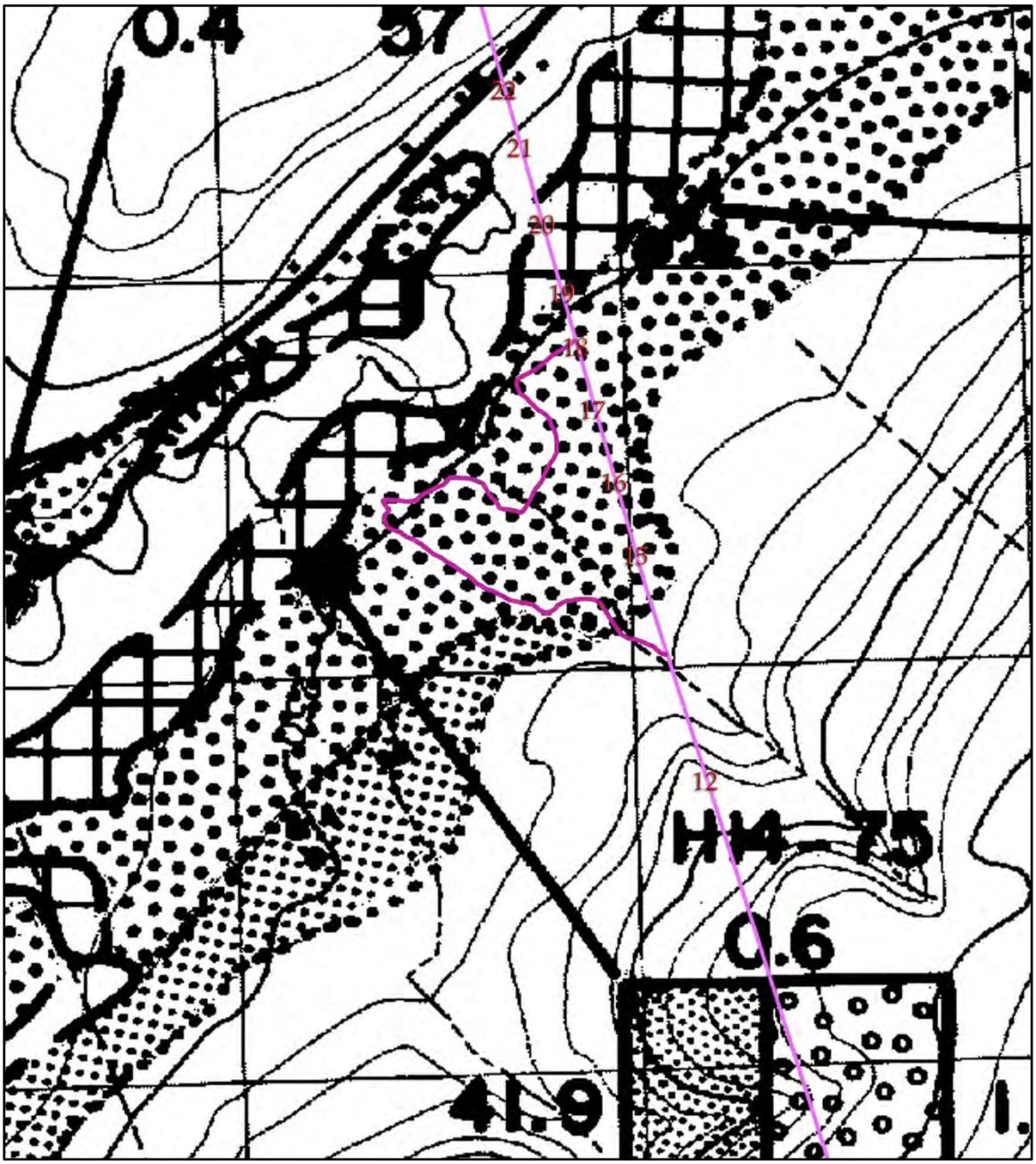

Figure 5: Transmission line with approx. structure locations on the surficial geology map (Seaman 1986).

Figure 6: Excavating a test pit at the first loc. of Structure 12 – facing south-west.

Figure 7: Test pit on east side of south guy trench. Positive for a stone flake.

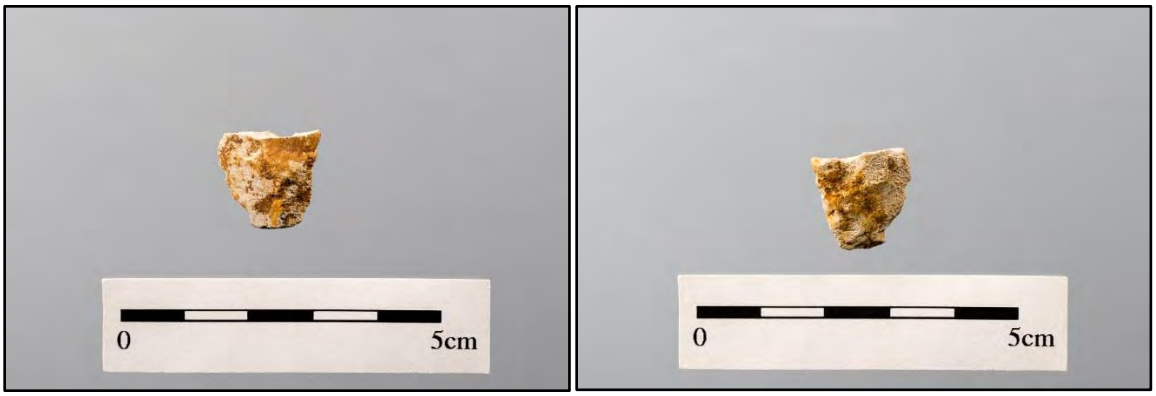

Figure 8: Both sides of flake recovered from original location of Structure 12.

Figure 9: Area at Structure 15.

Figure 10: Test pit on east side of poles trench at Structure 15.

Figure 11: Area at Structure 16.

Figure 12: Test pit on east side of poles trench at Structure 16.

Figure 13: Area at Structure 17.

Figure 14: Test pit on west side of poles trench at Structure 17.

Figure 15: Former river terrace, south of Structure 18, exposed in nearby clear cut.

Figure 16: Area at Structure 18.

Figure 17: Test pit on west side of poles trench at Structure 18.

Figure 18: Area at Structure 19.

Figure 19: Test pit on east side of poles trench at Structure 19.

Figure 20: Area at Structure 20.

Figure 21: Test pit on east side of poles trench at Structure 20.

Figure 22: Area at Structure 21.

Figure 23: Test pit on east side of poles trench at Structure 21.

Figure 24: Area at Structure 22.

Figure 25: Test pit on east side of poles trench at Structure 22.

Figure 26: Updated area at Structure 12.

Figure 27: Updated area at Structure 12.

Figure 28: Test pit on west side of south guy trench at updated area for Structure 12.

Figure 29: Proposed access road, west of Structure 18 – facing east.

Figure 30: Proposed access road at stream crossing.

Figure 31: Updated turbine location, Site 1.

Figure 32: Updated turbine location, Site 2.

Figure 33: Updated turbine location, Site 5.

Figure 34: Updated turbine location, Site 7A.

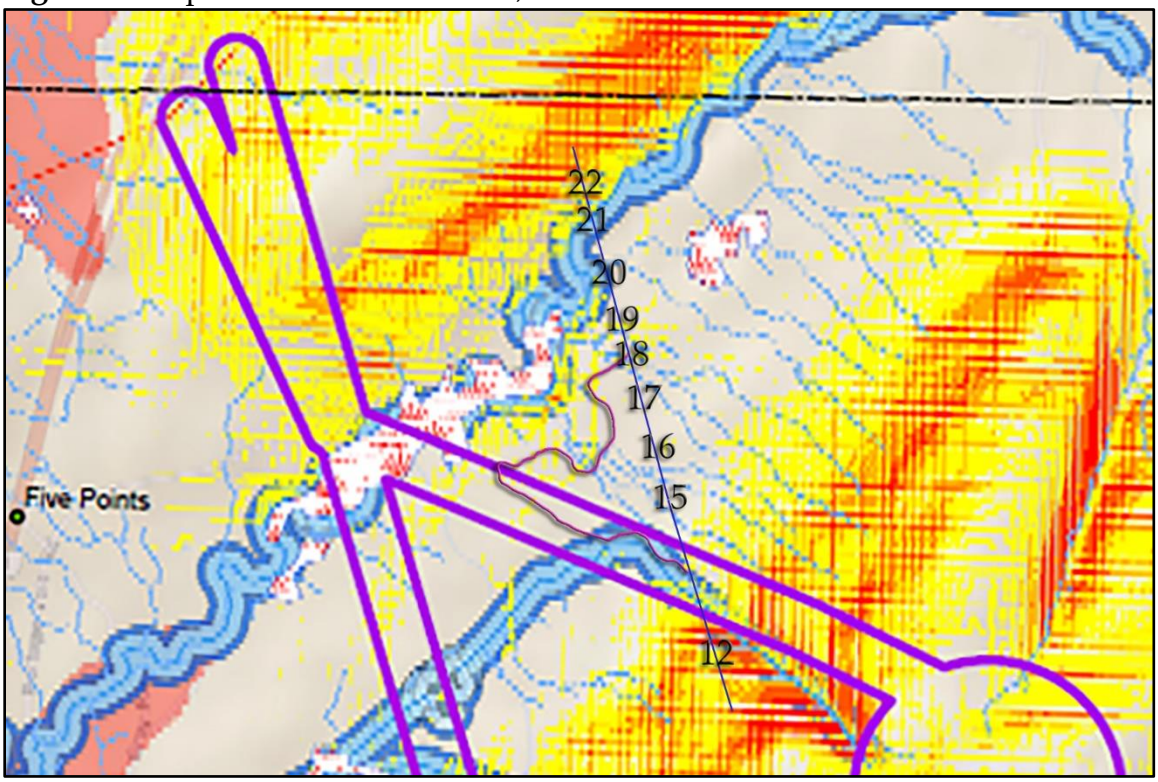

Figure 35: Transmission line, structures and assessed access road on the Province-supplied predictive model.

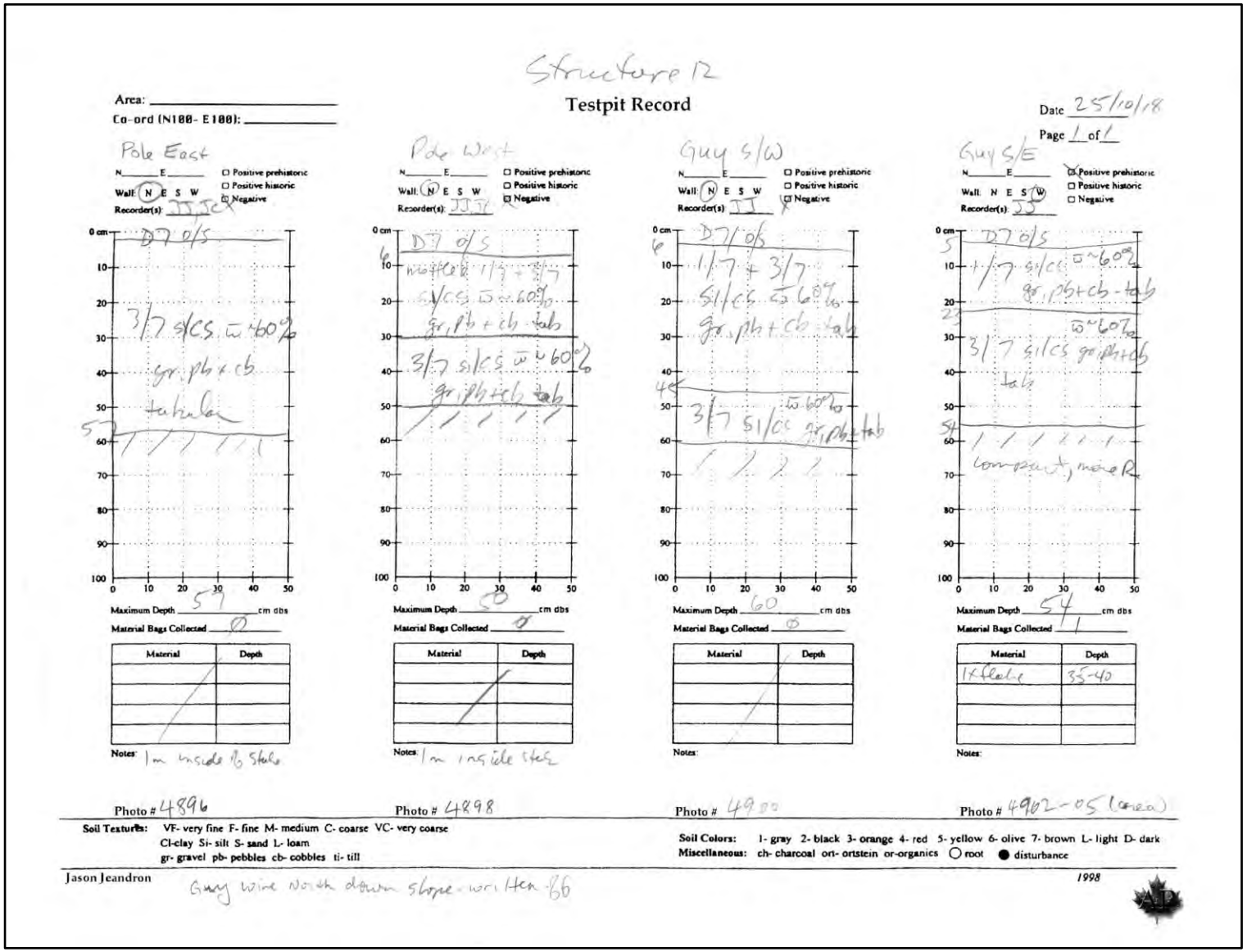

Figure 36: Example of a test pit form (from Structure 12).