

DRAWING NOTES

Attached is a drawing titled "Environmental/Geotechnical Description of Frederick Brick Works, Inc. Property" which shows Frederick Brick's property divided into areas exhibiting varying environmental and geotechnical features. The features observed in each of the areas are described below. Also presented is a discussion of remedial and construction measures that may be needed in rendering the areas suitable for mixed commercial/residential development. These findings are based on the results of subsurface investigations, analysis of the chemical and engineering properties of fill soil, and air-photo interpretation. Subsurface investigations completed to date include the excavation of 60 test pits and the completion of 28 hollow-stem auger borings and 24 air-track borings by Hillis-Carnes Engineering Associates of Frederick, Bay Environmental, and KCI. Testing work consists of the chemical analysis of 13 soil/fill samples collected by Bay Environmental and KCI and engineering characterization of fill materials by Hillis-Carnes. The drawing and this associated presentation of findings were prepared by Hydro-Terra with assistance from Hillis-Carnes in describing geotechnical features and construction practices.

AREA A-1 (Approx. 31.3 Acres, No Fill Except Along Railroad Right-of-Way)

Environmental Features: The area is agricultural and has not been disturbed by clay mining or waste disposal. No soil contamination of consequence is anticipated.

Geotechnical Features: A closed depression containing trash exists on adjoining property southwest of the area, and the depression intrudes onto Frederick Brick's property. Sinkholes appear to be present on adjoining property southeast of the area.

Remedial/Construction Measures: Environmental conditions should not warrant remedial action. Should sinkhole potential become a concern, use of deep foundations or mat foundations under buildings and placement of geofabric under roadways and critical fills might be required.

AREA A-2 (Approx. 1.3 Acres, No Fill)

Environmental Features: The area consists of a depression which probably is a remnant of a drainageway that once ran along the west side of the property. No waste of any consequence was found in the depression. Environmental conditions are unlikely to impede development of this area.

Geotechnical Features: No evidence of past or current sinkholes was observed.

Remedial/Construction Measures: It is unlikely that measures will need to be taken to remedy environmental conditions. Development would probably necessitate placement of an engineered fill. In lieu of the placement of a clean-soil fill, the depression could be

filled with waste materials removed from other areas of the property during grading that have suitable engineering properties. Per the presumptive remedial actions adopted by MDE under their Voluntary Cleanup Program (VCP), a one-story, lightly-loaded commercial building could be placed directly over the compacted waste even though the chemical quality of the waste exceeded cleanup standards. A multi-story building may require a deep foundation. Alternatively, use of the area as a paved parking lot or open space would, under the VCP, require capping contaminated waste with two and three feet of clean soil, respectively. The presence of this depression will probably facilitate development of the rest of the property.

AREA A-3 (Approx. 12.9 Acres, Est. Fill Depths: 0 to 10.5 Feet)

Environmental Features: Auger borings show soil fill over the area, containing, in some locations, rejected bricks. Environmental conditions significantly impeding development are not apparent. On the retail portion of the area, leaking underground storage tanks containing petroleum products were removed. In these limited areas, some petroleum-contaminated soil might be encountered during earthwork.

Geotechnical Features: No evidence of past or present sinkholes was observed. Bedrock is shallow in some locations and would impede excavation, should excavation be planned at these locations.

Remedial/Construction Measures: Minor amounts of petroleum-contaminated soil may have to be removed. Foundation conditions should not significantly impede development.

AREA A-4 (Approx. 3.3 Acres, Little or No Fill)

Environmental Features: Little or no fill of environmental significance is anticipated.

Geotechnical Features: No past or present sinkholes were observed. Elevated bedrock in areas could impede excavation, if excavations were planned.

Remedial/Construction Measures: Environmental conditions should not necessitate remedial action. Foundation conditions should not significantly impede development.

AREA B-1 (Approx. 10.0 Acres, Est. Fill Depth: 0 to 34 Feet)

Environmental Features: No municipal or brick-manufacturing wastes were observed in fill within this area, but limited amounts of very old waste could be present along the northern edge of the Kline fill at a depth not likely, in its present state, to result in significant human exposure during development. The Kline fill contains mostly soil from offsite construction sites. The soil contains some construction and land-clearing debris

consisting of mostly concrete, asphalt, and stone. Lesser amounts of wood and topsoil are scattered within the fill, material that might result in pockets of elevated methane concentration. However, the poorly-permeable clayey cover soil and the apparent lack of concentrated pockets of wood suggest that methane may not be a significant problem over much of the fill. Presence of inorganic and organic contaminants in the fill soil at concentrations of concern is unlikely.

Geotechnical Features: No past or current sinkholes were observed. The Kline fill was not constructed as an engineered fill, and, consequently, excessive ground settlement might occur under buildings constructed on the fill in its present state.

Remedial/Construction Measures: In dealing with environmental and geotechnical concerns, two options are apparent:

1. Should methane concentrations be relatively low, construct buildings on deep foundations, develop area for commercial use only, restrict use of basements, and install a relatively inexpensive vapor control system under the buildings similar to the type used to control radon gas.
2. Should methane concentration be relatively high over much of the fill, remove the fill and separate the methane-producing organic materials and the solid wastes that impede soil compaction. Use the remaining soil as clean-soil for capping waste material, treating other environmental or geotechnical conditions on the property, or constructing structural fills. Reconstruct the fill with waste materials from other areas having suitable engineering properties, including ash after being mixed with soil to make it a suitable material for constructing an engineered fill. If sinkhole development is a concern, install geofabric under the fill.

A considerable amount of clean soil could be obtained from the Kline fill area, and a significant amount of waste materials could be used in reconstructing the fill in a manner allowing commercial and residential development. Availability of the Kline fill as a source of borrow material for use in constructing engineered fills, capping wastes, and amending ash-laden waste in Area B-1 should facilitate development of the property. It could be the preferred option even if methane is not found to be a concern. Access to a portion of the low ground south of the Kline fill for disposal of excavated wastes should also facilitate development of the property.

AREA B-2 (Approx. 4.2 Acres, Est. Fill Depth: 0 to 10 Feet)

Environmental Features: The fill consists mostly of soil and demolition debris from construction sites. Some wood was observed in the fill which could be generating methane. It is unlikely that organic and inorganic contaminants of concern will be encountered at levels above their risk-based concentrations (RBCs).

Geotechnical Features: No past or current sinkholes were observed. Since the fill was not constructed as an engineered fill, excessive ground settlement could occur under structures built in this area.

Remedial/Construction Measures: Excavate any methane "hot spots" and backfill with clean soil and/or stable rubble. Excavate fill from beneath all building sites and backfill with suitably compacted clean soil having a permeability less than the surrounding fill. Restrict use of basements and require installation of a vapor-control system under the floor slabs and, should some organic material remain under open spaces, around the perimeters of the buildings. Remove the methane-producing material from excavated fill material, and dispose of the remaining soil and waste in Areas B-1 and A-2 as previously discussed. Alternatively, bury the remaining material under open spaces and/or roadways in the manner permitted by MDE.

AREA B-3 (Approx. 1.3 Acres, Est. Fill Depth: 0 to 9 Feet)

Environmental Features: Fill consists mostly of demolition debris and reject brick. Less soil is present than in Area B-2, and more wood waste was observed. Some coal ash is present in places. Methane concentration is likely to be the environmental concern rather than the presence of organic and inorganic contaminants above their RBCs.

Geotechnical Features: Same as B-2.

Remedial/Construction Measures: Same as B-2.

AREA C (Approx. 12.9 Acres, Est. Fill Depth: 0 to 16.5+ Feet)

Environmental Features: This area contains the oldest buried waste on the property. The fill consists primarily of a mixture of soil, coal ash, municipal solid waste composed mostly of composted organic materials and glass, and rejected brick. Considering the age and makeup of the fill, methane generation is probably not a problem. Screening-level sampling of fill material by Frederick Brick and the State Highway Administration has shown elevated levels (above RBCs) of lead, arsenic, mercury, and polynuclear aromatic hydrocarbon at some locations within this area. The likely source of the elevated chemical concentrations is probably the mix of coal ash and degraded municipal waste.

Geotechnical Features: No evidence of past or present sinkholes was observed in this area, although a sinkhole may be present on adjoining property to the west of the area. The pits scattered over the area appear to be dug by bottle collectors. Testing of ash samples showed dry unit weights below 100 pcf and elevated organic content which would require excavation and blending with clean soils to render the material acceptable for use in structural fills.

Remedial/Construction Measures: The presence of chemicals in some samples at concentrations above regulatory standards does not indicate the need for presumptive remedial actions as defined by MDE in their VCP, or that there are adverse human-health risks associated with exposure to the fill material, only that they are chemicals of potential concern. Should a more extensive sampling program be undertaken, pursuant to a more rigorous human-health risk evaluation, the calculated 95% upper-concentration-limits (95% UCLs) for these chemicals may be below levels requiring presumptive remedial action. Even if the 95% UCLs for one or more chemicals were found above the VCP cleanup standard, a quantitative human-health risk assessment could find the risks are within the acceptable ranges established by the U.S. Environmental Protection Agency and MDE.

The presence of low-density ash with elevated organic content within the fill material will negate dynamic compaction as a means of stabilizing the fill prior to construction. Since the area will probably be developed principally for commercial use and methane is expected not to be a problem, use of deep foundations will probably be the most cost-effective foundation-construction practice. Even if it is found that a chemical in the fill exceeds the regulatory standard, the floor slab of a building can be placed directly on the fill material, thus eliminating the need to remove and dispose of the material. However, should the 95% UCL concentration of one or more chemicals exceed regulatory standards, it would be necessary, unless a risk assessment indicates otherwise, to remove some fill material from open spaces and under roadways and to cap the remaining fill with clean soil. An alternative to deep foundations would be to excavate the ash-laden fill from beneath building locations, mix clean soil with the ash, and place the mixed material in the excavations as engineered fills. This should allow for use of strip foundations rather than deep foundations. Excess material, whether generated from foundation and utility construction or from grading, could, with some soil amendment, be disposed of under clean fill in Areas B-1 and A-2.

AREA D (Approx. 2.8 Acres, Est. Fill Depth: 0 to 15+ Feet)

Environmental Features: The area is underlain by a mixture of municipal solid waste, construction and demolition debris, coal ash, and soil. Wood and other organic material capable of generating methane are present. The fill was probably placed in the late 1960s and early 1970s. The age and composition of the fill material indicated that methane could be present in the fill at elevated concentrations. The presence of organic and inorganic contaminants at levels above regulatory standards is probably less likely than in Area C.

Geotechnical Features: No evidence of past or present sinkholes was observed. Since the fill was not placed as an engineered fill and due to the presence of organic material, construction of buildings on the fill is probably not feasible.

Remedial/Construction Measures: Methane concentration will probably necessitate excavation of the site to remove the methane-generating waste under and around building

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sites, backfilling with compacted low-permeability soils, and installation of a vapor-control system under and/or around the buildings. Use of basements would need to be restricted. Use of the area or portions of it for open space would only require capping with clean soil. Construction of parking garages would probably be permitted, but deep foundations would likely be required.

E 1197000

E 1197500

E 1198000

E 1198500

E 1199000

E 1199500

E 1200000

N 635500

N 635000

N 634500

N 634000



A-3

B-3

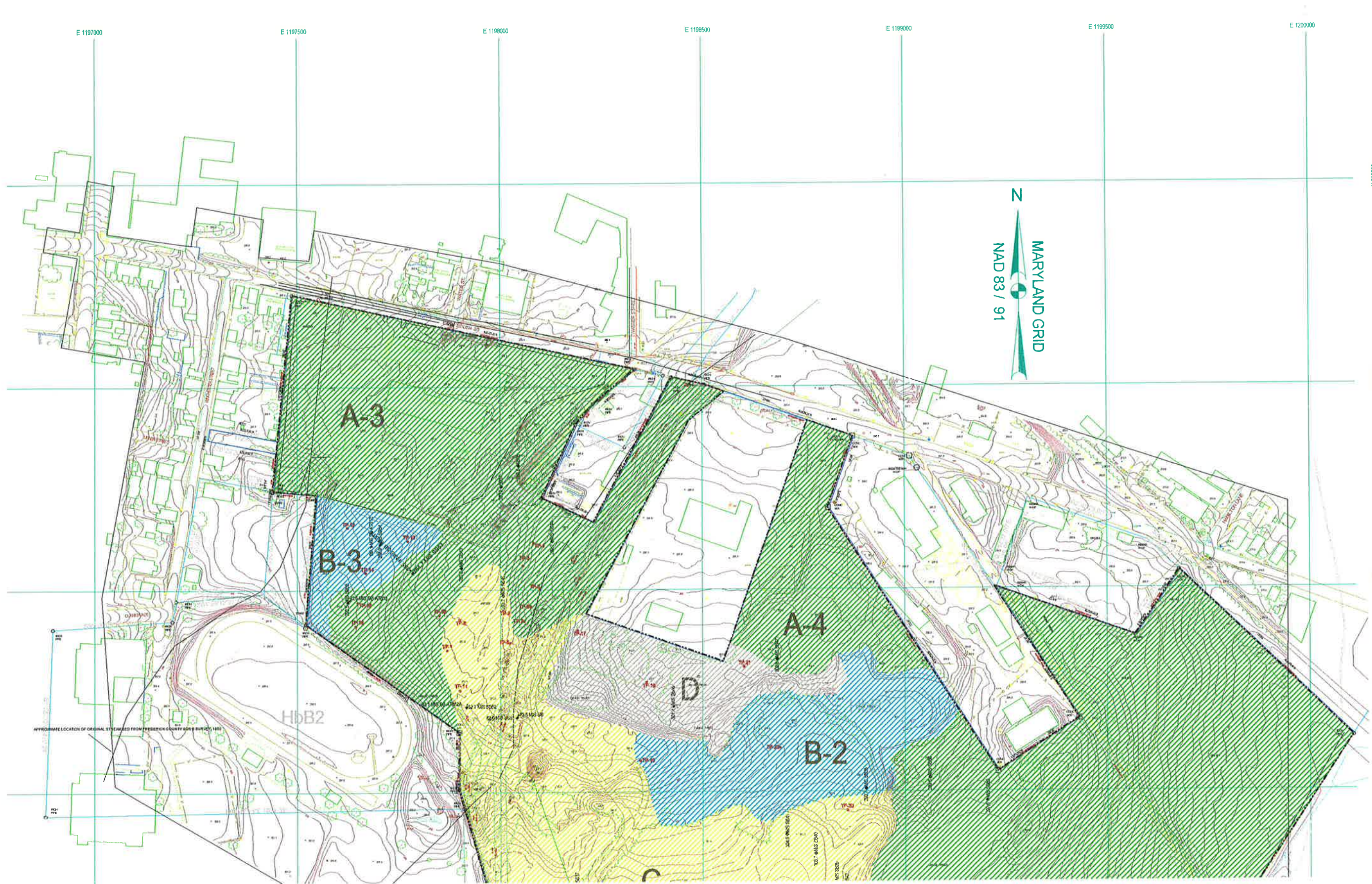
A-4

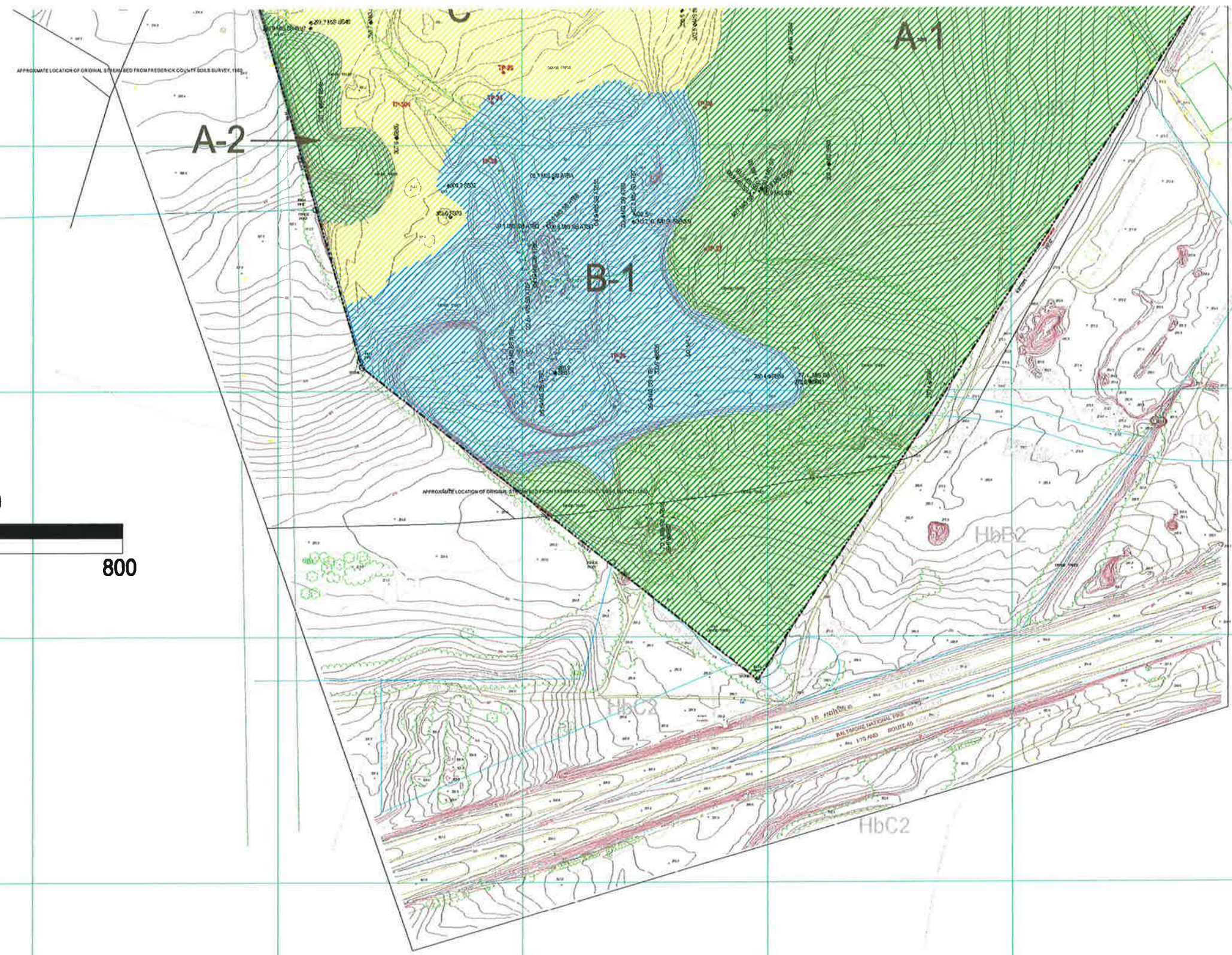
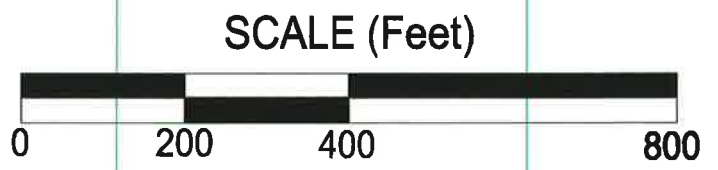
D

B-2

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APPROXIMATE LOCATION OF ORIGINAL STREAMBED FROM FREDERICK COUNTY SORE BANKS, 1981





N 632500

N 632000

N 632500

N 632000