Interim Report—Preliminary Geotechnical Evaluation

Twin Cities Army Ammunition Plant Redevelopment
Northeast of US Highway 10 and Highway 96
Arden Hills, Minnesota

Prepared for

Ryan Companies US, Inc.

October 3, 2007

American Engineering and Testing, Inc.
Braun Intertec Corporation

October 3, 2007

Ms. Genevieve McJilton
Ryan Companies US, Inc.
50 South 10th Street, Suite 300
Minneapolis, MN 55403

Re: Interim Report—Preliminary Geotechnical Evaluation
Twin Cities Army Ammunition Plant Redevelopment
Northeast of US Highway 10 and Highway 96
Arden Hills, Minnesota

Dear Ms. McJilton:

The following is a summary of the geotechnical evaluation being conducted by our firms, American Engineering and Testing, Inc. (AET), and Braun Intertec Corporation (Braun). The purpose of this summary is to inform the design team of the subsurface conditions that we found in our borings on the Twin Cities Army Ammunition Plant (TCAAP) site and to provide preliminary geotechnical analyses and general opinions on the suitability of the subsurface conditions for the proposed development.

Project Background

TCAAP covers approximately 2,370 acres. The site is bounded by Lexington Avenue on the east, Interstate Highway 35W and US Highway 10 on the west, Highway 96 on the south, and County Road I on the north.

Prior to 1941, this site was used mainly for agricultural purposes. Construction of the TCAAP facility started in August of 1941 by Federal Cartridge Corporation. The facility operated between 1942 and the mid-1970s. Many of the buildings on this site are currently vacant and several of the original buildings have been completely or partially demolished.

In December of 2006, AET and Braun submitted a joint work plan to conduct a preliminary geotechnical evaluation for the proposed TCAAP redevelopment. The geotechnical evaluation was to be performed together with an environmental investigation lead by Tetra Tech EM, Inc. (Tetra Tech), for whom AET and Braun would also be providing drilling services. As such, three types of investigation sites were defined for this project: (a) environmental investigation sites, (b) geotechnical investigation sites, and (c) combined environmental and geotechnical investigation sites. This summary discusses data obtained from the geotechnical sites and combined environmental and geotechnical investigation sites. Tetra Tech will provide a summary of their environmental investigation.

In preparation for our field exploration, we reviewed available geotechnical publications/reports pertinent to the site and the general area around the site, well logs obtained through the Minnesota Department of Health and historical aerial photographs, and noted geotechnical-related site characteristics during site visits. The information gathered from those preparatory efforts helped determine an appropriate soil boring grid spacing for this preliminary geotechnical evaluation, as well as targeting locations believed to be of significance from a geotechnical perspective; for example, where review of historical aerial photographs indicated previous wetland or swampy areas prior to the construction of TCAAP.

Proposed Development

Of the 2,370 acres encompassed by TCAAP, approximately 580 acres is slated for future redevelopment. Actual development will be concentrated in a subset of about 385 acres of the available 580 acres. The proposed development will include retail structures, generally one- to two-stories in height, a corporate campus adjacent to Interstate Highway 35W in the northwestern portion of the site, which may include several multi-story structures, residential structures, recreation areas, such as ball fields and parks, and associated infrastructure and roadways. There will be a designated wildlife corridor in the northeastern portion of the redevelopment area and a designated wetland conservation area within the Rice Creek Watershed (north central portion of redevelopment area).

The development will be completed in several phases over the next 10 to 15 years. However, it is our understanding that you plan to "rough" grade the entire site prior to the first phase of development.

General Overview of Surficial Geology

Based on our review of the available geotechnical publications/reports that were made available to us prior to beginning our geotechnical investigation, we understood that the surface soils on this site generally consist of outwash and lacustrine sands, surface fill, with some areas of organic soils and wetlands. The upper soil layers, typically referred to in previous studies as "Unit 1," vary in thicknesses from about 10 to 20 feet. Below the upper soil layers in most areas of the site, there is a cohesive and relatively impervious clay till (Unit 2) that varies in thickness from about 20 to 70 feet. Older glacial outwash and valley fill materials (Unit 3) underlie the till, and extend to depths on the order of 100 to 400 feet, or to the top of bedrock. The depth to bedrock varies considerably across the site. The bedrock in this area generally consists of weathered and fractured dolomite of the Prairie du Chien Group overlying Jordan Sandstone.

Perched groundwater is present above the Unit 2 "aquitard," with hydrostatic groundwater present in the Unit 3 glacial outwash above the bedrock. The bedrock also acts as a separate aquifer.

Review of historic aerial photographs indicates that depressions and wetlands existed throughout the site before TCAAP was first constructed. Many of those depressions and wetlands had been filled during the original development of the TCAAP site. Some of the borings drilled for previous environmental studies indicated buried organic soils, which probably represent buried wetland areas.

Summary of Results

Summary of Borings

We drilled a total of 219 Standard Penetration test borings at an approximate nominal grid spacing of 500 lineal feet across the site; the grid spacing varied along the perimeter of the site and in areas believed to be of significance from a geotechnical perspective (e.g., previous wetland areas). The approximate boring locations are shown on Figure 1; Westwood Professional Services surveyed the as-drilled boring locations and shot the ground surface elevations at the borings. The planned depth of most borings was 25 feet. However, several of the borings in the southeastern portion of the site (near Building 502) were extended to depths of 40 feet or more based on planned cuts of more than 15 feet shown on the preliminary grading plan. In addition, two borings in the northwestern portion of the site were drilled to a depth of about 100 feet; this is an area where heavily-loaded buildings are anticipated (i.e., mult-story corporate campus office buildings). We backfilled all borings with bentonite grout.

Summary of Soils Encountered

The native mineral soils that we found in our borings were generally consistent with the soils identified by previous investigations on this site. As indicated on the attached Subsurface Boring Log/Log of Boring sheets, we generally found varying thicknesses of topsoil, organic deposits and existing fill, overlying glacial and alluvial deposits consisting predominately of poorly graded sand, silty sand, clayey sand, lean clay, and, to a lesser extent, local deposits of sandy silt and silt. As anticipated, we did not encounter bedrock in any of our borings.

Table 1 provides a boring-by-boring tabulation of the depths and corresponding bottom elevations of topsoil, organic soils (swamp deposits), existing fill, and soft soils encountered in our borings. The topsoil, organic soils and existing fill have been grouped into a general category called "unsuitable soils" on Table 1, representing the greatest depth of topsoil, organic soil, existing fill, and/or soft soils. The estimated depths to unsuitable soils and corresponding bottom elevations are also presented in plan view on Figure 2, including contours of the estimated bottom elevations.

Groundwater Summary

Our drillers checked for groundwater in the boreholes as the borings were advanced. Based on our observations during and after drilling, the measured moisture content and apparent moisture condition of samples we collected, and soil properties such as color, we developed the groundwater elevation summary presented in Table 1 and on Figure 3.

Summary of Preliminary Geotechnical Recommendations

Building Areas—Spread Footings

The topsoil, swamp deposits, and soft clay are compressible and, in our opinion, are unsuitable for support of the proposed building structures. The existing fill overlying buried organic soils or existing fill containing organic material and debris are also considered to be unsuitable for support of the proposed buildings. For purposes of this preliminary evaluation, we assume that the unsuitable soils summarized in Table 1 will have to be removed from building areas and replaced with suitable, compacted backfill. More detailed supplemental investigations and evaluations will be required to further assess the horizontal and vertical extent of unsuitable soils on this site. As mentioned previously, Table 1 and Figure 2 present approximate excavation depths to remove unsuitable soils, along with corresponding bottom elevations of the unsuitable soils.

Please note that pending the results of further supplemental evaluations performed after building locations have been determined, it is possible that some of the existing fill might be able to be left in place below buildings, depending on the condition of the existing fill and the type of structure.

After necessary earthwork corrections, we estimate buildings on this site can generally be supported on typical concrete spread footings sized for the net allowable bearing capacities presented in Table 2 below.

Table 2. Range of Net Allowable Bearing Capacities

Soil Type	Soil Classification	Typical Range of Net Allowable Bearing Pressures (psf)	Typical Ground Improvement to Achieve Higher Limit of Bearing Capacities
Granular Glacial Deposits	SM, SP, SP-SM	2,000 to 4,000	Surface compaction of footing subgrades
Cohesive Glacial Deposits	SC, CL	2,000 to 3,000	Local subexcavation and replacement with aggregate
Granular Lacustrine Deposits	SM, SP, SP-SM	2,000 to 4,000	Surface compaction of footing subgrades
Cohesive Lacustrine Deposits	CL, ML	2,000 to 2,500	Local subexcavation and replacement with aggregate

Supplemental field explorations with pressuremeter testing and/or CPT soundings could be used to evaluate the feasibility of allowable bearing capacities higher than those summarized above.

Building Areas—Pile Supported

In the northwestern portion of the site, where heavily loaded office buildings are planned, it might be economical to support those buildings on deep foundations, depending on the structural loads and settlement tolerances of those buildings. Assuming that deep foundations would consist of commonly available 9 5/8-inch or 12 3/4-inch driven steel pipe pile extended to depths on the order of about 90 to 100 feet, we estimate that working capacities ranging from about 50 to 100 tons could be achieved in the northwestern portion of the site, based on data collected from our soil borings.

Parking and Roadway Areas

Swamp Deposits and Topsoil

It is our opinion that the swamp deposits encountered on this site are generally unsuitable for direct support of pavements. We recommend removing the organic soils from the upper 5 to 10 feet of pavement subgrades, and replacing them with suitable, compacted backfill. Provided that the surface vegetation and heavy root zone are removed, it is likely that low-organic topsoil materials could be left in place at depths of 3 feet or more below pavement subgrade elevations.

Existing Fill and Native Mineral Soils

Based on the results of our Standard Penetration tests, the existing fill and native mineral soils are, in our opinion, generally suitable for support of parking lots and roadways provided that pavement subgrades are adequately improved prior to placing pavement materials. We estimate that subgrade improvement methods would range from surface compaction of loose granular soils to subexcavation-and-replacement of soft clayey/silty soils to depths of 2 to 3 feet below proposed pavement subgrade elevations.

Preliminary Recommended Pavement Sections

For preliminary planning purposes, we estimate that regular-duty pavement sections, those supporting typical automobile traffic, would typically consist of 3 1/2 to 4 1/2 inches of bituminous over about 6 to 8 inches of aggregate base course. For heavy-duty pavement areas, we estimate that pavement sections will typically consist of 4 to 5 inches of bituminous over 8 to 12 inches of aggregate base course.

For concrete pavements placed over at least 6 inches of aggregate base course, concrete thicknesses will likely range from about 5 inches for regular-duty pavements to 7 inches for heavy-duty pavements.

Utility Support

Swamp Deposits

To the extent possible, we recommend routing utilities around swamp deposits. In the event that utilities will run through highly organic swamp deposits, utilities might have to be supported on deep foundations or utility subgrades will have to be corrected (i.e., swamp deposits removed and replaced with new compacted fill), especially if the grade is raised over the utility alignment. In the areas of buried organic soils where the grade will not be raised along the utility alignment, it might be possible to "float" the utilities across the swamp deposits; this would require additional further evaluation. Please note that the organic soils should be considered corrosive to metallic pipe, and all utility pipe material subject to corrosion should be cathodically protected or wrapped with polyethylene sleeves.

Existing Fill and Native Mineral Soils

In our opinion, the existing fill and native mineral soils are generally suitable for support of utilities (sanitary sewer, watermain and storm water pipes and associated manholes). Where the utility subgrade consists of clay or silt, granular pipe bedding could be required depending on the size and type of pipe. For larger utility structures, such as lift stations and pump houses, we recommend further geotechnical evaluation on a structure-by-structure basis.

Reuse of On-site Materials and Compaction

Please note that comments on the reuse of on-site materials as fill are based on geotechnical considerations only. Environmental conditions could also dictate the reuse of on-site materials, as on-site material planned for reuse as fill will be evaluated with respect to plans approved by the United States Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA).

Building Areas

Materials having an organic content of no more than 3 percent are generally considered suitable for reuse as structural fill and backfill in building areas. You should anticipate that buildings exerting higher bearing pressures will require the use of relatively clean sand as fill below footings.

You should anticipate that most on-site borrow material will have to be moisture conditioned to near-optimum levels prior to compaction. Please note that soils classified as clayey sand, lean clay, silty sand and silt, and some fine-grained clean sand, will be difficult to compact if wet.

Pavement Areas

It is our opinion that you could consider placing soils with organic contents between 3 and 7 percent at depths greater than 3 feet below pavement subgrades as long as the overall thickness of this slightly organic material is limited to less than about 4 to 8 feet.

Within the upper 3 feet of pavement subgrades, the soils should consist of mineral soils with an organic content less than 3 percent.

Recycled Material

If you consider using demolition spoils as recycled aggregate base course or as haul road materials, we recommend that the recycled materials consist of crushed concrete and bituminous. We recommend that the use of recycled aggregate containing bituminous be limited to pavement areas only.

Dewatering

Based on the conditions we found in our borings, construction dewatering will be required during the excavation of unsuitable soils in building pad areas, and during excavation of deeper underground utilities such as sanitary sewer. It is our opinion that pumping from open sump pits would be effective as the dewatering method where the excavation terminates in clayey soils. Where the excavation terminates in granular soils, the contractor will likely have to use well points and/or wells, plus pumping from screened sumps at the excavation base ("mop-up sumps").

Environmental conditions could dictate the discharge and/or disposal of pumped groundwater, and all dewatering plans should be evaluated with respect to plans approved by the EPA and the MPCA.

Remarks

This report is for the exclusive use of the parties to which it has been addressed. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

The conclusions contained in this report represent our professional opinions. American Engineering and Testing, Inc., and Braun Intertec Corporation endeavored to perform the engineering services for this project in a manner consistent with that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality under similar budgetary and time constraints. No warranty, express or implied, is made.

If you have any questions regarding this report, please contact Tom Venema at 952.361.3781 or Bob Janssen at 651.487.7017.

Sincerely,

Prepared By:

Chad A. Underwood, PE, PG
American Engineering and Testing, Inc.
Senior Geotechnical Engineer

Prepared By:

Joel C. Kurpius, PE
Braun Intertec Corporation
Project Engineer

Reviewed By:

Thomas P. Venema, PE
American Engineering and Testing, Inc.
Principal Engineer

Reviewed By:

Robert J. Janssen, PE
Braun Intertec Corporation
Principal Engineer

Attachments:
Table 1
Figure 1
Figure 2
Figure 3
Subsurface Boring Log/Log of Boring Sheets

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-1	908.1	0.5	907					0.5	907				
ST-2	901.3	0.5	900					0.5	900	23.0	879	23.0	879
ST-3	902.4	0.5	901					0.5	901			23.0	880
ST-11	901.0	0.5	900					0.5	900	24.4	877	24.4	877
ST-19	898.1	1	897					1.0	897	18.0	881	18.0	881
ST-20	900.8	0.5	900					0.5	900	22.0	879	22.0	879
ST-21	900.6	0.5	900					0.5	900	24.0	877	24.0	877
ST-25	895.9	1	894					1.0	894	17.0	879	17.0	879
ST-26	896.2	0.5	895					0.5	895	19.0	878	19.0	878
ST-27	893.3	1	892					1.0	892	12.0	882	12.0	882
ST-31	892.9	0.5	892					0.5	892	11.0	882	11.0	882
ST-32	893.5	1	892					1.0	892	13.0	881	13.0	881
ST-33	895.7	1	894					1.0	894	14.0	882	14.0	882
ST-34	894.3	1	893					1.0	893	14.0	881	14.0	881
ST-35	896.0	0.5	895					0.5	895	16.0	881	16.0	881
ST-40	893.7	0.5	893					0.5	893	13.0	881	13.0	881
ST-41	892.5	0.7	891					0.7	891	12.0	881	12.0	881

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-42	885.3	11.5	873	9	876			11.5	873	10.1	876	10.1	876
ST-43	890.2			4	886			4.0	886	6.8	884	7.0	884
ST-44	888.6			2	886			2.0	886			7.0	882
ST-45	892.4			8.5	883			8.5	883	6.5	886	7.0	886
ST-46	895.4	22	873	12	883			22.0	873	11.0	885	11.0	885
ST-47	893.3			4	889			4.0	889	14.4	879	11.5	882
ST-48	890.9			1.5	889			1.5	889	11.0	880	11.0	880
ST-50	882.8	12	870	7	875			12.0	870	11.0	872	11.0	872
ST-51	881.2	12	869	7	874			12.0	869	9.0	873	9.0	873
ST-52	885.9			12	873			12.0	873	10.9	876	10.9	876
ST-53	885.5			7	878			7.0	878	10.3	876	10.3	876
ST-54	888.9			4.5	884	6	882	6.0	882	0.0	889	4.5	885
ST-55	892.4			2	890			2.0	890	0.0	893	9.5	883
ST-57	893.6	23.5	870	22	871			23.5	870	22.5	872	22.0	872
ST-59	884.4	12	872	11	873			12.0	872	12.1	873	12.1	873
ST-60	883.9	16.5	867	14	869			16.5	867	8.0	876	8.0	876
ST-61	885.9	8	877	7	878			8.0	877	9.4	877	9.4	877
ST-62	884.3	14	870	12	872			14.0	870	12.0	873	12.0	873
ST-63	886.1			9	877			9.0	877	14.0	873	14.0	873
ST-64	883.5	10.5	872	9	874			10.5	872	10.2	874	10.2	874
ST-65	886.2			2.5	883			2.5	883	10.0	877	10.0	877
ST-66	888.9			2	886			2.0	886	10.0	879	10.0	879
ST-67	888.7			3	885			3.0	885	6.0	883	6.0	883
ST-68	895.0	9	885	7	887			9.0	885	5.2	890	5.2	890
ST-69	894.8			1	893			1.0	893	4.0	891	4.0	891
ST-70	885.0	1.5	883					1.5	883	7.0	878	7.0	878
ST-71	887.3			1.5	885			1.5	885	7.0	881	7.0	881
ST-72	887.4			7	880			7.0	880	4.8	883	4.8	883
ST-73	891.3	6.5	884	4	887			6.5	884	9.0	883	9.0	883
ST-74	891.8			5	886			5.0	886	6.4	886	6.4	886
ST-75	898.8			4	894			4.0	894	4.3	895	4.3	895
ST-76	907.0			7	899			7.0	899			14.0	893
ST-77	892.4			7	885			7.0	885	11.0	882	11.0	882
ST-78	886.1	14	872	7	879			14.0	872	14.0	873	7.0	880
ST-79	888.9	0.5	888					0.5	888	7.0	882	7.0	882
ST-80	891.1			2	889			2.0	889			12.0	880
ST-81	895.1	1	894					1.0	894			9.5	886
ST-82	898.6	8.5	890	7	891			8.5	890			14.5	885
ST-83	903.0			4.5	898			4.5	898			9.5	894
ST-84	911.0			4.5	906			4.5	906			12.0	900
ST-85	892.1			2	890	7	885	7.0	885			9.5	883

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-86	897.0	0.5	896					0.5	896	8.1	889	8.1	889
ST-87	898.3			2	896			2.0	896			12.0	887
ST-88	889.7			6	883			6.0	883	8.0	882	8.0	882
ST-89	890.4			7	883			7.0	883	7.0	884	7.0	884
ST-90	891.0	2	888					2.0	888	6.0	885	6.0	885
ST-91	893.1	13.5	879	8.5	884			13.5	879	12.0	882	12.0	882
ST-92	898.4	7	891	2	896			7.0	891			18.0	881
ST-93	901.2			3.5	897			3.5	897			18.0	884
ST-94	922.9	3	919					3.0	919			18.0	905
ST-95	924.0	9	914	7	916			9.0	914	13.0	911	13.0	911
ST-96	892.3	9	883	4	888			9.0	883	9.0	884	9.0	884
ST-97	891.0			2.5	888			2.5	888	6.1	885	6.1	885
ST-98	892.3	9	883	7	885			9.0	883	8.0	885	8.0	885
ST-99	892.8	18	874	12	880	22	870	22.0	870	12.0	881	12.0	881
ST-100	895.7	9	886	6	889			9.0	886	9.0	887	9.0	887
ST-101	897.9	7	890	4.5	893	11	886	11.0	886	10.4	888	7.0	891
ST-102	902.2			7	895			7.0	895			7.0	896
ST-103	924.9			4	920			4.0	920			18.0	907
ST-104	934.9	12	922	7	927			12.0	922			23.0	912
ST-105	899.1			7	892			7.0	892	9.0	891	9.0	891
ST-106	903.4	7	896	5	898			7.0	896	12.2	892	12.2	892
ST-107	902.7	1	901					1.0	901	12.1	891	12.1	891
ST-108	906.6			4	902			4.0	902	12.5	895	12.5	895
ST-109	904.5			7	897			7.0	897			12.0	893
ST-110	913.2	1	912					1.0	912			9.0	905
ST-111	922.1			4	918			4.0	918			14.0	909
ST-112	936.8			1	935			1.0	935				
ST-113	941.8	2.3	939					2.3	939				
ST-114	913.1	4.5	908	2.5	910	5	908	5.0	908	5.2	908	5.2	908
ST-115	908.2			4.5	903			4.5	903			12.0	897
ST-116	913.0			0.5	912			0.5	912			9.5	904
ST-117	914.4			2.5	911			2.5	911	3.6	911	9.5	905
ST-118	914.9	14	900					14.0	900	6.0	909	6.0	909
ST-119	929.7			9	920			9.0	920			22.0	908
ST-120	940.8	0.5	940					0.5	940				
ST-121	944.6			4	940	12	932	12.0	932				
ST-122	959.5			2	957	7	952	7.0	952				
ST-123	913.4			6	907			6.0	907	25.0	889	25.0	889
ST-124	923.8	14	909	9	914			14.0	909			14.0	910
ST-125	932.7			9.5	923			9.5	923				
ST-126	957.0	12	944	7	949			12.0	944	12.0	945	12.0	945

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-127	952.8			6	946	12	940	12.0	940			18.0	935
ST-128	954.1			7	947	12	942	12.0	942				
ST-129	915.9			4.5	911			4.5	911			11.5	905
ST-130	915.1			7	908			7.0	908			14.0	902
ST-131	926.9			9.5	917			9.5	917			18.0	909
ST-132	936.0			3	933			3.0	933				
ST-133	945.0			12	932	18	926	18.0	926				
ST-134	949.0			7	942	12	937	12.0	937	24.0	926	24.0	926
ST-135	950.5			4.5	946			4.5	946				
ST-136	956.7	9	947	7	949			9.0	947				
ST-137	956.0	9	947	7	949			9.0	947				
ST-138	955.9	22	933	14.5	941	26	929	26.0	929	24.3	932	14.5	942
ST-139	951.8	12	939	9.5	942	14.5	937	14.5	937	9.6	943	9.5	943
ST-140	962.9	1	961					1.0	961				
ST-141	913.3			7	906			7.0	906	26.5	887	18.0	896
ST-142	933.7	19.5	914	15	918			19.5	914	23.7	910	15.0	919
ST-143	949.9			4	945			4.0	945				
ST-144	955.0			4.5	950			4.5	950				
ST-145	954.7			0.5	954			0.5	954				
ST-146	966.0			0.5	965	9	957	9.0	957				
ST-147	958.6	0.5	958					0.5	958				
ST-148	957.9	16	941	6	951			16.0	941	7.3	951	7.3	951
ST-149	990.9			22	968			22.0	968	19.0	972	19.0	972
ST-150	927.0	7	919	4.5	922			7.0	919				
ST-151	922.3			2	920			2.0	920	5.1	918	5.1	918
ST-152	942.0			12	929			12.0	929	12.3	930	12.3	930
ST-153	951.2			4.5	946	7	944	7.0	944			23.0	929
ST-154	956.7			16	940			16.0	940				
ST-155	959.9							0.0					
ST-156	959.8							0.0					
ST-157	995.9			14	981			14.0	981				
ST-158	955.5			21.5	934			21.5	934			22.0	934
ST-159	959.4			25	934			25.0	934	18.0	942	18.0	942
ST-160	920.2	8.5	911	7	913	12	908	12.0	908	11.8	909	11.8	909
ST-161	926.7			4.5	922			4.5	922			18.0	909
ST-162	956.7			1	955			1.0	955				
ST-163	949.2	17	932	14.5	934			17.0	932			17.0	933
ST-164	951.0			2	949			2.0	949			23.0	929
ST-165	953.1			2	951			2.0	951				
ST-166	955.0			2	952			2.0	952	21.2	934	21.2	934
ST-167	945.0			4.5	940	12	932	12.0	932	21.2	924	21.2	924

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-168	947.2			3	944			3.0	944				
ST-169	948.1	12.5	935	10.5	937			12.5	935			12.5	936
ST-170	949.7	12	937	10.5	939			12.0	937	12.6	938	12.6	938
ST-171	915.0	12	903	9.5	905			12.0	903	8.6	907	8.6	907
ST-172	925.1	17	908	7	918	24	901	24.0	901	6.0	920	6.0	920
ST-173	942.9	1	941					1.0	941				943
ST-174	944.9			4	940			4.0	940				945
ST-175	948.1			3	945			3.0	945	15.1	934	15.1	934
ST-176	951.0	12.5	938	10	941			12.5	938			16.0	936
ST-177	953.6	14.5	939	13	940			14.5	939				
ST-178	948.4	10	938	9.5	938			10.0	938			18.0	931
ST-179	929.3	0.5	928					0.5	928			14.0	916
ST-180	935.9	1	934					1.0	934			12.0	924
ST-181	935.0	1	933					1.0	933				
ST-182	941.8	0.5	941					0.5	941				
ST-183	933.7	0.5	933					0.5	933	18.0	916	18.0	916
ST-184	942.1			4.5	937			4.5	937			12.0	931
ST-185	901.0							0.0	900				
ST-186	925.2	9	916	7	918			9.0	916			14.0	912
ST-187	914.2	1	913					1.0	913			12.0	903
ST-188	934.5			4	930			4.0	930	19.0	916	19.0	916
ST-189	952.2	0.7	951					0.7	951				
ST-190	952.8			2	950			2.0	950				
ST-191	956.3			4	952			4.0	952				
ST-192	959.1							0.0	959				
ST-193	961.9			4	957			4.0	957				
ST-195	942.2			4.5	937	9	933	9.0	933				
ST-196	943.4			7	936	12	931	12.0	931	18.0	926	18.0	926
ST-197	944.3	9	935	7	937	18	926	18.0	926	9.0	936	9.0	936
ST-198	944.4	19	925	14	930	22	922	22.0	922			19.0	926
ST-199	944.2			7	937			7.0	937				
ST-200	949.2			14	935	22	927	22.0	927	20.0	930	20.0	930
ST-201	956.8			4.5	952			4.5	952				
ST-202	955.0			2.5	952			2.5	952				
ST-203	954.4			4.5	949			4.5	949				
ST-204	938.6			18.0	920			18.0	920				
ST-205	937.1			4.5	932			4.5	932				
ST-206	916.0			4.0	912			4.0	912			12.0	905
ST-207	908.5			4.5	904			4.5	904			9.0	900
ST-208	914.5			4.5	909			4.5	909			12.0	903
ST-209	892.8			7.0	885			7.0	885	9.1	884	9.1	884

Twin Cities Army Ammunition Plant (TCAAP) Redevelopment
Northeast of Highway 96 and US Highway 10
Arden Hills, Minnesota

Table 1

		Topsoil / Orgainic Soils		Existing Fill		Soft Clays and Silts		Unsuitable Soil		Groundwater			
Boring Number	Surface Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Approximate Depth (ft)	Estimated Bottom Elevation	Measured Depth (ft)	Measured Groundwater Elevation	Estimated Depth (ft)	Estimated Elevation
ST-210	898.8	6.0	892	4.5	894			6.0	892			12.0	887
ST-211	892.3			8.5	883			8.5	883	7.6	885	7.6	885
ST-212	895.1	13.0	882	9.5	885			13.0	882	7.3	888	7.3	888
ST-213	890.2		890	5.5	884			5.5	884	7.1	884	7.1	884
ST-214	884.9		884	9.5	875			9.5	875	12.7	873	12.7	873
ST-215	894.5	11.0	883	9.0	885			11.0	883	9.3	886	9.3	886
ST-216	895.0	13.5	881	11.5	883			13.5	881			13.5	882
ST-217	889.3	1.0	888		889			1.0	888	3.3	887	3.0	887
ST-218	885.7		885	7.0	878			7.0	878			12.0	874
ST-219	891.3	1.0	890		891			1.0	890	15.0	877	15.0	877
ST-220	897.0	2.0	894		896			2.0	894	17.8	880	17.8	880
ST-221	899.0	2.0	897		899			2.0	897	18.3	881	18.3	881
ST-222	898.6		898	9.5	889			9.5	889	18.9	880	18.9	880
ST-223	908.4		908	9.5	898			9.5	898	28.9	880	28.9	880
ST-224	938.6	6.0	932	4.0	934			6.0	932				

125' 0 250'

SCALE: 1" = 250'

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

DRAFT

Subject to Change

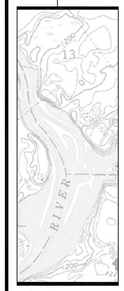
BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

Revisions	
Date:	Checked By:



Project No:
SP0605871

Drawing No:
SP0605871B

Scale:	1" = 250'
Drawn By:	MRG
Date Drawn:	8/27/07
Checked By:	JK
Last Modified:	10/3/07

SOIL BORING LOCATION SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet:	Fig:
of	

P:\sp\SP0605871B.dwg GEOTECH NORTH, 10/5/2007 2:25:53 PM

125' 0 250'

SCALE: 1" = 250'

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

DRAFT

Subject to Change

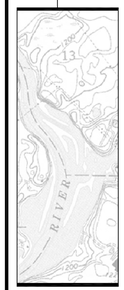
BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

Revisions	
Date:	Checked By:



Project No:
SP0605871

Drawing No:
SP0605871B

Scale:	1" = 250'
Drawn By:	MRG
Date Drawn:	8/27/07
Checked By:	JK
Last Modified:	10/3/07

SOIL BORING LOCATION SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet:	Fig:
of	

P:\sp\SP0605871B.dwg GEOTECH SOUTH 10/5/2007 2:29:16 PM

125' 0 250'
SCALE: 1" = 250'

● DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

XX / XX UNSUITABLE SOIL DEPTH / UNSUITABLE SOIL ELEVATION (FT.)

UNSUITABLE SOIL ELEVATION CONTOUR (FT.)

DRAFT
Subject to Change

SOIL BORING LOCATION AND UNSUITABLE SOIL DEPTH / ELEVATION / CONTOUR SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet: of
Fig:

Scale: 1" = 250'
Drawn By: MRG
Date Drawn: 8/27/07
Checked By: JK
Last Modified: 10/3/07

Drawing No: SP0605871B
Project No: SP0605871

Revisions
Date: Checked By:

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH: (952) 995-2000
FAX (952) 995-2020

BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

125' 0 250'

SCALE: 1" = 250'

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

XX / XX UNSUITABLE SOIL DEPTH / UNSUITABLE SOIL ELEVATION (FT.)

UNSUITABLE SOIL ELEVATION CONTOUR (FT.)

DRAFT

Subject to Change

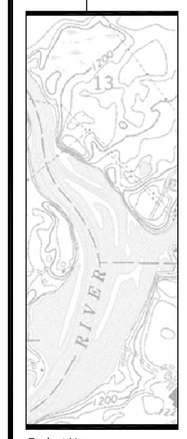
BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

Revisions	
Date:	Checked By:



Project No:
SP0605871

Drawing No:
SP0605871B

Scale:	1" = 250'
Drawn By:	MRG
Date Drawn:	8/27/07
Checked By:	JK
Last Modified:	10/3/07

SOIL BORING LOCATION AND UNSUITABLE SOIL DEPTH / ELEVATION / CONTOUR SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet: of

Fig:

P:\sp\SP0605871B.dwg,UNSUITABLE CONTOUR SOUTH,10/3/2007 2:43:31 PM

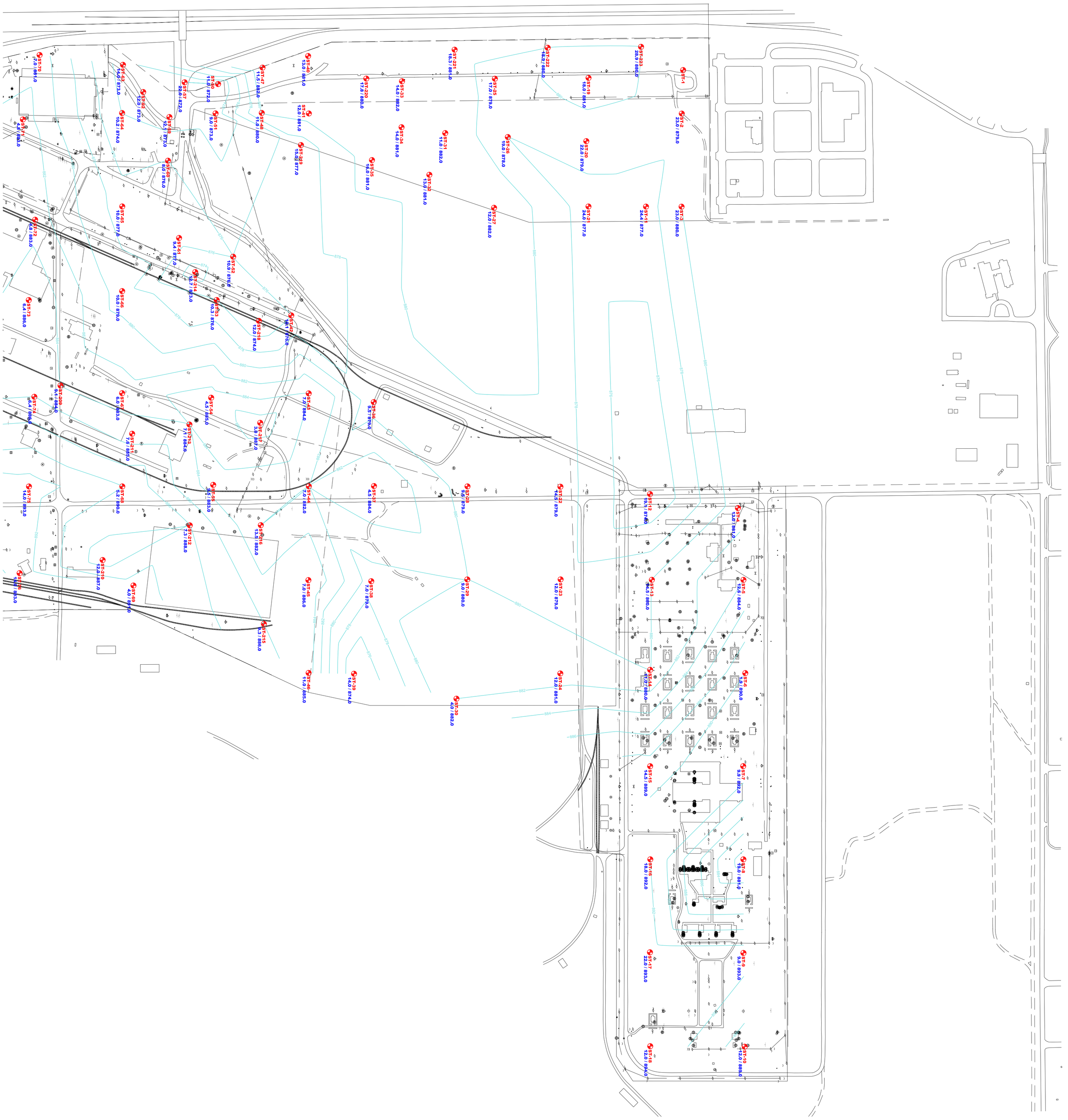
125' 0 250'
SCALE: 1" = 250'

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

XX / XX GROUNDWATER DEPTH / GROUNDWATER ELEVATION (FT.)

GROUNDWATER ELEVATION CONTOUR (FT.)

DRAFT
Subject to Change



SOIL BORING LOCATION AND GROUNDWATER DEPTH / ELEVATION / CONTOUR SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet: of
Fig:

Scale: 1" = 250'
Drawn By: MRG
Date Drawn: 8/27/07
Checked By: JK
Last Modified: 10/3/07

Project No: SP0605871
Drawing No: SP0605871B

Revisions
Date: Checked By:

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

N

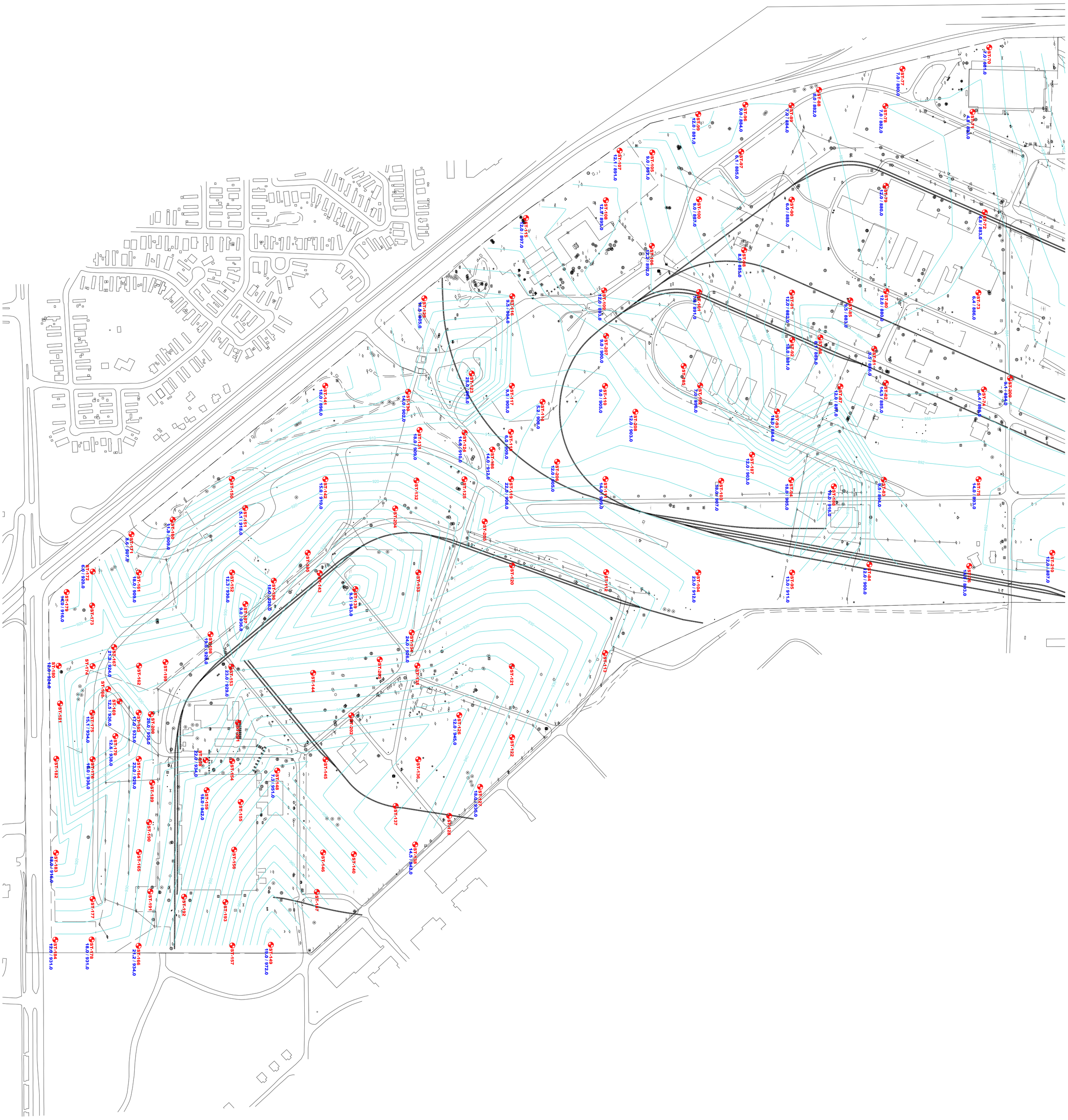
125' 0 250'
SCALE: 1" = 250'

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

XX / XX GROUNDWATER DEPTH / GROUNDWATER ELEVATION (FT.)

GROUNDWATER ELEVATION CONTOUR (FT.)

DRAFT
Subject to Change



SOIL BORING LOCATION AND GROUNDWATER DEPTH / ELEVATION / CONTOUR SKETCH
GEOTECHNICAL EVALUATION
TCAAP REDEVELOPMENT
NORTHEAST OF HIGHWAY 10 AND HIGHWAY 96
ARDEN HILLS, MINNESOTA

Sheet: of
Fig:

Scale: 1" = 250'
Drawn By: MRG
Date Drawn: 8/27/07
Checked By: JK
Last Modified: 10/3/07

Drawing No: SP0605871B
Project No: SP0605871

Revisions
Date: Checked By:

Base Dwg Provided By:
WESTWOOD PROFESSIONAL SERVICES, INC.

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH: (952) 995-2000
FAX (952) 995-2020

BRAUN INTERTEC

Providing engineering and environmental solutions since 1957

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-1**

LOCATION: N: 213690.577, E: 550665.094 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
908.1	0.0					
907.6	0.5	SM	SILTY SAND, trace of Roots, dark brown, wet. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown to light brown, moist, loose. (Lacustrine)	4		
				3		
				5		
				5		
896.1	12.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, loose to medium dense. (Glaciofluvium)	6		
				13		
890.1	18.0					
		ML	SANDY SILT, Sand seams, brown, wet, medium dense. (Glaciofluvium)	19		
886.1	22.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, medium dense. (Glaciofluvium)	15		
882.1	26.0					
			END OF BORING. Water not observed with 24 feet of hollow-stem auger in the ground. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-2**

LOCATION: N: 213683.523, E: 550898.513 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/22/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
901.3	0.0					
900.8	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SM	SILTY SAND, fine-grained, reddish-brown to brown, moist, loose to medium dense. (Glaciofluvium)	8		
				16		
				13		
892.3	9.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, loose to medium dense. (Glaciofluvium)	11		
				9		
				7		
				14		
878.3	23.0				▽	
		SM	SILTY SAND, fine-grained, gray, waterbearing.	21		
875.3	26.0					
			END OF BORING.			
			Water observed at 23 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587L.GPJ BRAUN.GDT 10/2/07 14:44

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST- 3 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **902.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, trace roots, dark brown, moist, medium dense (SM)	TOPSOIL									
2	SAND WITH SILT, fine grained, trace roots, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	11	M	SS	17					
3	SAND WITH SILT, fine grained, brown, moist, loose (SP-SM)		9	M	SS	14					
4											
5	SILTY SAND, fine grained, brown, light grayish brown, moist, medium dense, laminations of sand with silt (SM)										
6			13	M	SS	19					
7											
8			16	M	SS	19					
9											
10	SAND WITH SILT, fine grained, light grayish brown, a little brown, moist, medium dense, laminations of silty sand (SP-SM)										
11			15	M	SS	19					
12											
13	SAND WITH SILT, fine grained, light brownish gray, a little brown, moist, loose, laminations of silty sand (SP-SM)		10	M	SS	17					
14											
15	SILTY SAND, fine grained, light brownish gray, moist, loose (SM)										
16			7	M	SS	18					
17											
18											
19	SAND WITH SILT, fine grained, light brownish gray, a little brown, moist, dense, laminations of silty sand (SP-SM)										
20											
21			34	M	SS	17					
22											
23											
24	SILT, gray, wet, dense (ML)	FINE ALLUVIUM									
25											
26			32	M/W	SS	16	25				
	END OF BORING Northing=213682.3 Easting=551397.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/20/07**	**2:15**	**26.5**	**24.5**	**24.6**		**None**
BORING COMPLETED: **6/20/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-11 (p. 1 of 4)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **901.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, surface roots, trace roots, dark brown, moist, loose (SM)	TOPSOIL									
2	SAND WITH SILT, trace roots, light brown, moist, loose (SP-SM)	COARSE ALLUVIUM	8	M	SS	14					
3	SILTY SAND, fine grained, brown, a little light brown, moist, medium dense, laminations of sand with silt (SM)		15	M	SS	18					
6			20	M	SS	18					
7	SAND WITH SILT, fine grained, light grayish brown to light brownish gray, moist, medium dense to loose (SP-SM)		15	M	SS	16					
11			11	M	SS	17					
13			6	M	SS	17					
15	SAND WITH SILT, fine grained, light brownish gray, a little brown, moist, medium dense, laminations of sandy silt (SP-SM)		18	M	SS	20					
18	SAND WITH SILT, fine grained, light gray, a little gray, moist, dense, laminations of silt (SP-SM)		33	M	SS	17					
23	SAND WITH SILT, fine grained, light brownish gray, waterbearing, medium dense (SP-SM)		16	M/W	SS	19					
28		TILL									

DEPTH:	DRILLING METHOD
0-24½'	3.25" HSA
24½'-99½'	RD w/DM
BORING COMPLETED:	6/20/07
DR: SG	LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/20/07	8:55	26.5	24.5	24.5		24.4

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-11 (p. 2 of 4)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL) *(continued)*	TILL *(continued)*									
31			6	M	SS	24	17				
32											
33											
34											
35											
36			7	M	SS	24	17				
37											
38											
39											
40											
41			10	M	SS	24	20				
42											
43											
44											
45											
46			10	M	SS	24	17				
47											
48											
49											
50											
51			11	M	SS	24	19				
52											
53											
54											
55											
56			10	M	SS	24	20				
57											
58											
59											
60											
61			10	M	SS	22	18				
62											
63											

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO. ST-11 (p. 3 of 4)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
64	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL) *(continued)*	TILL *(continued)*									
65											
66			5	M	SS	24	19				
67											
68											
69	SILTY SAND, fine to medium grained, brownish gray, wet, loose (SM)	COARSE ALLUVIUM									
70											
71			5	M	SS	2	23				
72											
73											
74	LEAN CLAY WITH SAND, brown, hard (CL)	FINE ALLUVIUM									
75											
76			36	M	SS	24	17				
77											
78											
79	FAT CLAY, brown, hard to very stiff, laminations of silty sand (CH)										
80											
81			43	M	SS	24	33				
82											
83											
84											
85											
86			27	M	SS	24	25				
87											
88											
89	CLAYEY SAND, a little gravel, possible cobbles, brown, hard (SC)	TILL									
90											
91			62	M	SS	21	13				
92											
93											
94											
95											
96			70	M	SS	21	11				
97											

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO. ST-11 (p. 4 of 4)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
98	CLAYEY SAND, a little gravel, possible cobbles, brown, hard (SC) *(continued)*	TILL *(continued)*									
99											
100											
101			98	M	SS	26	10				
	END OF BORING Northing=213491.7 Easting=551397.2										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-19**

LOCATION: N: 213183.570, E: 550706.966 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
898.1	0.0							
897.1	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist. (Lacustrine)	9				
894.1	4.0							
		SM	SILTY SAND, fine-grained, brown, wet, medium dense. (Lacustrine)	11				
891.1	7.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, loose to medium dense. (Lacustrine)	11		6	6	
				9				
				6				
884.1	14.0							
		SM	SILTY SAND, light brown, moist, medium dense. (Glacial Outwash)	15				
880.1	18.0				▽			
		SM	SILTY SAND, fine-grained, light brown, to gray, waterbearing, medium dense to very dense. (Glacial Outwash)	35				
				60				
872.1	26.0							
			END OF BORING.					
			Water observed at 18 feet while drilling.					
			Boring then grouted.					

BRAUN BASIC LOG OF BORING SP06058871.GPJ BRAUN.GDT 10/2/07 14:44 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-20**

LOCATION: N: 213171.742, E: 551046.195 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
900.8	0.0							
900.3	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, rust at 2' sample depth, moist, loose to medium dense. (Lacustrine)	15				
				10				
891.8	9.0			8				
		ML	SANDY SILT, light brown, wet, loose. (Lacustrine)	6				
886.8	14.0			9		17	62	
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, medium dense. (Lacustrine)	28		4	7	
882.8	18.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, dense. (Lacustrine)	34				
878.8	22.0				▽			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose. (Lacustrine)					
874.8	26.0			10				
			END OF BORING. Water observed at 22 feet while drilling. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-21**

LOCATION: N: 213183.350, E: 553196.596 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
900.6	0.0					
900.1	0.5	SM	SILTY SAND, trace of Roots, brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, very loose to medium dense. (Lacustrine)	7		
				13		
				8		
				6		
886.6	14.0			4		
		SM	SILTY SAND, fine-grained, light brown, moist, loose. (Lacustrine)	9		
				10		
876.6	24.0				▽	
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brownish-gray, waterbearing, medium dense. (Lacustrine)	11		
874.6	26.0		END OF BORING. Water observed at 24 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-25**

LOCATION: N: 212681.566, E: 550711.506 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
895.9	0.0							
894.9	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, loose.	8				
				6				
				8				
				7				
883.9	12.0							
		ML	SANDY SILT, gray with bands of orangish-brown, wet, loose. (Lacustrine)	6				
881.9	14.0							
		SM	SILTY SAND, fine-grained, Silt laminations, brown to dark brown, wet, medium dense. (Glaciofluvium)	18				
878.9	17.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, waterbearing, medium dense. (Glaciofluvium)	6				
873.9	22.0							
		SC	CLAYEY SAND, trace of Gravel, gray, wet, medium dense. (Glacial Till)	6		13	42	LL = 23% PI = 12%
869.9	26.0							
			END OF BORING. Water observed at 17 feet while drilling. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-26**

LOCATION: N: 212751.010, E: 551024.200 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
896.2	0.0					
895.7	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to brown, rust at 15' sample depth, moist, loose to medium dense. (Lacustrine)	10		
				12		
				12		
				10		
				12		
				11		
877.2	19.0				▽	
		ML	SANDY SILT, gray, waterbearing, medium dense. (Glaciofluvium)	19		
				15		
870.2	26.0		END OF BORING. Water observed at 19 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-27**

LOCATION: N: 212677.165, E: 551403.522 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
893.3	0.0							
892.3	1.0	SM	SILTY SAND, very fine- to fine-grained, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, very loose to medium dense. (Lacustrine)	4				
				9				
				10				
				11		4	5	
881.3	12.0				▽			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown to light brown, waterbearing, loose. (Lacustrine)	8				
				6		22	11	
876.3	17.0							
		ML	SILT with SAND, grayish-brown to gray, wet, loose to medium dense. (Glaciofluvium)	9				
				24		24	82	
866.3	27.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, medium dense. (Glaciofluvium)	28				
861.3	32.0							

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-27 (cont.)**

LOCATION: N: 212677.165, E: 551403.522 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
861.3	32.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff. (Glacial Till)	9				
856.3	37.0	SC	CLAYEY SAND, trace of Gravel, gray, wet, rather stiff. (Glacial Till)	9		15	46	
850.3	43.0	CL	SANDY LEAN CLAY, trace of Gravel, wet, rather stiff. (Glacial Till)	9				
				10		18	51	
				9				
				9				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-27 (cont.)**

LOCATION: N: 212677.165, E: 551403.522 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
829.3	64.0		SANDY LEAN CLAY, trace of Gravel, wet, rather stiff. (Glacial Till) *(continued)*	9				
				9				
				12				
816.3	77.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, wet, very stiff to hard. (Glacial Till)	21				
				34		14	62	
				41				
801.3	92.0	CL	LEAN CLAY, reddish-brown to grayish-brown with laminatios of brown, very stiff to hard. (Glaciofluvium)	22				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-27 (cont.)**

LOCATION: N: 212677.165, E: 551403.522 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
797.3	96.0		LEAN CLAY, reddish-brown to grayish-brown with laminatios of brown, very stiff to hard. (Glaciofluvium) *(continued)*					
792.3	101.0		END OF BORING. Water observed at 12 feet while drilling. Boring then grouted.	30				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-31**

LOCATION: N: 212415.495, E: 551003.074 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.9	0.0					
892.4	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown, moist, medium dense. (Lacustrine)	11		
888.9	4.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, orange-brown to grayish-brown with rust at 7' sample depth, loose to medium dense. (Lacustrine)	9		
				15		
				12	▽	
880.9	12.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, grayish-brown, waterbearing, medium dense. (Glaciofluvium)	22		
				23		
				16		
869.9	23.0					
		ML	SANDY SILT, gray, wet, medium dense. (Glaciofluvium)	15		
866.9	26.0					
			END OF BORING. Water observed at 11 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-32**

LOCATION: N: 212330.333, E: 551226.541 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
893.5	0.0							
892.5	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, very loose to loose. (Lacustrine)	2				
				7		5	5	
886.5	7.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, orange-brown, moist to wet, loose to medium dense. (Lacustrine)	11				
				9				
881.5	12.0							
		SM	SILTY SAND, fine-grained, grayish-brown, waterbearing, very loose to medium dense. (Lacustrine)	6	▽			
				2		23	29	
				12				
870.5	23.0							
		CL-ML	SILTY CLAY, gray, wet, loose. (Glaciofluvium)					
867.5	26.0			9		23	96	LL = 27 PI = 6
			END OF BORING.					
			Water observed at 13 feet while drilling.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-33**

LOCATION: N: 212183.655, E: 550725.056 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
895.7	0.0							
894.7	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown to light brown, moist, very loose to loose. (Lacustrine)	4				
				6				
				7				
886.7	9.0	SM	SILTY SAND, fine-grained, brown to grayish-brown, moist, medium dense. (Glaciofluvium)	13				
				11				
881.7	14.0	SM	SILTY SAND, fine-grained, grayish-brown, waterbearing, medium dense. (Glaciofluvium)		▽			
				14				
877.7	18.0	ML	SANDY SILT, gray, wet, medium dense. (Glaciofluvium)					
				14		22	55	
873.7	22.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose. (Glaciofluvium)					
869.7	26.0			7				
			END OF BORING. Water observed at 14 feet while drilling. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-34**

LOCATION: N: 212181.205, E: 550971629 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
894.3	0.0							
893.3	1.0	SM	SILTY SAND, dark brown, moist. (Topsoil)					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to brown, moist, loose to medium dense. (Lacustrine)	5				
				12				
885.3	9.0			11		11	6	
		SP-SM	POORLY GRADED SAND with SILT,fine-grained, orange-brown, moist to wet, medium dense. (Lacustrine)	11				
880.3	14.0			11	▽			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, grayish-brown, waterbearing, very loose. (Lacustrine)	4				
876.3	18.0							
		SM	SILTY SAND, fine-grained, grayish-brown, waterbearing, medium dense. (Lacustrine)	13				
868.3	26.0			13				
			END OF BORING. Water observed at 14 feet while drilling. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-35**

LOCATION: N: 212022.662, E: 551147.722 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
896.0	0.0					
895.5	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to brown, moist, very loose to loose. (Lacustrine)	3		
				7		
				10		
				10		
				8		
				8	▽	
879.0	17.0	SM	SILTY SAND, fine-grained, grayish-brown to gray, waterbearing, medium dense. (Glaciofluvium)			
				13		
870.0	26.0			11		
			END OF BORING.			
			Water observed at 16 feet while drilling.			
			Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-40**

LOCATION: N: 211680.392, E: 550589.817 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/22/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
893.7	0.0					
893.2	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SM	SILTY SAND, fine-grained, dark brown, moist, very loose. (Lacustrine)	2		
889.7	4.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to grayish-brown with rust at 10' sample depth, moist, very loose to medium dense. (Lacustrine)	3		
						Silty Sand 0' to 4' Poorly Graded Sand w Silt 4' to 26'
				8		
				9		
				11	▽	
879.7	14.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, grayish-brown to gray, waterbearing, loose to medium dense. (Lacustrine)	6		
				16		
867.7	26.0			24		
			END OF BORING. Water observed at 13 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-41**

LOCATION: N: 211684.376. E: 550897.834 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.5	0.0					
891.8	0.7	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to brown, moist, loose to medium dense. (Lacustrine)	15		
				8		Poorly Graded Sand w Silt 0.7' to 12' Silty Sand 12' to 22'
				12		
				12		
880.5	12.0				▽	
		SM	SILTY SAND, fine-grained, brownish-gray, waterbearing, loose to medium dense. (Lacustrine)	10		
				17		
				16		
870.5	22.0					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose. (Lacustrine)	7		
866.5	26.0					
			END OF BORING. Water observed at 12 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-42 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **885.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sandy silt and silty sand, with gravel, surface roots, trace roots, brown and dark brown	FILL	29	M	SS	14					
3	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, brown, a little brownish gray and gray		23	M	SS	8					
6			10	M	SS	7					
8			20	M	SS	16					
10	SAND WITH SILT, fine grained, brownish gray to gray and black, medium dense, lenses and laminations of organic silt (SP-SM)	COARSE ALLUVIUM OR TOPSOIL	17	M	SS	19					
12	SAND, medium to fine grained, brown and gray, waterbearing, loose, lenses of sandy silt (SP)	COARSE ALLUVIUM	5	W	SS	4					
15	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL)	TILL	7	M	SS	8	22				
21			8	M	SS	15	16				
26			13	M	SS	18	16				
	END OF BORING Northing=211590.1 Easting=551980.4										

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA
9½'-24½'	RD w/DM

BORING COMPLETED: **6/21/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/21/07	**11:45**	**11.5**	**9.5**	**10.3**		**10.1**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-43 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **890.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, trace roots, brown and dark brown		11	M	SS	16	13				
3	SAND WITH SILT, trace roots, brown mottled to grayish brown, moist, dense, lenses and laminations of organic silt (SP-SM) (possible fill)	COARSE ALLUVIUM OR FILL	31	M	SS	14					
5	SAND WITH SILT, light brown and gray mottled, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	22	W	SS	16	20				
8	SILTY SAND, a little gravel, gray, medium dense (SM)	TILL	25	M	SS	14	11				
10	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL)		8	M	SS	15	18				
13			6	M	SS	21	17				
16			9	M	SS	20	18				
21			8	M	SS	22	15				
26			6	M	SS	21	23				
	END OF BORING Northing=211683.6 Easting=552398.6										

DEPTH:	DRILLING METHOD
0-9½'	**3.25" HSA**
9½'-24½'	**RD w/DM**
BORING COMPLETED:	**6/25/07**
DR: **SG**	LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/25/07	**8:15**	**6.5**	**4.5**	**5.5**		**None**
6/25/07	**8:20**	**9.0**	**7.0**	**7.6**		**6.8**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-44 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 888.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and clayey sand, a little gravel, trace roots, surface roots, pieces of plastic and concrete, brown and dark brown	FILL	5	M	SS	16	9 13				
3	SANDY LEAN CLAY, a little gravel, gray and brown mottled, firm, laminations of silty sand (CL)	TILL	8	M	SS	7	16				
6	SANDY LEAN CLAY, a little gravel, grayish brown, a little brown, stiff, laminations of silty sand (CL)		11	M	SS	19	17				
8	SANDY LEAN CLAY, a little gravel, dark gray, a little brown, stiff, laminations of silty sand (CL)		9	M	SS	18	15				
11			10	M	SS	16	16				
13	SANDY LEAN CLAY, a little gravel, dark gray, firm to stiff (CL)		9	M	SS	3	17				
16			8	M	SS	21	15				
21			9	M	SS	21	14				
26			11	M	SS	20	15				
	END OF BORING Northing=211684.3 Easting=552896.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	6/22/07	**11:45**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **6/22/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-45 RI-3008-18**

LOCATION: N: 211681.830, E: 553399.700 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.4	0.0	FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, moist.	26		
888.4	4.0	FILL	FILL: Clayey Sand, trace of Roots, brown to dark gray.	12	▽	Fuel Odor
885.4	7.0	FILL	FILL: Silty Sand, fine-grained, waterbearing, medium dense.	12		
883.9	8.5		END OF BORING. (Per Tetra Tech). Water observed at 6 1/2 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-46**

LOCATION: N: 211683.156, E: 553897.273 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
895.4	0.0					
894.4	1.0	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.			
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel with Wood fragments at 8' sample depth, reddish brown to gray moist to wet.	12		
				14		
				5		
				2	▽	
883.4	12.0	PT	PEAT, dark gray, wet. (Swamp Deposit)	3		
				3		
				5		
873.4	22.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, waterbearing, medium dense. (Glacial Outwash)			
869.4	26.0			11		
			END OF BORING. Water observed at 11 feet while drilling. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45 (See Descriptive Terminology sheet for explanation of abbreviations)

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-47 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **893.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SAND WITH SILT, surface roots, trace roots, fine grained, brown, a little dark brown, moist, very loose (SP-SM) (possible fill)	COARSE ALLUVIUM OR FILL	4	M	SS	13					
2	SAND WITH SILT, trace roots, fine grained, light brown and brown mottled, moist, very loose (SP-SM) (possible fill)		7	M	SS	15					
4	SAND WITH SILT, trace roots, fine grained, light brown and brown mottled, moist, loose, lenses and laminations of silty sand (SP-SM) (possible fill)	COARSE ALLUVIUM	8	M	SS	17					
7	SILTY SAND, fine grained, brown, moist, loose (SM) (possible fill)										
8	SAND WITH SILT, fine grained, light grayish brown, a little brown mottled, moist, loose (SP-SM)		10	M	SS	16					
10	SAND WITH SILT, trace roots, fine grained, light grayish brown, a little brown. moist, loose, laminations of silty sand (SP-SM)		9	M	SS	17					
12	SAND WITH SILT, fine grained, light grayish brown, waterbearing, loose to dense (SP-SM)		9	W	SS	16					
16			11	M	SS	15					
21			41	M	SS	18					
23	SAND WITH SILT, a little gravel, fine grained, gray, waterbearing, loose (SP-SM)										
25	CLAYEY SAND, a little gravel, gray, stiff (SC)	TILL	10	M	SS	18	17				
26	**END OF BORING** Northing=211436.0 Easting=550652.0										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½' 3.25" HSA							
14½'-24½' RD w/DM	**6/19/07**	**10:30**	**14.0**	**12.0**	**12.1**		**None**
	6/19/07	**10:35**	**16.5**	**14.5**	**14.5**		**14.4**
BORING COMPLETED: **6/19/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

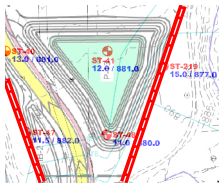
Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-48**

LOCATION: N: 211431.925, E: 550895.208 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
890.9	0.0							
889.4	1.5	FILL	FILL: Silty Sand, trace of Roots and concrete debris, dark brown, moist.					
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, orange-brown to light brown, moist, loose. (Lacustrine)	5				
				10				
879.9	11.0			10	▽			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown to gray, waterbearing, very loose to loose. (Lacustrine)	6				
				4		22	11	
872.9	18.0							
		SM	SILTY SAND, fine-grained, grayish-brown to gray, waterbearing, medium dense. (Lacustrine)	8				
864.9	26.0			14				
			END OF BORING. Water observed at 11 feet while drilling. Boring then grouted.					



Fill (silty sand) 0' to 1.5'
Poorly Graded Sand w Silt 1.5' to 18'
Silty Sand 18' to 26'

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-50**

LOCATION: N: 211197.779, E: 550740.041 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/22/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
882.8	0.0							
881.8	1.0	FILL	FILL: Silty Sand, very fine- to fine-grained, trace of Roots, dark brown, moist.					
		FILL	FILL: Clayey Sand, asphalt and concrete debris, trace of Roots, dark gray, moist.	15		8	16	OC = 2%
878.8	4.0	FILL	FILL: Poorly Graded Sand with Silt, very fine- to fine-grained, brown, moist.	11				
875.8	7.0	SM	SILTY SAND, slightly Organic, dark gray, wet, very loose. (Swamp Deposit)	3				
				3	▽	39	34	OC = 4 LL = 34 PI = 1
870.8	12.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft to rather stiff. (Glacial Till)	4				
				10				
				5				
856.8	26.0			7				
			END OF BORING.					
			Water observed at 11 feet while drilling.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-51**

LOCATION: N: 211184.241, E: 550897.404 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/21/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
881.2	0.0							
880.4	0.8	FILL	FILL: Silty Sand, very fine- to fine-grained, trace of Roots, dark brown, moist.					
		FILL	FILL: Silty Sand, very fine- to fine-grained, mixed dark brown to brown, moist.	8				
				2		13	15	OC = 2%
874.2	7.0	SM	SILTY SAND, fine-grained, trace of fibers, dark gray, moist, very loose. (Swamp Deposit)	3	▽	28	17	OC = 3
				4				
869.2	12.0	SM	SILTY SAND, fine-grained, dark gray, waterbearing, loose. (Lacustrine)	5				
				5				
864.2	17.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)					
				6				
855.2	26.0		END OF BORING. Water observed at 9 feet while drilling. Boring then grouted.	6				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-52 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **885.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4.5" Bituminous Pavement	FILL			SU						
1	FILL, mixture of clayey sand and silty sand, with gravel, trace roots, brown and light brownish gray		12	M	SS	12	10				
2											
3	FILL, mixture of sand, silty sand and clayey sand, a little gravel, pieces of wood at about 5', brown, light brownish gray and black		18	M	SS	19					
4											
5											
6			41	M	SS	19					
7				▽							
8			14	W	SS	17					
9											
10											
11			16	▼	SS	17					
12											
13	SAND WITH SILT, fine grained, gray, a little black, waterbearing, very loose, laminations of silty sand (SP-SM)	COARSE ALLUVIUM	4	W	SS	14					
14	CLAYEY SAND, a little gravel, dark gray, soft (SC)	TILL					19				
15											
16	CLAYEY SAND, gray, a little brown, soft, laminations of silty sand (SC)		4	M	SS	19	20				
17											
18											
19	SANDY LEAN CLAY, a little gravel, gray, soft to firm (CL)										
20											
21			4	M	SS	19	20				
22											
23											
24											
25											
26			7	M	SS	17	19				
	END OF BORING Northing=211278.6 Easting=551665.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14½' 3.25" HSA							
14½'-24½' RD w/DM	**6/21/07**	**10:45**	**14.0**	**12.0**	**12.4**		**10.9**
BORING COMPLETED: **6/21/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-53 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 885.5

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–2	FILL, mostly sand with silt, with gravel, surface roots, trace roots, dark brown and brown	FILL	13	M	SS	12					
3–6	FILL, mixture of silty sand and sand with silt, trace roots, brown, light brown, a little black		9	M	SS	13					
			16	M	SS	8					
7–11	SILTY SAND, fine grained, brown, moist to about 9.5', then wet, medium dense, lenses and laminations of sand with silt (SM)	COARSE ALLUVIUM	21	W/M	SS	17					
			18	W	SS	19					
12–14	CLAYEY SAND, a little gravel, brownish gray, firm (SC)	TILL	6	M	SS	24	19				
15–26	SANDY LEAN CLAY, a little gravel, brownish gray, stiff (CL)		13	M	SS	23	19				
			10	M	SS	21	16				
			12	M	SS	24	17				
	END OF BORING Northing=211190.3 Easting=551897.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½' 3.25" HSA							
9½'-24½' RD w/DM	6/21/07	1:00	11.5	9.5	10.6		10.3
BORING COMPLETED: 6/21/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-54 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **888.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, dark brown and brown, pieces of brick	FILL	18	M	SS	16					
2											
3			56	W/M	SS	1	19				
4											
5	CLAYEY SAND, brown and gray mottled, very soft, laminations of silty sand and sand with silt (SC)	WEATHERED TILL	4	W/M	SS	17					
6							22				
7	SANDY LEAN CLAY, a little gravel, gray, soft to stiff (CL)	TILL									
8			5	M	SS	19	18				
9											
10											
11			15	M	SS	19	16				
12											
13			8	M	SS	24	17				
14											
15											
16			9	M	SS	23	14				
17											
18											
19											
20											
21			10	M	SS	24	19				
22											
23											
24											
25											
26			10	M	SS	24	16				
	END OF BORING Northing=211160.7 Easting=552421.7										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/25/07**	**9:30**	**9.0**	**7.0**	**8.5**		**None**
BORING COMPLETED: **6/25/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-55 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **892.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, a little gravel, trace roots, pieces of bituminous, brown, gray and black	FILL	12	M	SS	13	10				
3	SANDY LEAN CLAY, a little gravel, gray and brown mottled, firm, laminations of silty sand and silt (CL)	WEATHERED TILL	7	M	SS	14	18				
5	SANDY LEAN CLAY, a little gravel, light brownish gray, a little brown, stiff to very stiff, laminations of silty sand (CL)	TILL	9	M	SS	22	17				
8			16	M	SS	22	16				
10	SANDY LEAN CLAY, a little gravel, dark gray, a little brown, stiff to firm, laminations of silty sand (CL)		14	M	SS	18	16				
13			11	M	SS	20	16				
16			10	M	SS	21	17				
21			8	M	SS	19	15				
26			13	M	SS	24	15				
	END OF BORING Northin=211171.6 Easting=552889.1										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/22/07**	**11:00**	**26.5**	**24.5**	**25.0**		**None**
BORING COMPLETED: **6/22/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-57 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **893.6**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	4.25" Bituminous Pavement	FILL									
1	FILL, mixture of sand with silt and silty sand, light brown and brown			M	SU						
3			67	M	SS	18					
5			44	M	SS	18					
7	FILL, mixture of sand with silt and silty sand, a little gravel, brown, dark brownish gray and black		64	M	SS	23					
10			78	M	SS	17					
13			5	M	SS	14					
15			12	M	SS	17					
18			38	W/M	SS	19					
20			14	M	SS	17					
22	SAND WITH SILT, trace roots, fine grained, brownish gray, a little black, waterbearing, medium dense, laminations of organic silt (SP-SM)	TOPSOIL OR COARSE ALLUVIUM	19	W/M	SS	19					
24	SAND, fine grained, brownish gray, waterbearing, medium dense, lense of fine to medium grained sand (SP)	COARSE ALLUVIUM	14	W	SS	22					
26	SANDY LEAN CLAY, a little gravel, brownish gray, stiff (CL)	TILL					15				
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA							
24½'-29½' RD w/DM	**6/19/07**	**12:15**	**24.0**	**22.0**	**22.4**		**None**
	6/19/07	**12:20**	**26.5**	**24.5**	**24.1**		**22.5**
BORING COMPLETED: **6/19/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-57 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30 – 31 –	SANDY LEAN CLAY, a little gravel, brownish gray, stiff (CL) *(continued)*	TILL *(continued)*	9	M	SS	24	15				
	END OF BORING Northing=211018.6 Easting=550730.8										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-59 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **884.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, pieces of bituminous, surface roots, trace roots, brown and dark brown	FILL	10	M	SS	14					
2											
3	FILL, mixture of sand with silt and silty sand, a little gravel, trace roots, brown and dark brown		26	M	SS	16					
4											
5											
6			28	M	SS	19					
7											
8			23	M	SS	17					
9											
10	FILL, mixture of organic clay and silty sand, trace roots, black and brown						17				
11			13	M	SS	17					
12	LEAN CLAY WITH ORGANICS, trace roots, black, a little gray, stiff, laminations of sand (CL)	TOPSOIL		▼			24				
13	SAND, fine grained, light brownish gray, waterbearing, medium dense (SP)	COARSE ALLUVIUM	11	W	SS	17					
14											
15	SAND, a little gravel, fine grained, brownish gray, a little black, waterbearing, very loose, laminations of organic silt (SP)										
16			4	W	SS	16					
17											
18	SAND WITH SILT, fine grained, light brownish gray, waterbearing, dense (SP-SM)										
19											
20											
21			37	W	SS	18					
22											
23	SILTY SAND, fine grained, light brownish gray, wet, dense (SM)										
24											
25											
26			31	W	SS	18					
	END OF BORING Northing=210936.8 Easting=550917.0										

Fill (silty sand) 0' to 2'
Fill (sand w silt) 2' to 9'
Fill (organic clay) 9' to 11'
topsoil 11' to 12'
Sand 12' to 18'
Sand w silt 18' to 23'

DEPTH:	DRILLING METHOD
0-14½'	3.25" HSA
14½'-20½'	RD w/DM

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/19/07	1:40	14.0	12.0	12.2		12.1

BORING COMPLETED: **6/19/07**

DR: **SG** LG: **SB** Rig: **91C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-60 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **883.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–2	FILL, mixture of silty sand, sandy silt and organic silt, a little gravel, trace roots, brown, dark brown and black	FILL	10	M	SS	14					
3–4	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, organic clay, trace roots, brown, a little light brown and black		16	M	SS	14					
5–6			4	W/M	SS	14					
7–8											
9			3	~~M~~	SS	14					
10–11			5	W	SS	17					
12–13											
14			13	W	SS	12					
15–16	SAPRIC PEAT, black, laminations of waterbearing sand (PT)	SWAMP DEPOSIT	WH	W	SS	19	48				
17–18	SAND, fine grained, gray to brownish gray, waterbearing, medium dense (SP)		12	W	SS	16					
19–20											
21			22	W	SS	19					
22–24											
25–26			28	W	SS	21					
	END OF BORING Northing=210929.3 Easting=551151.1										

Fill (silty sand) 0' to 14'
Sapric Peat 14' to 16.5'
Sand 16.5' to 26'

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA
9½'-24½'	RD w/DM

BORING COMPLETED: **6/19/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/19/07	2:45	9.0	7.0	7.0		None
6/19/07	2:50	11.5	9.5	9.0		8.0

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-61 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **885.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	5" Bituminous Pavement	FILL			SU						
1	FILL, mixture of silty sand and sand with silt, a little gravel, trace roots, brown and gray		20	M	SS	14					
3			32	M	SS	17					
6			39	M	SS	19					
7	CLAYEY SAND, black, a little gray, hard, laminations of sand with silt (SC)	TOPSOIL					13				
8	SILTY SAND, fine grained, light brownish gray, moist, dense (SM)	COARSE ALLUVIUM	38	M	SS	20					
10	SILTY SAND, fine grained, gray, wet, loose (SM)		8	W	SS	18					
12	SAND WITH SILT, trace roots, fine grained, gray, a little black, waterbearing, medium dense, laminations of clayey sand (SP-SM)		12	W	SS	14					
15			11	W	SS	10					
18			10	W	SS	15					
19	SAND WITH SILT, fine grained, gray, waterbearing, medium dense (SP-SM)										
20			21	W	SS	17					
25			22	W	SS	15					
26	**END OF BORING** Northing=210988.6 Easting=551565.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½' 3.25" HSA							
9½'-24½' RD w/DM	6/21/07	9:30	11.5	9.5	9.7		9.4
BORING COMPLETED: 6/21/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-62**

LOCATION: N: 210796.368, E: 550782.855 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
884.3	0.0							
883.8	0.5	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.					
		FILL	FILL: Silty Sand, very fine- to fine-grained, trace of Gravel, mixed with Poorly Graded Sand, light brown to brown, moist.	18				
				22				
				14				
				7				
872.3	12.0				▽			
		SM	SILTY SAND, fine-grained, trace of Roots, slightly Organic, dark gray, waterbearing, loose. (Swamp Deposit)	6		25	17	OC = 2%
870.3	14.0							
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose. (Lacustrine)	5				
866.3	18.0							
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium to rather stiff. (Glacial Till)	7				
				10				
858.3	26.0							
			END OF BORING.					
			Water observed at 12 feet while drilling.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-63**

LOCATION: N: 210687.940, E: 550637.026 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
886.1	0.0	FILL	FILL: Poorly Graded Sand with Silt, fine-grained, trace of Gravel, mostly brown mixed with dark brown, moist.	23		
				17		
877.1	9.0			23		
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown to grayish-brown, loose. (Lacustrine)	7		
872.1	14.0			6	▽	
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, very loose. (Lacustrine)	3		
868.1	18.0					
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft to rather stiff. (Glacial Till)	5		
860.1	26.0			10		
			END OF BORING. Water observed at 14 feet while drilling. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP060587L.GPJ BRAUN.GDT 10/2/07 14:45 (See Descriptive Terminology sheet for explanation of abbreviations)

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-64 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **883.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	2.25" Bituminous Pavement	FILL			SU						
1	FILL, mixture of gravelly sand with silt and clayey sand, trace roots, brown		7	M	SS	12					
2											
3	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, brown, a little dark brown, gray and black		12	M	SS	16	11				
4											
5											
6			32	M	SS	19	7				
7											
8	FILL, mixture of silty sand and organic clay, trace roots, brownish gray and black		25	M	SS	20					
9											
10	SAPRIC PEAT, black (PT)	SWAMP DEPOSIT									
11	SILTY SAND, trace roots, fine grained, gray and black, wet very loose, laminations of organic silt (SM)	COARSE ALLUVIUM	3	M	SS	14					
12											
13			3	W	SS	12					
14											
15	SANDY LEAN CLAY, a little gravel, gray, firm to stiff, laminations of sand (CL)	TILL									
16			6	M	SS	12	14				
17											
18											
19											
20											
21			6	M	SS	22	16				
22											
23											
24											
25											
26			12	M	SS	22	17				
	END OF BORING Northing=210683.3 Easting=550895.7										

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA
9½'-24½'	RD w/DM
BORING COMPLETED:	6/20/07
DR: SG	LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/20/07	3:35	11.5	9.5	10.9		10.2

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-65 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **886.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4.5" Bituminous Pavement	FILL			SU						
1-2	FILL, mixture of silty sand, sand with silt and clayey sand, with gravel, trace roots, dark brown, light brown and gray		14	M	SS	13					
3-4	SAND WITH SILT, fine grained, light brown and brown mottled, moist, medium dense, laminations of silty sand (SP-SM)	COARSE ALLUVIUM	22	M	SS	19					
5-6	SAND WITH SILT, fine grained, light brown, moist to waterbearing, medium dense (SP-SM)		23	W	SS	17					
7-9	SAND WITH SILT, fine grained, brownish gray, a little black, w[illegible] then moist, medium [illegible] sand (SP-SM)		15	M	SS	17					
10				▼							
11			14	M	SS	20					
12-13	SAND WITH SILT, trace roots, fine grained, gray and black, moist, medium dense, lenses of organic silt (SP-SM)										
13-14	SAND, fine grained, gray and light grayish brown mottled, waterbearing, medium dense (SP)		12	W	SS	19					
15-16	SANDY SILT, gray and brownish gray, wet, loose, lenses and laminations of lean clay (ML)	FINE ALLUVIUM	8	M	SS	17					
17-18											
19-20	CLAYEY SAND, a little gravel, gray, stiff, laminations of wet silty sand (SC)	TILL									
21			9	M	SS	20	14				
22-23											
24	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
25-26			13	M	SS	19	19				
	END OF BORING Northing=210684.0 Easting=551396.3										

Fill (silty sand) 0.3' to 2.5'
Sand w Silt 2.5' to 12'
Sand 12' to 14.5'
Sandy Silt 14.5' to 18'
Clayey Sand 18' to 23'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-12' 3.25" HSA							
12'-24½' RD w/DM	**6/21/07**	**8:20**	**14.0**	**12.0**	**12.1**		**10.0**
BORING COMPLETED: **6/21/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-66 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **888.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS: WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, trace roots, dark brown	FILL	20	M	SS	19					
2	FILL, mixture of sand with silt and silty sand, a little gravel, trace roots, light brown and brown										
3	SILTY SAND, fine grained, brown, moist, medium dense (SM)	COARSE ALLUVIUM	20	M	SS	18					
4											
5	SAND WITH SILT, fine grained, light grayish brown to brown mottled, moist, medium dense, laminations of silty sand (SP-SM)										
6			15	M	SS	15					
7											
8	SAND WITH SILT, fine grained, light brownish gray and brown mottled, moist to about 9.5', then waterbearing, medium dense to loose (SP-SM)		18	M	SS	18					
9											
10											
11			12	W	SS	17					
12											
13			6	W	SS	14					
14											
15	SILTY SAND, a little gravel, fine to medium grained, gray, wet, very loose (SM)		2	W	SS	13					
16											
17											
18	CLAYEY SAND, a little gravel, gray, soft (SC)	TILL									
19											
20											
21			4	M	SS	24	18				
22											
23	SANDY LEAN CLAY, a little gravel, gray, firm (CL)										
24											
25											
26			7	M	SS	24	21				
	END OF BORING Northing=210683.5 Easting=551850.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½' 3.25" HSA							
9½'-24½' RD w/DM	**6/21/07**	**2:05**	**11.5**	**9.5**	**10.2**		**10.0**
BORING COMPLETED: **6/21/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-67 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **888.7**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly organic silt, surface roots, trace roots,dark brown and black	FILL	8	M	SS	15					
2	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, dark brown, brown and light brown										
3	SAND WITH SILT, a little gravel, light brown to light brown mottled, waterbearing, loose to medium dense (SP-SM)	COARSE ALLUVIUM	17	M	SS	14					
4											
5			17	▼	SS	15					
6											
7											
8			21	W	SS	17					
9											
10			9	W	SS	15					
11											
12	CLAYEY SAND, a little gravel, gray, stiff (CL)	TILL									
13			9	M	SS	10	17				
14											
15	SANDY LEAN CLAY, a little gravel, gray, firm to stiff		6	M	SS	17	15				
16											
17											
18											
19											
20			11	M	SS	16	17				
21											
22											
23											
24											
25			10	M	SS	18	18				
26											
	END OF BORING Northing=210683.4 Easting=552397.5										

Fill (silty sand) 0.7' to 3'
Sand w Silt 3' to 12'
Clayey Sand 12' to 14.5'
Sandy Lean Clay 14.5' to 26'

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA
9½'-24½'	RD w/DM

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/22/07	8:40	9.0	7.0	6.8		6.0

BORING COMPLETED: **6/22/07**

DR: **SG** LG: **SB** Rig: **91C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-68 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **895.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and sand with silt, a little gravel, surface roots, trace roots, light brown, brown and dark brown	FILL	13	M	SS	12					
3			16	M	SS	6					
5			12	M	SS	14					
7	ORGANIC CLAY, trace roots, black, soft (OL/OH)	TOPSOIL OR SWAMP DEPOSIT	3	M	SS	10	39				
9	SAND WITH SILT, a little gravel, brown and gray, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	28	W	SS	17					
12	LEAN CLAY, gray and black, stiff, lenses of sandy lean clay, laminations of fat clay (CL)	TILL	14	M	SS	24	16				
14	SANDY LEAN CLAY, a little gravel, gray, firm to stiff, laminations of lean clay (CL)		5	M	SS	6					
20			11	M	SS	19	17				
25			12	M	SS	21	18				
	END OF BORING Northing=210684.3 Easting=552897.4										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-4½' 3.25" HSA							
4½'-24½' RD w/DM	6/22/07	1:00	6.5	4.5	6.0		5.2
BORING COMPLETED: 6/22/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-69 RI-3002-05**

LOCATION: N: 210744.173, E: 553428.679 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
894.8	0.0					
893.8	1.0	FILL	FILL: Poorly Graded Sand with Silt, trace of Gravel, dark brown, moist.			
		SM	SILTY SAND, fine-grained, gray, moist, loose. (Lacustrine)	8		
890.8	4.0				▽	
		SP-SM	POORLY GRADED SAND with SILT, trace of Gravel, brown, waterbearing, very loose to loose. (Lacustrine)	10		
				7		
				3		
880.8	14.0			10		
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium to rather stiff. (Glacial Till)	10		
				8		
868.8	26.0			10		
			END OF BORING.			
			Water observed at 4 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587I.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-70**

LOCATION: N: 210240.974. E: 550584.304 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
885.0	0.0					
883.5	1.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, orange-brown, moist, loose. (Lacustrine)	9		
				9		
878.0	7.0				▽	
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to gray with rust, waterbearing, very loose to loose. (Lacustrine)	4		
				4		
				8		
871.0	14.0					
		CL	SANDY LEAN CLAY, trace of Gravel, gray,w et, medium to rather stiff. (Glacial Till)	9		
				6		
859.0	26.0			9		
			END OF BORING. Water observed at 7 feet while drilling. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-71 RI-1015-01**

LOCATION: N: 210151.469. E: 550929.912 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
887.3	0.0					
887.1	0.3	PAV	3" of Bituminous			
885.8	1.5	FILL	FILL: Poorly Graded Sand with Silt, fine-grained, trace of Gravel, brown, moist.			
		SP-SM	POORLY GRADED SAND with SILT,fine-grained, light brown to orange-brown, moist, loose to medium dense. (Lacustrine)	16		
				7		
880.3	7.0				▽	
		SP-SM	POORLY GRADED SAND with SILT,fine-grained, brownish-gray to gray, waterbearing, very loose to loose. (Lacustrine)	4		
				10		
875.3	12.0					
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff to very stiff. (Glacial Till)	25		
				14		
				11		
861.3	26.0			11		
			END OF BORING.			
			Water observed at 7 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-72 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **887.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and sand, light brown, brown and dark brown	FILL	6	M	SS	14					
3			3	W	SS	12					
5				▼							
7			7	W	SS	15					
8	SAND WITH SILT, fine to medium grained, a little gravel, brown, waterbearing, loose (SP-SM)	COARSE ALLUVIUM	6	W	SS	14					
10	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, waterbearing, loose (SP-SM)	TILL	5	M	SS	18	16				
12	CLAYEY SAND, a little gravel, gray, firm (CL)										
13			6	M	SS	14	15				
15											
16			7	M	SS	15	14				
18	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
21			9	M	SS	23	17				
25											
26			12	M	SS	23	16				
	END OF BORING Northing=210217.1 Easting=551467.5										

Fill (silty sand) 0' to 7'
Sand w Silt 7' to 10'
Clayey Sand 10' to 18'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/26/07**	**11:55**	**6.5**	**4.5**	**4.9**		**4.8**
	6/26/07	**12:20**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **6/26/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-73 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **891.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand, sand with silt and sandy silt, a little gravel, surface roots, trace roots, dark brown, black and gray	FILL	8	M	SS	12					
3			6	M	SS	8					
5	LEAN CLAY WITH ORGANICS, trace roots, black, firm (CL)	TOPSOIL	6	M	SS	14	23				
7	SAND WITH SILT, fine grained, gray and brown mottled, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	13	W	SS	16					
10	SAND WITH SILT, a little gravel, fine to medium grained, brown, a little gray mottled, waterbearing, medium dense (SP-SM)		22	W	SS	17					
12	SAND WITH SILT, fine grained, light brownish gray, waterbearing, medium dense (SP-SM)		25	W	SS	16					
15	SANDY LEAN CLAY, a little gravel, gray, firm (CL)	TILL	6	M	SS	15	24				
18	CLAYEY SAND, a little gravel, gray, firm (SC)		5	M	SS	24	19				
23	SANDY LEAN CLAY, a little gravel, gray, firm (CL)		7	M	SS	17	18				
26	**END OF BORING** Northing=210182.9 Easting=551898.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½' 3.25" HSA							
9½'-24½' RD w/DM	6/21/07	3:00	11.5	9.5	10.0		9.0
BORING COMPLETED: 6/21/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-74 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **891.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, a little gravel, surface roots, trace roots, brown	FILL	15	M	SS	15					
3	FILL, mixture of clayey sand and silty sand, a little gravel, trace roots, brown		14	M	SS	18	15				
6	SAND WITH SILT, a little gravel, fine to medium grained, light brown, waterbearing, loose to medium dense, laminations of silty sand (SP-SM)	COARSE ALLUVIUM	6	M	SS	13					
8			13	W	SS	15					
11	SAND WITH SILT, a little gravel, fine to medium grained, gray, medium dense (SP-SM)		19	W	SS	19	17				
12	CLAYEY SAND, a little gravel, gray, firm to very stiff (SC)	TILL									
13			7	M	SS	18	17				
16			10	M	SS	17	13				
18	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
21			10	M	SS	14	17				
26			13	M	SS	24	14				
	END OF BORING Northing=210212.8 Easting=552416.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	6/7/07	**3:05**	**6.5**	**4.5**	**4.8**		**None**
	6/27/07	**3:10**	**9.0**	**7.0**	**7.0**		**6.4**
BORING COMPLETED: **6/27/07**	**6/27/07**	**3:35**	**26.5**	**24.5**	**26.5**		**None**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-75 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **898.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–4	SAND WITH SILT, fine to medium grained, a little gravel, surface roots, trace roots, brown (SP-SM) (possible fill)	COARSE ALLUVIUM OR FILL	8	M	SS	10					
			15	M	SS	10					
5–6	CLAYEY SAND, a little gravel, brown, light brown and gray mottled, firm, lenses and laminations of sand with silt (SC)	MIXED ALLUVIUM					14				
6–7	SAND WITH SILT, a little gravel, trace roots, brown, waterbearing, loose (SP-SM)	COARSE ALLUVIUM	7	W/M	SS	14					
8–9	SANDY SILT, a little gravel, trace roots, gray, wet, medium dense (ML)	FINE ALLUVIUM	12	W	SS	NR					
10–12	CLAYEY SAND, a little gravel, brownish gray, stiff (SC)	TILL	10	W	SS	13	14				
13–17	SANDY LEAN CLAY, a little gravel, dark gray, firm to stiff (CL)		7	W	SS	21	19				
			10	W	SS	18	18				
21–26			12	M	SS	18	16				
			13	M	SS	17	11				

END OF BORING
Northing=210184.0
Easting=552897.6

DEPTH:	DRILLING METHOD
0-4½'	3.25" HSA
4½'-24½'	RD w/DM
BORING COMPLETED:	6/25/07
DR: SG	LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/25/07	10:30	6.5	4.5	4.9		4.3

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4001-02 ST-76**

LOCATION: N: 210133.678, E: 553362.349 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: 7/23/07 | SCALE: 1" = 4'

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
907.0	0.0					
906.0	1.0	FILL	FILL: Silty Sand, fine-grained, with Organics and Gravel, dark brown, moist.			
		FILL	FILL: Silty Sand, fine- to coarse-grained, with Gravel, brown, moist.	19		
			Petroleum odor at 5 1/2 feet.	32		
900.0	7.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, medium to rather stiff. (Glacial Till)	8		
				9		
893.0	14.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, moist, medium. (Glacial Till)	9		
				7		
				7		
881.0	26.0			7		
			END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-77**

LOCATION: N: 209775.961, E: 550699.340 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/26/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.4	0.0					
891.4	1.0	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.			
		FILL	FILL: Silty Sand, fine-grained, trace of Gravel, dark brown to brown, moist.	9		
				8		
885.4	7.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to grayish-brown, moist, loose to medium dense. (Lacustrine)	12		
881.4	11.0			7	▽	
		SP-SM	POORLY GRADED SAND with SILT, fine-grained, brownish-gray to gray, wet, very loose to loose. (Lacustrine)	4		
				5		
				10		
870.4	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff. (Glacial Till)	9		
866.4	26.0		END OF BORING. Water observed at 11 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-78**

LOCATION: N: 209684.547, E: 550898.325 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/26/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
886.1	0.0							
884.6	1.5	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.					
879.1	7.0	FILL	FILL: Silty Sand, fine-grained, dark brown mixed with light brown and gray, moist.	3 2				
872.1	14.0	PT	PEAT, fibrous, dark gray, wet, very soft. (Swamp Deposit)	WH WH WH	▽	421	61	
860.1	26.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, very loose to loose. (Lacustrine)	1 4 8				
			END OF BORING. Water observed at 14 feet while drilling. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-79 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **888.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, a little gravel, surface roots, trace roots, dark brown, moist, loose (SM)	TOPSOIL									
2	SILTY SAND WITH GRAVEL, trace roots, brown, moist, loose (SM)	COARSE ALLUVIUM	10	M	SS	16					
3	SAND, fine grained, light brown, moist, loose, laminations of silty sand (SP)		9	M	SS	16					
4											
5											
6	Silty Sand 0' to 2' Sand 2' to 11.5' Sand w Silt 11.5' to 18'		13	W/M	SS	18					
7	SAND, fine grained, light brown, waterbearing, medium dense to loose (SP)										
8			11	W	SS	17					
9											
10											
11			7	W	SS	17					
12	SAND WITH SILT, fine grained, gray, waterbearing, very loose to very dense (SP-SM)										
13			2	W	SS	13					
14											
15											
16			55	W	SS	14					
17											
18											
19	SILTY SAND, a little gravel, gray, waterbearing, very loose (SM)	TILL									
20											
21	SANDY LEAN CLAY, a little gravel, gray, soft to very stiff, laminations of silty sand at 24.5' (CL)		4	W	SS	16	15				
22											
23											
24											
25											
26			17	M	SS	21	16				
	END OF BORING Northing=209686.5 Easting=551325.7										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/26/07**	**1:05**	**9.0**	**7.0**	**7.6**		**7.0**
BORING COMPLETED: **6/26/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-80**

LOCATION: N: 209689.484, E: 551891.038 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/28/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
891.1	0.0	FILL	FILL: Silty Sand, very fine- to fine-grained, trace of Gravel, brown, moist.				
889.1	2.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown and gray mixed with rust, wet. (Glacial Till)	5			
				7		15	
884.1	7.0	CL	SANDY LEAN CLAY, trace of Gravel, grayish-brown, wet, rather stiff to medium. (Glacial Till)	9		14	
				7			
879.1	12.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft to medium. (Glacial Till)	5			
				7		16	
				7			
865.1	26.0			8			
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-81 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **895.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SANDY SILT, a little gravel, surface roots, trace roots, dark brown, moist, loose (ML)	TOPSOIL									
2	SAND WITH SILT, fine grained, a little gravel, trace roots, brown, moist, loose (SP-SM)	COARSE ALLUVIUM	10	M	SS	16					
3			6	M	SS	6					
4	SILTY SAND, trace roots, brown, waterbearing, loose, laminations of lean clay (SM)										
5	SANDY LEAN CLAY, a little gravel, brown and gray mottled, firm (CL)	TILL	7	M	SS	15	16				
6											
7	SANDY LEAN CLAY, a little gravel, brownish gray, a little brown, stiff, laminations of silty sand (CL)		11	M	SS	19	15				
8											
9											
10	CLAYEY SAND, a little gravel, gray, firm (SC)		8	M	SS	22	15				
11											
12	SANDY LEAN CLAY, a little gravel, brownish gray, a little brown, stiff, laminations of silty sand (CL)		13	M	SS	21	16				
13											
14	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL)										
15			8	M	SS	17	15				
16											
17											
18											
19											
20			11	M	SS	20	17				
21											
22											
23											
24											
25			12	M	SS	19	14				
26											
	END OF BORING Northing=209624.8 Easting=552198.7										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/26/07**	**2:55**	**26.5**	**24.5**	**26.0**		**None**
BORING COMPLETED: **6/26/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-82 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **898.6**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, surface roots, trace roots, dark brown	FILL									
2	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, light brown, brown and dark brown		25	M	SS	14					
3			15	M	SS	13					
4											
5											
6			20	M	SS	16					
7	LEAN CLAY WITH ORGANICS, trace roots, gray and black, moist, very stiff, lenses and laminations of silty sand (CL)	TOPSOIL									
8			19	M/W	SS	17	15				
9	SILTY SAND, a little gravel, brownish gray, waterbearing, medium dense (SM)	TILL									
10	CLAYEY SAND, a little gravel, trace roots, gray and brown mottled, soft (SC)										
11			3	M	SS	20	19				
12											
13			4	M	SS	21	17				
14											
15	SANDY LEAN CLAY, gray, firm to stiff (CL)										
16			6	M	SS	21	16				
17											
18											
19											
20											
21			11	M	SS	22	14				
22											
23											
24											
25											
26			15	M	SS	22	15				
	END OF BORING Northing=209687.1 Easting=552381.8										

DEPTH: DRILLING METHOD **0-24½' 3.25" HSA**

BORING COMPLETED: **6/28/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/28/07	**8;15**	**11.5**	**9.5**	**11.2**		**None**
6/28/07	**8:30**	**26.5**	**24.5**	**26.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-83 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 903.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, gravelly, trace roots, brown to dark brown	FILL	25	M	SS	12					
2	Hit gas line between 1' to 2'										
	END OF BORING Northing=209676.4 Easting=552900.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-2' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
BORING COMPLETED: **6/25/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-83A (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **903.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	2.5" Bituminous Pavement	FILL			SU						
1	FILL, mixture of clayey sand and silty sand with gravel, possible cobbles, brown		27	M	SS	6					
3			37	M	SS	10					
5	SANDY LEAN CLAY, a little gravel, light brown and gray mottled, stiff, laminations of silty sand (CL)	TILL	9	M	SS	16	17				
7	SANDY LEAN CLAY, a little gravel, brown, very stiff (CL)		18	M	SS	18	16				
10	SANDY LEAN CLAY, a little gravel, dark gray, stiff to very stiff (CL)		15	M	SS	20	16				
13			13	M	SS	20	15				
16			13	M	SS	22	16				
21			13	M	SS	17	15				
26			16	M	SS	24	15				
	END OF BORING Northing=209676.4 Easting=552900.3										

DEPTH:	DRILLING METHOD
0-24½'	**3.25" HSA**
BORING COMPLETED:	**6/28/07**
DR: **SG**	LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/28/07	**10:00**	**26.5**	**24.5**	**26.0**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-84 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **911.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, surface roots, trace roots, brown	FILL	13	M	SS	14					
2	FILL, mixture of sand with silt and sandy lean clay, a little gravel, trace roots, brown, gray, light gray and light brown										
3			7	M	SS	13	16				
4											
5	SANDY LEAN CLAY, a little gravel, light brown and gray mottled, with gray, firm to stiff (CL)	TILL									
6			7	M	SS	17	19				
7											
8			10	M	SS	20	17				
9											
10	SANDY LEAN CLAY, a little gravel, brown mottled, dark brown, stiff, laminations of silt (CL)										
11			14	M	SS	24	15				
12											
13	SANDY LEAN CLAY, a little gravel, dark gray, stiff to very stiff (CL)		14	M	SS	19	15				
14											
15											
16			15	M	SS	16	15				
17											
18											
19											
20											
21			19	M	SS	16	14				
22											
23											
24											
25											
26			21	M	SS	18	16				
	END OF BORING Northing=209598.8 Easting=553354.1										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/18/07**	**3:35**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/18/07**							
DR: **SG** LG: **SB/BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-85 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **892.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and sand with silt, a little gravel, surface roots, trace roots, brown	FILL	13	M	SS	15					
3	CLAYEY SAND, a little gravel, trace roots, dark brown, very stiff (SC)	TILL	23	M	SS	17	8				
5	SILTY SAND, trace roots, fine to medium grained, moist, very loose, laminations of sand with silt (SM)		4	M	SS	18					
8	CLAYEY SAND, a little gravel, trace roots, gray and brown mottled, firm (SC)		5	M	SS	18	19				
10	CLAYEY SAND, a little gravel, trace roots, dark gray, firm to stiff (SC)		5	M	SS	23	17				
13			6	M	SS	24	15				
16			10	M	SS	23	14				
18	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)										
21			9	M	SS	24	19				
25			14	M	SS	22	15				
	END OF BORING Northing=209496.7 Easting=551939.7										

DEPTH: DRILLING METHOD

0-24½' 3.25" HSA

BORING COMPLETED: **6/27/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/27/07	**9:35**	**9.0**	**7.0**	**8.2**		**None**
6/27/07	**10:05**	**26.5**	**24.5**	**26.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-86 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **897.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–4	SAND WITH SILT, fine grained, a little gravel, trace roots, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	22	M	SS	15					
			22	M	SS	19					
5–7	SILTY SAND, a little gravel, brown and gray, moist, medium dense (SM)		33	M	SS	16					
8–11	SANDY LEAN CLAY, a little gravel, gray, firm to stiff, lenses of lean clay with sand at 8' (CL)	WEATHERED TILL	6	M	SS	17					
			9	M	SS	20					
12–18	SANDY LEAN CLAY, a little gravel, brown and gray mottled, stiff to firm, laminations of silty sand (CL)	TILL					17				
			8	M	SS	22	15				
			9	M	SS	24	17				
19–22	SANDY LEAN CLAY, a little gravel, dark gray, a little brown, stiff, laminations of silty sand (CL)		13	M	SS	21	14				
23–26	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)		15	M	SS	20	15				
	END OF BORING Northing=209336.2 Easting=552138.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	6/26/07	**3:40**	**9.0**	**7.0**	**9.0**		**8.1**
BORING COMPLETED: **6/26/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-87 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **898.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand, clayey sand and sand with silt, a little gravel, surface roots, trace roots, dark brown and black	FILL	19	M	SS	14	7				
3	SANDY LEAN CLAY, a little gravel, trace roots, brown and gray mottled, firm (CL)	TILL	8	M	SS	14	17				
5	SANDY LEAN CLAY, a little gravel, light brown and gray mottled, stiff (CL)		11	M	SS	19	16				
8			11	M	SS	20	14				
10	SANDY LEAN CLAY, a little gravel, brownish gray, a little brown, stiff, laminations of silty sand (CL)		14	M	SS	21	15				
13	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)		11	M	SS	22	14				
16			14	M	SS	20	15				
20			15	M	SS	21	14				
25			14	M	SS	19	15				
26	**END OF BORING** Northing=209443.6 Easting=552400.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/26/07**	**9:20**	**26.5**	**24.5**	**26.0**		**None**
BORING COMPLETED: **6/26/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-88**

LOCATION: N: 209329.011, E: 550811.898 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/28/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
889.7	0.0	FILL	FILL: Silty Sand, very fine- to fine-grained, trace of Gravel, trace of Roots at 5' sample depth, mixed dark brown to brown, moist.	16		
883.7	6.0			24		
881.7	8.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown, moist, loose. (Lacustrine)	6	▽	
871.7	18.0	SP-SM	POORLY GRADED SAND with SILT,fine-grained, brownish-gray to gray, waterbearing, loose to medium dense. (Lacustrine)	15		
				6		
				10		
863.7	26.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft to rather stiff. (Glacial Till)	10		
				4		
			END OF BORING. Water observed at 8 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:45

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-89**

LOCATION: N: 209181.170, E: 550895.450 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/27/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
890.4	0.0					
890.2	0.2	PAV	2" of Bituminous			
		FILL	FILL: Silty Sand, fine-grained, trace of Gravel, mixed dark brown to brown, moist.	21		
				10		
883.4	7.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, brown, waterbearing, medium dense. (Lacustrine)	14	▽	
				10		
				11		
				11		
872.4	18.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft. (Glacial Till)	4		
864.4	26.0		END OF BORING.	5		
			Water observed at 7 feet while drilling			
			Boring then grouted..			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-90**

LOCATION: N: 209183.404, E: 551399.923 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/26/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
891.0	0.0					
889.0	2.0	SM	SILTY SAND, very fine- to fine-grained, trace of Roots, dark brown, moist. (Topsoil)			
885.0	6.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, loose to medium dense. (Lacustrine) Silty Sand 0' to 2' Poorly Graded Sand w Silt 2' to 17' Sandy Lean Clay 17' to 26'	9 11	▽	
880.0	11.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, grayish-brown with rust, waterbearing, medium dense. (Lacustrine)	15 14		
874.0	17.0	SP-SM	POORLY GRADED SAND with SILT,fine-grained, gray, waterbearing, loose to medium dense. (Lacustrine)	11 10		
865.0	26.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	6 7		
			END OF BORING. Water observed at 6 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-91 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **893.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, a little gravel, surface rots, trace roots, dark brown	FILL									
2	FILL, mixture of silty sand and sand with silt, a little gravel, pieces of brick, brown and black		13	M	SS	16					
3											
4			26	M	SS	21					
5											
6			28	M	SS	23					
7											
8			14	M	SS	18					
9	ORGANIC CLAY, trace roots, trace shells, black, stiff to very soft (OL/OH)	SWAMP DEPOSIT					89				
10							118				
11	BOGLIME, trace roots, gray, a little black, moist, very soft to firm, lense of sapric peat (OL)		2	M	SS	23	149				
12											
13											
14	SAND WITH SILT, a little gravel, gray, waterbearing, loose (SP-SM)	COARSE ALLUVIUM	7	W	SS	20					
15	CLAYEY SAND, a little gravel, gray, very soft to stiff (SC/CL)	TILL									
16			2	M	SS	18	17				
17											
18											
19											
20											
21			6	M	SS	17	15				
22											
23											
24											
25											
26			9	M	SS	18	14				
	END OF BORING Northing=209184.1 Easting=551898.2										

DEPTH:	DRILLING METHOD
0-24½'	3.25" HSA

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/27/07	11:05	14.0	12.0	12.5		12.0

BORING COMPLETED: **6/27/07**

DR: **SG** LG: **SB** Rig: **91C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-92 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **898.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	1.5" Bituminous Pavement	FILL			SU						
1	FILL, mixture of silty sand and clayey sand, a little gravel, pieces of bituminous, brown		26	M	SS	3	7				
2	ORGANIC CLAY, a little gravel, black, a little gray, stiff, laminations of sandy lean clay (OL/OH)	SWAMP DEPOSIT	10	M	SS	17	13				
3											
4	ORGANIC CLAY, trace roots, black, soft (OL/OH)										
5											
6			4	M	SS	17	46				
7	CLAYEY SAND, a little gravel, gray, soft, laminations of sand with silt (SC)	TILL									
8			3	M	SS	18	18				
9	CLAYEY SAND, a little gravel, trace roots, brown and gray mottled, soft to firm (SC)										
10			4	M	SS	17	16				
11											
12											
13			8	M	SS	23	16				
14	SANDY LEAN CLAY, a little gravel, brownish gray, a little black, stiff, laminations of silty sand (CL)										
15			10	M	SS	23	16				
16											
17											
18	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
19											
20											
21			10	M	SS	24	13				
22											
23											
24											
25											
26			15	M	SS	21	14				
	END OF BORING Northing=209185.3 Easting=552151.9										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	6/27/07	**12:25**	**26.5**	**24.5**	**26.0**		**None**
BORING COMPLETED: **6/27/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-93 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **901.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, surface roots, trace roots, dark brown	FILL	14	M	SS	16					
2	FILL, mixture of clayey sand and silty sand, a little gravel, trace roots, brown and dark brown										
3			8	M	SS	14					
4	CLAYEY SAND, a little gravel, brown, firm to stiff (SC)	TILL					13				
5							17				
6			8	M	SS	20					
7											
8			9	M	SS	23	16				
9											
10	SANDY LEAN CLAY, a little gravel, light brown to brown, firm to stiff (CL)		7	M	SS	22	16				
11											
12											
13			11	M	SS	24	16				
14											
15											
16			13	M	SS	24	18				
17											
18	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
19											
20											
21			11	M	SS	22	16				
22											
23											
24											
25											
26			11	M	SS	23	16				
	END OF BORING Northing=209104.1 Easting=552534.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/27/07**	**2:10**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **6/27/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-94**

LOCATION: N: 209180.273, E: 552902.330 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
922.9	0.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)	8			
918.9	4.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown, wet, rather soft to medium. (Glacial Till)	5			
				5		16	
				7			
				8			
904.9	18.0			7			
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium to rather stiff. (Glacial Till)	11			
				7			
893.9	29.0						
		CL	SANDY LEAN CLAY, trace of Gravel, gray, moist, medium. (Glacial Till)	7			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-94 (cont.)**

LOCATION: N: 209180.273, E: 552902.330 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
890.9	32.0		SANDY LEAN CLAY, trace of Gravel, gray, moist, medium. (Glacial Till) *(continued)*	7			
881.9	41.0		END OF BORING. Water not observed with 39 1/2 feet of hollow-stem auger in the ground. Boring then grouted.	7			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-95**

LOCATION: N: 209184.739, E: 553397.793 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
924.0	0.0	FILL	FILL: Silty Sand, trace of Roots, trace of Roots, dark brown, moist.			
922.0	2.0	FILL	FILL: Sandy Lean Clay, mixed light brown, brown and dark brown, moist.	6		
				9		
917.0	7.0	SC	CLAYEY SAND, trace of Roots, dark gray, moist. (Buried Topsoil)	10		
915.0	9.0	CL	SANDY LEAN CLAY, trace of Gravel, greenish gray to light brown, wet. (Glacial Till)	5		
				4	▽	
907.0	17.0			5		
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff to stiff. (Glacial Till)	13		
898.0	26.0			10		
			END OF BORING. Water observed at 13 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-96**

LOCATION: N: 208934.186, E: 550891.188 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/27/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.3	0.0	FILL	FILL: Sandy Lean Clay, dark brown to light brown, wet.	10		
888.3	4.0	PT	PEAT, dark gray, wet, rather soft to soft. (Swamp Deposit)	5	▽	
				3		
883.3	9.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose to medium dense. (Lacustrine)	7		
				8		
				12		
				8		
869.3	23.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	8		
866.3	26.0		END OF BORING. Water observed at 9 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-97 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **891.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–2	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, surface roots, trace roots, dark brown and black	FILL	14	M	SS	17	12				
3–4	SAND WITH SILT, fine grained, a little gravel, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	26	M	SS	10	9				
5–6			12	▼	SS	9					
7–8			2	W	SS	14					
9–11	SILTY SAND, a little gravel, trace roots, fine to medium grained, gray, waterbearing, very loose to medium dense (SM)		2	W	SS	10					
12–13			22	W	SS	17					
14–16			23	W	SS	17					
17–19	SANDY SILT, dark gray, waterbearing, medium dense, laminations of lean clay at 20' (ML)	FINE ALLUVIUM	16	W	SS	15	24				
20–23											
24–25	CLAYEY SAND, a little gravel, dark gray, firm (SC)	TILL	7	M	SS	19	16				
26	**END OF BORING** Northing=208912.1 Easting=551143.1										

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA
9½'-24½'	3.25" HSA
BORING COMPLETED:	7/11/07
DR: SG	LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/25/07	8:05	9.0	7.0	7.0		6.1

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-98**

LOCATION: N: 208927.565, E: 551670.574 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/26/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
892.8	0.0	FILL	FILL: Sandy Lean Clay, dark brown, moist.	11		
				5		
885.8	7.0	PT	PEAT, dark gray, wet, medium. (Swamp Deposit)	6	▽	
883.8	9.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, with Gravel, light brown to gray with rust at 12' sample depth, waterbearing, medium dense to dense. (Glaciofluvium)	*		* 50 blows for 5 inches
				26		
876.8	16.0			18		
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	7		
866.8	26.0			7		
			END OF BORING. Water observed at 8 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587 1.GPJ BRAUN.GDT 10/2/07 14:46

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-99**

LOCATION: N: 208681.670, E: 550941.756 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/27/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
892.8	0.0	FILL	FILL: Clayey Sand, trace of Gravel, mixed dark gray to brown, moist to wet.	13				
				5				
				4				
				5		17	43	LL = 30% PI = 15
880.8	12.0	PT	PEAT, dark gray, wet, rather soft. (Swamp Deposit)	4	▽			
				4		322		OC = 69
874.8	18.0	SM	SILTY SAND, fine-grained, gray to brownish-gray, waterbearing, very loose to loose. (Lacustrine)	4				
866.8	26.0		END OF BORING.	7				
			Water observed at 12 feet while drilling.					
			Boring then grouted.					

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:46 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-100**

LOCATION: N: 208686.177, E: 551398.832 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/26/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
895.7	0.0	FILL	FILL: Clayey Sand, fine- to medium-grained, trace of Gravel, dark brown to brown, moist.	9		
			Fill (Clayey Sand) 0' to 6' Peat 6' to 9' Poorly Graded Sand 9' to 22'			
889.7	6.0	PT	PEAT, Fibrous, dark gray, wet, rather stiff. (Swamp Deposit)	6		
886.7	9.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, loose to medium dense. (Glacial Till)	11	▽	
				12		
				14		
873.7	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	6		
869.7	26.0		END OF BORING.	6		
			Water observed at 9 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-101 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **897.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, surface roots, trace roots, brown	FILL	28	M	SS	12					
3			5	M	SS	13	10				
5	CLAYEY SAND, a little gravel, trace roots, dark gray, a little black, very soft, laminations of organic clay (SC)	MIXED ALLUVIUM OR TOPSOIL	1	W/M	SS	4					
8	SANDY LEAN CLAY, a little gravel, trace roots, dark gray, very soft to firm, a lense of sand with silt at 9.5' to 9.9' (CL)	TILL	1	M	SS	2	15				
10			5	M	SS	10	18				
12	CLAYEY SAND, a little gravel, trace roots, gray and brown, stiff (SC)		10	M	SS	19	14				
15	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)		10	M	SS	19	14				
20			12	M	SS	23	14				
25			13	M	SS	23	15				
	END OF BORING Northing=208686.2 Easting=551895.0										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/29/07**	**9:40**	**9.0**	**7.0**	**7.1**		**None**
	6/29/07	**9:45**	**11.5**	**9.5**	**10.5**		**10.4**
BORING COMPLETED: **6/29/07**	**6/29/07**	**10:00**	**26.5**	**24.5**	**26.5**		**None**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-102 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 902.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, a little gravel, surface roots, trace roots, dark brown, possible cobbles	FILL	10	M	SS	3					
2											
3	FILL, moslty clayey sand, a little gravel, trace roots, brown, dark brown and a little gray		5	M	SS	6	12				
4											
5			16	M	SS	7	16				
6											
7											
8	CLAYEY SAND, a little gravel, dark gray, firm to stiff (SC)	TILL	10	M	SS	19	13				
9											
10			8	M	SS	17					
11											
12											
13			9	M	SS	20	15				
14											
15			9	M	SS	21	16				
16											
17											
18											
19	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)										
20			9	M	SS	21	16				
21											
22											
23											
24											
25			10	M	SS	21	15				
26											
	END OF BORING Northing=208692.0 Easting=552395.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/29/07**	**9:00**	**26.5**	**24.5**	**26.0**		**None**
BORING COMPLETED: **6/29/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-103 RI-1007-07**

LOCATION: N: 208804.674, E: 552906.273 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
924.9	0.0	FILL	FILL: Silt, dark brown, moist.				
923.9	1.0	FILL	FILL: Lean Clay, brown to dark brown, dry.	18			
920.9	4.0	CL	SANDY LEAN CLAY, gray with iron staining, moist to wet, rather soft to rather stiff. (Glacial Till)	8			
				5			
				4		18	
				7			
				10			
906.9	18.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, moist, medium to stiff. (Glacial Till)	8			
				8			
				15			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING **ST-103 RI-1007-07 (cont.)**

LOCATION: N: 208804.674, E: 552906.273 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
892.9	32.0		SANDY LEAN CLAY, trace of Gravel, gray, moist, medium to stiff. (Glacial Till) *(continued)*	11			
884.9	40.0		END OF BORING. Water not observed with 38 1/2 feet of hollow-stem auger in the ground. Boring then grouted.	13			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4003-01 ST-104**

LOCATION: N: 208682.011, E: 552906.273 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/23/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
934.9	0.0					
934.4	0.5	FILL	FILL: Silty Sand, fine-grained, dark brown, moist.			
		FILL	FILL: Silty Sand, fine- to coarse-grained, trace of Gravel, with Clay layers, brown, moist.	11		
930.9	4.0					
		FILL	FILL: Silty Sand, fine-grained, mixed with Clay, black, moist.	8		
927.9	7.0					
		OL	ORGANIC CLAY, black wet, very soft to rather soft. (Swamp Deposit)	2		
				5		
922.9	12.0					
		CL	SANDY LEAN CLAY, bluish-gray, wet, soft to rather soft. (Lacustrine)	5		
				3		
916.9	18.0					
		CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, medium. (Glacial Till)	7		
911.9	23.0					
		CL	SANDY LEAN CLAY, trace of Gravel, gray, moist, medium. (Glacial Till)	6		
908.9	26.0					
			END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-105**

LOCATION: N: 208435.237, E: 551147.610 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/27/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
899.1	0.0	FILL	FILL: Clayey Sand, fine- to medium-grained, trace of Gravel, grayish-brown, moist.	13		
895.1	4.0	FILL	FILL: Silty Sand, fine-grained, dark brown, moist.	13		
892.1	7.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown, moist, loose. (Lacustrine)	6		
890.1	9.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, light brown to grayish-brown, waterbearing, loose to medium dense. (Lacustrine)	8	▽	
				6		
				7		
				13		
877.1	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff. (Glacial Till)	9		
873.1	26.0		END OF BORING. Water observed at 9 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-106 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **903.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand, silty sand and organic clay, a little gravel, surface roots, trace roots, dark brown, brown and black	FILL	11	M	SS	14	9				
3			26	M	SS	19	15				
5							8				
5	LEAN CLAY WITH ORGANICS, trace roots, black, stiff, lense of silty sand (CL)	TOPSOIL	14	M	SS	19	22				
7	SILTY SAND, a little gravel, fine to medium grained, light brown, medium dense (SM)	COARSE ALLUVIUM	15	M	SS	16					
10	SAND WITH SILT, a little gravel, fine to medium grained, light brown, waterbearing, medium dense (SP-SM)		16	M	SS	17					
13			23	W	SS	16	13				
14	CLAYEY SAND, a little gravel, brown, very stiff to stiff (SC)	TILL									
15	CLAYEY SAND, a little gravel, gray, soft to stiff (SC)		4	M	SS	17	17				
20			7	M	SS	20	14				
25			11	M	SS	23	14				
26	**END OF BORING** Northing=208433.1 Easting=551647.6										

Fill (Clayey sand) 0' to 5'
topsoil 5' to 7'
silty sand 7' to 9.5'
Sand w silt 9.5' to 13.5'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/11/07**	**9:20**	**14.0**	**12.0**	**12.4**		**12.2**
	7/11/07	**9:30**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **7/11/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-107 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 902.7 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, a little gravel, surface roots, trace roots, dark brown, moist, medium dense (SM)	TOPSOIL	11	M	SS	15	4				
2	SAND WITH SILT, fine grained, trace roots, light brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM									
3			14	M	SS	20					
4											
5			13	M	SS	20					
6											
7											
8			15	M	SS	21					
9											
10											
11			11	W/M	SS	19					
12	SILTY SAND, a little gravel, fine to medium grained, brownish gray, waterbearing, medium dense to very loose, lense of silt with sand at 11' (SM)			▼							
13			9	W	SS	15					
14											
15			2	W	SS	8					
16											
17											
18	CLAYEY SAND, a little gravel, gray, stiff to firm (SC)	TILL									
19											
20			14	M	SS	19	12				
21											
22											
23											
24											
25			8	M	SS	23	15				
26											
	END OF BORING Northing=208260.5 Easting=551137.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/11/07**	**10:30**	**14.0**	**12.0**	**12.3**		**12.1**
	7/11/07	**10:40**	**26.5**	**24.5**	**24.9**		**None**
BORING COMPLETED: **7/11/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1011-02 ST-108**

LOCATION: N: 208186.939, E: 551402.993 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
906.6	0.0					
906.4	0.2	PAV	2" of Bituminous			
		FILL	FILL: Silty Sand, fine- to medium-grained, dark brown, moist.	26		
902.6	4.0	SP	POORLY GRADED SAND, fine-grained, brown with iron staining, moist, loose to medium dense. (Glacial Outwash)	5		
				11		
897.6	9.0	SP	POORLY GRADED SAND, fine-grained, brown, wet to waterbearing, medium dense. (Glacial Outwash)	15		
				12	▽	
			With Gravel layer at 15 1/2 feet.	22		
888.6	18.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft. (Glacial Till)	5		
880.6	26.0		END OF BORING. Water observed at 12 1/2 feet while drilling. Boring then grouted.	5		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP06005871.GPJ BRAUN.GDT 10/2/07 14:41

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-109 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **904.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, surface roots, trace roots, dark brown	FILL	11	M	SS	12					
2	FILL, mixture of sand with silt, silty sand and clayey sand, a little gravel, trace roots, dark brown and light brown						15				
3			7	M	SS	11					
4											
5							16				
6			11	M	SS	21					
7											
8	SANDY LEAN CLAY, a little gravel, gray, a little brown, stiff to firm, laminations of silty sand (CL)	TILL	12	M	SS	19	16				
9	Fill (sand w silt) 0.5' to 7' Sandy lean clay 7' to 26.5'										
10											
11			8	M	SS	14	17				
12											
13	SANDY LEAN CLAY, a little gravel, dark gray, firm to stiff (CL)		9	M	SS	24	16				
14											
15											
16			7	M	SS	17	17				
17											
18											
19											
20											
21			8	M	SS	22	16				
22											
23											
24											
25											
26			10	M	SS	20	17				
	END OF BORING Northing=208177.9 Easting=551886.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/18/07**	**9:40**	**26.5**	**24.5**	**24.9**		**None**
BORING COMPLETED: **7/18/07**							
DR: **SG** LG: **SB/BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1007-05 ST-110**

LOCATION: N: 208182.321, E: 552397.605 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
913.2	0.0					
912.2	1.0	FILL	FILL: Silty Sand, fine-grained, trace of Gravel, dark brown, moist.			
		CL	SANDY LEAN CLAY, trace of Gravel, brown with iron staining, wet, rather soft to medium. (Glacial Till)	6		
				5		
				8		
904.2	9.0					
		CL	SANDY LEAN CLAY, trace of Gravel, gray, moist, medium to rather stiff. (Glacial Till)	9		
				8		
				8		
				8		
887.2	26.0			12		
			END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1007-06 ST-111**

LOCATION: N: 208184.910, E: 552896.448 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
922.1	0.0					
921.1	1.0	FILL	FILL: Silty Sand, fine-grained, with Roots, trace of Gravel, dark brown, moist.			
		FILL	FILL: Organic Clay, with Silty Sand layer, black to dark brown, moist.	11		
918.1	4.0	SP	POORLY GRADED SAND, fine-grained, brown, wet, loose. (Glacial Outwash)	8		
915.1	7.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, wet, rather soft. (Glacial Till)	4		
913.1	9.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray, moist, medium to rather stiff. (Glacial Till)	8		
				9		
908.1	14.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	7		
				7		
				6		
893.6	28.5			6		
			END OF BORING. Water not observed with 27 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-112**

LOCATION: N: 208188.459, E: 553395.319 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/29/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
936.8	0.0							
936.7	0.1	PAV	2" Bituminous Pavement.					
935.8	1.0	FILL SM	FILL: Poorly Graded Sand with Silt, trace of Gravel, brown, moist.					
			POORLY GRADED SAND with SILT, fine- to medium-grained, trace of Gravel, reddish brown, moist, loose to medium dense. (Glacial Outwash)	7				
				24		4	9	
				28				
927.8	9.0	SP	POORLY GRADED SAND, fine- to medium-grained, reddish brown, moist, medium dense. (Glacial Till)	27				
924.8	12.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish brown, moist, medium dense to dense. (Glacial Till)	32				
918.8	18.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, dense to very dense.	39				
910.8	26.0			50		2		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-113**

LOCATION: N: 208182.505, E: 553828.508 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/29/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
941.8	0.0	SC	CLAYEY SAND, trace of roots, dark brown, moist. (Topsoil)			
939.5	2.3	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish brown, moist, medium dense. (Glacial Till)	17		
				21		
				55		
				32		
929.8	12.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, moist, medium dense to dense. (Glacial Outwash)	16		
				20		
				36		
915.8	26.0			33		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-114 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **913.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and sandy silt, a little gravel, surface roots, trace roots, black and brown	FILL	8	M	SS	6	8				
3	ORGANIC CLAY, trace roots, black, a little gray, firm, laminations of silty sand (OL/OH)	SWAMP DEPOSIT	7	M	SS	15	38, 24				
5	LEAN CLAY, gray, very stiff (CL)	FINE ALLUVIUM	19	M	SS	12	44, 28				
6	SANDY SILT, a little gravel, trace roots, gray, a little dark gray, wet, medium dense, laminations of lean clay (ML)										
8	SILTY SAND, a little gravel, fine to medium grained, gray, waterbearing, very loose (SM)	TILL	3	W	SS	16	19				
10	SANDY LEAN CLAY, a little gravel, gray, soft to very stiff (CL)		3	M	SS	15	18				
13			9	M	SS	16	16				
15			11	M	SS	16	17				
20			14	M	SS	24	16				
25			17	M	SS	24	16				
	END OF BORING Northing=207847.6 Easting=552482.9										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/18/07	**11:40**	**9.0**	**7.0**	**7.0**		**5.2**	
	7/18/07	**12:05**	**26.5**	**24.5**	**26.5**		**None**	
BORING COMPLETED: **7/18/07**								
DR: **SG** LG: **SB/BR** Rig: **91C**								

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-115 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 908.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, surface roots, trace roots, dark brown	FILL	15	M	SS	21					
2	FILL, mixture of clayey sand and sand with silt, trace roots, brown and black										
3			20	M	SS	20					
4											
5	SAND WITH SILT, a little gravel, medium to fine grained, brown, moist to wet, medium dense (SP-SM)	COARSE ALLUVIUM	12	M	SS	18					
6											
7											
8			18	M	SS	19					
9											
10											
11			11	W/M	SS	17	15				
12	CLAYEY SAND, a little gravel, dark brown, stiff (SC)	TILL									
13	CLAYEY SAND, a little gravel, dark gray, soft to stiff (SC)		4	M	SS	19	17				
14											
15			7	M	SS	21	16				
16											
17											
18											
19											
20			8	M	SS	23	13				
21											
22											
23											
24											
25			10	M	SS	24	16				
26											
	END OF BORING Northing=207758.9 Easting=551498.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/11/07	**11:20**	**11.5**	**9.5**	**10.1**		**None**	
	7/11/07	**11:40**	**26.5**	**24.5**	**24.5**		**None**	
BORING COMPLETED: **7/11/07**								
DR: **SG** LG: **SB** Rig: **91C**								

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-116 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **913.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, a little gravel, surface roots, trace roots, brown and dark brown, moist, medium dense (SM)	TOPSOIL / COARSE ALLUVIUM	13	M	SS	17					
2	SILTY SAND, trace roots, fine to medium grained, brown, medium dense, lense of clayey sand at 3.5' (SM)		20	M	SS	18	14				
3											
4	CLAYEY SAND, a little gravel, light brownish gray and gray mottled, very stiff (SC)	TILL									
5	CLAYEY SAND, a little gravel, gray and brown mottled, firm to stiff (SC)		8	M	SS	19	18				
6											
7											
8			11	M	SS	23	17				
9											
10	SANDY LEAN CLAY, a little gravel, gray, firm to stiff (CL)		8	M	SS	21	17				
11											
12											
13			6	M	SS	24	19				
14											
15			7	M	SS	24	19				
16											
17											
18											
19											
20			7	M	SS	24	17				
21											
22											
23											
24											
25			9	M	SS	24	17				
26											
	END OF BORING Northing=207685.1 Easting=551917.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/11/07**	**1:00**	**26.5**	**24.5**	**24.5**		**None**
BORING COMPLETED: **7/11/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-117 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 914.4 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4" Bituminous Pavement	FILL			SU						
1	FILL, mixture of clayey sand, sandy silt and sand with silt, a little gravel, pieces of bituminous, brown, gray and black		18	M	SS	12	8				
3	SAND WITH SILT, fine grained, gray, medium dense (SP-SM)	COARSE ALLUVIUM	19	▼	SS	15					
4	SAND WITH SILT, fine to medium grained, brownish gray, medium dense (SP-SM)										
5			13	W	SS	16					
8			15	W	SS	17					
10	SANDY LEAN CLAY, a little gravel, dark gray, firm to stiff (CL)	TILL	8	M	SS	14	17				
13			8	M	SS	16	16				
15			9	M	SS	22	16				
20			10	M	SS	24	17				
25			12	M	SS	24	17				
	END OF BORING Northing=207683.1 Easting=552397.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/18/07**	**10:30**	**6.5**	**4.5**	**6.5**		**3.6**
	7/18/07	**10:55**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/18/07**							
DR: **SG** LG: **SB/BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-118**

LOCATION: N: 207677.923, E: 552643.604 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/10/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
914.9	0.0	OL	ORGANIC CLAY, trace of Roots, dark gray, wet. (Topsoil)	7		
910.9	4.0	SM	SILTY SAND, fine-grained, gray, wet, very loose. (Lacustrine)	3	▽	
				3		
905.9	9.0	PT	PEAT, dark gray, wet. (Swamp Deposit)	2		
				3		
900.9	14.0	SM	SILTY SAND, fine-grained, gray, waterbearing, very loose. (Lacustrine)	2		
				3		
892.9	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	7		
888.9	26.0		END OF BORING. Water observed at 6 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587L.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-119**

LOCATION: N: 207678.910, E: 552897.340 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
929.7	0.0					
929.2	0.5	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.			
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, brown, moist to wet.	20		
				13		
				12		
920.7	9.0	CL	SANDY LEAN CLAY, light brown to brown with gray and rust, wet, rather soft to rather stiff. (Glacial Till)	5		
				8		
				9		
				19		
907.7	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)			
903.7	26.0			8		*NR Suspected Cobble or Boulder
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-120**

LOCATION: N: 207684.634, E: 553359.506 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/29/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
940.8	0.0							
940.3	0.5	SM	SILTY SAND, trace of roots, dark brown, moist.					
		CL	SANDY LEAN CLAY, trace of Gravel, yellowish brown, moist, rather stiff to medium. (Glacial Till)	7				
				5				
				9				
931.8	9.0							
		CL	LEAN CLAY with Sand, reddish brown, moist, very stiff. (Glaciofluvium)	21		16	73	LL = 26% PI = 10%
				21				
				18				
922.8	18.0							
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish brown, moist, medium dense to dense. (Glacial Till)	48				
				27				
911.8	29.0							
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to very dense. (Glacial Till)	23				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-120 (cont.)**

LOCATION: N: 207684.634, E: 553359.506 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/29/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
908.8	32.0		SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to very dense. (Glacial Till) *(continued)*					
904.8	36.0		No sample recovery at 35 1/2 feet.	*				* 70 blows for 12 inches
		SP	POORLY GRADED SAND, fine- to medium-grained, brown, moist, dense. (Glacial Till)	29				
898.8	42.0	SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, brown, moist, very dense. (Glacial Outwash)	53				
894.8	46.0		END OF BORING. Water not observed with 44 1/2 feet of hollow-stem auger in the ground. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-121**

LOCATION: N: 207682.711, E: 553899.659 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
944.6	0.0	FILL	FILL: Silty Sand, trace of Gravel, trace of roots in upper foot, mixed light brown to brown, moist.	24		
940.6	4.0	CL	SANDY LEAN CLAY, trace of Gravel, grayish brown to brown, with rust, wet, rather soft to rather stiff. (Glacial Till)	13		
				4		
935.6	9.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown, rather soft to rather stiff. (Glacial Till)	4		
				11		
930.6	14.0	CL-ML	SILTY CLAY, reddish brown, wet. (Glaciofluvium)	21		
				16		
918.6	26.0		END OF BORING.	10		
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-122**

LOCATION: N: 207684.411, E: 554279.817 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/28/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
959.5	0.0	FILL	FILL: Silty Sand, with Gravel, brown, moist.			
957.5	2.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, rather soft to medium. (Glacial Till)	5		
				5		
				7		
				7		
945.5	14.0	SP	POORLY GRADED SAND, fine- to medium-grained, reddish-brown, moist, medium dense. (Glacial Outwash)	32		
941.5	18.0	SC	CLAYEY SAND, trace of Gravel, reddish-brown, moist, very stiff. (Glacial Till)	25		
937.5	22.0	SM	SILTY SAND, fine- to medium-grained, reddish-brown, moist, very dense. (Glaciofluvium)	70		
933.5	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1007-03 ST-123**

LOCATION: N: 207468.088, E: 552331.548 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
913.4	0.0					
912.4	1.0	FILL	FILL: Silty Sand, fine- to medium-grained, dark brown, moist.			
		FILL	FILL: Sandy Lean Clay, trace of Gravel, brown, moist.			
			Fill (silty sand) 0' to 1' Fill (sandy lean clay) 1' to 6' Sandy Lean Clay 6' to 26'	12		
907.4	6.0		No sample recovery at 5 1/2 feet.	12		
		CL	SANDY LEAN CLAY, trace of Gravel, gray, moist to wet, rather soft to medium. (Glacial Till)	7		
				6		
				5		
				6		
				6		
				7	▽	
887.4	26.0		END OF BORING.			
			Water observed at 25 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-01 ST-124**

LOCATION: N: 207429.899, E: 552647.857 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
923.8	0.0					
922.8	1.0	FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, dark brown, moist.			
		FILL	FILL: Sandy Lean Clay, brown, moist to wet.	7		
				12		
				6		
914.8	9.0	OL	ORGANIC CLAY, black, wet. (Swamp Deposit)	5		
911.8	12.0	CL	SANDY LEAN CLAY, trace of Gravel, grayish-brown, wet, soft. (Lacustrine)	3		
909.8	14.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	7		
				6		
897.8	26.0			6		
			END OF BORING. Water not observed during drilling. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-125 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **932.7**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and silty clay, surface roots, trace roots, possible cobbles, dark brown	FILL	27	M	SS	9	7				
3	FILL, mostly clayey sand with gravel, possible cobbles, trace roots, brown		31	M	SS	11	7				
5			12	M	SS	8	9				
8			6	M	SS	4	10				
10	CLAYEY SAND, a little gravel, trace roots, brown, firm (SC)	TILL	7	M	SS	6	10				
13			7	M	SS	11	10				
15	SAND WITH GRAVEL, trace roots, well graded, light brownish gray, moist, medium dense (SW)	COARSE ALLUVIUM									
16	CLAYEY SAND, a little gravel, light brownish gray, stiff (SC)	TILL	13	M	SS	16	14				
19	CLAYEY SAND, a little gravel, possible cobbles, brown, very stiff (SC)		20	M	SS	21	10				
24	SAND WITH SILT, a little gravel, fine to medium grained, brown, moist, very dense (SP-SM)	COARSE ALLUVIUM	66	M	SS	NR					
	END OF BORING Northing=207429.3 Easting=552897.4										

DEPTH: DRILLING METHOD

0-24½' 3.25" HSA

BORING COMPLETED: **7/6/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/6/07	**10:30**	**26.5**	**24.5**	**26.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-125A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 932.7 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken to 29.5', Refer to Log of Boring ST-125										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	**7/25/07**	**1:20**	**41.5**	**39.5**	**41.5**		**None**
BORING COMPLETED: **7/25/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-125A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense to dense (SP)	COARSE ALLUVIUM	31	M	SS	20					
31											
32											
33											
34											
35			25	M	SS	19					
36											
37											
38											
39											
40			38	M	SS	20					
41	**END OF BORING** Northing=207429.3 Easting=552897.4										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-126**

LOCATION: N: 207401.256, E: 554161.240 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/28/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
957.0	0.0	FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, brown to light brown, moist.	8		
				4		
950.0	7.0	OL	ORGANIC CLAY, dark gray, wet, soft to rather soft. (Swamp Deposit)	2		
				4		
945.0	12.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft to medium. (Glacial Till)	4		
				6		
				9		
931.0	26.0			9		
			END OF BORING.			
			Water observed at 12 feet while drilling.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-126A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 957.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken to 29.5', Refer to Log of Boring ST-126										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	**7/23/07**	**11:15**	**41.5**	**39.5**	**41.5**		**None**
BORING COMPLETED: **7/23/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-126A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SILTY SAND, fine to medium grained, brown, moist, very dense (SM)	COARSE ALLUVIUM	79	M	SS	22	7				
31	LEAN CLAY WITH SAND, brown, hard, lense of sand with silt and gravel at 31 feet (CL)	TILL									
32											
33	SILTY SAND WITH GRAVEL, fine to medium grained, brown, moist, very dense (SM)										
34											
35			148	M	SS	15					
36											
37											
38	SILTY SAND, a little gravel, fine to medium grained, brown, a little light brown, moist, very dense, lense of sand with silt and gravel at 41 feet (SM)										
39											
40			63	M	SS	24					
41											
	END OF BORING Northing=207401.3 Easting=554161.2										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-127 RI-4006-21**

LOCATION: N: 207512.939, E: 554545.415 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
952.8	0.0							
951.8	1.0	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.					
		FILL	FILL: Clayey Sand, trace of Gravel, dark brown to brown and reddish brown, moist.	8				
946.8	6.0			4				
		SC	CLAYEY SAND, Organic, dark gray, wet, soft to medium. (Swamp Deposit)	4				
				3		35	42	OC = 6
938.8	14.0			6				
		CL	LEAN CLAY, olive gray, wet, rather soft. (Swamp Deposit)	3				
934.8	18.0							
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff. (Glacial Till)	12				
926.8	26.0			11		15		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-128 RI-4006-20**

LOCATION: N: 207347.078, E: 554700.746 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
954.1	0.0						
953.1	1.0	FILL	FILL: Silty Sand, trace of roots, dark brown, moist.				
		FILL	FILL: Sandy Lean Clay, trace of Gravel, reddish brown, moist.	10			
				7			
947.1	7.0	CL	SANDY LEAN CLAY, slightly Organic, dark gray to olive gray, soft. (Swamp Deposit)	3			
				2		21	OC = 3%
942.1	12.0	CL	SANDY LEAN CLAY, grayish brown with rust, wet, medium. (Glacial Till)	7			
				7			
936.1	18.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish brown, moist, medium dense to dense. (Glacial Till)	26			
928.1	26.0			33*			*Suspect cobble or boulder
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.				

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43 (See Descriptive Terminology sheet for explanation of abbreviations)

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-129 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **915.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand, silty sand and sand with silt, a little gravel, surface roots, trace roots, dark brown and brown	FILL	18	M	SS	15	6				
3			12	M	SS	15					
5	CLAYEY SAND, a little gravel, dark brown and brown mottled, firm (SC)	TILL	5	M	SS	19	12				
7	CLAYEY SAND, a little gravel, brown and gray mottled, firm, laminations of silt and sandy lean clay (SC)		8	M	SS	19	16				
10	CLAYEY SAND, a little gravel, brown and brownish gray mottled, stiff (SC)		12	M	SS	18	15				
12	CLAYEY SAND, a little gravel, dark gray, firm to stiff (SC)		5	M	SS	22	16				
15			8	M	SS	24	18				
20			9	M	SS	24	18				
25			11	M	SS	24	18				
26	**END OF BORING** Northing=207214.0 Easting=551928.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/11/07	**2:05**	**26.5**	**24.5**	**24.5**		**None**	
BORING COMPLETED: **7/11/07**								
DR: **SG** LG: **SB** Rig: **91C**								

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-130**

LOCATION: N: 207127.116, E: 552428.985 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/13/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
915.1	0.0							
914.8	0.3	FILL	FILL: Silty Sand, fine-grained, dark brown, moist.					
		FILL	FILL: Silt, black, moist.	8		9	4	
				5				
908.1	7.0	CL	SANDY LEAN CLAY, brown, wet. (Glacial Till)	5				
906.1	9.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray, wet, rather soft to medium. (Glacial Till)	8				
				5				
901.1	14.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	6				
				7				
889.1	26.0		END OF BORING.	7				
			Water not observed during drilling.					
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-131 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 926.9

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, surface roots, trace roots, grayish brown	FILL	17	M	SS	17	7 6				
2	FILL, mixture of clayey sand and sandy lean clay, a little gravel, possible cobbles, trace roots, grayish brown and brown										
3			11	M	SS	5	11				
4											
5			6	M	SS	19	17				
6							18				
7	FILL, mixture of sand with silt and silty sand, trace roots, brown and black										
8			8	M	SS	12					
9	SILTY SAND, trace roots, fine grained, dark brown, a little brown, moist, loose (SM) (possible fill)	COARSE ALLUVIUM OR FILL									
10		WEATHERED TILL									
11	SANDY LEAN CLAY, a little gravel, trace roots, gray, a little brown and black, firm (CL)		6	M	SS	20	21				
12											
13	SANDY LEAN CLAY, a little gravel, light brownish gray, a little brown, stiff to very stiff, laminations of silty sand (CL)	TILL	12	M	SS	15	17				
14											
15			18	M	SS	19	16				
16											
17											
18	SANDY LEAN CLAY, a little gravel, brownish gray to dark gray, very stiff to stiff (CL)										
19											
20			23	M	SS	24	16				
21											
22											
23											
24											
25			14	M	SS	24	16				
26											
	END OF BORING Northing=207188.3 Easting=552633.8										

Fill (sandy silt) 0' to 0.5'
Fill (clayey sand) 0.5' to 7'
Fill (sand w silt) 7' to 8'
Silty Sand 8' to 9.5'
Sandy Lean Clay 9.5' to 26'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	7/6/07	11:45	26.5	24.5	26.5		None
BORING COMPLETED: 7/6/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-132 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **936.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4.25" Bituminous Pavement	FILL			SU						
1	FILL, mixture of clayey sand and sandy lean clay, a little gravel, dark brown, light brownish gray and black		9	M	SS	5	9				
2											
3	SILTY SAND, a little gravel, possible cobbles, brown, medium dense to dense (SM)				SS	20	11				
4											
5			36	M	SS	18					
6											
7	CLAYEY SAND, a little gravel, possible cobbles, brown, very stiff (SC)										
8			29	M	SS	19	9				
9											
10			28	M	SS	14	10				
11											
12											
13			19	M	SS	24	12				
14											
15			17	M	SS	24	13				
16											
17											
18	SAND WITH SILT AND GRAVEL, fine to medium grained, light brown, moist, dense (SP-SM)	COARSE ALLUVIUM									
19											
20			36	M	SS	13					
21											
22											
23	GRAVELLY SAND WITH SILT, possible cobbles, medium to fine grained, light brown, moist, very dense (SP-SM)										
24											
25			62	M	SS	15					
26											
	END OF BORING Northing=207171.7 Easting=552904.3										

Fill (clayey sand) 0.3' to 3'
Silty Sand 3' to 7'
Clayey Sand 7' to 18'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/6/07**	**9:00**	**26.5**	**24.5**	**25.2**		**None**
BORING COMPLETED: **7/6/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-132A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 936.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-132										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	**7/25/07**	**2:47**	**41.5**	**39.5**	**41.0**		**None**
BORING COMPLETED: **7/25/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-132A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SAND, a little gravel, fine to medium grained, light brown, moist, dense to medium dense (SP)	COARSE ALLUVIUM	49	M	SS	19					
31											
32											
33											
34											
35			39	M	SS	23					
36											
37											
38											
39											
40			35	M	SS	19					
41	**END OF BORING** Northing=207171.7 Easting=552904.3										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-133 RI-4007-20**

LOCATION: N: 207181.741, E: 553397.254 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
945.0	0.0						
944.0	1.0	FILL	FILL: Silt, with Roots, dark brown, moist.				
941.0	4.0	FILL	FILL: Sand Lean Clay, trace of Gravel, brown, moist.	9			
933.0	12.0	FILL	FILL: Sandy Lean Clay, reddish-brown, gray and dark brown, moist.	4 3 3			
931.0	14.0	FILL	FILL: Silty Sand, fine- to medium-grained, dark brown, wet.	3			
927.0	18.0	SM	SILTY SAND, fine- to medium-grained, reddish-brown, wet, very loose. (Glacial Till)	4			
922.0	23.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, wet, medium. (Glacial Till)	7			
917.0	28.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, wet, stiff. (Glacial Till)	16			
913.0	32.0	SP-SM	POORLY GRADED SAND with SILT, fine- to coarse-grained, trace of Gravel, brown, wet, stiff. (Glacial Till)	15			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING **ST-133 RI-4007-20 (cont.)**

LOCATION: N: 207181.741, E: 553397.254 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
913.0	32.0	SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, brown, moist, loose. (Glacial Outwash)	7		4	
				10			
899.0	46.0			10		3	
			END OF BORING. Water not observed with 44 1/2 feet of hollow-stem auger in the ground. Boring then grouted.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-134 RI-4007-22**

LOCATION: N: 207146.617, E: 553719.021 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
949.0	0.0					
948.0	1.0	FILL	FILL: Silt, with Root Fibers, dark brown, moist.			
		FILL	FILL: Silty Sand, brown to dark brown, moist.	7		
				4		
			With Roots and pieces of topsoil at 5 1/2 feet.			
942.0	7.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, wet, rather soft to rather stiff. (Glacial Till)	4		
				4		
				10		
935.0	14.0	SM	SILTY SAND, fine- to coarse-grained, trace of Gravel, reddish-brown, wet, medium dense. (Glacial Till)	15		
931.0	18.0	SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, reddish-brown, wet to waterbearing, very loose to medium dense. (Glacial Outwash)	7		
					▽	
				3		
				10		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING **ST-134 RI-4007-22 (cont.)**

LOCATION: N: 207146.617, E: 553719.021 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/20/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
917.0	32.0		POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, reddish-brown, wet to waterbearing, very loose to medium dense. (Glacial Outwash) *(continued)*	4		
				24		
906.0	43.0	SP	POORLY GRADED SAND, fine-grained, brown, waterbearing, loose. (Glacial Till)			
903.0	46.0			7		
			END OF BORING. Water down 24 feet with 44 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-135 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **950.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, a little gravel, pieces of bituminous, surface roots, trace roots, dark brown	FILL	36	M	SS	15					
2	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, cinders and clinkers, brown		18	M	SS	13	11				
5	SANDY LEAN CLAY, a little gravel, trace roots, brown, very stiff to hard, laminations of silt (CL)	TILL	20	M	SS	20	14				
8			19	M	SS	23	15				
10			31	M	SS	18	19				
11	CLAYEY SAND WITH GRAVEL, brown, hard, lense of silty sand (SC)						8				
12	SAND WITH GRAVEL, medium to fine grained, brown, moist, very dense (SP)	COARSE ALLUVIUM	56	M	SS	14					
15	GRAVEL WITH SAND, brown, moist, dense (GP)		44	M	SS	4					
18	SAND WITH GRAVEL, medium to fine grained, brown, moist, very dense (SP)										
20			58	M	SS	8					
25			63	M	SS	12					
26	**END OF BORING** Northing=207176.8 Easting=553896.4										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/28/07**	**1:15**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **6/28/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-135A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 950.5 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-135										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD

0-44½' 3.25" HSA

BORING COMPLETED: **7/23/07**

DR: **SG** LG: **BR** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/23/07	**9:12**	**46.5**	**44.5**	**46.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-135A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, moist, dense (SP-SM)	COARSE ALLUVIUM	39	M	SS	20					
31	SAND WITH SILT, fine grained, light brown, moist, dense (SP-SM)										
32											
33											
34											
35			40	M	SS	18					
36											
37											
38	SAND WITH SILT, a little gravel, medium to fine grained, brown, a little dark brown, moist, medium dense, lenses and laminations of silty sand (SP-SM)										
39											
40			29	M	SS	22					
41											
42											
43											
44											
45			35	M	SS	20					
46	**END OF BORING** Northing=207176.8 Easting=553896.4										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-136**

LOCATION: N: 207181.552, E: 554398.416 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **6/28/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
956.7	0.0	FILL	FILL: Clayey Sand, trace of Gravel, brown, moist.	9				
				10				
949.7	7.0	OL	ORGANIC SILT, trace of fibers, dark green, wet, rather soft. (Swamp Deposit)	4				
947.7	9.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray with rust, wet, medium. (Glacial Till)	7				
942.7	14.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish brown, moist, medium dense to dense. (Glacial Till)	7				
				29				
				28		6	25	LL = 13 PI = 1
930.7	26.0			35				
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-137**

LOCATION: N: 207060.401, E: 554647.884 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
956.0	0.0					
955.0	1.0	FILL	FILL: Silty Sand, with Gravel, brown, moist.			
		FILL	FILL: Clayey Sand, trace of Gravel, reddish-brown, moist.	7		
				5		
949.0	7.0	OL	ORGANIC CLAY, trace of Roots, dark brown, moist. (Buried Topsoil)	4		
947.0	9.0	SM	SILTY SAND, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	7		
				18		
				44		
939.0	17.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, moist, medium dense. (Glacial Outwash)	11		
930.0	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.	18		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-138 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 955.9 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, surface roots, trace roots, dark brown	FILL	17	M	SS	14	8				
2	FILL, mixture of clayey sand and sand with silt, a little gravel, trace roots, brown, light brown and gray										
3			13	M	SS	7	10				
4											
5							13				
6			15	M	SS	12					
7											
8			9	W/M	SS	15	14				
9											
10			5	M	SS	14	20				
11											
12							15				
13			3	W/M	SS	18					
14											
15	ORGANIC CLAY, trace roots, black, very soft to soft (OL/OH)	SWAMP DEPOSIT	4	M	SS	20	41				
16											
17											
18			2	W/M	SS	24	28				
19											
20			3	M	SS	18	29				
21											
22											
23	LEAN CLAY WITH SAND, trace roots, pieces of wood, dark gray, firm (CL)	FINE ALLUVIUM	8	W/M	SS	4	38				
24				▼							
25	CLAYEY SAND, a little gravel, dark gray, very soft (SC)	TILL					23				
26	CLAYEY SAND, a little gravel, gray, soft, lenses and laminations of silty sand (SC)		3	W/M	SS	24	22				
27											
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-29½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	6/29/07	**11:45**	**26.5**	**24.5**	**25.0**		**24.3**	
	6/29/07	**11:50**	**31.5**	**29.5**	**31.5**		**None**	
BORING COMPLETED: **6/29/07**								
DR: **SG** LG: **SB** Rig: **91C**								

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-138 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SANDY LEAN CLAY, a little gravel, brown, stiff (CL) *(continued)*		14	M	SS	24	17				
31	SAND WITH SILT, a little gravel, fine to medium grained, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM									
	END OF BORING Northing=207165.1 Easting=554854.2										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-139 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **951.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand, sandy lean clay, silty sand and sand with silt, a little gravel, trace roots, brown and dark brown	FILL	26	M	SS	12	9				
3			21	M	SS	19	8, 10				
5			14	M	SS	14					
8			10	M	SS	15	20, 18				
10	ORGANIC CLAY, trace roots, pieces of wood, dark gray, firm, lenses and laminations of silty sand (OL/OH)	SWAMP DEPOSIT	5	W	SS	12	20, 38				
12	SANDY SILT, pieces of wood, dark gray, wet, very loose, laminations of silty sand (ML)	FINE ALLUVIUM	4	W/M	SS	14	19, 18				
14	SILTY SAND, fine grained, gray, waterbearing, very loose (SM)	COARSE ALLUVIUM									
15	SANDY LEAN CLAY, a little gravel, gray and brown mottled, stiff, laminations of silty sand (CL)	TILL	10	M	SS	19	19				
18	SANDY LEAN CLAY, a little gravel, brown, firm, laminations of silty sand (CL)		8	M	SS	21	19				
25	CLAYEY SAND WITH GRAVEL, brown, hard (SC)		54	M	SS	18	11				
26	SAND WITH SILT, a little gravel, fine to medium grained, brown, moist, very dense (SP-SM)	COARSE ALLUVIUM									
	END OF BORING Northing=206844.7 Easting=553486.0										

DEPTH: DRILLING METHOD **0-24½' 3.25" HSA**

BORING COMPLETED: **6/28/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
6/28/07	**10:44**	**11.5**	**9.5**	**9.8**		**9.6**
6/28/07	**11:05**	**26.5**	**24.5**	**26.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-139A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 951.8 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-139										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44½' 3.25" HSA	**7/23/07**	**1:16**	**46.5**	**44.5**	**46.5**		**None**
BORING COMPLETED: **7/23/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-139A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SILTY SAND WITH GRAVEL, medium to fine grained, brown, moist, dense (SM) (possible cobbles)	COARSE ALLUVIUM	40	M	SS	6					
31											
32											
33											
34											
35			47	M	SS	6					
36											
37											
38	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, dense (SP-SM)										
39											
40			33	M	SS	21					
41											
42											
43	SAND, fine grained, light brown, dense (SP)										
44											
45			33	M	SS	20					
46											
	END OF BORING Northing=206844.7 Easting=553486.0										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4006-15 ST-140**

LOCATION: N: 206836.519, E: 554906.041 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
962.9	0.0	CL	SANDY LEAN CLAY, trace of Gravel, yellowish-brown to brown, moist, medium dense. (Glacial Till)	8		
				6		
				8		
951.9	11.0			17		
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist. (Glacial Till)	42		
				*		*70 blows for 6" (set) suspected Cobble or Boulder
				*		*50 blows for 1" (set) suspected Cobble or boulder
939.9	23.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, brown, moist, very dense. (Glacial Outwash)	54		
936.9	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-140A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 962.9 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–19	No samples taken in upper 19.5', Refer to Log of Boring ST-140										
20–24	CLAYEY SAND, a little gravel, brown, hard (SC)	TILL	37	M	SS	20	9				
25–27	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, dense (SP-SM)	COARSE ALLUVIUM	44	M	SS	16					

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44½' 3.25" HSA	**7/25/07**	**11:10**	**41.5**	**39.5**	**41.4**		**None**
BORING COMPLETED: **7/25/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-140A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
29	GRAVELLY SAND WITH SILT, medium to fine grained, light brown, moist, very dense (SP-SM)										
30			116	M	SS	14					
31											
32											
33											
34											
35			79	M	SS	17					
36											
37											
38	GRAVEL WITH SILTY SAND, light brown, moist, very dense (GP)										
39											
40			99	M	SS	16					
41											
	END OF BORING Northing=206836.5 Easting=554906.0										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-141 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 913.3 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and sandy silt, a little gravel, surface roots, trace roots, brown	FILL	17	M	SS	17					
2	FILL, mixture of silty sand, clayey sand and sandy lean clay, a little gravel, trace roots, organic clay, brown, dark brown, gray and black										
3			19	M	SS	22	10				
4											
5											
6			11	M	SS	17	9				
7											
8	CLAYEY SAND, a little gravel, trace roots, brown and dark gray, stiff (SC)	TILL	9	M	SS	17	19				
9	SANDY LEAN CLAY, a little gravel, dark gray and gray mottled, a little brown, firm, laminations of silty sand and clayey sand (CL)										
10			5	M	SS	20	22				
11											
12											
13	SANDY LEAN CLAY, a little gravel, light brown and gray mottled, stiff, laminations of brown silty sand (CL)		10	M	SS	12	19				
14											
15			14	M	SS	24	18				
16											
17											
18											
19	CLAYEY SAND, a little gravel, dark gray, stiff to very stiff (SC)										
20			14	M	SS	24	15				
21											
22											
23											
24											
25											
26			18	M ▼	SS	16	15				
	END OF BORING Northing=206683.1 Easting=552396.6			–							

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/18/07**	**1:50**	**26.5**	**24.5**	**26.5**		**26.5**
BORING COMPLETED: **7/18/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-142 (p. 1 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 933.7

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, surface roots, trace roots, dark brownish gray	FILL	17	M	SS	10	9				
2	FILL, mostly clayey sand, a little gravel, possible cobbles, trace roots, brown and grayish brown						8				
3			14	M	SS	4	10				
4											
5			8	M	SS	7	13				
6											
7											
8			2	W/M	SS	2	18				
9											
10	FILL, mixture of silty sand, clayey sand and sand with silt, a little gravel, dark grayish brown, gray and black		18	M	SS	19	20				
11											
12											
13			10	M	SS	14					
14											
15							20				
16	SANDY SILT, trace roots, dark brownish gray, a little gray, moist, loose, lenses and laminations of silty sand (ML)	FINE ALLUVIUM	6	M	SS	18	34				
17											
18	SILT WITH ORGANICS, black, wet, loose (ML)		5	W	SS	23	27				
19											
20	CLAYEY SAND, gray, a little brown, stiff, laminations of wet silty sand (SC)	MIXED ALLUVIUM	9	M/W	SS	19	20				
21											
22											
23	LEAN CLAY, trace roots, gray, a little black, stiff, laminations of fat clay (CL)	FINE ALLUVIUM		▼							
24											
25			11	M	SS	17	32				
26	SILTY SAND, fine grained, gray, wet, medium dense (SM)	COARSE ALLUVIUM									
27	SILTY SAND, a little gravel, fine to medium grained, gray, wet, medium dense (SM)										
28			14	W	SS	20					

Fill (sandy silt) 0' to 0.5'
Fill (clayey sand) 0.5' to 9.5'
Fill (silty sand) 9.5' to 15'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-29½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/5/07	9:35	26.0	24.5	24.8		23.7
	7/5/07	2:00	31.5	29.5	29.9		24.5
BORING COMPLETED: 7/5/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-142 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SANDY LEAN CLAY, a little gravel, gray, firm (CL)	TILL	5	M	SS	14	19				
31	**END OF BORING**										
	Northing=206683.8 Easting=552897.3										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-143 RI-4007-02**

LOCATION: N: 206653.285, E: 553400.699 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
949.9	0.0					
949.3	0.6	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.			
		FILL	FILL: Clayey Sand, trace of Gravel, mixed light brown and dark brown, moist.	29		
945.9	4.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, trace of Gravel, light brown, moist.	18		
				5		
940.9	9.0	CL	SANDY LEAN CLAY, trace of Roots, dark brown, moist. (Buried Topsoil)	4		
937.9	12.0	CL	SANDY LEAN CLAY, trace of Gravel, grayish-brown, wet, rather soft to medium. (Glacial Till)	3		
				6		
930.9	19.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, wet, rather soft to rather stiff. (Glacial Till)	5		
				10		
921.9	28.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	21		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING **ST-143 RI-4007-02 (cont.)**

LOCATION: N: 206653.285, E: 553400.699 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
917.9	32.0		SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till) *(continued)*			
				18		
				35		
903.9	46.0			12		
			END OF BORING.			
			Water not observed with 44 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-144 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **955.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
0	Concrete	FILL			SU						
1	FILL, mostly sand with silt, a little gravel, brown		10	M	SS	9					
2											
3	FILL, mixture of clayey sand and silty sand, a little gravel, brown		21	M	SS	20					
4											
5	SILTY SAND, a little gravel, fine grained, brown, medium dense (SM)	TILL	12	M	SS	20	13				
6											
7											
8	SILTY SAND, a little gravel, fine to medium grained, brown, medium dense (SM)		15	M	SS	20	13				
9											
10	SAND WITH SILT, a little gravel, medium to fine grained, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	12	M	SS	8					
11											
12											
13			15	M	SS	12					
14											
15	SAND WITH SILT WITH GRAVEL, medium to fine grained, brown, moist, medium dense to dense (SP-SM)		30	M	SS	6					
16											
17											
18											
19											
20			44	M	SS	14					
21											
22											
23											
24											
25			40	M	SS	15					
26	**END OF BORING** Northing=206618.1 Easting=553935.0										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/9/07**	**8:55**	**26.5**	**24.5**	**26.2**		**None**
BORING COMPLETED: **7/9/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-144A (p. 1 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 955.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 24.5', Refer to Log of Boring ST-144										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44½' 3.25" HSA	7/24/07	12:02	46.5	44.5	46.0		None
BORING COMPLETED: 7/24/07							
DR: SG LG: BR Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-144A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
25	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, dense to very dense (SP-SM)	COARSE ALLUVIUM	35	M	SS	20					
30			51	M	SS	24					
35	SAND WITH SILT, fine to medium grained, light brown, moist, dense to very dense (SP-SM)		39	M	SS	21					
40			53	M	SS	22					
45	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, very dense (SP-SM)		57	M	SS	22					
46	**END OF BORING** Northing=206618.1 Easting=553935.0										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-145 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 954.7 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, a little gravel, surface roots, trace roots, light brown	FILL									
2	CLAYEY SAND, a little gravel, trace roots, brown, laminations of silty sand, very stiff (SC)	TILL	24	M	SS	16	7 9 12				
3			25	M	SS	13					
4							7				
5							14				
6			18	M	SS	15	14				
7			67/0.9								
8				M	SS	11	7				
9											
10							8				
11			16	M	SS	12					
12	SAND, a little gravel, medium to fine grained, brown, moist, medium dense to dense (SP)	COARSE ALLUVIUM									
13			18	M	SS	14					
14											
15											
16			33	M	SS	14					
17											
18	GRAVELLY SAND WITH SILT, fine to coarse grained, brown, moist, very dense (SP-SM)										
19											
20											
21			60	M	SS	12					
22											
23											
24	SAND WITH SILT, fine to medium grained, brown, moist, dense (SP-SM)										
25											
26			44	M	SS	15					
	END OF BORING Northing=206685.1 Easting=554399.4										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/29/07**	**1:40**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **6/28/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-145A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 954.7 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-145										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	**7/24/07**	**9:55**	**41.5**	**39.5**	**40.4**		**None**
BORING COMPLETED: **7/24/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-145A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SAND WITH SILT, fine grained, light brown, a little black, moist, medium dense, laminations of silt at 31 feet (SP-SM)	COARSE ALLUVIUM	25	M	SS	17					
31											
32											
33	SANDY SILT, light brown, moist, dense (ML)	FINE ALLUVIUM									
34											
35			50	M	SS	19					
36											
37											
38	SAND WITH SILT, a little gravel, medium to fine grained, brown, moist, very dense (SP-SM)	COARSE ALLUVIUM									
39											
40			57	M	SS	22					
41											
	END OF BORING Northing=206685.1 Easting=554399.4										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-146 RI-4006-07**

LOCATION: N: 206671.599, E: 554897.200 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
966.0	0.0							
965.5	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)					
		CL	SANDY LEAN CLAY, trace of Gravel, brown, moist. (Glacial Till)	10				
962.0	4.0	CL	SANDY LEAN CLAY, trace of Gravel, yellowish-brown, wet. (Glacial Till)	7				
				4		22	54	LL = 29 PI = 17
957.0	9.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, moist, hard. (Glacial Till)	33				
955.0	11.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	82				NR Suspected Cobble or Boulder
				46		6	25	
				32				
940.0	26.0			32				
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-146A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 966.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 27', Refer to Log of Boring ST-146										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44½' 3.25" HSA	**7/25/07**	**8:46**	**46.5**	**44.5**	**46.0**		**None**
BORING COMPLETED: **7/25/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-146A (p. 2 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
28	GRAVEL WITH SILTY SAND, light brown, moist, dense to very dense (GP)	COARSE ALLUVIUM	79	M	SS	19					
29											
30			42	M	SS	10					
31											
32											
33											
34											
35			57	M	SS	14					
36											
37											
38	SAND, a little gravel, fine to medium grained, light brown, moist, dense (SP)										
39											
40											
41			40	M	SS	17					
42											
43											
44	GRAVELLY SAND WITH SILT, medium to fine grained, light brown, moist, very dense (SP-SM)										
45											
46			56	M	SS	18					
	END OF BORING Northing=206671.6 Easting=554897.2										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4006-16 ST-147**

LOCATION: N: 206638.252. E:555108.351 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/2/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
958.6	0.0					
958.1	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)	20		
				22		
				28		
949.6	9.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, moist, medium dense to very dense. (Glacial Outwash)	22		
				52		Suspected Cobble or Boulder
				34		
				38		
932.6	26.0			53		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-147A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 958.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-147										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44½' 3.25" HSA	**7/24/07**	**2:20**	**45.5**	**44.5**	**45.4**		**None**
BORING COMPLETED: **7/24/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-147A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	GRAVEL WITH SAND, brown, very dense (GP)	COARSE ALLUVIUM	119	M	SS	16					
31											
32											
33											
34											
35			84/0.8	M	SS	14					
36											
37											
38	GRAVELLY SAND WITH SILT, medium to fine grained, brown, moist, very dense (SP-SM)										
39											
40			100/0.5	M	SS	8					
41											
42											
43											
44											
45			62/0.5	M	SS	8					
	END OF BORING Northing=206638.3 Easting=555108.4										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-148 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: 957.9

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6" Bituminous Pavement	FILL			SU						
1	FILL, mostly gravelly silty sand, brown and light brown		26	M	SS	9					
2											
3	FILL, mixture of sandy lean clay, clayey sand and silty sand, a little gravel, pieces of bituminous, brown, gray, dark gray and brown, a little black		17	M	SS	10	10				
4											
5			20	M	SS	20					
6											
7				▼							
8			1	W	SS	14					
9											
10	ORGANIC CLAY, trace roots, black and dark gray, soft (OL/OH)	SWAMP DEPOSIT	2	M	SS	21	26				
11	HEMIC PEAT, dark brown, a little gray, laminations of lean clay (PT)						182				
12											
13	ORGANIC CLAY, trace roots, black, soft to very soft (OL/OH)		2	M	SS	24	102				
14											
15			1	M	SS	23	31				
16							27				
17	SILTY CLAY, gray and black, very soft, laminations of silty sand (CL-ML)	FINE ALLUVIUM									
18	CLAYEY SAND, a little gravel, gray and brownish gray, very soft to very stiff (SC)	TILL	2	M	SS	16	18				
19											
20			1	M	SS	7	23				
21											
22											
23											
24											
25			18	M	SS	5	18				
26											
27											
28											
29											
30	CLAYEY SAND, a little gravel, dark brown, very stiff (SC)		20	M	SS	20	10 15				
31											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	7/17/07	12:05	9.0	7.0	7.4		7.3
	7/17/07	12:45	36.5	34.5	35.7		33.9
BORING COMPLETED: 7/17/07	7/17/07	12:50	41.5	39.5	40.3		39.9
DR: SG LG: SB/BR Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-148 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
32	SANDY LEAN CLAY, a little gravel, dark brown, a little brown, very stiff, lense of silty sand at 31.5' (CL)										
33											
34	CLAYEY SAND, a little gravel, trace roots, brown, hard to firm (SC)										
35											
36			36	W	SS	16	10				
37											
38											
39											
40											
41			8	W	SS	19	14				
	END OF BORING Northing=206425.9 Easting=554458.6										

BRAUN℠ INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-149**

LOCATION: N: 206391.747, E: 555391.606 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
990.9	0.0						
989.9	1.0	FILL	FILL: Silty Sand, trace of Roots, moist.				
		FILL	FILL: SANDY LEAN CLAY, trace of GRAVEL, mixed light brown to dark brown, moist.	11			
				7			
				5			
				8			
978.9	12.0						
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of gravel, reddish-brown to grayish-brown, moist to wet.	7			
				4			
					▽		
				6			
968.9	22.0						
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet. (Glacial Till)	4			
				4		23	
958.9	32.0						

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-149 (cont.)**

LOCATION: N: 206391.747, E: 555391.606 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/11/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
958.9	32.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, wet.	*			*50 blows for 6"
952.9	38.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to hard.	30			
				59		7	
939.9	51.0			29			
			END OF BORING. Water observed at 19 feet while drilling. Boring then grouted. Given moist conditions at depth groundwater appears to be trapped in clay layer.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-150 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 927.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, surface roots, trace roots, dark brownish gray	FILL	34	M	SS	12	7				
2	FILL, mixture of clayey sand and silty sand, a little gravel, trace roots, grayish brown and brown										
3			21	M	SS	19					
4											
5	CLAYEY SAND, trace roots, dark brown, firm (SC) (possible fill)	TOPSOIL OR FILL	7	M	SS	3	16				
6											
7	CLAYEY SAND, a little gravel, brown and light gray mottled, stiff (SC/CL)	TILL									
8			10	M	SS	16	17				
9											
10	CLAYEY SAND, a little gravel, light brownish gray, a little brown, stiff, laminations of silty sand (SC/CL)		11	M	SS	21	18				
11											
12											
13			14	M	SS	21	16				
14											
15	SANDY LEAN CLAY, a little gravel, brown and dark brown, very stiff (CL)		16	M	SS	24	14				
16											
17											
18											
19											
20			16	M	SS	24	14				
21											
22											
23	SANDY LEAN CLAY, a little gravel, brown, very stiff, lenses and laminations of sand (CL)										
24											
25			23	M	SS	21	14				
26											
	END OF BORING Northing=206182.3 Easting=552896.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/6/07**	**2:10**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/6/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-151 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 922.3 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, surface roots, trace roots, black and brown	FILL	24	M	SS	14	33				
3	CLAYEY SAND, a little gravel, trace roots, brown, very stiff (SC)	TILL	18	M	SS	24	12				
5	SAND WITH SILT, fine to medium grained, a little gravel, brown, wet, medium dense (SP-SM)	COARSE ALLUVIUM	13	W	SS	11					
8	SANDY LEAN CLAY, a little gravel, gray, a little reddish brown, firm to stiff, laminations of silty sand at 7.5' (CL)	TILL	5	M	SS	18	18				
10			7	M	SS	24	15				
13			10	M	SS	24	16				
15			10	M	SS	21	15				
19	LEAN CLAY, brownish gray, a little gray, hard to very stiff, laminations of silt (CL)	FINE ALLUVIUM	33	M	SS	21	17				
25			25	M	SS	24	25				
	END OF BORING Northing=206254.2 Easting=553051.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/9/07	**9:35**	**6.5**	**4.5**	**5.2**		**5.1**
	7/9/07	**10:00**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **7/9/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-152 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **942.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5" Bituminous Pavement	FILL			SU						
1	FILL, mostly sand with silt and gravel, brown		21	M	SS	5					
2											
3	FILL, mixture of sandy lean clay and clayey sand, with gravel, brown and gray		16	M	SS	11	15				
4											
5			9	M	SS	5	16				
6											
7											
8			7	M	SS	12	24				
9											
10	SILTY SAND, fine grained, dark brown, wet, very loose (SM) (possible fill)	COARSE ALLUVIUM OR FILL	3	W	SS	14					
11											
12	SAND WITH SILT, fine grained, brownish gray, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM		▼							
13			11	W	SS	13					
14	SILTY SAND, fine grained, gray, wet, medium dense (SM)										
15			15	W	SS	14					
16	CLAYEY SAND, gray, stiff (SC)	TILL					22				
17											
18	CLAYEY SAND, a little gravel, grayish brown, stiff (SC)		9	M	SS	21	17				
19											
20	CLAYEY SAND, a little gravel, brown and gray mottled, stiff (SC)		12	M	SS	21	17				
21											
22											
23	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
24											
25			14	M	SS	8	15				
26											
	END OF BORING Northing=206184.0 Easting=553397.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/5/07**	**11:50**	**14.0**	**12.0**	**12.5**		**12.3**
	7/5/07	**12:10**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **7/5/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-153 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **951.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly gravelly silty sand, possible cobbles, surface roots, trace roots, brown	FILL	22	M	SS	12					
3	FILL, mixture of clayey sand and sandy lean clay, a little gravel, brown and dark brown		25	M	SS	10	13				
5	SANDY LEAN CLAY, a little gravel, brown, a little gray, firm, laminations of sand (CL)		5	M	SS	17	20				
8	CLAYEY SAND, a little gravel, brown mottled, stiff (SC)		12	M	SS	18	17				
10	CLAYEY SAND, a little gravel, light brownish gray, a little brown, mottled, stiff, lenses and laminations of silty sand (SC)		12	M	SS	17	18				
13	SANDY LEAN CLAY, a little gravel, light brownish gray and brown mottled, stiff to very stiff (CL)		14	M	SS	23	15				
15			16	M	SS	23	15				
20			30	M	SS	22	13				
24	CLAYEY SAND, a little gravel, possible cobbles, dark grayish brown to brown, hard (SC)		100/0.9	M	SS	12	7				
	END OF BORING										
	Northing=206179.7 Easting=553901.3										

Fill 0' to 4.5'
Sandy Lean Clay
4.5' to 7'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/5/07**	**11:05**	**25.9**	**24.5**	**25.3**		**None**
BORING COMPLETED: **7/5/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-153A (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 951.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	No samples taken in upper 29.5', Refer to Log of Boring ST-153										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

DEPTH: DRILLING METHOD

0-44½' 3.25" HSA

BORING COMPLETED: **7/23/07**

DR: **SG** LG: **BR** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/23/07	**3:07**	**46.5**	**44.5**	**46.4**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-153A (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SILTY SAND, a little gravel, fine to medium grained, brown, moist, very dense (SM)	TILL	73	M	SS	22					
31											
32											
33											
34	CLAYEY SAND WITH GRAVEL, brown, moist, hard to very stiff, lense of silty sand, a little gravel at 46 feet (SC)										
35			56	M	SS	20	11				
36											
37											
38											
39											
40			34	M	SS	24	9				
41											
42											
43											
44											
45			28	M	SS	24	9				
46											
	END OF BORING Northing=206179.7 Easting=553901.3										

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-154 RI-4008-15**

LOCATION: N: 206184.030, E: 554408.064 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
956.7	0.0					
955.7	1.0	FILL	FILL: Silty Sand, brown, moist.			
		FILL	FILL: Sandy Lean Clay, with Sand layer, brown, dark brown and reddish-brown, moist.	30		
				21		
				12		
947.7	9.0		With topsoil lense at 8 feet.			
		FILL	FILL: Sandy Lean Clay, trace of Gravel, brown, moist.	8		
945.7	11.0					
		FILL	FILL: Sandy Lean Clay, with topsoil chunks, brown to dark brown, wet.	6		
940.7	16.0		With Organic Clay layer at 15 1/2 feet.	3		
		SC	CLAYEY SAND, trace of Gravel, brown and gray with iron staining, wet, medium. (Lacustrine)	6		
				7		
928.7	28.0					
		CL	SANDY LEAN CLAY, trace of Gravel, brown with iron staining, moist, stiff. (Glacial Till)	13		

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING **ST-154 RI-4008-15 (cont.)**

LOCATION: N: 206184.030, E: 554408.064 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
924.7	32.0		SANDY LEAN CLAY, trace of Gravel, brown with iron staining, moist, stiff. (Glacial Till) *(continued)*	15		
919.7	37.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, dense. (Glacial Till)	38		
915.7	41.0		END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 39 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-157**

LOCATION: N: 206185.157, E: 555395.351 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/10/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
995.9	0.0					
994.9	1.0	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.			
		FILL	FILL: Sandy Lean Clay, mixed, light brown to grayish brown, moist.	12		
				7		
				12		
986.9	9.0	FILL	FILL: Silty Sand, fine-grained, trace of Roots at 12' Sample Depth, brown to dark brown, moist.	9		
				6		
981.9	14.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown, moist, medium to very stiff. (Glacial Till)	7		
				18		
				13		
963.9	32.0			14		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-157 (cont.)**

LOCATION: N: 206185.157, E: 555395.351 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/10/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
963.9	32.0	SM	SILTY SAND, fine-grained, reddish-brown, moist, dense to very dense. (Glaciofluvium)	38		
				38		
				*		*50 blows to for 5" (set) suspected cobble or boulder
948.9	47.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, moist, very dense. (Glacial Outwash)	74		
				88		
				*		*50 blows for 4" (set)

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-157 (cont.)**

LOCATION: N: 206185.157, E: 555395.351 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/10/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
931.9	64.0		POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, light brown, moist, very dense. (Glacial Outwash) *(continued)*	52		
				68		
				*		*50 blows for 6" (set)
914.9	81.0			58		
			END OF BORING.			
			Water not observed with 79 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-158 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **955.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sandy lean clay, clayey sand and silty sand, surface roots, trave roots, brown, light brown and gray	FILL	26	M	SS	14	7				
3			35	M	SS	15	8				
5			7	M	SS	18	14				
8			12	M	SS	17	22				
10			15	M	SS	19	15				
13	FILL, mixture of clayey sand and sandy lean clay, a little gravel, trace roots, brown and gray, a little black, lense of organic clay, laminations of sandy silt		9	M	SS	15	19				
15			8	M	SS	14	20				
18			10	M	SS	24	17				
20			9	M	SS	20	19				
21							24				
22	LEAN CLAY, trace roots, gray and black, stiff, lense of organic clay, lense of silty sand (CL)	FINE ALLUVIUM									
23	CLAYEY SAND, a little gravel, gray, soft (SC)	TILL	4	M	SS	24	19				
25	SANDY LEAN CLAY, a little gravel, gray, a little brown, stiff, laminations of lean clay (CL)		11	M	SS	24	21				
26	**END OF BORING** Northing=206042.2 Easting=554402.2										

Fill (Sandy lean clay) 0' to 13'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/17/07**	**11:05**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/17/07**							
DR: **SG** LG: **SB/BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-159**

LOCATION: N: 206047.880. E: 554563.240 See attached sketch.

DRILLER: M. Rowland | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/12/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
959.4	0.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace of Gravel, brown, moist then waterbearing at 20' sample depth. (Lacustrine)		▽	
933.4	26.0		END OF BORING. Water observed at 18 feet while drilling. Boring then grouted.			

Fill (Poorly graded sand with silt) 0' to 26'

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-160 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **920.2**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, surface roots, black and brown	FILL	24	M	SS	13	15				
2	FILL, mixture of sand with silt, clayey sand, and silty sand, a little gravel, trace roots, brown and gray, possible cobbles										
3			21	M	SS	23	10				
4											
5											
6			11	M	SS	12	16				
7	LEAN CLAY WITH ORGANICS, trace roots, black, firm (CL)	TOPSOIL OR SWAMP DEPOSITS									
8			8	M	SS	20	20				
9	SILTY SAND, trace roots, fine grained, dark gray, loose (SM)	COARSE ALLUVIUM									
10	SILTY SAND, trace roots, fine grained, gray, waterbearing, very loose with lenses and laminations of lean clay with sand (SM)										
11			4	W/M	SS	14					
12	SAND WITH SILT, fine grained, brown, waterbearing, medium dense (SP-SM)										
13			11	W	SS	15					
14											
15	CLAYEY SAND, a little gravel, gray, soft to stiff, laminations of silty sand at 26' (SC)	TILL									
16			4	M	SS	17	16				
17											
18											
19											
20											
21			11	M	SS	4	19				
22											
23											
24											
25											
26			10	M	SS	22	16				
	END OF BORING Northing=205865.8 Easting=553115.1										

DEPTH: DRILLING METHOD

0-24½' 3.25" HSA

BORING COMPLETED: **7/9/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/9/07	**10:45**	**14.0**	**12.0**	**12.3**		**11.8**
7/9/07	**11:00**	**26.5**	**24.5**	**26.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-161 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 926.9 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly gravelly sand with silt, light grayish brown	FILL	15	M	SS	4					
2											
3	FILL, mixture of sandy lean clay, clayey sand and silty sand, a little gravel, light brownish gray and brown		15	M	SS	20	12				
4											
5	LEAN CLAY WITH SAND, gray, a little black, firm, laminations of organic clay and silty sand (CL)	FINE ALLUVIUM	7	M	SS	5	13				
6											
7											
8	CLAYEY SAND, a little gravel, gray, stiff (SC)	TILL	10	M	SS	14	18				
9											
10	CLAYEY SAND, a little gravel, light brownish gray and brown mottled, stiff to firm, laminations of silty sand (SC)		9	M	SS	20	18				
11											
12											
13			8	M	SS	21	18				
14											
15			12	M	SS	21	18				
16											
17											
18	CLAYEY SAND, a little gravel, dark gray, stiff (SC)										
19											
20			13	M	SS	20	13				
21											
22											
23											
24											
25			14	M	SS	21	16				
26											
	END OF BORING Northing=205683.9 Easting=553397.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/9/07**	**3:05**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/9/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-162**

LOCATION: N: 205685.324, E: 553896.610 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/3/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
956.7	0.0					
955.7	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		CL	SANDY LEAN CLAY, trace of Gravel, yellowish-brown to brown with rust lenses scattered, moist, medium to stiff. (Glacial Till)	7		
				9		
				13		
				14		
				15		
				16		
				13		
				11		
927.7	29.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, moist, rather stiff. (Glacial Till)	12		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-162 (cont.)**

LOCATION: N: 205685.324, E: 553896.610 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/3/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
924.7	32.0					
923.7	33.0					
		SM	SILTY SAND, fine- to medium-grianed, trace of Gravel, reddish-brown, moist, dense. (Glacial Till)	35		
918.7	38.0					
		SP	POORLY GRADED SAND, fine- to coarse-grained, brown, moist, dense. (Glacial Outwash)	40		
910.7	46.0			40		
			END OF BORING. Water not observed with 44 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:43

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-163 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 949.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	7.5" Bituminous Pavement	FILL			SU						
1	FILL, mixture of sand with silt, silty sand and clayey sand with gravel, brown and brownish gray		15	M	SS	12					
2											
3	FILL, mixture of clayey sand and sandy lean clay, a little gravel, gray and brown		19	M	SS	12	17				
4											
5							13				
6			15	M	SS	8	16				
7											
8			3	M	SS	8	18				
9							20				
10							17				
11			10	M	SS	15	20				
12							18				
13			5	M	SS	7	19				
14											
15	SAPRIC PEAT, black (PT)	SWAMP DEPOSIT					159				
16	ORGANIC CLAY, trace roots, black, firm (OL/OH)		7	M	SS	20	35				
17											
18	LEAN CLAY WITH SAND, dark brownish gray, firm, laminations of sand (CL)	FINE ALLUVIUM	5	M	SS	21	25				
19											
20	CLAYEY SAND, a little gravel, gray, soft, laminations of fine grained sand (SC)	TILL									
21			3	W/M	SS	14	18				
22											
23											
24											
25											
26			3	M	SS	24	17				
	END OF BORING Northing=205683.4 Easting=554148.1										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/2/07	**1:55**	**26.5**	**24.5**	**26.4**		**None**	
BORING COMPLETED: **7/2/07**								
DR: **SG** LG: **SB** Rig: **91C**								

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-164 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **951.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS: WC	DEN	LL	PL	%-#200
	4.25" Bituminous Pavement	FILL			SU						
1	FILL, mixture of silty sand and clayey sand with gravel, brown and gray		19	M	SS	13	8				
2	SANDY LEAN CLAY, a little gravel, brownish gray and brown, stiff (CL)	TILL									
3			15	M	SS	1	16				
4		Sandy Lean Clay 2.0' to 8.5'									
5			15	M	SS	12	14				
6							16				
7											
8			9	M	SS	19	21				
9	SILTY SAND, trace roots, fine grained, dark brown and gray, moist, loose, lenses and laminations of sand with silt (SM)	COARSE ALLUVIUM									
10			4	W/M	SS	12					
11	SAND WITH SILT, fine grained, brown and gray, very loose, moist to wet, laminations of lean clay with sand (SP-SM)										
12	CLAYEY SAND, a little gravel, gray, firm (SC)	TILL									
13			6	M	SS	22	19				
14											
15	CLAYEY SAND, a little gravel, gray and brown mottled, firm (SC)		5	M	SS	18	17				
16											
17											
18	CLAYEY SAND, a little gravel, brown, stiff (SC)										
19											
20			11	M	SS	24	15				
21											
22											
23	CLAYEY SAND, a little gravel, dark gray, very stiff (SC)										
24											
25			18	M	SS	24	15				
26											
	END OF BORING Northing=205683.9 Easting=554395.9										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/5/07**	**10:00**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/5/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-165 RI-4008-36**

LOCATION: N: 205684.892, E: 554894.762 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/16/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
953.1	0.0					
952.8	0.3	PAV	3 1/2" of Bituminous			
		FILL	FILL: Silty Sand, fine-grained, brown, moist.			
951.1	2.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, medium to very stiff. (Glacial Till)	7		
				8		
				13		
				19		
941.1	12.0	ML	SILT, reddish-brown, moist, medium dense. (Glaciofluvium)	24		
940.1	13.0	SP	POORLY GRADED SAND, fine-grained, reddish-brown, moist, medium dense. (Glacial Outwash)	23		
935.1	18.0	ML	SILT, reddish-brown, moist, medium dense. (Glaciofluvium)	22		
930.1	23.0	SM	SILTY SAND, fine-grained, with Cobbles, reddish-brown, moist, dense. (Glacial Till)	39		
927.1	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

Sandy Lean Clay
2.0' to 12'

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP06055871.GPJ BRAUN.GDT 10/2/07 14:44

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-166 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 955.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4.75" Bituminous Pavement	FILL			SU						
1	FILL, mostly gravelly sand with silt, brown (possible base)		19	M	SS	3					
2	SANDY LEAN CLAY, a little gravel, light grayish brown, a little light brown, stiff to very stiff, laminations of sandy silt (CL)	TILL OR WEATHERED TILL									
3			11	M	SS	7	14				
4											
5			16	M	SS	20					
6							15				
7	SANDY LEAN CLAY, a little gravel, light grayish brown, a little brown and light brown, very stiff, laminations of silty sand and sandy silt (CL)	TILL									
8			20	M	SS	18	15				
9							15				
10			23	M	SS	21	15				
11											
12											
13			20	M	SS	17	15				
14											
15			19	M	SS	21	15				
16											
17											
18	CLAYEY SAND, a little gravel, possible cobbles, brown, a little light brownish gray, hard (SC)										
19											
20			88	▼	SS	14	13				
21											
22											
23	SAND, a little gravel, medium to fine grained, brown, waterbearing, dense (SP)	COARSE ALLUVIUM									
24											
25			41	W	SS	24					
26	SILTY SAND, fine grained, brown, wet, dense (SM)										
	END OF BORING Northing=205683.0 Easting=555397.1										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	7/5/07	8:35	26.5	24.5	24.1		21.2
BORING COMPLETED: 7/5/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-167 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **945.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5.75" Bituminous Pavement	FILL			SU						
1	FILL, mostly gravelly sand with silt, brown (possible base)		20	M	SS	8					
2											
3	FILL, mixture of clayey sand, sandy lean clay and silty sand, a little gravel, brown and grayish brown		9	M	SS	3	9				
4											
5	SANDY LEAN CLAY, a little gravel, grayish brown, firm (CL)	WEATHERED TILL	8	M	SS	12	15				
6											
7	SANDY LEAN CLAY, a little gravel, gray, firm, lenses and laminations of organic clay and sand (CL)		5	M	SS	9	20				
8											
9	CLAYEY SAND, gray, a little brown, soft (SC)										
10			3	M	SS	15	24				
11	CLAYEY SAND, a little gravel, gray, a little brown, soft, laminations of silty sand (SC)	TILL					24				
12											
13	SANDY LEAN CLAY, a little gravel, brown, soft (CL)		4	M	SS	20	22				
14											
15	SANDY LEAN CLAY WITH GRAVEL, gray, stiff (CL)		9	M	SS	17	19				
16											
17											
18	CLAYEY SAND, a little gravel, gray, stiff (SC)										
19											
20			9	WM	SS	19	16				
21											
22											
23											
24											
25			13	M	SS	22	15				
26											
	END OF BORING Northing=205551.6 Easting=553796.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/2/07**	**8:40**	**21.5**	**19.5**	**21.5**		**21.2**
	7/2/07	**8:45**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/2/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-168 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 947.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	10.5" Bituminous Pavement	FILL			SU						
1	FILL, mostly gravelly sand with silt, brown			M	SS	8					
2	FILL, mostly sandy lean clay, a little sapric peat, trace roots, gray and brown, a little black						19				
3			5	M	SS	14					
4	SANDY LEAN CLAY, trace roots, light brownish gray and light gray, firm, laminations of silt (CL)	WEATHERED TILL					16				
5		TILL					14				
6	SANDY LEAN CLAY, a little gravel, trace roots, light brownish gray, a little light gray, stiff to very stiff, laminations of silt (CL)		15	M	SS	17	15				
7											
8			20	M	SS	19	16				
9											
10											
11			21	M	SS	14	14				
12											
13	SANDY LEAN CLAY, a little gravel, light brownish gray, a little brown, very stiff, laminations of silty sand (CL)		18	M	SS	18	16				
14											
15	CLAYEY SAND, a little gravel, grayish brown, a little brown, very stiff (SC)		29	M	SS	12	14				
16											
17											
18	CLAYEY SAND, a little gravel, brown, very stiff (SC)		21	M	SS	17	15				
19											
20	SANDY LEAN CLAY, a little gravel, brown, very stiff (CL)		24	M	SS	19	16				
21											
22											
23											
24	GRAVELLY SAND, medium grained, brown, moist, medium dense (SP)	COARSE ALLUVIUM									
25											
26			16	M	SS	6					
	END OF BORING Northing=205519.6 Easting=554022.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/2/07**	**11:20**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/2/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-169 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 948.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	10.75" Bituminous Pavement	FILL			SU						
1	FILL, mixture of sand with silt with gravel and clayey sand with gravel, brown										
2			28	M	SS	11	7				
3	FILL, mixture of sand with silt and crushed limestone with gravel, brown and light brown		26	W	SS	6					
4											
5	FILL, mixture of sandy lean clay, clayey sand and silty sand, a little gravel, gray and brown		16	M	SS	12	13				
6											
7											
8			9	M	SS	12	17				
9											
10											
11	ORGANIC CLAY, a little gravel, trace roots, gray, very stiff to soft (OL/OH)	SWAMP DEPOSIT	14	M	SS	19	39				
12							24				
13	SANDY LEAN CLAY, a little gravel, gray, soft (CL/SC)	TILL	3	M	SS	20	22				
14	SANDY LEAN CLAY, a little gravel, gray, a little brown, stiff, laminations of silty sand (CL)										
15			15	M	SS	18	17				
16											
17											
18											
19											
20			14	M	SS	19	16				
21											
22											
23											
24											
25			14	M	SS	22	20				
26											
	END OF BORING Northing=205580.7 Easting=554087.9										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/2/07**	**12:20**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/2/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-170 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **949.7**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6.25" Bituminous Pavement	FILL			SU						
1	FILL, mixture of sand with silt and gravel and clayey sand, brown and brownish gray		14	M	SS	4					
2	FILL, mixture of clayey sand and sandy lean clay, a little gravel, light brownish gray, gray and a little brown										
3			9	M	SS	6	15				
4											
5							15				
6			12	M	SS	17					
7											
8			14	M	SS	17					
9							14				
10							18				
11	LEAN CLAY WITH ORGANICS, trace roots, black, firm (CL)	TOPSOIL	6	M	SS	12	23				
12	SILTY SAND, fine grained, gray and brown mottled, wet, medium dense (SM)	COARSE ALLUVIUM		$\bar{W}$							
13			11		SS	15					
14											
15	SANDY LEAN CLAY, a little gravel, gray, a little brown, firm, laminations of silty sand (CL)	TILL	5	M	SS	19	20				
16											
17											
18	CLAYEY SAND WITH GRAVEL, gray, a little brown, stiff, laminations of silty sand (SC)										
19											
20			13	M	SS	21	17				
21											
22											
23	CLAYEY SAND, a little gravel, gray, stiff (SC)										
24											
25											
26			11	M	SS	5	17				
	END OF BORING Northing=205558.5 Easting=554273.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/2/07**	**2:40**	**14.0**	**12.0**	**13.2**		**12.6**
	7/2/07	**2:55**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/2/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-171 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **915.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	3.25" Bituminous Pavement	FILL			SU						
1	FILL, mostly sand with silt and gravel, brown		21	M	SS	14					
2											
3	FILL, mixture of sandy lean clay and clayey sand, a little gravel, light grayish brown to light brownish gray		11	M	SS	8	14				
4							10				
5			4	M	SS	16	16				
6											
7											
8			5	▼	SS	17	20				
9	SAND, a little gravel, medium to fine grained, brown, waterbearing, loose (SP)	TOPSOIL OR COARSE ALLUVIUM					18				
10	SILTY SAND, fine grained, gray and black, wet, very loose, lenses and laminations of organic silt and sand (SM)		3	W	SS	19					
11											
12	CLAYEY SAND, a little gravel, trace roots, gray, very soft, lenses of waterbearing sand with silt (SC)	TILL									
13			1	M	SS	22	18				
14											
15	SANDY LEAN CLAY, a little gravel, gray, a 2" thick fine grained sand lenses at 15.6'		5	M	SS	24	19				
16											
17											
18											
19											
20			11	M	SS	17	17				
21											
22											
23											
24											
25			12	M	SS	23	19				
26											
	END OF BORING Northing=205644.7 Easting=553192.7										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/6/07**	**12:50**	**11.5**	**9.5**	**9.5**		**8.6**
	7/6/07	**1:05**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **7/6/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-172**

LOCATION: N: 205439.106, E: 553392.375 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
925.1	0.0							
924.6	0.5	FILL	FILL: Silty Sand, trace of Roots, dark brown, moist.					
		FILL	FILL: Sandy Lean Clay, trace of Gravel, mixed light brown to brown, moist.	14				
				9	▽			
918.1	7.0	SC	CLAYEY SAND, Organic, dark gray, wet, soft to rather soft. (Swamp Deposit)	4				
				3				
911.1	14.0	PT	PEAT, dark gray, soft. (Swamp Deposit)	2		29	48	LL = 36 PI = 23
				3				
908.1	17.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, very soft to medium. (Glacial Till)					
				WH				
899.1	26.0		END OF BORING.	6				
			Water observed at 6 feet while drilling.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-173**

LOCATION: N: 205433.823, E: 553574.478 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
942.9	0.0					
941.9	1.0	SM	SILTY SAND, trace of Roots, dark brown, wet. (Topsoil)			
		CL	SANDY LEAN CLAY, trace of Gravel, light brown, moist, very stiff to hard. (Glacial Till)	19		
				46		*NR Suspected Cobble or Boulder
935.9	7.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown with gray and rust, wet, rather soft to rather stiff. (Glacial Till)	9		
				5		
				7		
				9		
				10		
920.9	22.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, very stiff. (Glacial Till)			
				17		
916.9	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-174 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 944.9 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sandy silt and sandy lean clay, a little gravel, possible cobbles, surface roots, trace roots, brown and light brown	FILL	15	M	SS	12	12				
3			17	M	SS	3	13				
5	SANDY LEAN CLAY, a little gravel, possible cobbles, trace roots, gray and brown mottled, a little light gray, very stiff, laminations of sandy silt (CL)	WEATHERED TILL	21	M	SS	19	14				
8	SANDY LEAN CLAY, a little gravel, apparent cobbles, trace roots, light grayish brown, a little brown, very stiff, laminations of sandy silt (CL) (possible fill)	TILL	27	M	SS	16	16				
11	CLAYEY SAND, a little gravel, grayish brown to gray, very stiff to stiff (SC)		21	M	SS	NR					
13			21	M	SS	20	15				
15			19	M	SS	18	16				
20			15	M	SS	18	16				
24	CLAYEY SAND, a little gravel, apparent cobbles, brown and gray mottled, hard, laminations of sand with silt (SC)		32	M	SS	20	13				
	END OF BORING Northing=205436.5 Easting=553898.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/2/07	**10:10**	**26.5**	**24.5**	**26.4**		**None**
BORING COMPLETED: **7/2/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-174**

LOCATION: N: 205436.535, E: 553898.789 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
944.9	0.0		Power Auger to 29 feet. No samples obtained.			
915.9	29.0	SM	SILTY SAND, fine-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	16		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587I.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-174 (cont.)**

LOCATION: N: 205436.535, E: 553898.789 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/25/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
912.9	32.0		SILTY SAND, fine-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till) *(continued)*	31		
903.9	41.0		END OF BORING.	27		
			Water not observed during drilling.			
			Water not observed with 39 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-175 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 948.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–2	FILL, mixture of clayey sand and silty sand, a little gravel, surface roots, trace roots, pieces of brick, brown and dark brown	FILL	18	M	SS	15	6				
3–4	SANDY LEAN CLAY, a little gravel, trace roots, brown, very stiff (CL)	TILL	18	M	SS	19	11 11				
5–6	CLAYEY SAND, a little gravel, trace roots, brown, stiff (SC)		12	M	SS	17	12				
7–8	SANDY LEAN CLAY, a little gravel, trace roots, gray, stiff to hard (CL)		30	M	SS	20	15 20				
9–10	CLAYEY SAND, a little gravel, brown, hard (SC)		10	M	SS	7	16				
11–14	CLAYEY SAND, a little gravel, brownish gray, stiff to firm, laminations of silty sand (SC)		8	M	SS	7	13				
15–17	LEAN CLAY WITH SAND, gray and brown mottled, firm, laminations of silty sand (CL)		7	W	SS	16	31				
18–22	SANDY LEAN CLAY, a little gravel, gray, soft, laminations of brown silty sand (CL)		8	M	SS	18	17				
23–26	SANDY LEAN CLAY, a little gravel, gray, soft (CL)		7	M	SS	16	18				
	END OF BORING Northing=205434.5 Easting=554148.7										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/3/07	**8:45**	**16.5**	**14.5**	**15.4**		**15.1**
	7/3/07	**8:50**	**21.5**	**19.5**	**20.3**		**None**
BORING COMPLETED: **7/3/07**	**7/3/07**	**9:00**	**26.5**	**24.5**	**26.5**		**None**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-176 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 951.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly sand with silt, a little gravel, surface roots, trace roots, brown	FILL	17	M	SS	8					
3	FILL, mixture of sand with silt and clayey sand, a little gravel, trace roots, brown, dark brown and gray		23	M	SS	14					
5			17	M	SS	3	16				
8			13	M	SS	10	13				
10	LEAN CLAY WITH ORGANICS, trace roots, black and dark brown, stiff, laminations of silty sand (CL)	TOPSOIL	9	M	SS	17	13				
11							29				
12	SANDY LEAN CLAY, a little gravel, trace roots, gray, a little black, stiff to soft (CL)	WEATHERED TILL	9	M	SS	16	20				
15			3	M	SS	20	23				
16	SANDY LEAN CLAY, a little gravel, gray, soft to stiff (CL)	TILL					22				
20			15	M	SS	22	18				
23	CLAYEY SAND WITH GRAVEL, gray (SC)										
24			50/0.3	M	SS	4	16				
	END OF BORING, Obstructed to SS at 24.8' Northing=205436.4 Easting=554397.8										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**6/29/07**	**3:10**	**24.8**	**24.5**	**24.8**		**None**
BORING COMPLETED: **6/29/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-177 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 953.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, a little gravel, surface roots, trace roots, piece of metal at 3", brown	FILL	28	M	SS	12					
2											
3	FILL, mixture of sand with silt and clayey sand, a little gravel, trace roots, brown and gray		40	M	SS	17	5				
4											
5			11	M	SS	18	8				
6											
7											
8			12	M	SS	17	11				
9											
10			16	M	SS	11	13				
11											
12											
13	CLAYEY SAND, trace roots, black and dark brown, a little gray, firm, laminations of silty sand (SC)	WEATHERED TILL OR TOPSOIL	6	M	SS	16	19				
14											
15	CLAYEY SAND, a little gravel, trace roots, gray and brown, stiff, laminations of sandy lean clay (SC)	TILL	10	M	SS	9	18				
16											
17											
18											
19											
20	CLAYEY SAND, a little gravel, brown and gray mottled, a little black, stiff, laminations of silty sand (SC)		12	M	SS	24	17				
21											
22											
23											
24											
25			14	M	SS	20	11				
26											
	END OF BORING Northing=205436.7 Easting=555146.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/3/07	10:15	26.5	24.5	26.5		None	
BORING COMPLETED: 7/3/07								
DR: SG LG: SB Rig: 91C								

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-178 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 948.4 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–2	FILL, mostly silty sand, a little gravel, possible cobbles, brown and grayish brown	FILL	17	M	SS	6					
3–4	FILL, mixture of sandy lean clay and clayey sand, a little gravel, possible cobbles, trace roots, brown and brownish gray		14	M	SS	18	11				
5–6			9	M	SS	2	13				
7–8			27	M	SS	8	8				
9–10	ORGANIC SILT, trace roots, black, wet, loose (OL)	SWAMP DEPOSIT	6	W	SS	14	47				
11–12	CLAYEY SAND, trace roots, dark brown, firm to soft, laminations of silty sand (SC)	WEATHERED TILL					22				
13–14	CLAYEY SAND, gray, a little black, soft, laminations of sand (SC)		4	M	SS	15	20				
15–16	CLAYEY SAND, a little gravel, trace roots, light gray, very soft (SC)	TILL	WH	M	SS	19	15				
17–18											
19–20	CLAYEY SAND, a little gravel, gray, firm to stiff (SC)		6	M	SS	24	19				
21–22											
23–24											
25–26			15	M	SS	22	15				
	END OF BORING Northing=205431.4 Easting=555363.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/3/07**	**11:50**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/3/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-179**

LOCATION: N: 205297.766, E: 553501.960 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
929.3	0.0					
928.8	0.5	SM	SILTY SAND, trace of Roots, dark brown, wet. (Topsoil)			
		SM	SILTY SAND, moist, stiff.	13		
925.3	4.0	CL	SANDY LEAN CLAY, trace of Gravel, light brown to grayish-brown with rust and dark brown, wet medium to rather stiff. (Glacial Till)	8		
				8		
				8		
915.3	14.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium to rather stiff. (Glacial Till)	9		
				8		
				7		
903.3	26.0			10		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-180**

LOCATION: N: 205254.843, E: 553896.986 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/3/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
935.9	0.0					
934.9	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		CL	SANDY LEAN CLAY, trace of Gravel, yellowish-brown to grayish-brown with rust at 5' sample depth, rather stiff tot very stiff. (Glacial Till)	18		
				12		
				14		
				16		
923.9	12.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff to stiff. (Glacial Till)	13		
				9		
				10		
909.9	26.0			10		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-181**

LOCATION: N: 205262.130, E: 554099.221 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
935.0	0.0					
934.0	1.0	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		CL	SANDY LEAN CLAY, light brown, moit, rather stiff to very stiff. (Glacial Till)	11		
				15		
				19		
923.0	12.0			19		
		CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown, wet, stiff to very stiff. (Glacial Till)	13		
				16		
				24		
913.0	22.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown to gray, stiff. (Glacial Till)			
909.0	26.0			14		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-182**

LOCATION: N: 205241.842, E: 554395.289 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/3/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
941.8	0.0					
941.3	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		CL	SANDY LEAN CLAY, trace of Gravel, yellowish-brown to brown, rust lenses scattered, moist, very stiff to hard. (Glacial Till)	22		
				23		
				29		
				22		
				26		
				26		
920.8	21.0			34		
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)			
				27		
915.8	26.0		END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **ST-183**

LOCATION: N: 205240.257, E: 554898.811 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/9/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
933.7	0.0					
933.2	0.5	SM	SILTY SAND, trace of Roots, dark brown, moist. (Topsoil)			
		CL	SANDY LEAN CLAY, light to brown seams of rust, wet rather soft to rather stiff. (Glacial Till)	9		
				8		
				6		
			Sandy Lean Clay 0.5' to 18'	4		
				6		
				5		
915.7	18.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, waterbearing, medium dense. (Glaciofluvium)		▽	
				12		
				16		
907.7	26.0		END OF BORING. Water observed at 18 feet while drilling. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:44

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-184 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 942.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand, sand with silt and clayey sand, a little gravel, surface roots, trace roots, dark brown, brown and black	FILL	15	M	SS	14					
3			10	M	SS	1	9				
5	SILTY SAND, fine grained, brown and dark brown to brownish gray, wet, medium dense (SM)	COARSE ALLUVIUM	12	W	SS	16					
8			15	W	SS	15					
10	SANDY LEAN CLAY, a little gravel, brownish gray, stiff, laminations of waterbearing sand (CL)	TILL	9	M/W	SS	18	20				
12	CLAYEY SAND, a little gravel, gray, firm (SC)		7	M	SS	22	19				
15			6	M	SS	23	18				
18	SANDY LEAN CLAY, a little gravel, gray, stiff (CL)										
20			13	M	SS	21	15				
23	CLAYEY SAND, a little gravel, gray, very stiff (SC)										
25			16	M	SS	18	14				
	END OF BORING Northing=205236.9 Easting=555364.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/3/07**	**12:50**	**6.5**	**4.5**	**5.8**		**None**
	7/3/07	**1:15**	**26.5**	**24.5**	**26.5**		**None**
BORING COMPLETED: **7/3/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1001-06 ST-185**

LOCATION: N: 208603.970, E: 552291.002 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/24/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
901.0	0.0		Redrill of Geo Probe Hole. Power Auger to 16 feet.			
885.0	16.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, medium. (Glacial Till)	7		
875.0	26.0		END OF BORING. Water not observed during drilling. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.	7		

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1007-04 ST-186**

LOCATION: N: 207579.028, E: 552738.508 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: 7/24/07 | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
925.2	0.0					
924.2	1.0	FILL	FILL: Silty Sand, fine-grained, dark brown, moist.			
922.2	3.0	FILL	FILL: Silty Sand, fine- to medium-grained, mixed with Lean Clay, brown, moist.	18		
918.2	7.0	FILL	FILL: Lean Clay, mixed with Silty Sand, brown, moist.	10		
916.2	9.0	SM	SILTY SAND, with Organic fines, black, moist. (Buried Topsoil)	8		
914.2	11.0	SM	SILTY SAND, fine- to coarse-grained, trace of Gravel, brown, wet, rather stiff. (Glacial Till)	9		
911.2	14.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, wet, medium. (Glacial Till)	8		
899.2	26.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather stiff to stiff. (Glacial Till)	9 13 9		
			END OF BORING. Water not observed during drilling. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41 (See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-1007-08 ST-187**

LOCATION: N: 208970.244, E: 552766.455 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/19/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
914.2	0.0					
913.2	1.0	PT	PEAT, mixed with Sand, black, moist. (Swamp Deposit)			
		CL	SANDY LEAN CLAY, trace of Gravel, brown with iron staining, moist, medium. (Glacial Till)	8		
				6		
				7		
				7		
902.2	12.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, moist to wet, medium to rather stiff. (Glacial Till)	11		
				10		
				7		
888.2	26.0			7		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587L.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4003-03 ST-188**

LOCATION: N: 209408.636, E: 552935.915 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/23/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
918.0	0.0					
917.7	0.3	PAV	3" of Bituminous			
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, dark brown, moist.	28		
914.0	4.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, medium to rather stiff. (Glacial Till)	7		
				9		
907.0	11.0			12		
		CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, moist, stiff. (Glacial Till)	16		
904.0	14.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)	22		
899.0	19.0				▽	
		CL	LEAN CLAY, reddish-brown, wet to moist, medium to rather stiff. (Glacial Till)	9		
				8		* Water observed at 19 feet while drilling.
889.0	29.0					Water not observed with 29 1/2 feet of hollow-stem auger in the ground.
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, dense. (Glacial Till)	36		Boring then grouted.
887.0	31.0		END OF BORING. *			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:41

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-35 ST-189**

LOCATION: N: 205755.343, E: 554523.702 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
952.2	0.0					
951.5	0.7	SM	SILTY SAND, fine-grained, with Organic fines, dark brown, moist.			
		CL	(Topsoil)			
			SANDY LEAN CLAY, brown, moist, medium to rather stiff. (Glacial Till)	12		
				8		
				19		
943.2	9.0		With Gravel layer at 8 feet.			
		CL	SANDY LEAN CLAY, trace of Gravel, brown with iron staining, moist, very stiff (Glacial Till)	18		
940.2	12.0					
		CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, stiff. (Glacial Till)	14		
				15		
934.2	18.0					
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, dense. (Glacial Till)	35		
926.2	26.0			40		
			END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-36 ST-190**

LOCATION: N: 205738.823, E: 554735.210 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
952.8	0.0						
952.5	0.3	PAV	4" of Bituminous				
		FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace of Gravel, brown, moist.				
950.8	2.0	SC	CLAYEY SAND, gray with iron staining, moist, stiff. (Glacial Till)	16			
948.8	4.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray with iron staining, wet, rather soft to medium. (Glacial Till)	6		15	
			Clayey Sand 2.0' to 4' Sandy Lean Clay 4' to 12'	6			
				5			
940.8	12.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray with iron staining, wet, soft. (Glacial Till)	2			
938.8	14.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, medium to very stiff. (Glacial Till)	8			
				19			
929.8	23.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)				
926.8	26.0			26			
			END OF BORING. Water not observed during drilling. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP060587L.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-40 ST-191**

LOCATION: N: 205745.555, E: 555106.431 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/16/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
956.3	0.0					
955.3	1.0	FILL	FILL: Silty Sand, fine- to medium-grained, with Organic fines, dark brown, moist.			
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel and Roots, brown, moist.	33		
952.3	4.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist, loose to medium dense. (Glacial Till)	9		
				17		
				14		
942.3	14.0			13		
		SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	23		
				34		
930.3	26.0			25		
			END OF BORING.			
			Water not observed during drilling.			
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-42 ST-192**

LOCATION: N: 205926.630, E: 555134.452 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/16/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
959.1	0.0		Soil samples taken with Geoprobe to 6 foot depth.			
953.1	6.0	SM	SILTY SAND, fine-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)	16		
948.1	11.0	SP	POORLY GRADED SAND, fine- to medium-grained, brown,moist, loose to medium dense. (Glacial Outwash)	29		
				24		
				8		
941.1	18.0	SM	SILTY SAND, fine-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Till)	13		
938.1	21.0	SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, brown,moist, medium dense. (Glacial Outwash)	26		
933.1	26.0		END OF BORING. Water not observed during drilling. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-43 ST-193**

LOCATION: N: 206148.097, E: 555162.879 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/16/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
961.9	0.0	FILL	FILL: Silty Sand, fine- to medium-grained, with Organic fines, trace of Gravel, dark brown, moist.	40		
957.9	4.0	SM	SILTY SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense to dense. (Glacial Till)	17		
				44		
			Cobble at 10 1/2 feet.	38		
			Cobbles at 13 feet.	37		
945.9	16.0			33		
943.9	18.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, brown, moist, medium dense to dense. (Glacial Outwash)			
		SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, brown, moist, medium dense to dense. (Glacial Outwash)	34		
				16		* Water not observed during drilling.
						Water not observed with 29 1/2 feet of hollow-stem auger in the ground.
930.9	31.0			30		Boring then grouted.
			END OF BORING. *			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4008-44 ST-194**

LOCATION: See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/16/07** | SCALE: **1" = 4'**

Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
0.0					
0.5	FILL	FILL: Silty Sand, fine- to medium-grained, with Organics, dark brown, moist.			
	FILL	FILL: Sandy Lean Clay, brown, moist.	25		
4.0					
	FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, reddish-brown, moist.	25		
		With trace of topsoil at 8 feet.	56		
9.0					
	SM	SILTY SAND, fine- to medium-grained, with Sand layers, trace of Gravel, reddish-brown, moist, very dense. (Glacial Till)	68		
			*		* 50 blows for 6 inches
16.0			83		
	SP	POORLY GRADED SAND, fine- to coarse-grained, trace of Gravel, brown, moist, dense. (Glacial Outwash)	32		
			35		* Water not observed during drilling.
28.0			33		
		END OF BORING. *			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.
					Boring then grouted.

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-06 ST-195**

LOCATION: N: 206589.315, E: 553291.605 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
942.2	0.0						
941.9	0.3	PAV	3" of Bituminous				
		FILL	FILL: Poorly Graded Sand with Silt, fine-grained, brown, moist.	8			
937.7	4.5	CL	SANDY LEAN CLAY, brown, wet, rather soft. (Lacustrine)	4		15	
				4			
933.2	9.0	CL	SANDY LEAN CLAY, trace of Gravel, brown with iron staining, moist, rather stiff. (Glacial Till)	10			
930.2	12.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown, moist, stiff to very stiff. (Glacial Till)	16			
				26			
924.2	18.0	CL	SANDY LEAN CLAY, trace of Gravel, grayish-brown, moist, very stiff. (Glacial Till)	17			
921.2	21.0		END OF BORING.				
			Water not observed during drilling.				
			Water not observed with 19 1/2 feet of hollow-stem auger in the ground.				
			Boring then grouted.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-07 ST-196**

LOCATION: N: 206407.349, E: 553441.134 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
943.4	0.0					
943.1	0.3	PAV	3" of Bituminous			
		FILL	FILL: Poorly Graded Sand with Silt, fine-grained, brown, moist.			
939.4	4.0	FILL	FILL: Sandy Lean Clay, with topsoil chunks, olive, wet.	4		
936.4	7.0	CL	SANDY LEAN CLAY, brown with iron staining, wet, rather soft. (Lacustrine)	4		
				4		
931.4	12.0	CL	SANDY LEAN CLAY, trace of Gravel, brown and gray with iron staining, moist, rather soft to stiff. (Glacial Till)	5		
				8		
925.4	18.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, wet, stiff. (Glacial Till)		▽	
922.4	21.0			13		
			END OF BORING.			
			Water observed at 18 feet while drilling.			
			Boring then grouted.			

Fill (poorly graded sand) 0.3' to 4'
Fill (sandy lean clay) 4' to 7'
Sandy Lean Clay 7' to 21'

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP06005871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-08 ST-197**

LOCATION: N: 206255.301, E: 553565.997 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
944.3	0.0					
944.0	0.3	PAV	3" of Bituminous			
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, reddish-brown, moist.			
			Fill (silty sand) 0.3' to 4' Fill (sandy lean clay) 4' to 7' Organic Clay 7' to 9'	11		
940.3	4.0	FILL	FILL: Sandy Lean Clay, trace of Gravel, brown, gray and olive, moist.	7		
937.3	7.0	OL	ORGANIC CLAY, black, wet. (Swamp Deposit)	2		
935.3	9.0	SM	SILTY SAND, fine-grained, gray, waterbearing, very loose. (Lacustrine)	2	▽	
933.3	11.0	CL	SANDY LEAN CLAY, gray with iron staining, wet, soft. (Lacustrine)	3		
930.3	14.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, wet, soft to medium. (Glacial Till)	3		
923.3	21.0			6		
			END OF BORING.			
			Water observed at 9 feet while drilling.			
			Water down 9 feet with 19 1/2 feet of hollow-stem auger in the ground.			
			Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-09 ST-198**

LOCATION: N: 206068.255, E: 553728.185 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
944.4	0.0							
944.1	0.3	PAV	4" of Bituminous					
		FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, brown, moist.	19				
			No sample recovery at 5 1/2 feet.	6				
936.4	8.0			1				
		FILL	FILL: Clayey Sand, gray, brown and olive, moist.	7		17	47	
				5		15		
930.4	14.0							
		CL	SANDY LEAN CLAY, with Organic fines, black, wet. (Swamp Deposit)	3				
925.4	19.0							
		CL	SANDY LEAN CLAY, gray, wet, soft. (Lacustrine)	3				
920.4	24.0							
		CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, very stiff. (Glacial Till)	19				
918.4	26.0							
			END OF BORING.					
			Water not observed during drilling.					
			Water not observed with 24 1/2 feet of hollow-stem auger in the ground.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-10 ST-199**

LOCATION: N: 205827.000, E: 553879.890 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	P200 %	Tests or Notes
944.2	0.0							
943.7	0.5	FILL	FILL: Silt, brown, moist.					
		FILL	FILL: Sandy Lean Clay, brown, dry.	20				
940.2	4.0	FILL	FILL: Silty Sand, fine- to medium-grained, brown, moist.	4		7	20	
937.2	7.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, wet, medium to stiff. (Glacial Till)	8				
				7				
				7				
				11				
				16				
923.2	21.0		No sample recovery at 20 1/2 feet.					
			END OF BORING.					
			Water not observed during drilling.					
			Water not observed with 19 1/2 feet of hollow-stem auger in the ground.					
			Boring then grouted.					

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-11 ST-200**

LOCATION: N: 205748.933, E: 554156.383 See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/17/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
949.2	0.0					
948.0	1.2	FILL	FILL: Silty Sand, fine- to medium-grained, trace of Gravel, dark brown, moist.			
945.2	4.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace of Gravel, brown, moist.	21		
935.2	14.0	FILL	FILL: Sandy Lean Clay, trace of Gravel and wood, brown to dark brown, wet.	8 7 5		
933.2	16.0	SC	CLAYEY SAND, black, wet. (Swamp Deposit)	4		
927.2	22.0	SC	CLAYEY SAND, gray, wet, soft. (Lacustrine)	2	▽	
923.2	26.0	CL	SANDY LEAN CLAY, trace of Gravel, gray, wet, rather soft. (Glacial Till)	2		
			END OF BORING. Water down 20 feet with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/2/07 14:42 (See Descriptive Terminology sheet for explanation of abbreviations)

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO. ST-201/AB- 1 (p. 1 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 956.8

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and clayey sand, a little gravel, surface roots, trace roots, brown and dark brown	FILL	12	M	SS	7					
3	FILL, mixture of sand with silt and clayey sand, a little gravel, brown, a little gray and light brown		14	M	SS	17	7				
5	SANDY LEAN CLAY, a little gravel, brown, a little light brown and dark brown, stiff, laminations of silt and silty sand (CL)	WEATHERED TILL	14	M	SS	23	15				
7	SANDY LEAN CLAY, a little gravel, brown, a little light brown and dark brown, stiff, laminations of silt and silty sand (CL)	TILL	29	M	SS	16	8				
9	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, laminations of silt (SC)		24	M	SS	18	7				
13			21	M	SS	22	7				
14	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, moist, dense (SP-SM)	COARSE ALLUVIUM	40	M	SS	7					
18	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, medium dense to dense (SP-SM)		26	M	SS	22					
26			47	M	SS	19					

Fill 0' to 4.5'
Sandy Lean Clay
4.5' to 7'

DEPTH:	DRILLING METHOD
0-34½'	3.25" HSA

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/26/07	8:52	31.5	34.5	36.5		None

BORING COMPLETED: 7/26/07

DR: SG LG: BR Rig: 91C

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-201/AB- 1 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30 31 32 33 34 35 36	SAND WITH SILT, a little gravel, fine to medium grained, light brown, moist, medium dense to dense (SP-SM) *(continued)*		40 45	M M	SS SS	24 20					
	END OF BORING Northing=206215.3 Easting=554201.0										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-202/AB- 2 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 955.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, trace roots, brown	FILL	57	M	SS	7					
3	SANDY SILT, a little gravel, brown, moist, medium dense (ML)	TILL	24	M	SS	17	11				
5	CLAYEY SAND, a little gravel, brown, very stiff (SC)										
6	SILTY SAND, a little gravel, possible cobbles, fine to medium grained, brown, moist, medium dense (SM)		19	M	SS	15					
8	SAND, a little gravel, brown, moist, medium dense (SP) (possible fill)	COARSE ALLUVIUM	20	M	SS	16					
9	SAND WITH GRAVEL, medium grained, brown, moist, medium dense (SP)										
11	SAND WITH GRAVEL, possible cobbles, medium to fine grained, brown, moist, dense (SP)		37	M	SS	14					
13	GRAVEL WITH SAND, brown, moist, medium dense (GP)		27	M	SS	8					
15	SAND, fine to medium grained, light brown, moist, dense, laminations of silty sand (SP)		40	M	SS	14					
19	SAND, a little gravel, medium grained, light brown, moist, dense (SP)		43	M	SS	17					
24	SAND, a little gravel, fine to medium grained, light brown, moist, very dense (SP)		51	M	SS	18					
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-39½' 3.25" HSA	**7/26/07**	**10:55**	**41.5**	**39.5**	**41.0**		**None**
BORING COMPLETED: **7/26/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-202/AB- 2 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SAND, a little gravel, medium to fine grained, light brown, moist, very dense (SP) *(continued)*		55	M	SS	19					
31											
32											
33	SAND, fine grained, light brown, moist, dense, laminations of silt (SP)										
34											
35			48	M	SS	18					
36											
37											
38	SAND WITH GRAVEL, medium grained, brown, moist, very dense (SP)										
39											
40			54	M	SS	19					
41											
	END OF BORING Northing=206823.0 Easting=554162.7										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-203/AB- 3 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **954.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, surface roots, trace roots, dark brown	FILL	8	M	SS	14	10				
2	FILL, mostly clayey sand, a little gravel, trace roots, light brown, dark brown and brown										
3			13	M	SS	24	12				
4											
5	CLAYEY SAND, a little grave, brown, very stiff (SC)	TILL									
6			22	M	SS	17	11				
7											
8			27	M	SS	19	7				
9											
10											
11			28	M	SS	19	6				
12											
13	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, moist, medium dense to very dense (SP-SM)	COARSE ALLUVIUM	47	M	SS	10	7				
14											
15											
16			26	M	SS	14					
17											
18											
19											
20											
21			33	M	SS	16					
22											
23											
24											
25											
26			74	M	SS	12					
27											
28	SAND, medium to fine grained, brown, moist, medium dense to dense (SP)										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-49½' 3.25" HSA	**7/27/07**	**2:47**	**51.5**	**49.5**	**51.5**		**None**
BORING COMPLETED: **7/27/07**							
DR: **SG** LG: **BR** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-203/AB- 3 (p. 2 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SAND, medium to fine grained, brown, moist, medium dense to dense (SP) *(continued)*										
31			24	M	SS	19					
32											
33											
34											
35											
36			39	M	SS	16					
37											
38											
39	SAND WITH GRAVEL, fine to medium grained, light brown, moist, medium dense (SP)										
40											
41			26	M	SS	17					
42											
43											
44											
45											
46			23	M	SS	20					
47											
48											
49											
50	SILTY CLAY, brown, very stiff (CL-ML)	FINE ALLUVIUM					19				
51	SAND WITH SILT, fine to medium grained, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	23	M	SS	16					
	END OF BORING Northing=206974.8 Easting=553863.2										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-204/AB- 4 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 938.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, surface roots, trace roots, brown	FILL	31	M	SS	10	7				
2	FILL, mixture of clayey sand, sandy lean clay and silty sand, a little gravel, trace roots, brown, light brown, dark brown and gray										
3			42	M	SS	18	9				
4											
5											
6			13	M	SS	17	19				
7											
8			2	M	SS	NR					
9											
10											
11			3	M	SS	9	14				
12				▽							
13			4	W	SS	12					
14											
15											
16			2	W	SS	17	17				
17											
18	CLAYEY SAND, a little sandy silt, a little gravel, brown, stiff (SC)	TILL	10	M	SS	17	19				
19											
20	SANDY LEAN CLAY, a little gravel, light brown, a little brown, stiff, laminations of silt (CL)										
21			11	M	SS	20	27				
22											
23	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, a little dark brown, moist, very dense, lense of clayey sand at 24' very dense to medium dense (SP-SM)	COARSE ALLUVIUM	52	M	SS	14					
24											
25											
26			22	M	SS	7					
27											
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-34½' 3.25" HSA							
	7/30/07	**10:00**	**14.0**	**12.0**	**12.2**		**None**
	7/30/07	**10:30**	**36.5**	**34.5**	**36.5**		**None**
BORING COMPLETED: **7/30/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-204/AB- 4 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30 – 31 – 32 – 33 – 34 – 35 – 36 –	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, a little dark brown, moist, very dense, lense of clayey sand at 24' very dense to medium dense (SP-SM) *(continued)*	COARSE ALLUVIUM *(continued)*	18	M	SS	13					
			21	M	SS	12					
	END OF BORING Northing=207058.0 Easting=553053.9										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-205/AB- 5 (p. 1 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 937.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, a little gravel, surface roots, trace roots, brown and light brown	FILL	27	M	SS	12	6				
3			39	M	SS	15	6				
5	SILTY CLAY, brown, very stiff to hard (CL-ML)	FINE ALLUVIUM	22	M	SS	20	13				
8			17	M	SS	24	23				
10			20	M	SS	24	18				
13			20	M	SS	24	17				
16	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, moist, dense (SP-SM)	COARSE ALLUVIUM	33	M	SS	14	12				
21			47	M	SS	10					
23	GRAVELLY SAND WITH SILT, medium to fine grained, brown, moist, dense to very dense (SP-SM)										
26			44	M	SS	10					

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-44½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	7/30/07	8:50	46.5	44.5	46.4		None	
BORING COMPLETED: 7/30/07								
DR: SG LG: SB Rig: 91C								

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-205/AB- 5 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	GRAVELLY SAND WITH SILT, medium to fine grained, brown, moist, dense to very dense (SP-SM) *(continued)*		60	M	SS	14					
31											
32											
33											
34											
35			50+	M	SS	8					
36											
37											
38	SAND WITH SILT, fine to medium grained, brown, moist, very dense (SP-SM)										
39											
40											
41			57	M	SS	16					
42											
43											
44											
45											
46			63	M	SS	17					
	END OF BORING Northing=207537.6 Easting=553124.1										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-206/AB- 6 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	SURFACE ELEVATION: 916.0 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, surface roots, trace roots, dark brown	FILL	32	M	SS	14	5				
2	FILL, mixture of clayey sand and silty sand, a little gravel, trace roots, dark brown										
3			26	M	SS	13	12				
4											
5	SANDY LEAN CLAY, a little gravel, gray and brown mottled, a little black, stiff, laminations of silt (CL)	WEATHERED TILL									
6			12	M	SS	17	18				
7											
8	SANDY LEAN CLAY, a little gravel, dark brown and brown mottled, stiff (CL)	TILL	15	M	SS	20	18				
9											
10	SANDY LEAN CLAY, a little gravel, dark brown, very stiff (CL)										
11			16	M	SS	22	16				
12											
13	SANDY LEAN CLAY, a little gravel, dark gray, stiff to very stiff (CL)		15	M	SS	19	14				
14											
15											
16			12	M	SS	20	15				
17											
18											
19											
20											
21			14	M	SS	22	16				
22											
23											
24											
25											
26			13	M	SS	24	16				
27											
28											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-29½' 3.25" HSA	7/30/07	12:00	31.5	29.5	31.2		None	
BORING COMPLETED: 7/30/07								
DR: SG LG: SB Rig: 91C								

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-206/AB- 6 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30 –	SANDY LEAN CLAY, a little gravel, dark gray, stiff to very stiff (CL) *(continued)*										
31 –			18	M	SS	23	13				
	END OF BORING Northing=207925.7 Easting=552804.2										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO. ST-207/AB- 7 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 908.5 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of clayey sand and silty sand, a little gravel, surface roots, trace roots, dark brown and brown	FILL	33	M	SS	12	4				
2											
3			22	M	SS	9	6				
4											
5	SANDY LEAN CLAY, a little gravel, dark brown, a little brown, stiff, laminations of silt (CL)	TILL	15	M	SS	17	16				
6											
7											
8			14	M	SS	18	17				
9											
10	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)		10	M	SS	20	17				
11											
12											
13			11	M	SS	20	15				
14											
15			10	M	SS	19	16				
16											
17											
18											
19											
20			10	M	SS	20	16				
21											
22											
23											
24											
25			10	M	SS	24	16				
26											
	END OF BORING Northing=208187.8 Easting=552129.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**7/30/07**	**1:30**	**26.5**	**24.5**	**24.9**		**None**
BORING COMPLETED: **7/30/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO. ST-208/AB- 8 (p. 1 of 2)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 914.5

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand and clayey sand, a little gravel, surface roots, trace roots, brown, dark brown and black	FILL	27	M	SS	12	4				
2											
3			16	M	SS	18	9				
4											
5	SANDY LEAN CLAY, a little gravel, light brown and gray, firm (CL)	WEATHERED TILL	5	M	SS	17	19				
6											
7											
8			7	M	SS	19	16				
9											
10	SANDY LEAN CLAY, a little gravel, brown, stiff (CL)	TILL	10	M	SS	22	15				
11											
12	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL)										
13			13	M	SS	22	15				
14											
15											
16			9	M	SS	20	15				
17											
18											
19											
20											
21			12	M	SS	23	15				
22											
23											
24											
25											
26			11	M	SS	24	16				
27											
28											

DEPTH: DRILLING METHOD

0-34½' 3.25" HSA

BORING COMPLETED: 7/30/07

DR: SG LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/30/07	2:35	36.5	34.5	36.3		None

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-208/AB- 8 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SANDY LEAN CLAY, a little gravel, dark gray, stiff (CL) *(continued)*										
31			14	M	SS	20	16				
32											
33											
34											
35											
36			14	M	SS	24	17				
	END OF BORING Northing=208345.2 Easting=552536.3										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081** LOG OF BORING NO. **ST-209/AB- 9 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **892.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand with gravel, trace roots, brown	FILL	36	M	SS	13	4				
2	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, brown, light brown, dark brown and black										
3			10	M	SS	16	11				
4											
5											
6			18	M	SS	16	6				
7											
8	SAND WITH SILT, a little gravel, fine to medium grained, brownish gray, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	16	W/M	SS	14					
9				▼							
10											
11			7	W	SS	14					
12											
13	SANDY LEAN CLAY, a little gravel, dark gray, firm to stiff (CL)	TILL	6	M	SS	16	16				
14											
15											
16			9	M	SS	20	16				
17											
18											
19											
20											
21			9	M	SS	23	16				
	END OF BORING Northing=210352.9 Easting=552356.5										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/31/07	**7:46**	**9.0**	**7.0**	**7.9**		**None**
	7/31/07	**7:43**	**11.0**	**9.5**	**9.3**		**9.1**
BORING COMPLETED: **7/31/07**	**7/31/07**	**7:55**	**21.5**	**19.5**	**20.0**		**None**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-210/AB-10 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **898.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1 – 4	FILL, mixture of silty sand and clayey sand, a little gravel, trace roots, pieces of brick, brown and dark brown	FILL	37	M	SS	15					
			11	M	SS	12					
5 – 6	SILT WITH ORGANICS, trace roots, black, loose (ML)	TOPSOIL	5	W/M	SS	19	19				
7 – 9	SILTY SAND, fine grained, trace roots, dark gray, waterbearing, loose to medium dense (SM)	COARSE ALLUVIUM	11	W	SS	2					
10 – 12	SANDY LEAN CLAY, a little gravel, brown and gray mottled, a little dark brown, firm, laminations of silt (CL)	WEATHERED TILL	6	W	SS	16	14				
13 – 15	SANDY LEAN CLAY, a little gravel, dark gray, stiff to very stiff (CL)	TILL	9	M	SS	16	14				
16 – 19			9	M	SS	18	16				
20 – 21			20	M	SS	19	15				
	END OF BORING Northing=210578.9 Easting=553291.9										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/31/07	**8:35**	**6.5**	**4.5**	**4.9**		**None**
	7/31/07	**8:50**	**21.5**	**19.5**	**21.5**		
BORING COMPLETED: **7/31/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO ST-211/AB-11 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

DEPTH IN FEET	SURFACE ELEVATION: 892.3 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand, clayey sand and sandy silt, surface roots, trace roots, brown, dark brown and gray	FILL	20	M	SS	15					
2											
3			14	M	SS	14					
4											
5											
6			12	M	SS	18	19				
7											
8			17	W	SS	18	20				
9	SILTY CLAY, brown, very stiff (CL-ML)	FINE ALLUVIUM									
10	CLAYEY SAND, a little gravel, dark gray, stiff to firm (SC)	TILL									
11			10	M	SS	14	13				
12											
13			7	M	SS	21	15				
14											
15	SANDY LEAN CLAY, a little gravel, dark gray, stiff to firm (CL)										
16			9	M	SS	23	17				
17											
18											
19											
20											
21			8	M	SS	22	16				
	END OF BORING Northing=210737.1 Easting=552615.0										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/31/07	9:30	9.0	7.0	11.8		7.6
	7/31/07	9:40	21.5	19.5	21.5		None
BORING COMPLETED: 7/31/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO: **ST-212/AB-12 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **895.1**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	3.5" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, brown		26	M	SS	14	5				
2	FILL, mixture of clayey sand and silty sand, a little gravel, organic clay, brown, dark brown, gray and black										
3			25	M	SS	15	10				
4											
5											
6			23	W/M	SS	16	11				
7				▼							
8			33	W	SS	NR					
9											
10	SILT WITH ORGANICS, trace roots, black, moist, very loose (ML)	SWAMP DEPOSIT OR TOPSOIL					25				
11			2	M	SS	17	23				
12	LEAN CLAY WITH ORGAINCS, trace roots, black, very soft to soft (CL)						26				
13			5	W/M	SS	16	114				
14	SILTY SAND, trace roots, fine grained, dark gray, waterbearing, loose (SM)	COARSE ALLUVIUM									
15											
16			9	W	SS	7					
17											
18											
19	CLAYEY SAND, a little gravel, dark gray, firm (SC)	TILL									
20											
21			8	M	SS	16	17				
	END OF BORING Northing=211046.0 Easting=553106.0										

DEPTH: DRILLING METHOD

0-24½' 3.25" HSA

BORING COMPLETED: **7/31/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/31/07	**10:50**	**9.0**	**7.0**	**8.1**		**7.3**
7/31/07	**11:10**	**21.5**	**19.5**	**19.5**		**18.9**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO. ST-213/AB-13 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 890.2

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of silty sand, sandy silt and clayey sand, a little gravel, surface roots, trace roots, brown, dark brown and black	FILL	26	M	SS	16	4				
3			10	M	SS	16	9				
6	SAND WITH SILT, fine to medium grained, brownish gray, a little gray, waterbearing, loose, laminations of sandy silt (SP-SM)	COARSE ALLUVIUM	10	M	SS	16	18				
8	SILTY SAND, a little gravel, gray, a little dark gray, waterbearing, medium dense, lenses and laminations of lean clay and sandy lean clay (SM)		12	W	SS	14	24				
10	SANDY LEAN CLAY, a little gravel, dark gray, loose, lense of medium to fine grained silty sand at 10', laminations of sand with silt (CL)	TILL	8	M/W	SS	15	19				
13			3	M/W	SS	20	17				
16			4	M	SS	19	17				
21			4	M	SS	20	18				
	END OF BORING Northing=211044.1 Easting=552565.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	8/2/07	9:45	9.0	7.0	7.2		7.1	
	8/2/07	10:00	21.5	19.5	19.5		None	
BORING COMPLETED: 8/2/07								
DR: SG LG: SB Rig: 91C								

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-214/AB-14 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **884.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1–9	FILL, mixture of sandy silt, clayey sand, silty sand and sand with silt, a little gravel, surface roots, trace roots, brown, dark brown, gray and black	FILL	51	M	SS	10	6				
			53	M	SS	19					
			35	M	SS	20					
			19	M	SS	18					
10–11	SAND WITH SILT, fine grained, gray, a little dark gray, waterbearing, medium dense, laminations of silty sand (SP-SM)	COARSE ALLUVIUM	WH	W	SS	17					
12–14	SILTY SAND, trace roots, fine grained, dark gray, a little black, waterbearing, loose, lense of organic clay at 15.5' (SM)		5	W	SS	14					
15–16	SAND WITH SILT, fine grained, gray, waterbearing, medium dense (SP-SM)		12	W	SS	17					
17–18	SAND WITH SILT AND GRAVEL, medium to fine grained, dark gray, waterbearing, medium dense (SP-SM)										
19–21	SANDY LEAN CLAY, a little gravel, gray, firm (CL)	TILL	6	M	SS	15	18				
	END OF BORING Northing=211075.3 Easting=551748.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	8/2/07	**8:15**	**11.5**	**9.5**	**9.5**		**None**
	8/2/07	**8:20**	**14.0**	**12.0**	**12.0**		**None**
BORING COMPLETED: **8/2/07**	**8/2/07**	**8:25**	**16.0**	**14.5**	**14.5**		**12.7**
DR: **SG** LG: **SB** Rig: **91C**	**8/2/07**	**8:30**	**21.5**	**19.5**	**19.5**		**18.7**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO: **ST-215/AB-15 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **894.5**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, surface roots with silty sand, dark brown	FILL									
2	FILL, mostly sand with silt, a little gravel, trace roots, light brown		5	M	SS	1	11				
3			21	M	SS	0					
4											
5	FILL, mixture of silty sand, clayey sand and sandy lean clay, a little gravel, trace roots, dark brown, brown, light brown and gray										
6			9	M	SS	12					
7											
8			9	M	SS	14	15				
9											
10	LEAN CLAY, trace roots, organics, black, a little dark gray, stiff, laminations of silty sand (CL)	TOPSOIL									
11			9	M	SS	15	21				
12	SILTY SAND, a little gravel, fine to medium grained, gray, a little dark gray, waterbearing, loose, laminations of lean clay (SM)	COARSE ALLUVIUM									
13			17	W	SS	12					
14											
15											
16			16	W	SS	5					
17											
18											
19	SANDY LEAN CLAY, a little gravel, gray, firm (CL)	TILL									
20											
21			5	M	SS	16	17				
	END OF BORING Northing=211443.2 Easting=553634.2										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	8/1/07	**12:15**	**11.5**	**9.5**	**9.9**		**9.3**
	8/1/07	**12:34**	**21.5**	**19.5**	**20.0**		**18.3**
BORING COMPLETED: **8/1/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-216/AB-16 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **895.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	3" Bituminous pavement	FILL			SU						
	FILL, mostly silty sand with gravel, brown		32	M	SS	14	8				
2	FILL, mixture of clayey sand, sandy lean clay and silty sand, a little gravel, pieces of concrete, brown, dark brown, gray and black										
3			36	M	SS	17	8				
4											
5											
6			46	M	SS	15	6				
7											
8			26	M	SS	17					
9											
10											
11			11	M ▽	SS	16	15				
12	ORGANIC CLAY, trace roots, black, stiff (OL/OH)	SWAMP DEPOSIT									
13	ORGANIC CLAY, trace roots, pieces of wood, black, a little gray, stiff, laminations of silty sand (OL/OH)		15	W	SS	18	74				
14		COARSE ALLUVIUM									
15	SAND WITH SILT, fine grained, gray, waterbearing, medium dense to very loose (SP-SM)										
16			7	W	SS	19					
17											
18											
19											
20											
21			3	M	SS	17	16				
	CLAYEY SAND, a little gravel, dark gray, soft (SC)	TILL									
	END OF BORING Northing=211426.9 Easting=553105.1										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-19½' 3.25" HSA	**8/1/07**	**11:00**	**11.5**	**9.5**	**11.8**		**None**
	8/1/07	**11:10**	**14.0**	**12.0**	**12.0**		**None**
BORING COMPLETED: **8/1/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081

LOG OF BORING NO ST-217/AB-17 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 899.3

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	CLAYEY SAND, surface roots, trace roots, dark brown, moist, medium dense (SC)	TOPSOIL									
2	SAND WITH SILT, fine grained, light brown, a little brown, moist, medium dense, laminations of silt (SP-SM)	COARSE ALLUVIUM	14	M	SS	15					
3											
4			17	M	SS	16					
5	SAND WITH SILT, fine grained, gray, a little brown, waterbearing, medium dense, laminations of silt (SP-SM)										
6			28	M-W	SS	15					
7											
8	CLAYEY SAND, a little gravel, dark gray, firm (SC)	TILL	8	M	SS	14	13				
9											
10	CLAYEY SAND, a little gravel, brown, stiff (SC)										
11			10	M	SS	13	14				
12											
13	CLAYEY SAND, a little gravel, dark gray, firm to stiff (SC)		8	M	SS	17	15				
14											
15											
16			10	M	SS	16	16				
17											
18											
19											
20											
21			11	M	SS	24	15				
	END OF BORING Northing=211423.6 Easting=552556.4										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-19½' 3.25" HSA	8/2/07	9:00	9.0	7.0	7.0		3.3
	8/2/07	9:10	21.5	19.5	20.9		None
BORING COMPLETED: 8/2/07							
DR: SG LG: SB Rig: 91C							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-218/AB-18 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **885.7**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mixture of sand with silt and silty sand, a little gravel, trace roots, brown, light brown and dark brown	FILL	22	M	SS	4					
3			20	M	SS	16					
6			6	M	SS	18					
8	SILTY SAND, fine to medium grained, brownish gray, waterbearing, loose (SM)	COARSE ALLUVIUM	10	W	SS	17					
10	SANDY LEAN CLAY, a little gravel, brown, a little light brown, firm, laminations of silty sand (CL)	TILL	7	M	SS	18	17				
13	CLAYEY SAND, a little gravel, dark gray, stiff (SC)		9	M	SS	19	13				
16			10	M	SS	17	15				
21			9	M	SS	24	16				
	END OF BORING Northing=211416.5 Easting=552009.6										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-19½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	8/1/07	**2:05**	**9.0**	**7.0**	**7.4**		**None**
	8/1/07	**2:20**	**21.5**	**19.5**	**19.8**		**None**
BORING COMPLETED: **8/1/07**							
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-219/AB-19 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **891.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, surface roots, trace roots, light brown and brown, moist, dense (SM)	TOPSOIL									
2	SAND WITH SILT, fine grained, brown, moist, loose to medium dense (SP-SM)	COARSE ALLUVIUM	37	M	SS	15					
3			18	M	SS	14					
4											
5											
6			9	M	SS	16					
7											
8			18	M	SS	18					
9											
10											
11			16	M	SS	18					
12	SILTY SAND, fine grained, grayish brown, a little brown, waterbearing, medium dense, laminations of silt (SM)										
13			14	W	SS	16					
14											
15				▼							
16			23	W	SS	14					
17											
18											
19	SAND WITH SILT, fine grained, gray, waterbearing, dense (SP-SM)										
20											
21			31	W	SS	19					
22											
23											
24											
25											
26			36	W	SS	21					
	END OF BORING Northing=211642.1 Easting=551067.3										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-24½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	7/30/07	**12:15**	**14.0**	**12.0**	**12.5**		**None**
	7/30/07	**12:25**	**16.5**	**14.5**	**15.0**		**15.0**
BORING COMPLETED: **7/30/07**	**7/30/07**	**1:00**	**26.5**	**24.5**	**24.5**		**23.1**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-220/AB-20 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **897.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND WITH GRAVEL, surface roots, trace roots, light brown, brown and dark brown, moist, medium dense (SM)	TOPSOIL	18	M	SS	14					
3	SILTY SAND, fine grained, brown, moist, medium dense (SM)	COARSE ALLUVIUM	20	M	SS	14					
6			19	M	SS	14					
8	SAND WITH SILT, fine grained, light brown, moist, medium dense (SP-SM)		17	M	SS	20					
11			14	M	SS	19					
13			10	M	SS	18					
15	SILTY SAND, fine grained, brown, waterbearing, medium dense to loose (SM)		15	W	SS	17					
21			7	W	SS	16					
23	SILT, gray, wet, medium dense (ML)	FINE ALLUVIUM									
26			12	W	SS	17	30				
28		COARSE ALLUVIUM									

DEPTH: DRILLING METHOD

0-29½' 3.25" HSA

BORING COMPLETED: **8/1/07**

DR: **SG** LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/1/07	**9:05**	**16.5**	**14.5**	**14.6**		**None**
8/1/07	**9:10**	**21.5**	**19.5**	**19.5**		**17.8**
8/1/07	**9:25**	**31.5**	**29.5**	**29.5**		**26.3**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-220/AB-20 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
30	SILTY SAND, fine grained, gray, waterbearing, very loose (SM) *(continued)*	COARSE ALLUVIUM *(continued)*	4	W	SS	20					
31	**END OF BORING** Northing=211992.3 Easting=550710.8										

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-221/AB-21 (p. 1 of 1)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **899.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	SILTY SAND, a little gravel, surface roots, trace roots, brown, dark brown and black, moist, medium dense (SM)	TOPSOIL	19	M	SS	16					
3	SILTY SAND, fine grained, brown, moist, loose to medium dense (SM)	COARSE ALLUVIUM	9	M	SS	15					
6			13	M	SS	18					
8	SAND WITH SILT, fine grained, light brown, moist, loose (SP-SM)		10	M	SS	17					
11			9	M	SS	18					
13			9	M	SS	20					
16	SILT WITH SAND, light brown, a little brown, wet, medium dense, laminations of lean clay (ML)	FINE ALLUVIUM	17	W	SS	17	26				
19	SILTY SAND, fine grained, brown, waterbearing, loose (SM)	COARSE ALLUVIUM	10	W	SS	17					
24	CLAYEY SAND, a little gravel, dark gray, stiff (SC)	TILL	9	M	SS	8	15				
	END OF BORING Northing=212465.7 Easting=550556.0										

Silty Sand 0' to 7'
Sand w Silt 7' to 17'
Silty Sand 17' to 23'

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**8/1/07**	**7:55**	**16.5**	**14.5**	**14.5**		**None**
	8/1/07	**8:00**	**21.5**	**19.5**	**19.2**		**18.3**
BORING COMPLETED: **8/1/07**	**8/1/07**	**8:10**	**26.5**	**24.5**	**24.5**		**23.9**
DR: **SG** LG: **SB** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: 22-00081 LOG OF BORING NO ST-222/AB-22 (p. 1 of 1)

PROJECT: TCAAP Redevelopment; Arden Hills, MN

SURFACE ELEVATION: 898.6

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, a little gravel, trace roots, dark brown	FILL	21	M	SS	15					
2											
3			7	M	SS	14					
4											
5											
6			4	M	SS	16					
7											
8	FILL, mixture of clayey sand and silty sand, trace roots, brown and light brown		9	M	SS	14	11				
9											
10	SAND WITH SILT, fine grained, trace roots, light brown and brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM	14	M	SS	16					
11											
12	SAND WITH SILT, fine grained, light brown, moist, medium dense (SP-SM)										
13			27	M	SS	19					
14											
15	SILTY SAND, fine grained, brown, waterbearing, medium dense to loose (SM)										
16			30	W/M	SS	24					
17											
18											
19				▼							
20											
21			6	W	SS	16					
	END OF BORING Northing=212964.6 Easting=550545.4										

Fill (silty sand) 0' to 7'
Fill (clayey sand) 7' to 9.5'
Sand w Silt 9.5' to 14.5'
Silty Sand 14.5' to 21'

DEPTH: DRILLING METHOD

0-19½' 3.25" HSA

BORING COMPLETED: 7/31/07

DR: SG LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/31/07	3:22	21.5	19.5	20.0		18.9

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

06/04

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO. **ST-223/AB-23 (p. 1 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

SURFACE ELEVATION: **908.4**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS: WC	DEN	LL	PL	%-#200
1–9	FILL, mostly silty sand, surface roots, trace roots, pieces of wood at 5', brown, light brown and dark brown	FILL	27	M	SS	15					
			10	M	SS	12					
			4	M	SS	12					
			3	M	SS	13					
10–23	SAND WITH SILT, fine grained, light brown, a little brown, moist, loose to medium dense, laminations of silt (SP-SM)	COARSE ALLUVIUM	5	M	SS	15					
			17	M	SS	17					
			9	M	SS	17					
			27	M	SS	19					
23–28	SAND, fine to medium grained, light brown, a little brown and gray, moist, medium dense, laminations of silt and silty sand (SP)		17	M	SS	16					

Fill (silty sand) 0' to 9.5'
Sand w Silt 9.5' to 23'
Sand 23' to 33'

DEPTH:	DRILLING METHOD
0-34½'	3.25" HSA
BORING COMPLETED:	7/31/07
DR: SG	LG: SB Rig: 91C

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
7/31/07	2:15	31.5	29.5	29.5		28.9
7/31/07	2:25	36.5	34.5	34.5		33.9

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-00081**

LOG OF BORING NO **ST-223/AB-23 (p. 2 of 2)**

PROJECT: **TCAAP Redevelopment; Arden Hills, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
30	SAND, fine to medium grained, gray, waterbearing, loose (SP) *(continued)*										
31			9	W	SS	17					
32											
33											
34	CLAYEY SAND, a little gravel, dark gray, firm (SC)	TILL									
35											
36			6	M	SS	23	18				
	END OF BORING Northing=213465.1 Easting=550540.6										

06/04

BRAUN INTERTEC

LOG OF BORING

Braun Project SP-06-05871
Geotecnical Evaluation
TCAAP Redevelopment
NE of Highway 10 and Highway 96
Arden Hills, Minnesota

BORING: **RI-4009-5 ST-224**

LOCATION: See attached sketch.

DRILLER: K. Keck | METHOD: 3 1/4" HSA, Autohmr | DATE: **7/18/07** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
938.6	0.0					
938.3	0.3	PAV	3" Bituminous.			
		FILL	FILL: Clayey Sand, fine- to medium-grained, trace of Gravel, mixed dark brown to grayish-brown, moist.	21		
934.6	4.0	CL	SANDY LEAN CLAY, trace of Roots, dark gray, moist, rather stiff to stiff. (Buried Topsoil)	13		
932.6	6.0	CL	SANDY LEAN CLAY, reddish-brown, moist. (Glacial Till)	56		
929.6	9.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, yellowish-brown, moist, loose. (Glaciofluvium)	6		
926.6	12.0	CL	SANDY LEAN CLAY, trace of Gravel, reddish-brown to grayish-brown, moist to wet, rather soft to rather stiff. (Glacial Till)	5		
				4		
				10		
915.6	23.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace of Gravel, reddish-brown, moist, medium dense. (Glacial Outwash)			
912.6	26.0			19		
			END OF BORING. Water not observed with 24 1/2 feet of hollow-stem auger in the ground. Boring then grouted.			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG OF BORING SP0605871.GPJ BRAUN.GDT 10/4/07 13:53