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Geotechnical Engineering • Materials Testing • Environmental Engineering

PRELIMINARY
GEOTECHNICAL INVESTIGATION
UNM SCIENCE AND TECHNOLOGY PARK
TRACT 1E2-A-2

Prepared for:

University of New Mexico Real Estate Office

Project No.: 06-1-139

October 9, 2006

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NOTES -l1OGS OF TEST HOT,ES

Test hole locations were determined by compass bearing and pacing distances from known topographic points.

"Drilling Method" refers to the equipment utilized to advance the test hole. Either seven inch outside diameter, continuous flight, hollowstem auger or a track-mounted excavator equipped with a 48" wide bucket was utilized.

"S" under "Sample Type" indicates a Standard Penetration test (ASTM D-15 86). The Standard Penetration sampler is 2 inches in outside diameter and 1 3/8 inches inside diameter.

"R" under "Sample Type" indicates a 3-inch outside diameter by 2.5-inch inside diameter sampler. The sampler is lined with I-inch high brass rings.

"B" under "Sample Type" indicates a bulk sample.

"Blows Per Foot" indicates the number of blows of a 140-pound hammer falling 30 inches required to drive the indicated sampler 12 inches.

"NR" under "Blows/Foot" indicates that no sample was recovered.

"Dry Density PCF" indicates the laboratory determined soil dly density in pounds per cubic foot.

"Water Content %" indicates the laborat01y determined soil moisture content in percent (ASTM D-2216).

"Unified Classification" indicates the field soil classification as per ASTM D-2488. When appropriate, the field classification is modified based upon subsequent laborat01y tests.

Variations in soil profile, consistency, and moisture content may occur between test holes. Subsmface conditions may also vary between test holes and with time.

Figure No.: 24

Lil TNTRQDUCITQN

This report presents the results of our preliminary geotechnical investigation for Tract 1E2-A-2 of the Science and Technology Park at the University of New Mexico. Tract 1E2-A-2 consists of the majority of the replatted Parcel 6. The remaindet of Parcel 6 was replatted as Tract 1E2-A-1, which is located adjacent to the northeast portion of the subject site.

This office previously performed a preliminaiy geotechnical investigation of Parcel 6, the results of which were presented in our report, V & A Project No.: 99-1-051. This office more recently perf01med a geotechnical investigation of Tract 1E2-A-1 for the new UNM Press Building, the results of which were presented in our report, V & A Project No.: 05-1-306. Pertinent field and laborat01y results from those rep01ts are presented in Appendices C and D. The results of our previous studies were reviewed prior to beginning this investigation in order to guide our field work towards increasing our knowledge of site conditions, instead of merely duplicating past effo1ts.

This investigation was performed to determine site subsmface conditions; and, based upon the conditions observed in the test holes, to develop preliminaty geotechnical recommendations for:

Mass Site Grading;
Foundation Design;

Slabs on Grade; and

Earthwork Constrnction.

The conclusions and recommendations presented are based on conceptual information provided to us regarding the proposed development, on subsurface conditions disclosed by the test holes, on laborat01y testing, and upon the local standards of our profession at the time this report was prepared.

This investigation was not perfo1med to determine the presence of potentially hazardous waste or radon gas. Determination of the presence of potentially hazardous materials was beyond the scope of this investigation and requires the use of exploration techniques and analytic testing which were not appropriate for this investigation. If desired, Vinyard & Associates, Inc. will perf01m an environmental audit of the site.

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Based upon inf01mation obtained from personnel with the University of New Mexico Real Estate Office, we anticipate that Tract 1E2-A-2 will be developed with several commercial office/warehouse type strnctures. Site grading concepts for the approximately 8.28-acre irregularly shaped parcel, as well as proposed building locations and strnctural details, were not available at the time this report was prepared. We anticipate that a moderate to substantial amount of cut/fill eaithwork will be required to develop the site.

3J1 SITE CONDITIONS

The site and its vicinity have a histmy of gravel and sand mining operations, subsequent earthwork activities, and dumping. In its current condition, Tract 1E2-A-2 has three main topographic areas:

- East Terrace - The east terrace occupies roughly the southeastern ½ of the site. The east terrace generally comprises the highest elevations on the site and for this reason was referred to in previous repmis as the "upper area". The east terrace is bound to the south and east by existing buildings, parking/d1iveways, and related appmienances. The east terrace is bound to the nmih and west by relatively steep slopes descending down to other po1iions of the Tract 1E2-A-2.
- West Bottom - The west bottom occupies roughly the western ¼ of the site. The west bottom generally comprises the lowest elevations on the site and for this reason was referred to in previous repmis as the "lower area". The west bottom is bound to the northeast and east by relatively steep slopes ascending up to other portions of the Tract 1E2-A-2. The west bottom is bound to the northwest and west by Basehmt/Langham Road SE and to the south by Goddard Road SE.
- Nmih Te1Tace-The nmth terrace occupies roughly the nmthem ¼ of the site. The nmth terrace was recently graded/established dming constrnction of the UNM Press Building, and generally comprises the middle elevations on the site. The nmth terrace straddles the nmthern portions of both the "upper and

lower areas" as described in previous reports. The n01th terrace is bound to the n01th by Basehart/Langham Road SE and to the east by the new UNM Press Building. The n01th telTace is bound to the south and west by relatively steep slopes ascending and descending, respectively, to the east teITace and west bottom areas.

Configuration and topography of the site are shown on the Site Plan, Figure IA. However, the base survey for the site plan was prepared prior to 1999 and does not accurately depict the n01th teITace, which was graded and established in the last year during the constmction of the new UNM Press Building on the adjacent Tract 1E2-A-l.

A small detention pond is located just off-site, south of and uphill from the UNM Press Building. We anticipate this pond will remain. The east and n01th terraces are both relatively level, and slope slightly off to the west. Limited rubble and debris is visible at the surface of these terraces. Substantial rubble and debris is visible in the steep slopes leading down from these teITaces to the lower western bottom.

The west bottom portion of the site is locally a depression. The west bottom catches and retains significant runoff from the rest of Tract 1E2-A-2, as well as limited 1unoff from the adjacent roads. Ponded storm water was visible in this bottom area after heavy rains. A stockpile located along the n01th boundaiy of the

bottom area serves as a ramp up to the newly created north tenace. A substantial amount of debris/rubble piles blanket the surface of the bottom area.

4.JI AERIAL PHOTOGRAPH REVIEW

Topographic maps prepared by the USGS show symbols depicting gravel pits in the vicinity of the site as early as 1954. Due to the manner in which the USGS periodically updates maps, aerial photography is considered a more reliable source of information. A series of aerial photographs were reviewed to obtain background information and construct a rough timeline of historical earthwork activities which occuned in the study area. Photographs dated 1947, 1959, 1967, 1981, 1996, and 2004 were reviewed. Copies of the photographs are presented in Appendix B. The approximate site boundaries are shown on each photograph.

- 1947 - This photograph shows the site as largely undistmbed. Two large arroyos traverse the site roughly from east to west. Some sand and gravel mining activities are apparent in and around the northeast comer of the site.

- 1959 - This photograph shows substantial sand and gravel mining activities in the nmthwestern two-thirds of the site.

- 1967 - This photograph appears to indicate the te1mination of sand and gravel mining activities. It appears that the east end of the east terrace was

not significantly mined or disturbed. It does not appear that any significant dumping has occmTed at this point.

• 1981 - This photograph shows the east ten-ace of the site as three distinct terraces stepping down to the west. The Social Security Administration Building has been constmcted east of the site, along with the small detention pond. It is possible that the earthwork required to create the new ten-aces was performed in conjunction with the constmction of the Social Security Administration Building. It is possible that some earthen fill and rubble was placed on the site during this time period.

• 1996 - This photograph shows the site to be similar to conditions observed when this office performed our 1999 investigation of Parcel 6. Substantial amounts of fill and rubble are likely to have been placed on the site by this time. The east ten-ace is visible as one largely level area. It appears that some fill has been end dumped down the slope between the east terrace and the lower areas to the west and n01th. Some whitish fill/mbble piles are visible in these lower areas.

• 2004 - This photograph shows the site to be similar to conditions observed when this office perfo1med our 2005 investigation of Tract 1E2-A-1. Basehart, Langham, and Goddard Roads have been graded and paved around the site. A fill stockpile has been placed along Basehart on the n01the1n edge of the site, serving as a ramp/access road. Large quantities of end dumped fill

and rubble are visible on the slope between the east terrace and the lower areas to the west and n01th, as well as on these lower areas. This photograph was taken approximately 2 years before the constmction of the UNM Press Building, and does not show the newly created north terrace. The north terrace was built by filling in the visible low areas in the northe1n ¼ of the site with fill and rubble removed from Tract 1E2-A-2 as well as matelial from the n01thern edge of the east terrace.

5J1 SITE.SUBSURFACE.CQNDTITQNS

To explore the site subsmface conditions, a total of 22 test holes were drilled or excavated with a trackhoe at the approximate locations shown on the Site Plan, Figure IA. Logs of the Test Holes are presented as Figures 2 through 23. The use of heavier/more powerful equipment allowed us to penetrate rubble previously described as "refusal materials" during earlier investigations. The approximate locations and elevations of the test holes were recorded using a Magellan Explorist 100 handheld OPS unit. A summmy of pe1tinent test hole data is presented in the following table.

Hole#	Approximate Elevation (feet)	Approximate Fill Thickness (feet)	Location	Excavation Style (see Fig. 24)
1	5100	40	East Ten-ace	7"H.S.A.
2	5097	34	East Te1Tace	7"H.S.A.
3	5095	18	East Ten-ace	7"H.S.A.
4	5100	9	East TetTace	7"H.S.A.
5	5095	15	East Terrace	7"H.S.A.
6	5104	16	East Ten-ace	7"H.S.A.

Hole#	Approximate Elevation (feet)	Approximate Fill Thickness (feet)	Location	Excavation Style (see Fig. 24)
7	5047	7	West Bottom	Trackhoe
8	5049	6	West Bottom	Trackhoe
9	5046	11	West Bottom	Trackhoe
10	5047	17	West Bottom	Trackhoe
11	5049	12	West Bottom	Trackhoe
12	5049	16	West Bottom	Trackhoe
13	5051	10	West Bottom	Trackhoe
14	5052	17	West Bottom	Trackhoe
15	5046	12	West Bottom	Trackhoe
16	5049	17	West Bottom	Trackhoe
17	5047	11	West Bottom	Trackhoe
18	5049	7	West Bottom	Trackhoe
19	5072	33	North Terrace	7"H.S.A.
20	5071	8	North Terrace	7"H.S.A.
21	5062	18	North Terrace	7"H.S.A.
22	5068	23	North Terrace	7"H.S.A.

• East Terrace - Test Holes 1 through 6 were drilled on the east terrace. The soil profile of the east terrace consisted of a wedge of fill overlying natural ground. Approximate fill thickness ranged from <10 feet along the east edge of the site, to ±40 feet along the west edge of this high terrace. The fill was generally composed of very loose/soft to medium dense silty to clayey sands with some debris/rubble. The amount of debris and rubble in the fill appears to increase significantly towards the west edge of the terrace. The debris and rubble in the fill was generally asphalt and hard concrete, with very minor amounts of wood and other decomposable materials.

• West Bottom - Test Holes 7 through 18 were excavated with a trackhoe in the west bottom. The soil profile of the west bottom consisted of a variable

thickness of fill overlying natural ground. The fill layer ranged from approximately 6 feet to 17 feet thick, and appears to thin towards the northwestern po1tion of this low-lying area. The fill was composed of alternating layers of debrishubble and loose silty to clayey sands. The amount of debris and rubble in the fill appears to be greater than 50% of the bulk fill. The debris and mbble in the fill was generally asphalt and hard concrete, with vely minor amounts of wood and other decomposable materials.

• No1th TelTace - Test Holes 19 through 22 were drilled on the north edge of the n01th terrace. The soil profile of the n01th telTace consisted of a variable thickness of fill overlying natural ground. Active grading activities on this po1tion of the site concu1Tent with our field investigation restricted our access to the entire telTace as it appears today. The.fill soils ranged from <8 feet to >30 feet in thickness where we had access to drill. If the data from Test Hole 20 is discounted, the fill on the n01th telTace appears to have a fairly consistent bottom elevation. The fill was composed of loose to medium dense silty to clayey sands blended with some debris. It is probable that the po1tion of the n01th telTace to which we had access was mostly underlain by older fill. We anticipate that the more recently placed fill will likely have some areas containing significant quantities of hard concrete rubble. We base this claim on observations of the concu1Tent grading activities, and conversations with the involved constmction personnel while on-site.

At various depths in the test holes, voids were often encountered within the 1ubble layers of the fill. The presence of voids is supported by circumstantial evidence in some of the drilled holes, and direct visual evidence in some of the holes excavated by trackhoe. It is difficult to speculate on the size and lateral continuity of voids within the mbble, which may vaiy significantly. Voids are likely located within loose pockets between nested angular slabs of concrete and other hard mbble.

Beneath the fill, undistmbed natural soils were encountered at vaiymg elevations. Most of the native soils likely belong to the "Santa Fe Group" of old, weakly-cemented sediments. These natural soils ranged widely in composition between locations, and were generally medium dense/stiff to dense/hard. Generally, natural soil layers of clay, silt, silty-clayey sand, and clean sand and gravel were encountered beneath the fill.

Neither flowing groundwater nor bedrock was encountered in the test holes to a depth of fifty-one feet, the maximum depth of exploration. However, groundwater conditions may change with time due to precipitation, variations in groundwater level, seepage from ponding areas, or leaking utilities.

The test holes allow observation of a vely small p01tion of the soils below the site. Significant variations in subsmface conditions may occur across the site, which were not disclosed by the test holes.

.6.Jl T,ARQRATQRY.TESTING

A laborat01y-testing program was performed on samples obtained dming the field investigation which appeared representative of the soils encountered in the test holes. The laborat01y-testing program was stluctured to dete1mine the physical properties of the soils encountered in the test holes necessaiy for development of geotechnical recommendations.

The laborato1y-testing program included:

- Moisture Content;
- Dly Density;
- Sieve Analysis;
- Atterberg Limits; and
- Consolidation/Collapse.

Moisture Content and Dry Density tests were performed to evaluate the in-place soil density and moisture content. Test results help to evaluate settlement potential. Test results indicate the fill soils encountered in the test holes had an average moisture content of approximately five percent. The underlying natural soils encountered in the test holes had an average dry density of 110 pcf, and an average moisture content of approximately five percent. Test results are presented on the Logs of Test Holes, Figures 2 through 23, and are summarized on Table 1.

Sieve Analysis and Atterberg Limits tests were performed to confirm field soil classifications and to provide info1mation on general physical soil properties. Test results are presented on Table 1.

Consolidation/Collapse tests were performed on the natural soils underlying the existing fill to evaluate structure settlement and to dete1mine the effect of water on site soils. The tests indicate the soils encountered in the test holes are slightly to moderately compressible under anticipated loads. Significant additional settlement may occur if the site soils are allowed to increase in moisture content. Test results are presented on Figures 25 through 29.

1.0. ANAT,YSIS

The subsmface information obtained from the test holes combined with the GPS data allowed us to develop three-dimensional models of the fill materials on the site using Surfer 7.0. A map of approximate fill thicknesses and a map of the approximate elevations of the bottom of fill are presented on Figure 1B. Given the limited number of data points and the inherent inaccuracy of handheld GPS units, these fill profiles should be considered very approximate. However, they may be useful for estimating the elevations at which undistmbed natural soils may be present, and developing rough volumetric estimates of the amount of fill cun-ently on the site.

The map modeling the estimated bottom of fill elevations depicts the natural ground sloping down to the west-northwest. This con-esponds with the lay of the land visible in the aerial photographs from 1947 and 1959 before substantial fill placement and dumping occun-ed. The map showing fill thickness indicates that the deepest fills are located in a rough north-south swath across the middle of the site, under the west edge of the east terrace extending to Basehai1 Road. This model is suppo1ted by the historical aerial photographs. In the aerial photographs from 1959 through 1996, this p011ion of the site appears to have experienced the most change due to sand and gravel mining activities and subsequent eai1hwork and dumping.

Based on the results of our investigation, the site appears compatible with the proposed development. However, a substantial amount of rubble removal and earthworkwill likely be necessaiy to develop the site. The existing fill may contain, on average, around 50% 1ubble and debris, most of which is not organic or naturally decomposable. The presence of numerous small to medium sized voids within this rubble is quite possible. The fill has sporadic and possibly substantial loose/soft zones encountered while drilling and excavating. The fill was not placed and compacted with engineering oversight. The existing fill will be prone to significant total and differential settlement ifleft in place.

The underlying natural soils also show a pronounced potential for settlement if not adequately addressed during design and constmction. The consolidation testing performed on several different types of natural soils indicate a slight to

moderate potential for compression under the anticipated building loads. Moderate to significant additional settlement may occur if these soils become wetted.

Without knowing in advance the site grading concepts, building locations, size, configuration and strnctural loading, it is difficult to prepare effective design recommendations. The Owner and project designers are therefore presented with four preliminmy options in the following section. We recommend that a course of action is chosen that balances costs with the Owner's comfort with the risks associated with each design strategy. When building locations and loads are finalized, this office should be contacted to confi1m the following recommendations.

8..JBECQMMENDATTQNS

Option 1: It would be possible to leave most of the existing fill and rnbble in place beneath strnctures. If this option were chosen by the Owner and project designers, the proposed buildings would have to be supp01ted on deep foundations penetrating through the fill and well into the underlying natural soils, on the order of 30 feet. The building floors would have to be strnctural floors also supported on these deep foundations. Utilities below the structure would have to be suspended from the floor, and utility breaks would still be quite possible. This option has several inherent problems and therefore increased risks due to the potential for differential settlement between the buildings and connecting utilities, adjacent sidewalks, driveways and paved parking areas. This differential settlement could be substantial and occur suddenly within paved and landscaped areas, particularly after

heavy precipitation or possible utility break. Increased building and site maintenance/repair costs would be a factor. Numerous additional test holes would have to be drilled in order to effectively design the deep foundations.

Option 2: It also would be possible to supp01t buildings on deep foundations penetrating through the fill as described above, and a conventional slab-on-grade floor suppmted on some engineered fill. The depth of removal of the existing fill and rnbble beneath the building floors will depend largely on the Owner's understanding that differential settlement between building walls and floors will occur if any of the existing fill is left in place beneath the new engineered fill. Increasing the thickness of new engineered fill beneath the floor slabs will reduce, but not eliminate, the risk of substantial differential settlement between building walls and floors. As desciibed above, undue settlement outside the buildings is still a substantial risk. This option may therefore have more inherent problems, associated risks and long-te1m costs than Option 1. Numerous additional test holes would still have to be drilled in order to effectively design the deep foundations.

If either Option 1 or 2 are chosen, Vinyard & Associates, Inc. would be pleased to provide additional field studies and consulting as necessary to aid in site development plans.

Option 3: It would be possible to remove the existing fill and rnbble down to native soils only within the building envelopes, leaving the fill mostly in-place beneath paved parking and landscaped areas. If this option were chosen by the

Owner and project designers, the proposed buildings could likely be suppmted on shallow foundations and conventional slabs-on-grade bearing entirely on engineered fill. The engineered fill in this case would have to extend laterally outside the building foundations a distance equal to the depth of fill removed. This option has fewer inherent problems and therefore less associated risk. However, substantial and sudden differential settlement could still occur within the paved and landscaped areas under which the fill and rubble remained in place. This could still lead to damaged utilities. Increased site maintenance/repair costs would still be a factor.

Option 4: We suggest a development plan that includes removing the existing fill in its entirety down to native soils across the site as a whole and then placing engineered fill to meet desired grades. If this option were chosen by the Owner and. project designers, the proposed buildings could likely be suppmted on shallow foundations and conventional slabs-on-grade bearing entirely on engineered fill. The risks of settlement within paved areas and potential distress to utilities would be minimal. While the initial costs may be high, we believe the long-term costs of building and site maintenance would be significantly lower. This option appears to have the least inherent problems and associated risks.

If the Owner chooses to follow either Option 3 or 4, foundations and slabs may be designed as follows.

2JI FQUNUATTQNS

If the recommendations presented in the following sections of this rep01t are implemented particularly those regarding eaithwork, site grading and drainage, the proposed stmctures may be supported on conventional spread and strip footings bearing on a minimum of ten feet of engineered fill. Engineered fill should extend a minimum of ten feet laterally beyond the edge of all footings. Foundations four feet or greater in least dimension may be designed for an allowable bearing pressure of 3000 pounds per square foot. Foundations between two and four feet in least dimension may be designed for an allowable bearing pressure of 2000 pounds per square foot. Foundations less than two feet in least dimension may be designed for an allowable bearing pressure of 1500 pounds per square foot. These values may be increased by one-third for short-term loads due to wind and earthquakes. If it is not feasible to implement the eaithwork, site grading, drainage. and landscaping recommendations presented herein an alternate foundation system may be required. This office should be contacted for additional recommendations.

The base of exterior footings should be embedded a minimum of eighteen inches below lowest adjacent grade. The base of interior footings should be embedded a minimum of twelve inches below finish pad grade. Spread and strip footings should be a minimum of twenty-four and eighteen inches wide, respectively. However, local building codes may require greater dimensions.

Lateral foundation loads will be resisted by a combination of passive soil pressure against the sides of footings and friction along the base. A passive soil resistance of 300 pounds per cubic foot may be utilized for design. Frictional resistance may be determined by multiplying foundation dead load by a coefficient of friction of0.40.

Prior to fill placement and following footing excavation, the natural soils should be evaluated and engineered as detailed in the following Eaithwork Section 12 and in the attached Appendix A. All fill below stmctures should be placed and compacted as detailed in the following Eaithwork Section 12 and the attached Appendix A. Prior to poming concrete, footing excavations should be cleaned of any slough, loose soil, or debiis. Footing excavations should be compacted as detailed in the attached Appendix.

Foundations designed and constmcted as described herein are not anticipated to settle more than one inch. Differential settlement between adjacent column footings should not exceed one-half of the above value. The above settlement estimates are based on the assumption the site soils will not be allowed to increase in moisture content and that the site grading, drainage, eaithwork, and landscaping recommendations presented in this rep01t will be fully implemented.

The site soils are moderately collapsible if allowed to increase in moisture content. If the natural soils suppo1ting footings are allowed to increase in moisture content, additional settlement of ¼ inch per foot of wetted soil could occur.

Foundations should be designed and constmcted to tolerate the above settlement. Foundations should be designed by a qualified structural engineer.

To reduce the affect of settlement on the structure, we suggest that all stucco be fiberglass reinforced. Periodic control joints should be utilized in the stucco particularly at window and door corners. Periodic control joints should also be utilized in masonry walls.

1fi.Jl CQNCBEIE ST,ARS-QN-GRADE

Concrete slabs-on-grade may be utilized. Slabs should bear on a minimum of ten feet of engineered fill. Slabs should be isolated from all foundations, stem walls, elevator pits and utility lines. Frequent joints should be scored or cut in slabs to control the location of cracks.

Thickened slabs may be utilized to support interior partitions that impart loads ofless than 800 pounds per linear foot. Thickened slabs should be a minimum of twelve inches in width and should be designed to exert a maximum earth pressure of 500 pounds per square foot.

The thickness and reinforcement of floor slabs should be determined by a qualified strnctural engineer. For strnctural design of the floor slab, a modulus of subgrade reaction of 500 kips per cubic foot may be utilized. This value is for a

1' x 1' square or a 1' wide strip. The above value may be modified for various effective widths based upon the following equation:

Ks = $800\left[\frac{1}{B}\right]^2$ where:

Ks = Modulus of subgrade reaction (kips per cubic foot)

B = Effective width of loaded area (feet)

If moisture-sensitive floor covering is utilized, the flooring manufacturer should be contacted to determine the necessity of a vapor ban-ier. The moisture barrier may consist of a 6-mil' polyethylene film or equivalent. The balTier may be overlain with one or two inches of clean sand to provide a working surface and reduce shrinkage cracking.

Prior to placing slabs or stmctural fill, the natural soils should be evaluated and engineered as detailed in the following Earthwork Section 12 and in the attached Appendix A. All fill below slabs should be placed and compacted as detailed in the following Earthwork Section 12 and the attached Appendix A.

.ll.Jl RETAINING WATJ ,8

The location, height and anticipated loading of retaining walls to be constmcted in conjunction with this project are not known at this time. This office

would be pleased to consult with the Owner· and project designers concern ing retaining wall designs when that information becomes available.

12.JI EARTHWORK

.12.1 General

The recommendations presented in this repo1t are based upon the assumption that site eaithwork will be performed as recommended in this report and the attached Appendix. Presented below is a summary of the site earthwork recommendations. Detailed earthwork procedures are presented in the attached Appendix A.

.12_2 Clearing_and_Grubbing

Prior to placing stmctural fill, all borrow and fill areas should be stripped of vegetation and deleterious materials. All stiippings should be hauled off-site or utilized in landscaped areas. All existing utilities, leach fields, and disturbed soil should be removed from below the proposed stmctures. The resulting excavations should be backfilled with compacted fill as detailed in the attached Appendix A.

12.3. Removal_of_Existing_Fill

If either Options 3 or 4 of the recommendations previous listed in this report are followed, the existing fill onsite may be addressed in the following manner.

If these options are not to be followed, this office should be contacted for fmther recommendations. Option 3 assumed the removal of the existing fill down to undistmbed native soil within the proposed building footprints, and laterally to a distance equal to the thickness of fill removed. Option 4 assumed the removal of the existing fill down to undisturbed native soil across the entire site.

The existing fill soils with minor amounts of hard rubble appear suitable for re-use as engineered fill on this site. Organic or otherwise decomposable materials should be screened out and disposed of properly off-site. Rocks and hard rubble pieces in excess of four inches should be removed or clushed. These soils may then be blended to comply with the criteria for fill material as specified in the attached Appendix A.

The layers/zones of hard concrete and asphalt rubble may be crushed to <4" and blended with soils for re-use as engineered fill on this site, provided the criteria for fill material in the attached Appendix A can be met. Rebar in the concrete should be generally screened out and disposed of properly off-site. Alternately, the rubble could be milled to meet applicable COA or NMSHTD standard specifications and exported off-site. However, prior testing and approval will be necessmy from the applicable governing agency in this event.

12.d Excavation

We anticipate that on-site soils can be excavated with conventional earthwork equipment. Additional eff01t may be required to excavate the 1ubble. Large quantities of concrete rubble containing reinforcing steel, as well as other types of hard rubble, debris, cobbles, and boulders are anticipated. These materials should be treated as discussed in the above Section 12.3. These materials should not be placed within strnctural fills until they have been crushed to <4" and blended with soil so as to meet the criteria for fill materials. Rebar should be screened out and disposed of properly. Organic materials such as wood or other decomposable materials should also be screened out and disposed of properly.

12.5 Natural Grmmd Preparation

On-site native soils appear suitable for re-use as engineered fill. However, some blending will be necessary in order to meet the criteria for fill materials as detailed in the attached Appendix A.

Prior to placing strnctural fill and subsequent to final grading in cut areas, the exposed soils should be scarified to a depth of eight inches and moisture conditioned to a near optimum (±3%) moisture content. If natural clay soils are exposed at the final grade in cut areas or at the bottom of an excavation, the clay should be removed an additional two feet in depth before preparing the excavation to receive fill. The exposed soils should then be compacted to a minimum of 95%

of maximum density as determined by ASTM D-1557. If vibrat01y compaction poses a threat to nearby shuctures, static compaction should be utilized.

12Ji Fill Placement and Compaction

Structural fill should be placed in horizontal lifts a maximum of eight inches in loose thickness, moisture conditioned to a near optimum moisture content and mechanically compacted. Fill below footings and slabs should be compacted to a minimum of95% of maximum dly density as determined by ASTM D-1557.

12.1 Observation and Testing

All eaithwork activities including the placement and compaction of structural fill should be observed and tested by a qualified geotechnical engineer or his representative. The purpose of the observation and testing is to confi1m that the recommendations presented herein are followed and to provide supplemental recommendations, if subsurface conditions differ from those anticipated.

Foundation excavations should be observed by a qualified geotechnical engineer, or his representative, prior to placement of reinforcement or concrete. The purpose of the observation is to determine if the exposed soils are similar to those anticipated.

13.0 SITE GRADING AND DRAINAGE

The low-lying western portion of the site currently acts as a basin into which the rest of the site and some of the surrounding areas drain. This area should minimally be raised in grade above the lowest adjacent street grade to allow for positive drainage off the site.

The site soils are moderately to significantly collapsible if allowed to increase in moisture content. To reduce the risk of structure settlement the site should be graded to rapidly drain away from structures. We suggest a minimum four percent gradient within at least the first ten feet away from structures in areas not protected by sidewalks and pavement. Roof gutters and downspouts should be utilized. Roof gutters should discharge to the front of the structures. Water should run off rapidly. Splash blocks should be utilized below down spouts and canales.

If ponding areas are required, they should be lined with an impermeable liner, equipped to divert overflow water rapidly off-site, and located as far away from structures as possible, a minimum of ten feet. If these criteria cannot be met, this office should be contacted for supplemental recommendations.

14.0 LANDSCAPING

Landscaping adjacent to structures should be designed and constructed to minimize the potential for wetting of soils supporting the proposed facilities.

If soils supporting the proposed facilities are allowed to increase in moisture content, significant localized settlement could occur.

Trees and shrubs within five feet of structures should be hand watered or watered using controlled drip irrigation. If drip irrigation is used, emitters should discharge no more than one gallon per hour. If grass must be planted within five feet of structures, watering should be carefully controlled to prevent overwatering. Grassed areas adjacent to structures should be sloped so that excess irrigation water will run off promptly. Sprinkler lines and drip irrigation mains should be located a minimum of five feet away from foundations.

Mowing strips, planters and sidewalks should not "dam" water adjacent to structures. If necessary, mowing strips should be perforated to allow water to flow away from structures.

All interior planters should be closed bottom and watertight.

15.0 UTILITIES

The site soils are moderately collapsible if allowed to increase in moisture content. If post-construction water or sewer line leaks occur, localized settlement may result. Following installation, all water and sewer lines should be pressure checked for leaks. Any leaks found should be repaired. Backfill in utility line trenches below slabs and pavement should be compacted to a minimum of 90% of

maximum density as determined by ASTM D-1557. To reduce the possibility of breaking utility lines with compaction equipment, heavy compactors should not be utilized.,

Utility trenches may not be compacted to the same degree as the remainder of the building pad. Therefore, wall footings and thickened slabs should not be placed longitudinally over utility lines. Additionally, column footings should not be placed over utility trenches.

16.0 TRENCHES AND EXCAVATIONS

All trenches greater than four feet in depth must be sloped, shored or braced or otherwise supported according to OSHA Construction and Safety Standards. Material excavated from the trench or spoil must be placed a minimum of two feet from the edge of the excavation. The spoil should be retained in an effective manner such that no loose material can fall into the excavation.

Temporary construction excavations less than eight feet deep should be sloped no steeper than 1.5:1 (horizontal:vertical). If deeper excavations are required, this office should be contacted for supplemental recommendations. Limited raveling of slopes will occur particularly as the exposed soils dry out. Heavy equipment and material stockpiles should be located a minimum of five feet from the top of slope.

17.0 ASPHALTIC CONCRETE PAVEMENT

The location, square footage, and anticipated loading of pavements to be constructed in conjunction with this project are not known at this time. This office would be pleased to consult with the Owner and project designers concerning effective subgrade preparation and pavement section designs when that information becomes available.

18.0 CLOSURE

The recommendations presented in this report are based upon the subsurface conditions disclosed by the test holes. Soil and groundwater conditions may vary between test holes and with time.

This report reflects our interpretation of the site subsurface conditions. We strongly recommend that prior to bidding all contractors perform their own subsurface investigation to form their own opinion of the site soil, rock, and groundwater conditions. Should contractors elect to use this report for construction, bidding or estimating purposes, they do so at their own risk.

In a southwest climate it is particularly important to protect the soils supporting the proposed structure from an increase in moisture content. If soils supporting the structure increase in moisture content due to any cause such as poor

site drainage, ponding areas, or leaking utility lines, significant structural settlement and distress may occur.

If conditions are encountered during construction which differ from those presented herein, this office should be contacted for supplemental recommendations. The staff of **Vinyard & Associates, Inc.** is available for supplemental consultation as necessary.

This office would be pleased to review site grading and drainage plans to evaluate conformance with the recommendations presented herein. All site earthwork should be observed by a qualified geotechnical engineer or his representative. **Vinyard & Associates, Inc.** would be pleased to provide these services.

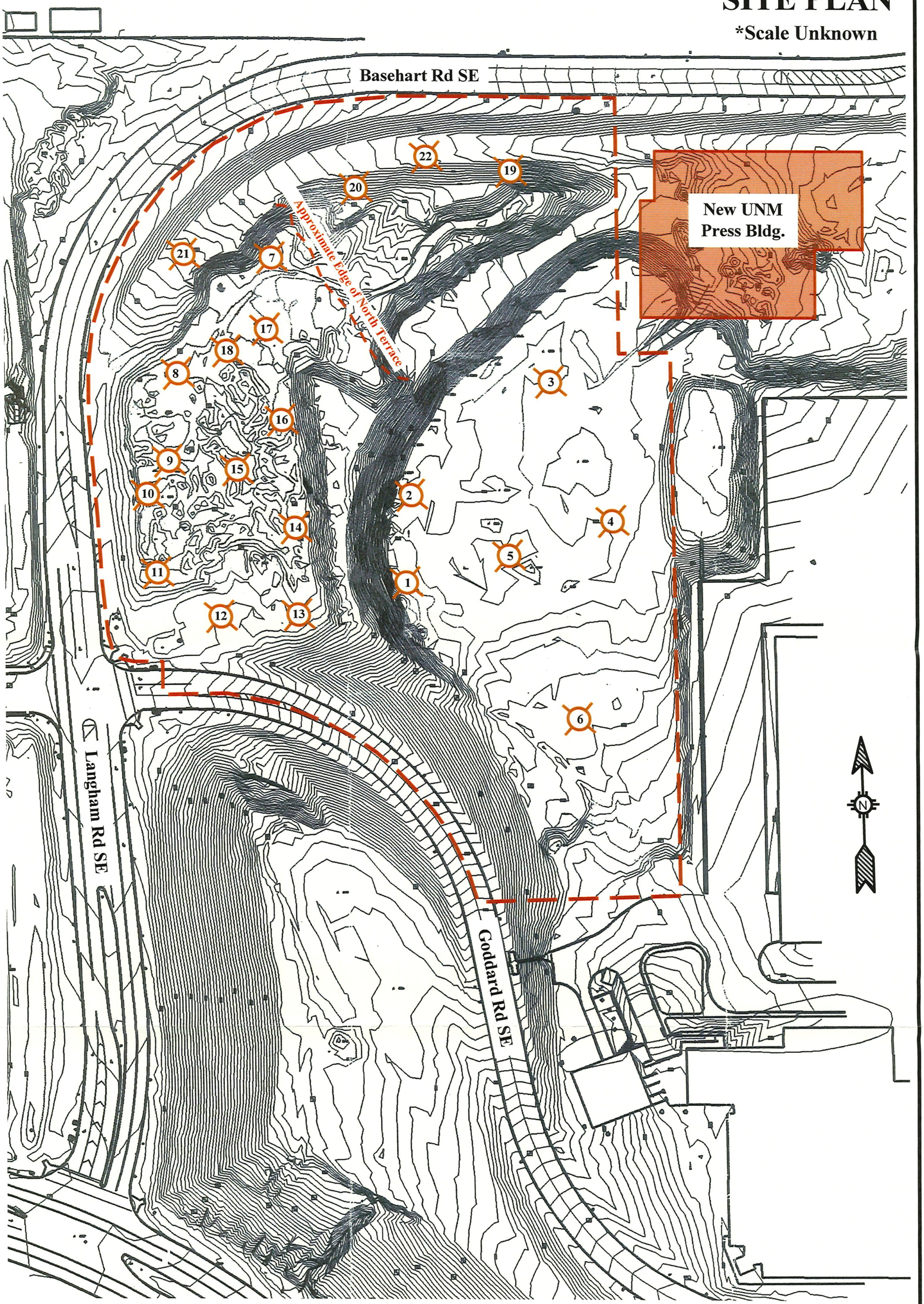
Vinyard & Associates, Inc.

Martin D. Vinyard, P.E.

MDV/lh-er

SITE PLAN

*Scale Unknown

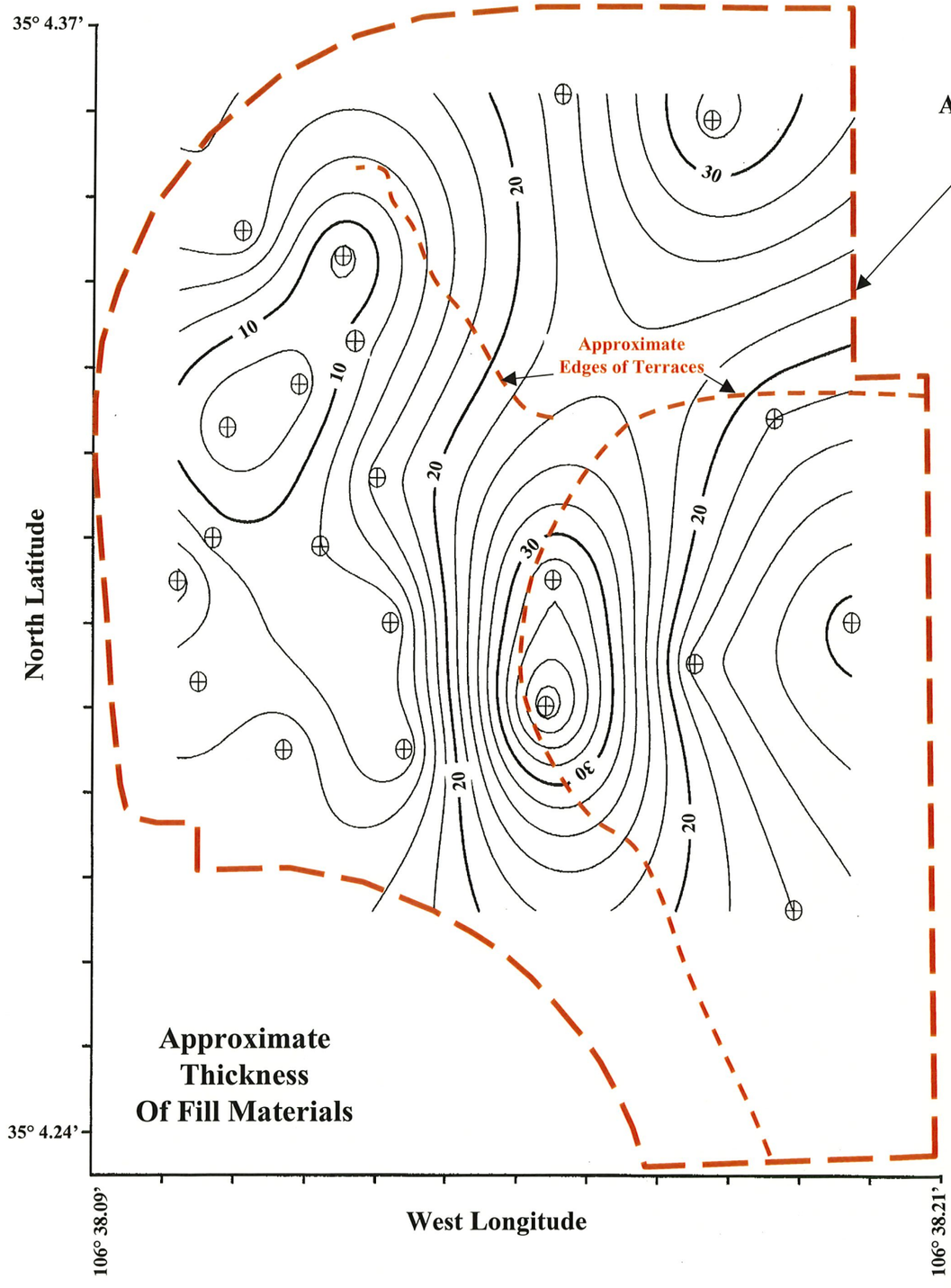


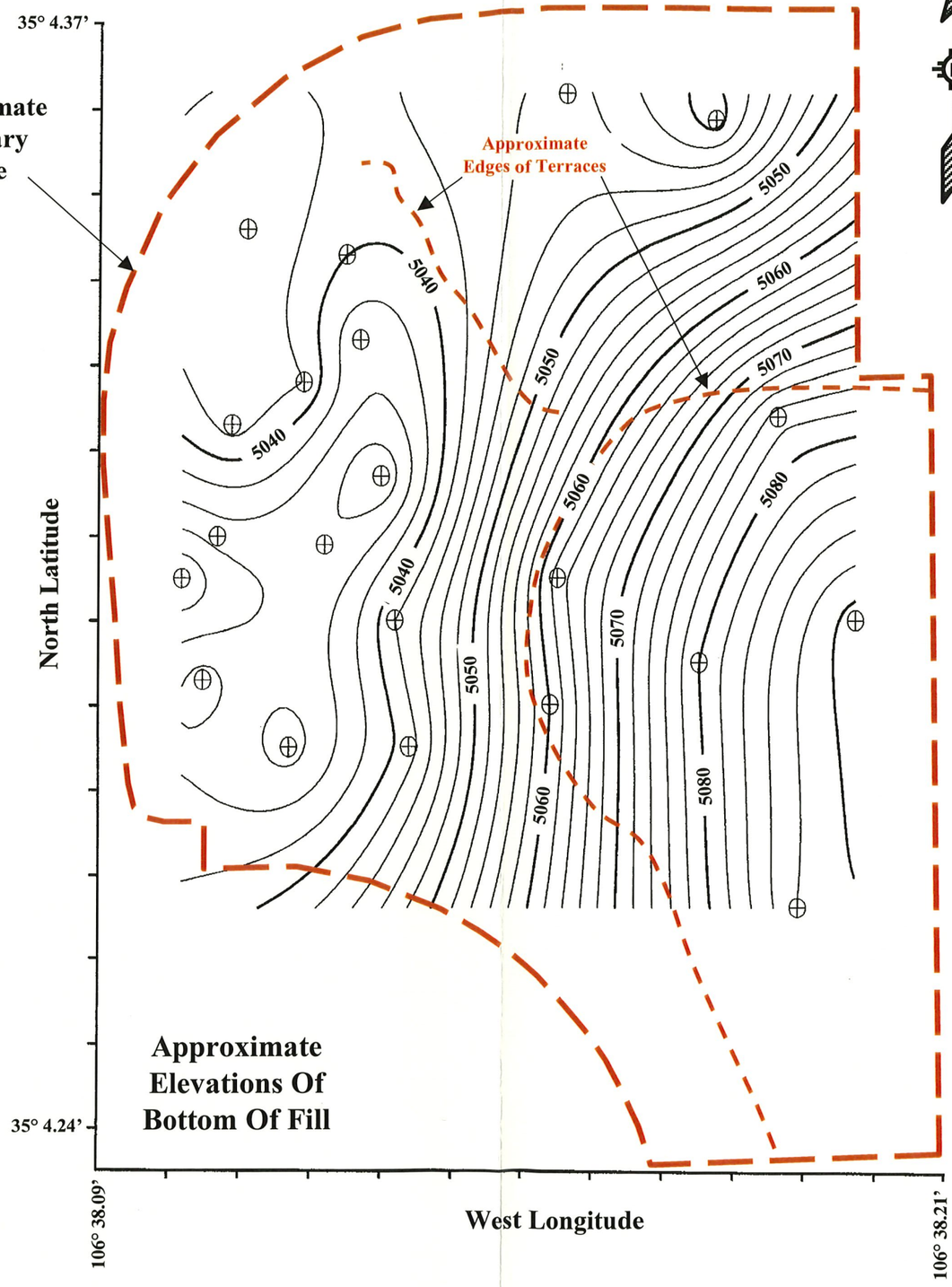
TEST HOLE LOCATION

V&A Project No.: 06-1-139

FIGURE 1A.

FILL PROFILES





⊕ TEST HOLE LOCATION

CONTOUR INTERVAL = 2 FEET

V&A PROJECT NO.: 06-1-139

FIGURE 1B.

V & A

LOG OF TEST HOLE NO. 1

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5100' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Large chunks of concrete & rebar top 3'
						SM	FILL - SAND, silty, fine to coarse grained, very gravelly, loose, medium moist, light brown, blended with asphalt debris
5	7	S		3.4	1		
10	51	S		5.3			Dense, with concrete debris, generally more debris than soil
15	14	S		3.9			Medium dense, with asphalt or burned debris, moderate odor
20	29	S		3.6	1		Asphalt and concrete debris, trace clay balls
25	15	S		5.0			Similar, trace wood and tile
30	11	S		4.4			
35						SC	PROBABLE FILL - SAND, very clayey, fine to coarse grained, trace gravel, medium dense, moist, medium brown

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2

V & A

LOG OF TEST HOLE NO. 1 cont'd

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139

Elevation - Top of Test Hole: ±5100' Date Drilled: 6/20/2006

Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Large chunks of concrete & rebar top 3'
40	17	S		5.7		SC	PROBABLE FILL - SAND, very clayey, fine to coarse grained, trace gravel, medium dense, moist, medium brown
	16	R	109	7.8	1,2,5	ML	NATURAL GROUND - SILT, very sandy, fine to medium grained, trace gravel, stiff, slightly moist, light pinkish brown, trace caliche
45	50	R	130	3.0	1,2	SM	SAND, silty, fine to coarse grained, gravelly, dense, medium moist, light brown
50	31	S		8.7			With alternating lenses of tan silt and reddish clay
55							Bottom of hole at 51½'
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2 cont'd

V & A

LOG OF TEST HOLE NO. 2

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5097' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SM	Large chunks of concrete top 2' FILL - SAND, silty, fine to coarse grained, very gravelly, loose, medium moist, light brown, concrete & asphalt debris
5	6	S		2.9			
10	4 NR	S					Pushed cobble
15	27	S		4.1	1		Medium dense, with black stained/burnt lens, moderate odor
20	18	S		3.6			Very small sample
25	21	S		4.4			Very small sample
30	7	S		4.5	1,2	ML	PROBABLE FILL - SILT, sandy, fine to coarse grained, trace gravel, dry, light brown
35						SM	NATURAL GROUND - SAND, silty, fine grained, medium dense, medium moist, light yellowish brown

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

V & A

LOG OF TEST HOLE NO. 2 cont'd

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5097' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Large chunks of concrete top 2'
	11	S		3.0	1	SM	NATURAL GROUND - SAND, silty, fine grained, medium dense, medium moist, light yellowish brown at 34'
40	29	R	102	8.7	1,2,5	ML	SILT, sandy, fine grained, very stiff, slightly moist, light yellowish brown
45						GP-GM	GRAVEL, slightly silty, fine to coarse grained, dense, slightly moist, gray, with cobbles Clay lenses
	33	S		1.4	1	SP-SM	SAND, slightly silty, fine to coarse grained, dense, slightly moist, light brown
50	66	S		0.9		GP	GRAVEL, trace silt, fine to coarse grained, dense, slightly moist, gray, trace cobbles
55							Bottom of hole at 51½'
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3 cont'd

V & A

LOG OF TEST HOLE NO. 3

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5095' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	11 NR	S				SP-SM	FILL - SAND, slightly silty, fine to coarse grained, very gravelly, medium dense, slightly moist, light brown, some concrete and asphalt debris
10							Lenses of gravel and cobbles
	10	S		6.3	1,2	SM-SC	FILL, silty sand, blended with clay, fine to coarse grained, slight gravel, medium dense, moist, mottled brown
15	21	S		8.4	1,2		
20	17	S		9.6		CL	NATURAL GROUND - CLAY, slightly sandy, fine grained, very stiff, very moist, pink and white, some caliche
25	36	R	113	6.2	1,2,5	SM	SAND, silty, fine to medium grained, medium dense, moist, light brown,
							Silty to slightly silty, medium moist, dense, light yellowish brown
30	50	R	121	3.5	1		
35	30	S		3.3	1		
							Bottom of hole at 36½'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4

V & A

LOG OF TEST HOLE NO. 4

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5100' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SM	FILL - SAND, silty, fine to coarse grained, slight gravel, medium dense, medium moist, medium brown
5	25	S		5.8	1,2	SC	POSSIBLE FILL - SAND, very clayey, fine to coarse grained, trace gravel, medium dense, moist, mottled brown
10	24	S		2.7	1	SM	NATURAL GROUND - SAND, silty, fine to coarse grained, gravelly, medium dense, slightly moist, light brown to gray
15	26	S		8.5	1,2	ML	SILT, very sandy, fine grained, very stiff, slightly moist, pinkish brown, trace caliche, with thin lenses of silty sand
20	34	S		11.4			Hard, more caliche, grading to clay
25	42	S		1.5		SP-SM	SAND, slight to trace silt, fine grained, dense, slightly moist, light yellowish brown
30							Bottom of hole at 26½'
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 5

V & A

LOG OF TEST HOLE NO. 5

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5095' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	51	S		2.4	1	SM	FILL - SAND, silty, fine to coarse grained, gravelly, dense, slightly moist, light brown, with concrete and asphalt debris
10	2	S		3.4	1		Very silty, fine to medium grained, trace gravel, very loose, medium moist, trace charcoal
15							Harder, trace debris
	18	S		10.8		CL	NATURAL GROUND - CLAY, sandy, fine grained, light pinkish brown, very stiff, slightly moist, trace caliche, with thin lenses of silty sand
20	21	R	110	13.8	1,2,5		Medium moist
25	32	R	85	4.4	1	SM	SAND, very silty, fine to medium grained, dense, medium moist, light brown, trace caliche
30	43	S		3.9			Silty to slightly silty, light yellowish brown
35							Bottom of hole at 31½'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 6

V & A

LOG OF TEST HOLE NO. 6

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5104' Date Drilled: 6/20/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	2	S		6.0	1	ML	FILL - SILT, sandy, fine to medium grained, trace gravel, very soft, slightly moist, light brown
10	3	S		1.3	1	SP-SM	FILL - SAND, slightly silty, fine to coarse grained, slight gravel, very loose, slightly moist, light brown
15	39	R	125	2.8		SP	FILL - SAND, trace silt, fine to coarse grained, trace gravel, very loose, slightly moist, light brown to gray Very gravelly, dense
20						CL	NATURAL GROUND - CLAY, sandy, fine grained, hard, slightly moist, light pinkish brown, trace caliche
	19	R	111	3.7	1,2,5	SM	SAND, very silty, fine to coarse grained, slight gravel, medium dense, medium moist, light brown
25	38	S		11.6		CL	CLAY, slightly sandy, fine grained, hard, slightly moist, pinkish brown to white, with caliche
30							Bottom of hole at 26½'
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 7

V & A

LOG OF TEST PIT NO. 7

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5047' Date Drilled: 7/6/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble at surface
5						SM	FILL - SAND, silty, fine to coarse grained, gravelly, medium moist, medium brown, with large chunks of concrete and asphalt to 7'
10						ML	NATURAL GROUND - SILT, very sandy, fine grained, medium moist, light yellowish brown
15							Bottom of hole at 10'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 8

V & A

LOG OF TEST PIT NO. 8

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5049' Date Drilled: 7/6/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble and standing water at surface
						SM	FILL - SAND, silty, fine to coarse grained, gravelly, moist, medium brown
5							Thick layer of concrete and asphalt rubble, 3'-6'
						SM	NATURAL GROUND - SAND, very silty, fine to medium grained, trace gravel, medium moist, light brown
10							Bottom of hole at 9'
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 9

V & A

LOG OF TEST PIT NO. 9

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139

Elevation - Top of Test Hole: 5046' Date Drilled: 7/6/2006

Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble and standing water at surface
5						SM	FILL - SAND, silty, fine to coarse grained, gravelly, moist, medium brown, with concrete asphalt, brick rubble and minor amounts of trash to 11'
10						SM	NATURAL GROUND - SAND, very silty, fine to medium grained, medium moist, light brown
15							Bottom of hole at 13'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 10

V & A

LOG OF TEST PIT NO. 10

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5047' Date Drilled: 7/6/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble at surface
5						SM	FILL - SAND, silty to slightly silty, fine to coarse grained, gravelly, medium moist, medium brown, with concrete, asphalt, wood, brick, metal debris, trace trash to 17'
10							
15							
						SP	NATURAL GROUND - SAND, trace silt, fine to medium grained, trace gravel, medium moist, gray
20							Bottom of hole at 18½'
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 11

V & A

LOG OF TEST PIT NO. 11

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5049' Date Drilled: 7/6/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete and asphalt rubble at surface
5						SM-SC	FILL - SAND, silty clayey, fine to coarse grained, gravelly, medium moist, medium brown, with concrete, asphalt rubble, and general construction debris to 12'
10							
						SM	NATURAL GROUND - SAND, very silty, fine to medium grained, trace gravel, medium moist, light brown
15							Bottom of hole at 14'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 12

V & A

LOG OF TEST PIT NO. 12

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5049' Date Drilled: 7/6/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5		B		3.1	1,2	SM-SC	FILL - SILT, sandy, fine to coarse grained, slight gravel, dry, medium brown, with tires and trace fine debris
15							Heavy concrete/rebar rubble 5'-16'
20						SM	NATURAL GROUND - SAND, very silty, fine to medium grained, trace gravel, medium moist, light brown
35							Bottom of hole at 20'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 13

V & A

LOG OF TEST PIT NO. 13

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5051' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5						SM	FILL - SAND, very silty, fine to coarse grained, slight gravel, moist, medium brown, trace debris
							Heavy concrete rubble 5'-9'
10						SC	POSSIBLE FILL - SAND, with clay balls
		B		2.6	1	SM	NATURAL GROUND - SAND, silty, fine to medium grained, trace gravel, slightly moist, light brown, trace caliche
15							Bottom of hole at 13'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 14

V & A

LOG OF TEST PIT NO. 14

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5052' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble at surface
						SM-SC	FILL - SAND, fine to coarse grained, blended with some clay balls and gravel, moist, pinkish brown
5							Heavy concrete/asphalt/metal rubble with some other debris and trash 4'-17'
10							
15							
20						SM	NATURAL GROUND - SAND, very silty, fine to medium grained, trace gravel, medium moist, light brown
							Poorly graded gray sand at bottom of hole
25							Bottom of hole at 20'
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 15

V & A

LOG OF TEST PIT NO. 15

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5046' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Asphalt and concrete rubble at surface
5						SM	FILL - SAND, silty, fine to coarse grained, medium moist, medium brown to light brown, mixed with large pieces of asphalt and concrete rubble
10							Layer of brick and wood debris, with some soil
15		B		3.0	1	SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, trace gravel, dense, medium moist, gray (Santa Fe Group)
20							Bottom of hole at 15'
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 16

V & A

LOG OF TEST PIT NO. 16

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5049' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							Concrete rubble at surface
						SM	FILL - SAND, silty, fine to coarse grained, slight gravel, moist, medium brown
5							Heavy concrete, asphalt, brick debris, with minor trash from 3'-17'
10							
15							
						SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, trace gravel, medium moist, yellow to gray (Santa Fe Group)
20							Bottom of hole at 19'
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 17

V & A

LOG OF TEST PIT NO. 17

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5047' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SM	FILL - SAND, silty, fine to coarse grained, gravelly, medium moist, light brown, trace debris
5							Heavy concrete/rebar and asphalt rubble 3'-9'
10		B		6.1	1,2	SC	FILL - SAND, blended with clay balls and gravel, moist, brown
						SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, trace gravel, medium moist, gray (Santa Fe Group)
15							Bottom of hole at 13'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 18

V & A

LOG OF TEST PIT NO. 18

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5049' Date Drilled: 7/7/2006
Depth to Groundwater: Not Encountered Drilling Method: Trackhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SM	FILL - SAND, very silty, fine to coarse grained, gravelly, moist, brown, some debris
5							Heavy concrete and asphalt rubble from 2'-5'
						SC	FILL - SAND, very clayey, fine to coarse grained, slight gravel, moist, medium brown, some debris
10		B		5.7	1	SM	NATURAL GROUND - SAND, very silty, fine grained, trace gravel, medium moist, light yellowish brown Poorly graded gray sand at bottom of hole
15							Bottom of hole at 12'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 19

V & A

LOG OF TEST HOLE NO. 19

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5072' Date Drilled: 7/12/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	6	S		3.2		SM-SC	FILL - SAND, very silty, fine to coarse grained, gravelly, loose, medium moist, light brown, with debris
10	17	S		8.6	1,2		Trace gravel, with moist clay balls, medium dense
15	44	S		5.7			Dense, pushing a cobble
20	4	S		3.2	1		Silty to slightly silty, loose, light yellowish brown
25	7	S		11.8			Clayey, very moist, medium brown
30	15	S		5.5		SM-SC	(FILL) SAND, silty, fine to coarse grained, slight gravel, medium dense, medium moist, light brown
35						SP-SM	NATURAL GROUND - SAND, slightly silty, fine to coarse grained, trace gravel, dense, medium moist, gray

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 20

V & A

LOG OF TEST HOLE NO. 19 cont'd

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5072' Date Drilled: 7/12/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
40	50	S		4.5	1	SP-SM	NATURAL GROUND - SAND, slightly silty, fine to coarse grained, trace gravel, dense, medium moist, gray
	45	S		5.2			Slight gravel
45							Bottom of hole at 41½'
50							
55							
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 20 cont'd

V & A

LOG OF TEST HOLE NO. 20

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139

Elevation - Top of Test Hole: ±5071' Date Drilled: 7/12/2006

Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	15	S		5.9		SM-SC	FILL - SAND, silty, fine to coarse grained, gravelly, medium dense, medium moist, medium brown, blended with clay balls and asphalt
10	22	S		3.1	1	SM	NATURAL GROUND - SAND, very silty, fine to medium grained, trace gravel, medium dense, medium moist, light yellowish brown, trace caliche
15	15	S		9.5	1	ML	SILT, sandy, fine grained, medium dense, slightly moist, light brown, with numerous thin lenses of fine gray sand
20	26	S		6.0		SP-SM	SAND, slightly silty, fine to coarse grained, trace gravel, medium dense, medium moist, light brown to gray
25							Bottom of hole at 21½'
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 21

V & A

LOG OF TEST HOLE NO. 21

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5062' Date Drilled: 7/12/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	22	S		6.0	1,2	SM-SC	FILL - SAND, very silty, fine to coarse grained, trace gravel, medium dense, medium moist, medium brown, blended with clay balls and asphalt
10	6	S		1.8		SP-SM	FILL - SAND, slightly silty, fine to coarse grained, slight gravel, loose, medium moist, medium brown, faint odor
15	12	S		4.0	1	SM	FILL - SAND, very silty, fine to coarse grained, gravelly, medium dense, medium moist, medium brown, with wood and metal debris
20	64	S		2.2		GP	NATURAL GROUND - GRAVEL, trace silt, very sandy, fine to coarse grained, dense, slightly moist, light brown to gray
25	43	S		5.3			Grading to dense, slightly silty sand, with caliche
30							Bottom of hole at 26½'
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 22

V & A

LOG OF TEST HOLE NO. 22

Project: Parcel 6, UNM Science & Technology Park Project No.: 06-1-139
Elevation - Top of Test Hole: ±5068' Date Drilled: 7/12/2006
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	25	S		8.4		SC	FILL - SAND, very clayey, fine to coarse grained, trace gravel, medium dense, moist, pinkish brown, trace debris
10	12	S		3.3		SP-SM	FILL - SAND, silty to slightly silty, fine to medium grained, medium dense, slightly moist, trace clay balls
15	13	S		2.4	1		
20	9	S		9.0	1,2	CL	FILL, CLAY, sandy, fine to medium grained, trace gravel, stiff, medium moist, pinkish brown
25	10	R		2.6		SP-SM	NATURAL GROUND - SAND, slightly silty, fine to coarse grained, trace gravel, loose, slightly moist, light brown, with thin lenses of silt
30	91	S		1.0		GP	GRAVEL and COBBLES, trace silt, sandy, fine to coarse grained, dense, slightly moist, gray
35							Bottom of hole at 31½'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 23

NOTES - LOGS OF TEST HOLES

Test hole locations were determined by compass bearing and pacing distances from known topographic points.

"Drilling Method" refers to the equipment utilized to advance the test hole. Either seven inch outside diameter, continuous flight, hollowstem auger or a track-mounted excavator equipped with a 48" wide bucket was utilized.

"S" under "Sample Type" indicates a Standard Penetration test (ASTM D-1586). The Standard Penetration sampler is 2 inches in outside diameter and 1 3/8 inches inside diameter.

"R" under "Sample Type" indicates a 3-inch outside diameter by 2.5-inch inside diameter sampler. The sampler is lined with 1-inch high brass rings.

"B" under "Sample Type" indicates a bulk sample.

"Blows Per Foot" indicates the number of blows of a 140-pound hammer falling 30 inches required to drive the indicated sampler 12 inches.

"NR" under "Blows/Foot" indicates that no sample was recovered.

"Dry Density PCF" indicates the laboratory determined soil dry density in pounds per cubic foot.

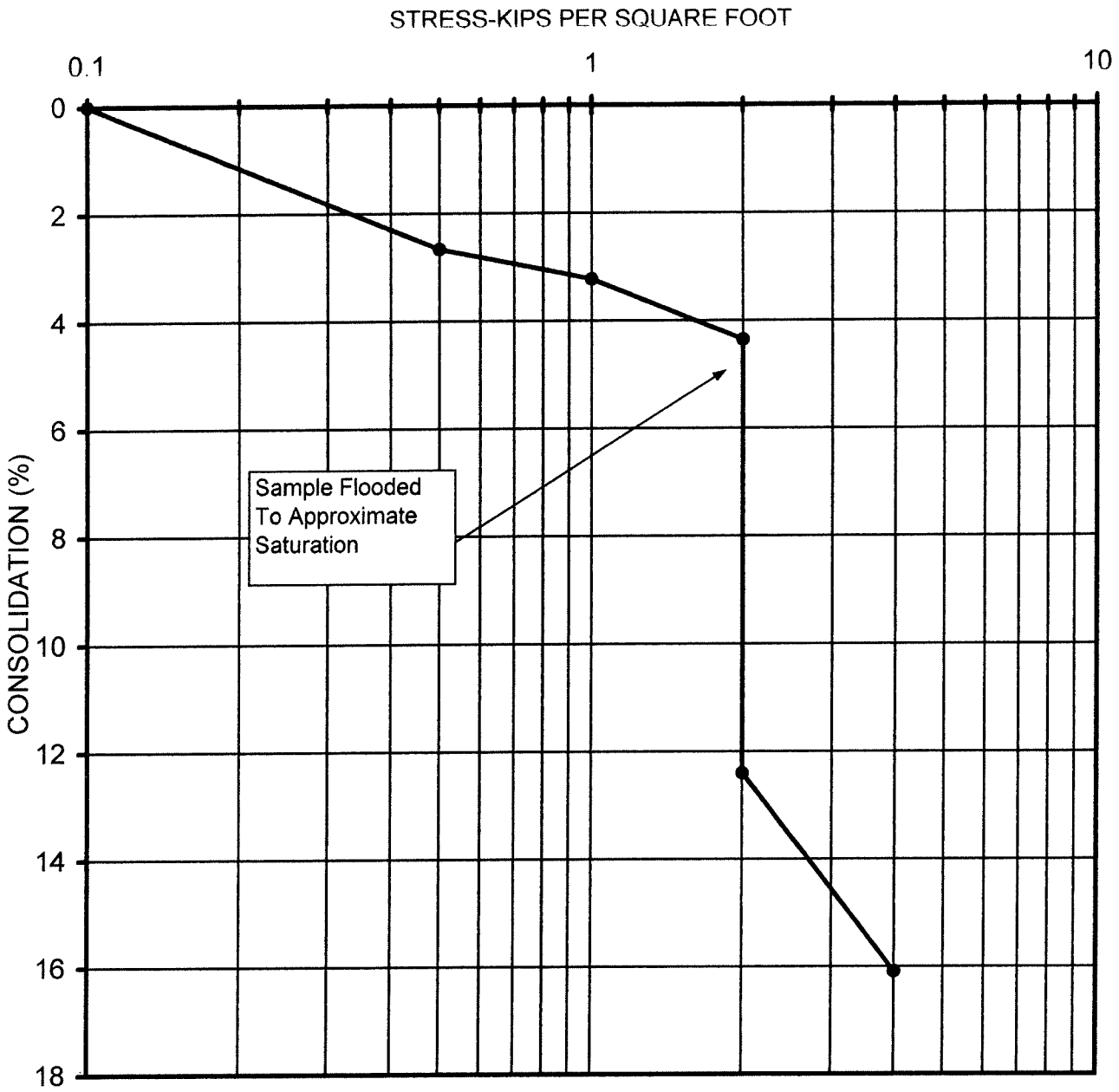
"Water Content %" indicates the laboratory determined soil moisture content in percent (ASTM D-2216).

"Unified Classification" indicates the field soil classification as per ASTM D-2488. When appropriate, the field classification is modified based upon subsequent laboratory tests.

Variations in soil profile, consistency, and moisture content may occur between test holes. Subsurface conditions may also vary between test holes and with time.

Figure No.: 24

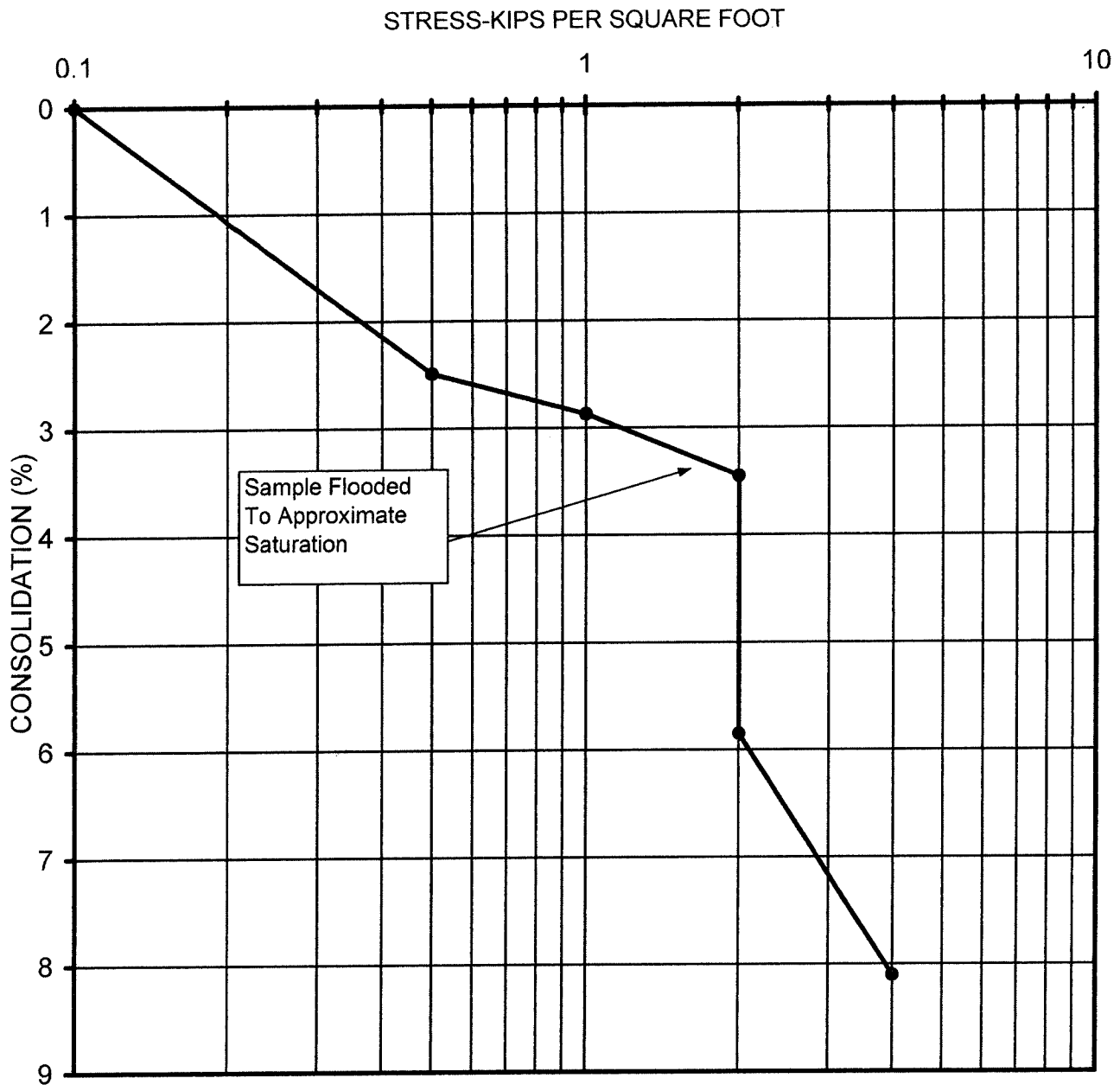
CONSOLIDATION TEST RESULTS



TEST HOLE NUMBER: 1
SAMPLE DEPTH: 40 FEET
SOIL CLASSIFICATION: ML
SOIL DESCRIPTION: SILT, very sandy
MOISTURE CONTENT (%): 7.8
DRY DENSITY: 109 lbs/cu ft

Vinyard & Associates, Inc.
Project No.: 06-1-139
Figure Number: 25

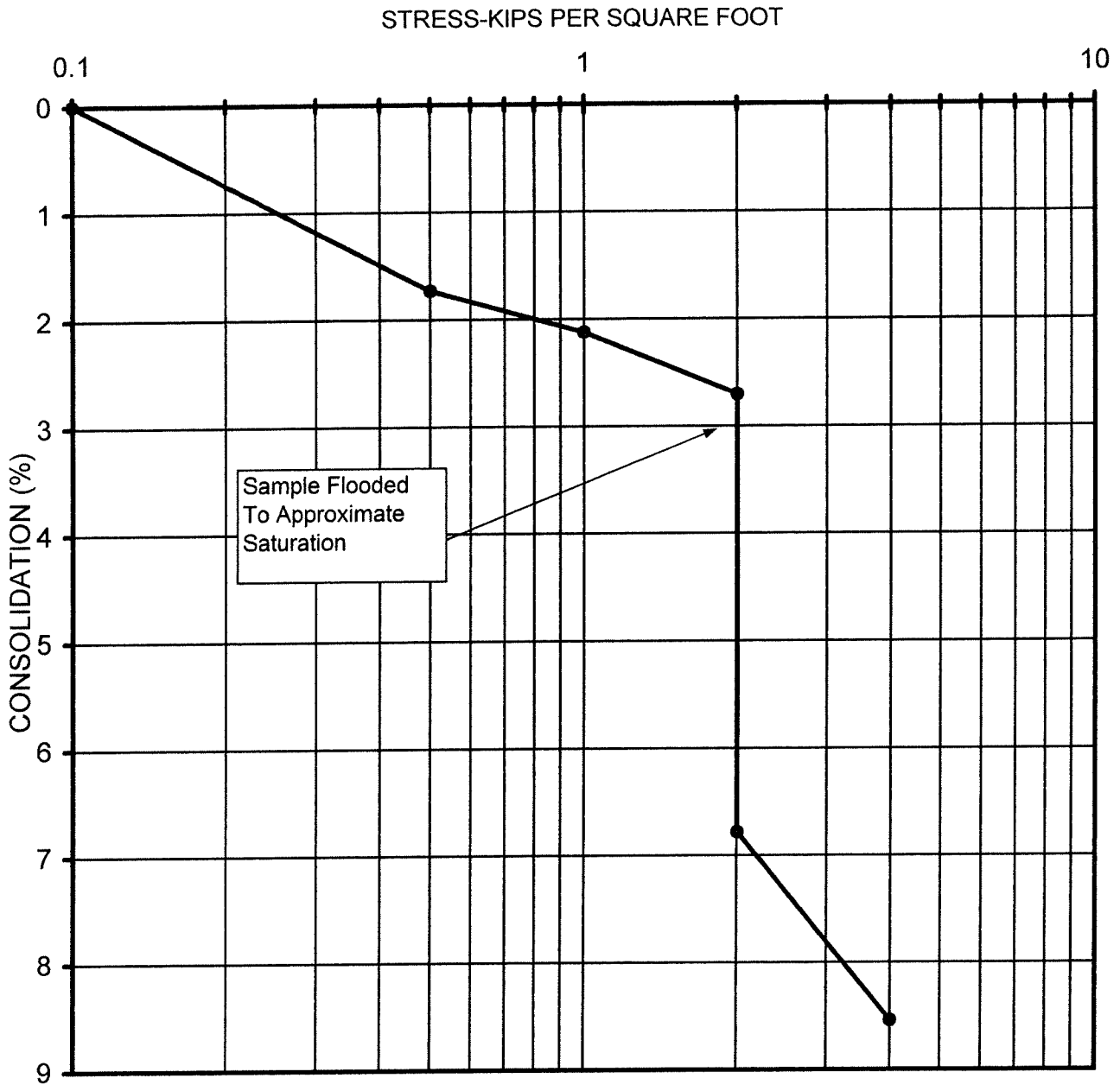
CONSOLIDATION TEST RESULTS



TEST HOLE NUMBER: 2
SAMPLE DEPTH: 40 FEET
SOIL CLASSIFICATION: ML
SOIL DESCRIPTION: SILT, sandy
MOISTURE CONTENT (%): 8.7
DRY DENSITY: 102 lbs/cu ft

Vinyard & Associates, Inc.
Project No.: 06-1-139
Figure Number: 26

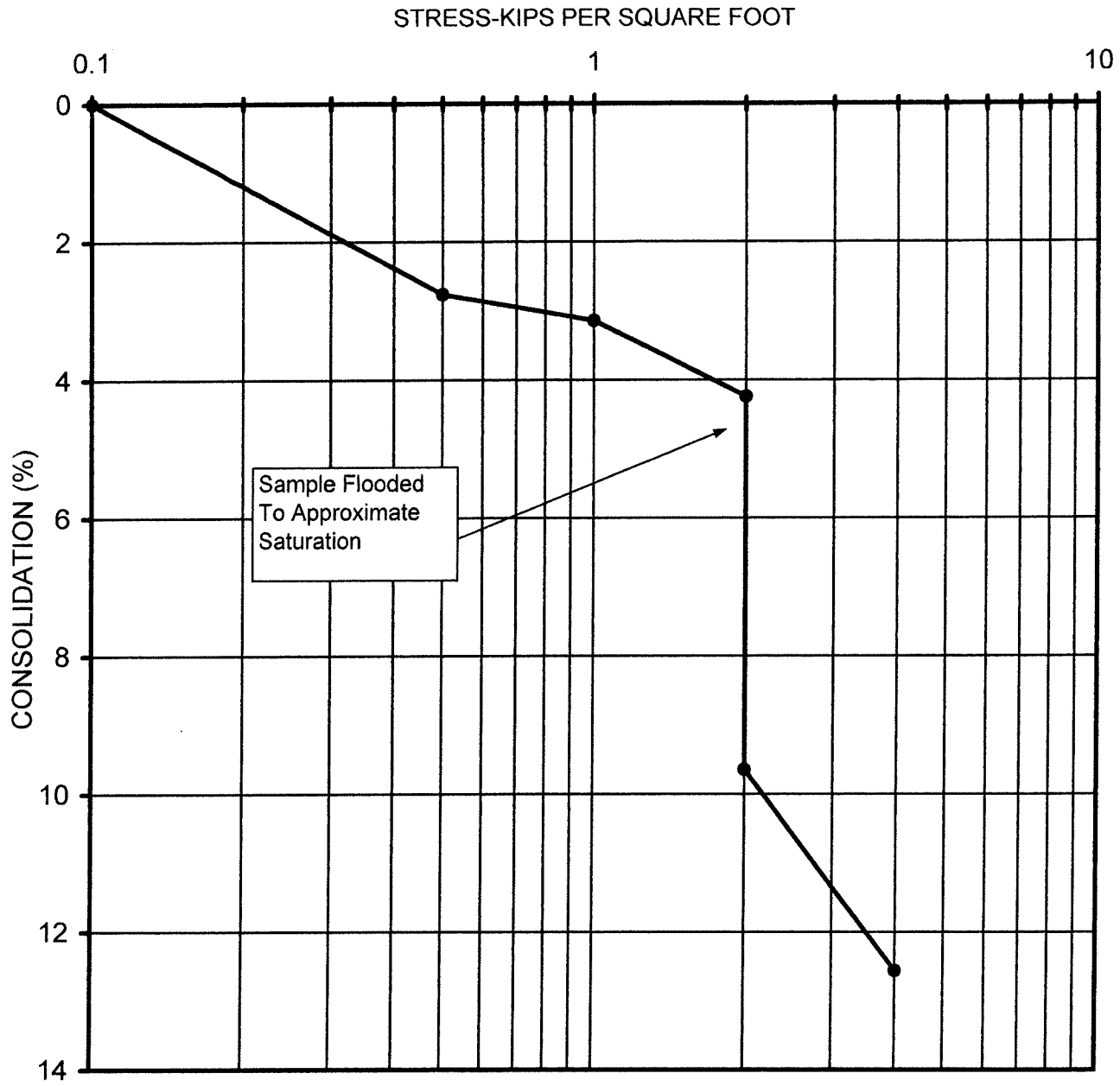
CONSOLIDATION TEST RESULTS



TEST HOLE NUMBER: 3
SAMPLE DEPTH: 25 FEET
SOIL CLASSIFICATION: SM
SOIL DESCRIPTION: SAND, silty
MOISTURE CONTENT (%): 6.2
DRY DENSITY: 113 lbs/cu ft

Vinyard & Associates, Inc.
Project No.: 06-1-139
Figure Number: 27

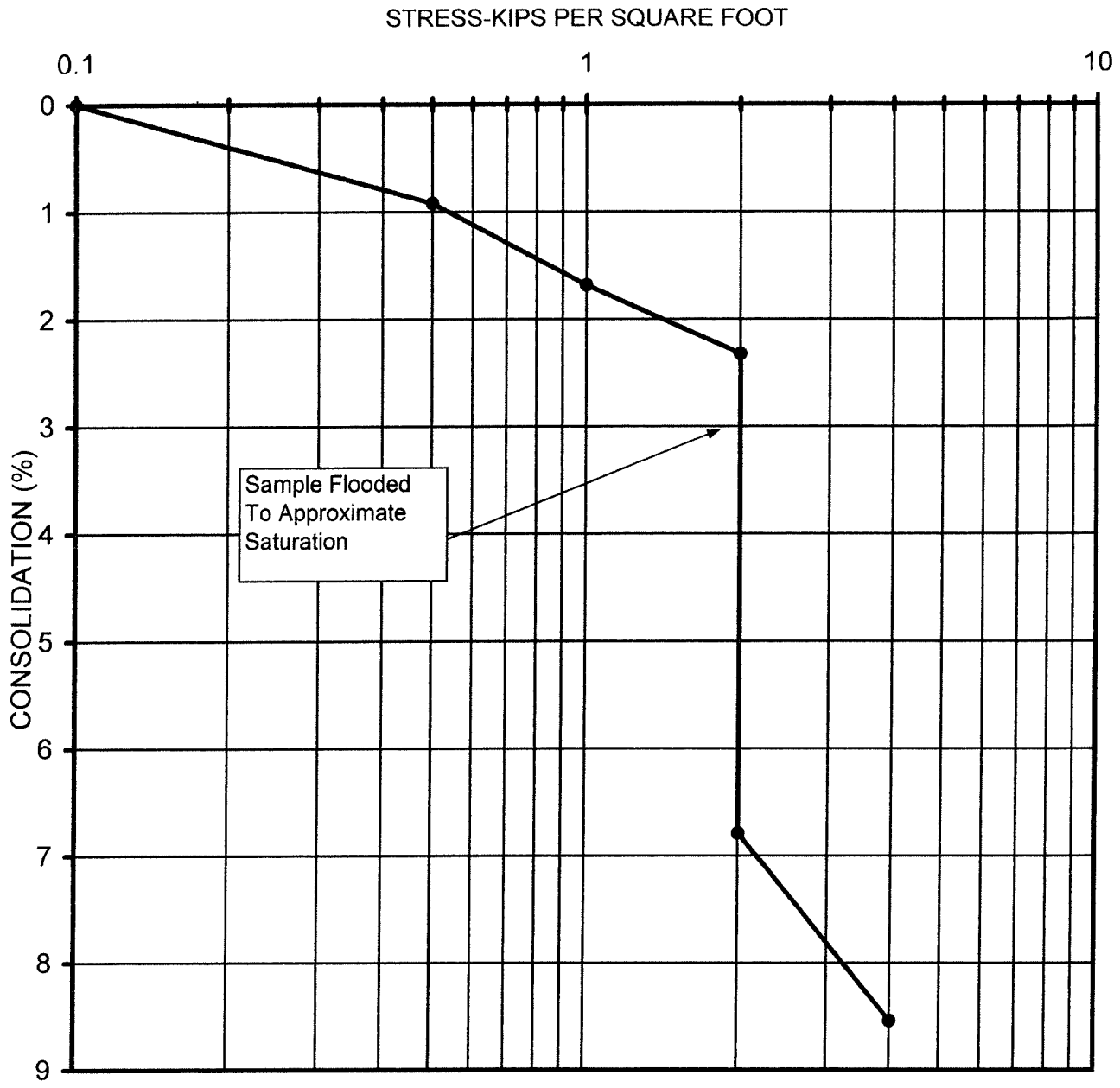
CONSOLIDATION TEST RESULTS



TEST HOLE NUMBER: 5
SAMPLE DEPTH: 20 FEET
SOIL CLASSIFICATION: CL
SOIL DESCRIPTION: CLAY, sandy
MOISTURE CONTENT (%): 13.8
DRY DENSITY: 110 lbs/cu ft

Vinyard & Associates, Inc.
Project No.: 06-1-139
Figure Number: 28

CONSOLIDATION TEST RESULTS



TEST HOLE NUMBER: 6
SAMPLE DEPTH: 20 FEET
SOIL CLASSIFICATION: SM
SOIL DESCRIPTION: SAND, very silty
MOISTURE CONTENT (%): 3.7
DRY DENSITY: 111 lbs/cu ft

Vinyard & Associates, Inc.
Project No.: 06-1-139
Figure Number: 29

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT									Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	5	SM		3.4				100	87	77	68	59	51	42	32	21.7	SAND, silty, gravelly
1	10			5.3													
1	15			3.9													
1	20	SM		3.6				100	94	79	68	60	52	42	33	22.9	SAND, silty, gravelly
1	25			5.0													
1	30			4.4													
1	35			5.7													
1	40	ML	109	7.8	NV	NP			100	98	93	87	83	77	70	54.4	SILT, very sandy
1	45	SM	130	3.0	NV	NP		100	90	79	66	50	38	29	24	17.1	SAND, silty, gravelly
1	50			8.7													
2	5			2.9													
2	15	SM		4.1				100	96	86	75	89	60	51	41	25.8	SAND, very silty, gravelly
2	20			3.6													
2	25			4.4													
2	30	ML		4.5	NV	NP			100	99	97	94	91	88	85	77.3	SILT, sandy
2	35	SM		3.0					100	99	98	98	97	86	56	16.7	SAND, silty
2	40	ML	102	8.7	NV	NP						100	99	99	95	67.7	SILT, sandy
2	45	SP-SM		1.4					100	98	96	91	77	37	14	7.4	SAND, slightly silty
2	50			0.9													
3	10	SM		6.3	NV	NP	100	100	95	89	81	75	68	58	48	36.1	SAND, very silty

V & A Project No.: 06-1-139

Project : Parcel 6 at UNM Science & Technology Park

Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
3	15	SC		8.4	30	15		100	93	90	85	79	73	65	57	40.5	SAND, very clayey
3	20			9.6													
3	25	SM	113	6.2	NV	NP			100	99	99	99	98	95	73	19.7	SAND, silty
3	30	SP-SM	121	3.5				100	93	90	88	85	79	57	32	7.7	SAND, slightly silty
3	35	SM		3.3					100	99	99	99	99	95	74	16.2	SAND, silty
4	5	SC		5.8	30	13			100	98	93	85	79	72	64	46.3	SAND, very clayey
4	10	SM		2.7			100	88	86	77	62	50	41	32	24	15.4	SAND, silty, gravelly
4	15	ML		8.5	NV	NP				100	99	97	95	91	81	61.1	SILT, very sandy
4	20			11.4													
4	25			1.5													
5	5	SM		2.4				100	92	78	69	62	52	38	26	13.1	SAND, silty, gravelly
5	10	SM		3.4				100	97	93	87	81	75	64	46	26.5	SAND, very silty
5	15			10.8													
5	20	CL	110	13.8	34	18		100	98	97	97	97	97	96	95	81.5	CLAY, sandy
5	25	SM	85	4.4				100	99	99	98	97	97	89	55	22.2	SAND, very silty
5	30			3.9													
6	5	ML		6.0				100	98	95	93	92	90	86	80	67.5	SILT, sandy
6	10	SP-SM		1.3				100	97	91	86	80	66	36	14	6.6	SAND, slightly silty
6	15		125	2.8													
6	20	SM	111	3.7	NV	NP			100	97	89	80	74	67	55	34.9	SAND, very silty
6	25			11.6													

V & A Project No.: 06-1-139

Project : Parcel 6 at UNM Science & Technology Park

Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT									Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
12	0-5	ML		3.1	NV	NP		100	94	92	87	83	78	71	63	57.6	SILT, sandy, slight gravel
13	10-13	SM		2.6				100	94	93	92	91	90	84	66	15.6	SAND, silty
15	12-15	SP		3.0					100	92	85	81	70	47	15	2.5	SAND, trace silt
17	9-11	SM		6.1	NV	NP		100	99	95	90	86	82	75	59	29.3	SAND, very silty
18	7-10	SM		5.7				100	97	96	95	95	93	88	71	36.7	SAND, very silty
19	5			3.2													
19	10	SM		8.6	NV	NP		100	99	95	89	83	79	72	61	44.5	SAND, very silty
19	15			5.7													
19	20	SM		3.2				100	94	93	90	88	85	76	54	17.5	SAND, silty
19	25			11.8													
19	30			5.5													
19	35	SP-SM		4.5					100	98	96	90	69	30	12	7.1	SAND, slightly silty
19	40			5.2													
20	5			5.9													
20	10	SM		3.1				100	99	99	98	96	95	89	76	30.3	SAND, very silty
20	15	ML		9.5										100	99	79.2	SILT, sandy
20	20			6.0													
21	5	SM		6.0	NV	NP		100	98	94	87	80	74	66	56	40.3	SAND, very silty
21	10			1.8													
21	15	SM		4.0			100	89	84	78	72	66	61	54	46	34.7	SAND, very silty, gravelly

V & A Project No.: 06-1-139

Project : Parcel 6 at UNM Science & Technology Park

Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
21	20			2.2													
21	25			5.3													
22	5			8.4													
22	10			3.3													
22	15	SP-SM		2.4					100	99	98	97	96	87	62	11.3	SAND, slightly silty
22	20	CL		9.0	29	12		100	99	97	96	95	94	93	89	73.0	CLAY, sandy
22	25			2.6													
22	30			1.0													

V & A Project No.: 06-1-139

Project : Parcel 6 at UNM Science & Technology Park

Table No.: 1

APPENDIX A

EARTHWORK PROCEDURES

Appendix A

EARTHWORK PROCEDURES

General

The Geotechnical Engineer shall be the Owner's representative to observe and evaluate the earthwork operations. The Contractor shall cooperate with the Geotechnical Engineer in the performance of the Engineer's duties.

Clearing and Grubbing

Prior to placing structural fill all borrow areas and areas to receive structural fill shall be stripped of vegetation and deleterious materials. Strippings shall be hauled offsite or stockpiled for subsequent use in landscaped areas or non-structural fill areas as designated by the Owner or his representative and approved by the Geotechnical Engineer.

Site Preparation - Fill Areas

Prior to placing structural fill, the areas to be filled shall be scarified to a depth of eight inches and moisture conditioned as described below. The area to be filled shall then be compacted to a minimum of 95 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of near by facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed as directed by the Geotechnical Engineer and replaced with structural fill as described herein.

Site Preparation - Cut Areas

Following excavation to rough grade, all building and pavement areas shall be scarified to a depth of eight inches and moisture conditioned as described below. All building and paved areas shall be compacted to a minimum of 95 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of near by facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed as directed

by the Geotechnical Engineer and replaced with structural fill as described herein.

Foundation, Slab and Pavement Subgrade Preparation

Prior to placing reinforcement, footings, slabs, or pavement the supporting soils shall be prepared, moisture conditioned, and compacted as described herein.

Fill Material

Fill material shall be non-expansive soil which may be gravel, sand, silt or clay or a combination there of.

Sieve Size	Percent Passing By Weight
4"	100
1"	90-100
No. 4	70-100
No. 200	10-40

Fill material shall exhibit a plasticity index of twelve or less. No organic, frozen, or decomposable material shall be utilized. All fill material shall be approved by the Geotechnical Engineer.

Fill Placement

Fill material shall be blended as necessary to produce a homogeneous material. Fill material shall be spread in horizontal lifts no greater than eight inches in uncompacted thickness, but in no case thicker than can be properly compacted with the equipment to be utilized. If fill is to be placed on slopes steeper than 5:1 (horizontal:vertical), the natural ground shall be benched with minimum three foot wide benches at maximum two foot vertical intervals.

Moisture Conditioning

Fill material shall be dried or moistened as necessary, prior to compacting, to within ± three percent of optimum moisture content as determined by ASTM D-1557. Moisture shall be distributed uniformly throughout each lift.

Compaction

Structural fill shall be mechanically compacted to the following:

	Minimum Compaction ASTM D-1557
Foundation Support	95%
Slab Support	95%
Below Slab Utility Trenches	90%
General Site Grading	90%
Pavement Support	
Upper 8" of Subgrade	95%
All other fill below pavement	90%

Aggregate Base Course shall be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

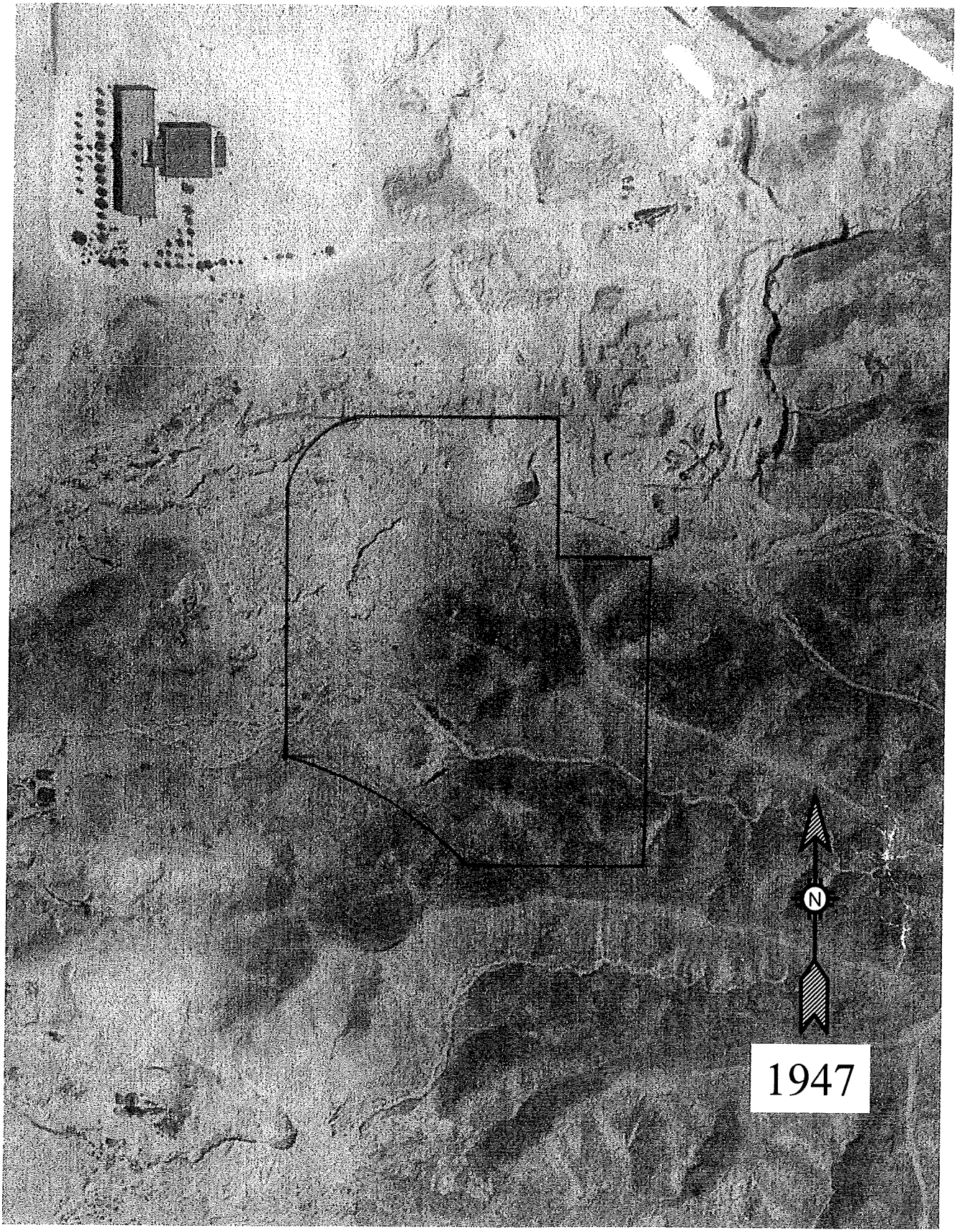
Asphaltic concrete shall be compacted to a minimum of 96% of maximum Marshall Density (75 Blows).

Compaction by flooding and jetting is specifically prohibited unless authorized in advance by the Owner or his representative and the Geotechnical Engineer.

Observation and Testing

The Geotechnical Engineer or his representative shall perform field density tests with a frequency and at the locations he feels appropriate. The Geotechnical Engineer or his representative will perform Proctor tests on representative samples of all fill material. To minimize delays, the Earthwork Contractor is encouraged to submit soil samples prior to use for proctor testing.

APPENDIX B
AERIAL PHOTOGRAPHS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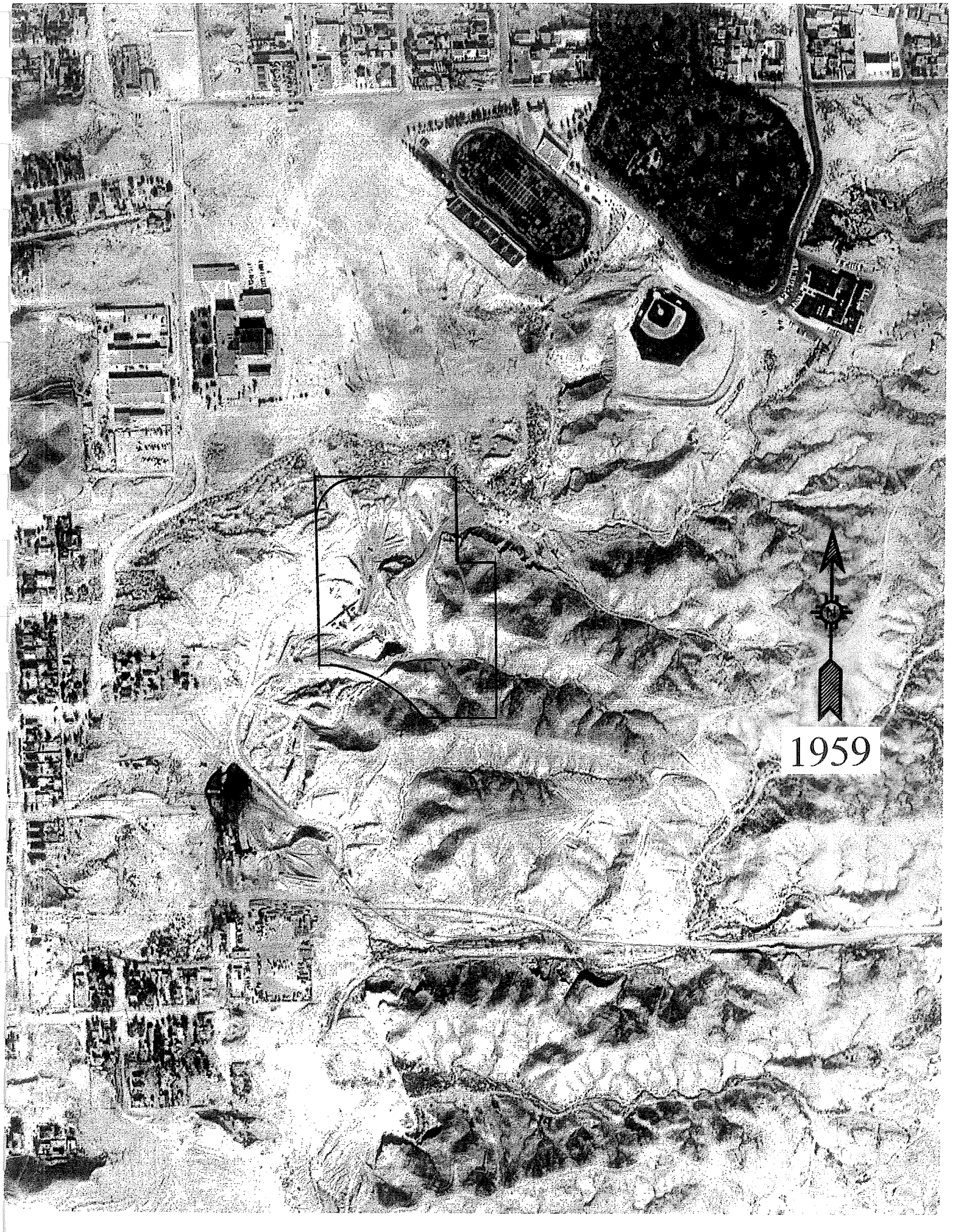
1947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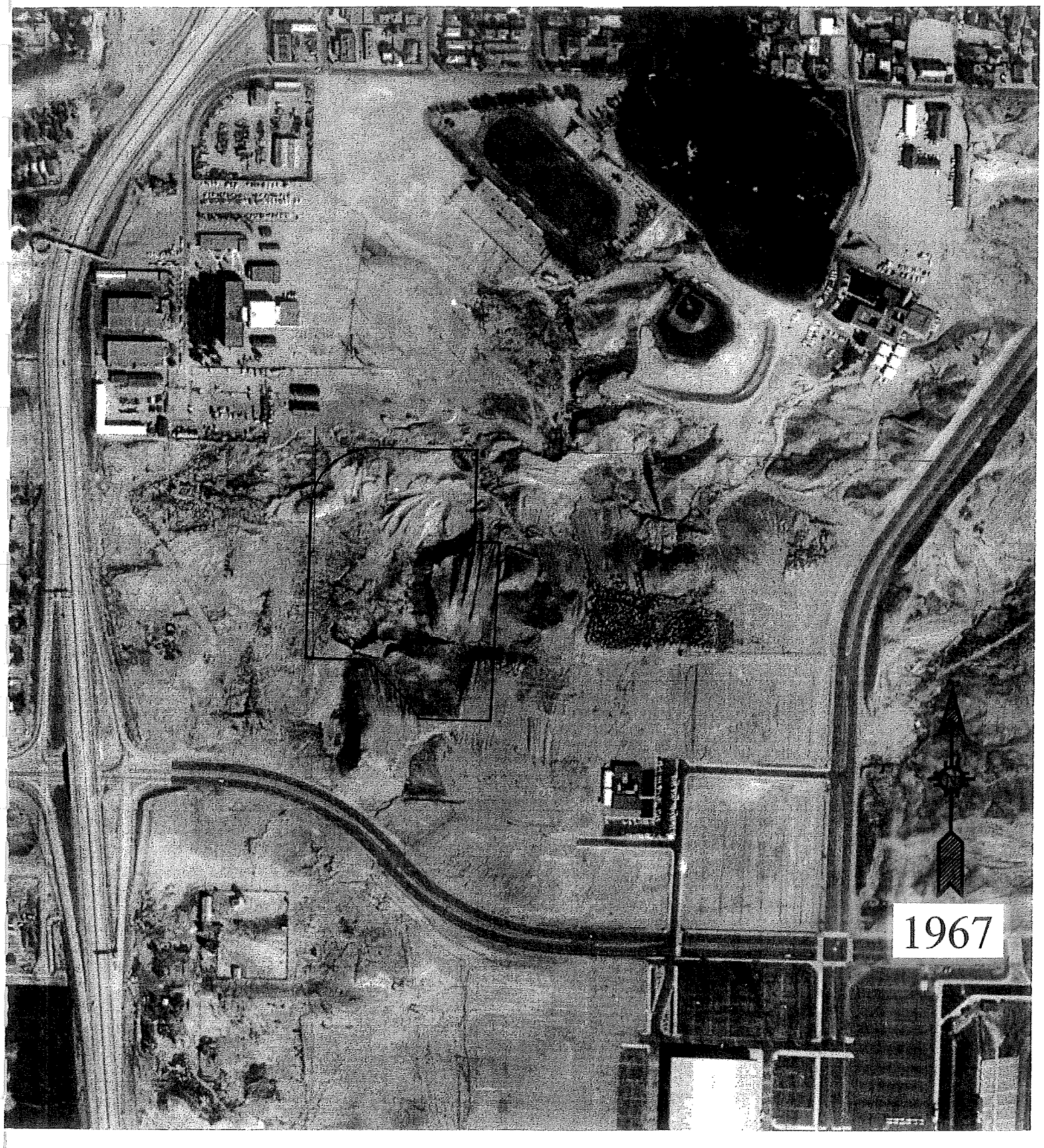
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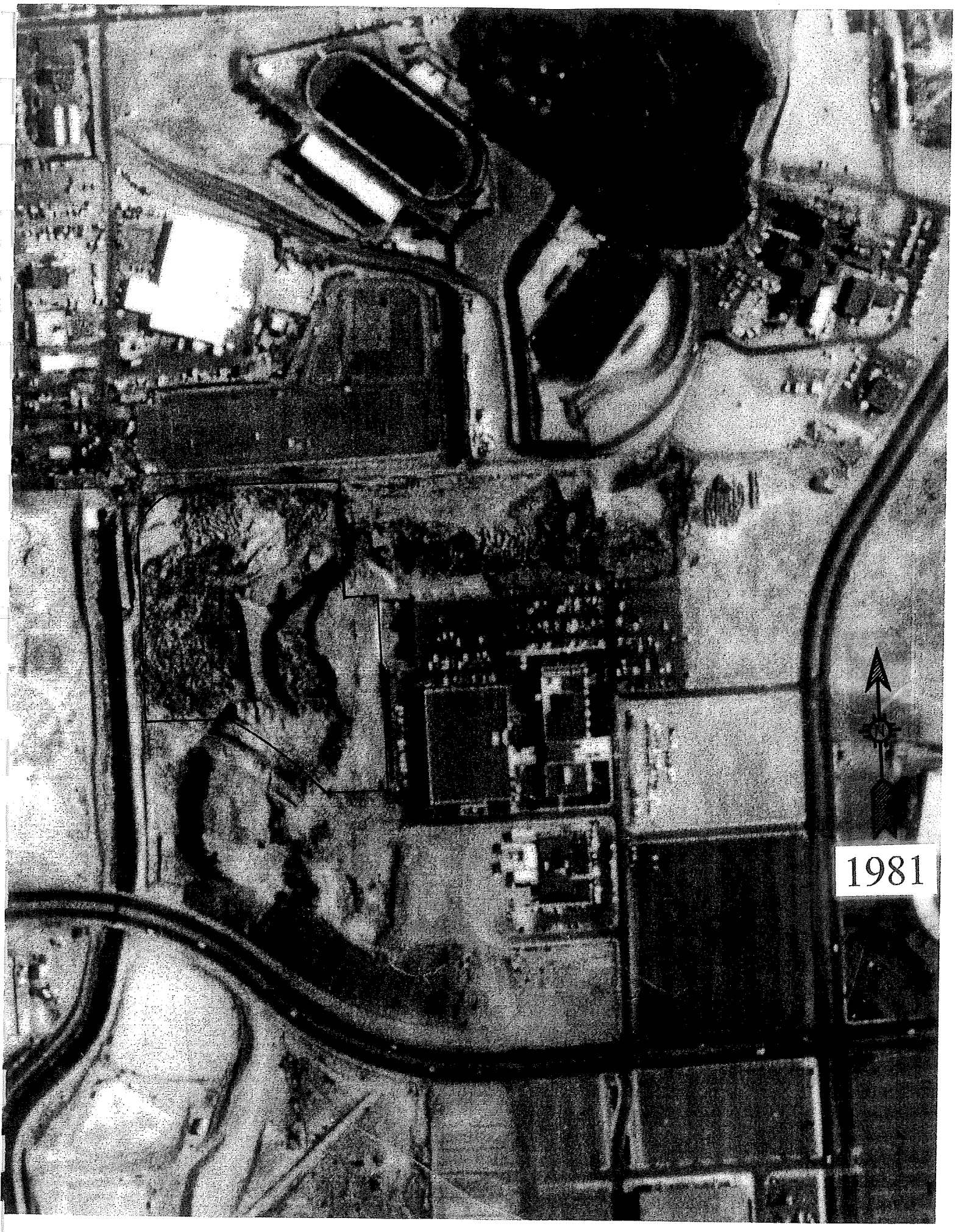
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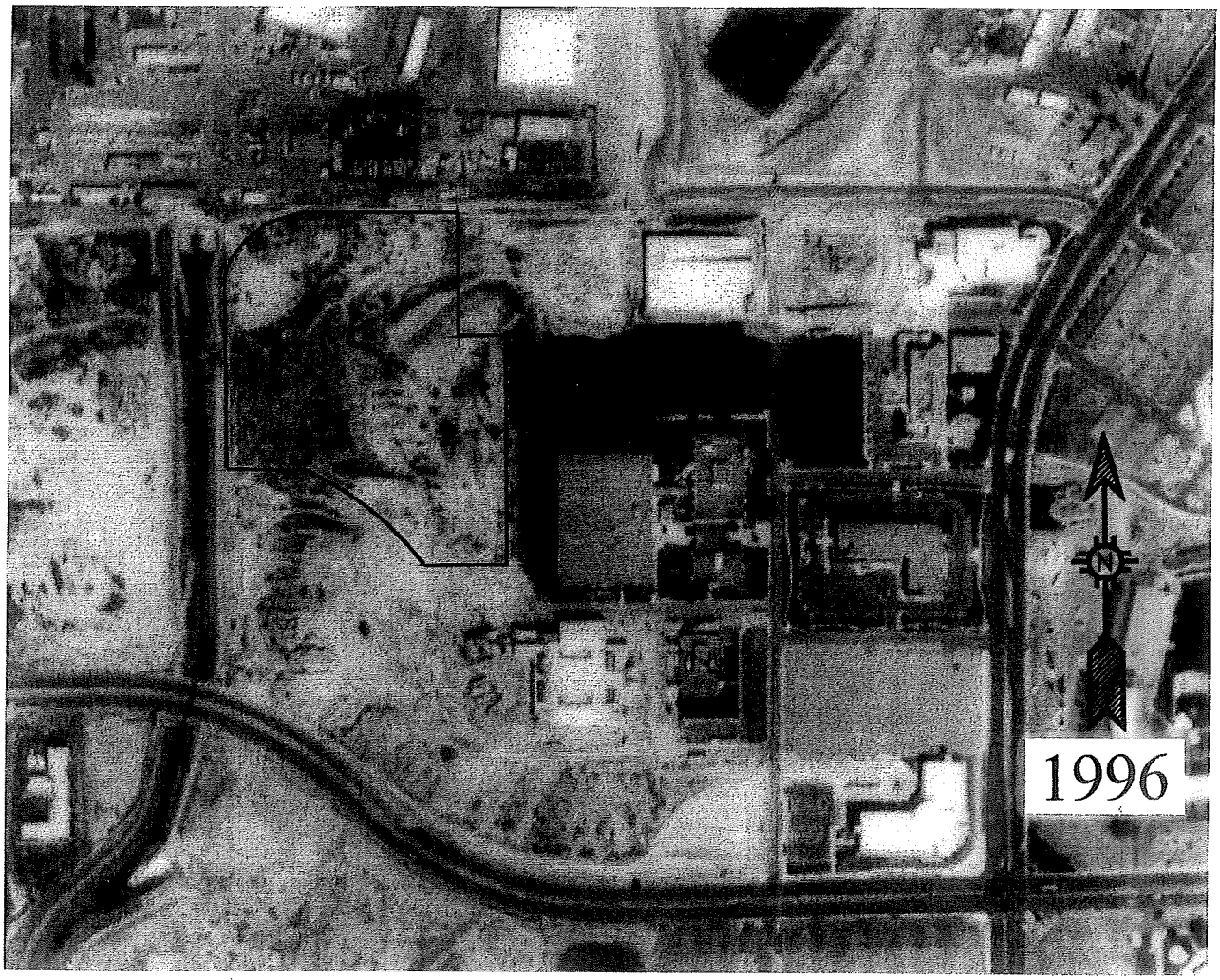
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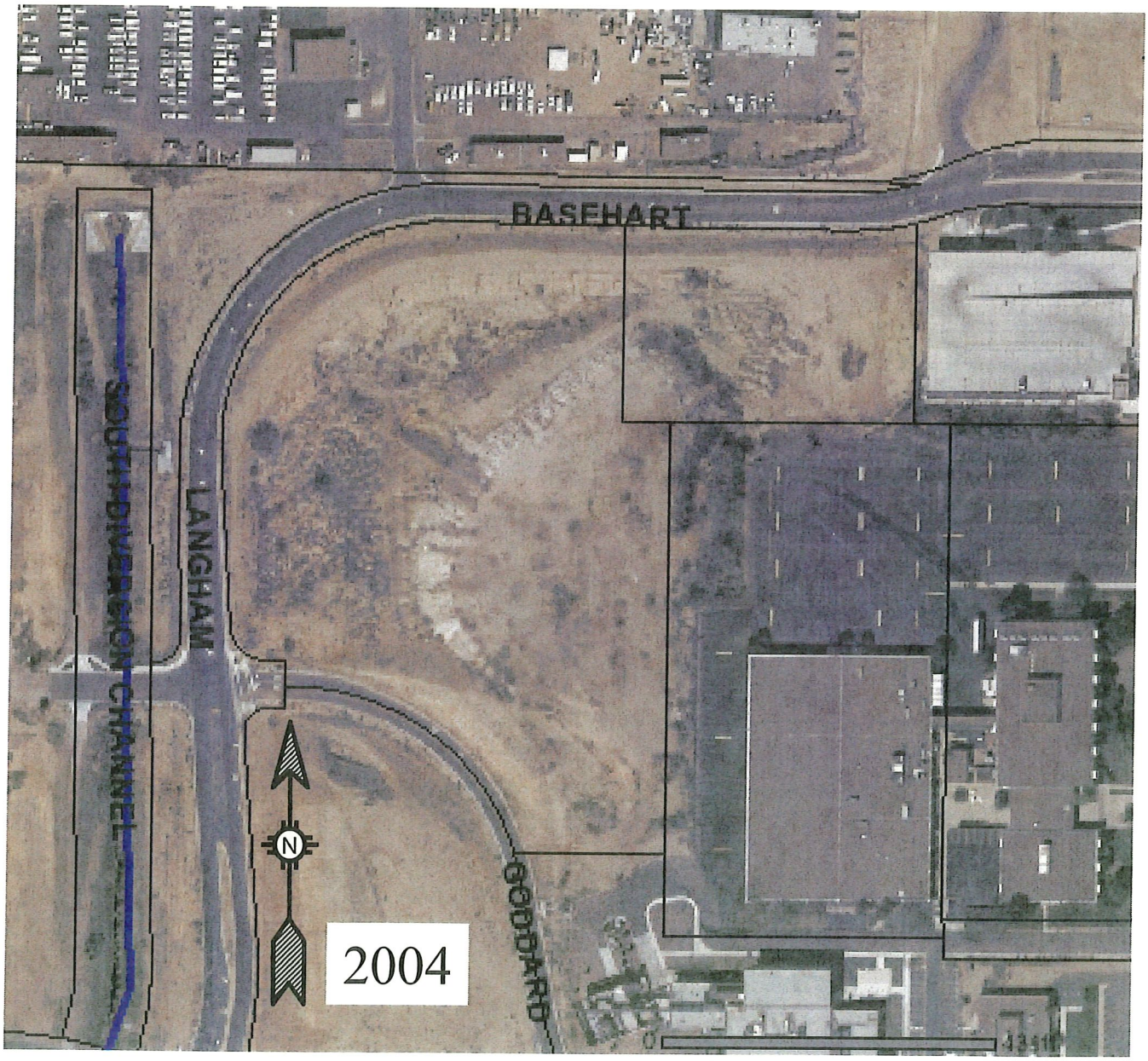
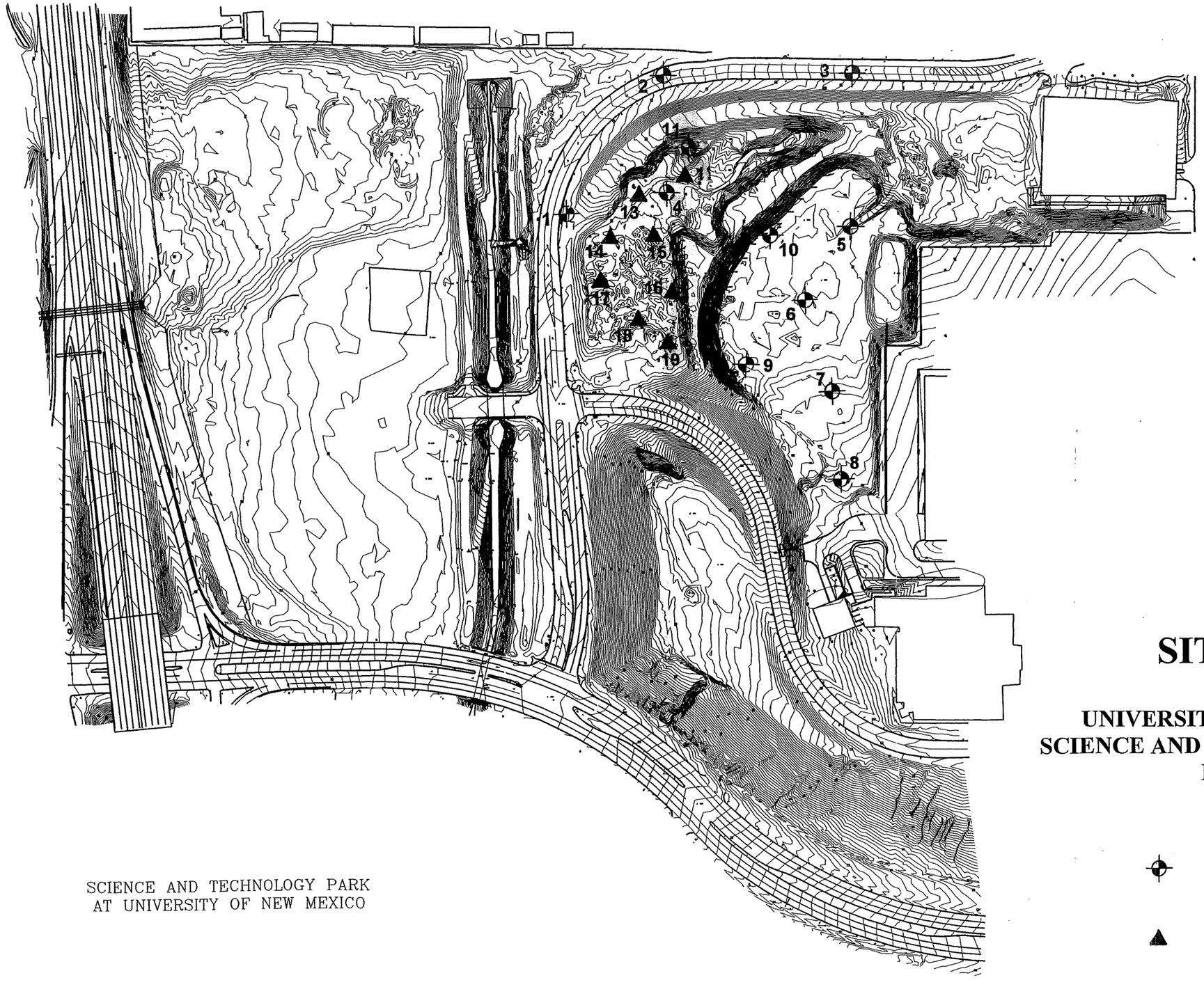
1996


BASEHART
LANGHAM
SOUTH BOUNDARY CHANNEL
GODDARD
N
2004

APPENDIX C

V & A PROJECT NO.: 99-1-051 (excerpt)



SCIENCE AND TECHNOLOGY PARK
AT UNIVERSITY OF NEW MEXICO

SITE PLAN

UNIVERSITY OF NEW MEXICO
SCIENCE AND TECHNOLOGY CENTER
PARCEL 6

TEST HOLE LOCATION

TEST PIT LOCATION

FIGURE 1.

V & A

LOG OF TEST HOLE NO. 1

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	50	R	116	6.1	1,2,5	SC-SM	FILL-SAND, very clayey-silty, fine to medium grained, slight gravel, dense, moist, brown
5	22	R	106	2.3	1		Medium dense, slightly moist, trace of rubble (particle board)
10	4	S		3.4	1,2		Loose, slightly gravelly, trace of rubble (particle board), gravelly
15	25	S				GM	FILL-GRAVEL, sand, silty, fine to medium grained, medium dense, medium moist, brown, trace of asphalt and concrete
20	26	S				SP	NATURAL GROUND-SAND, poorly graded, fine to medium grained, trace of gravel, medium dense, slightly moist, light brown
25							Bottom of Hole @ 21-1/2'
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2

V & A

LOG OF TEST HOLE NO. 2

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description Test Hole is S 100' from water hydrant
	48	R	113	7.4	1	SM	FILL-SAND, very silty, fine to medium grained, medium moist, brown
5	46	R	114	7.5	1		Slightly gravelly
10	35	S		9.2	1,2	SC-SM	FILL-SAND, very clayey-silty, fine to medium grained, dense, moist, brown
15		B			1,2	CL	FILL-CLAY, very sandy, trace of gravel, moist, brown
	69	S		9.4		SM	FILL-SAND, silty, fine to medium grained, slightly gravelly, dense, slightly moist, light brown, asphalt
20	15	S				SP-SM	FILL-SAND, slightly silty, fine to medium grained, trace of coarse material, medium dense, slightly moist, light brown
25 30 35							Bottom of Hole @ 21-1/2' Fill is more that 20' by looking from side profile

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

V & A

LOG OF TEST HOLE NO. 3

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	41	R	120	7.7	1	SC-SM	FILL-SAND, very clayey-silty, fine to medium grained, slight gravel, dense, moist, brown
	30	R	106	6.0	1,2		
		B					
10						SC	FILL-SAND, clayey, fine to medium grained, medium moist, brown, asphalt
	26	S		2.1	1	SM	FILL-SAND, silty, fine to coarse grained, slight gravel, medium dense, medium moist, brown, asphalt, trash
15	16	S		7.9	1	SC	FILL-SAND, very clayey, fine to coarse grained, medium dense, gravelly, medium moist, brown, asphalt
20		B		8.4	1,2		
	24	S				SP	NATURAL GROUND-SAND, poorly graded, medium to coarse grained, trace of gravel, medium dense, slightly moist, light brown
25							Bottom of Hole @ 21-1/2'
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4

V & A

LOG OF TEST HOLE NO. 4 (lower level)

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	75	R	118	1.8	1	SM	SAND, silty, fine to coarse grained, very gravelly, slightly moist, light brown
5	75	R	124	1.3	1		
		S					
							Bottom of Hole @ 7'
							Auger refusal @ 7' on rubble
10							Off set test hole location six times. Consistent refusal at 6' to 7' on concrete.
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 5

V & A

LOG OF TEST HOLE NO. 5

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
		B		4.6	1	GM	FILL-GRAVEL, silty, very sandy, fine to coarse grained, medium dense, medium moist, brown
5	20	S		7.7	1		Dense
10	67	S		2.8	1		
15	31	S		6.1	1	SC	FILL-SAND, very clayey, fine to medium grained, trace of fine gravel, dense, moist, brown
20	33	S		16.7	1,2	CL	NATURAL-CLAY, very sandy, fine to medium grained, hard, moist, brown Thin lens of silty sand
25	70	S		2.3		SP	SAND, poorly graded, fine to medium grained, dense, slightly moist, light brown
30	79	S		4.5			Fine grained
35							Bottom of Hole @ 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 6

V & A

LOG OF TEST HOLE NO. 6

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	13	R	103	5.3	1,2	SP-SM	FILL-SAND, slightly silty, medium to coarse grained, very gravelly, rubble - no sampling due to rubble Trace of trash
10	10	S		7.5		SM	SAND, silty, fine to medium grained, medium dense, medium moist, brown, approximately 50% of sample is asphalt
15				17.6	1	SC	SAND, clayey, fine to medium grained, moist, brown
	25	S		11.7	1		
20						CL	NATURAL GROUND-CLAY, very sandy, fine to medium grained, hard, moist, brown
	32	S		4.7	1	SM	FILL-SAND, silty, fine to medium grained, medium moist, brown
25		B		17.9	1,2		
	70	S		3.5			Stained soil, rust color
				10.2	1		Dense, very light brown, fine grained
30	77	S		6.3			
35							Bottom of Hole @ 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 7

V & A

LOG OF TEST HOLE NO. 7

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	40	R	119	4.1	1	SP-SM	FILL-SAND, poorly graded, fine to coarse grained, very gravelly, dense, slightly moist, brown
5	15	R	114	3.8	1		Medium dense
10	3	S		4.4	1		
15	9	S		12.3	1,2	ML	NATURAL GROUND-SILT, very sandy, fine to coarse grained, slight gravel, loose, moist brown
20	22	S		13.0	1,2		
25				13.6	1	CL	CLAY, very sandy, fine to medium grained, hard, medium moist, brown
	33	S B			1	SM	SAND, very silty, fine to medium grained, dense, moist, light brown
30	89	S		1.8		SP	SAND, poorly graded, fine to medium grained, dense, slightly moist, light brown
35							Bottom of Hole @ 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 8

V & A

LOG OF TEST HOLE NO. 8

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	31	R	117	1.7	1	SP-SM	FILL-SAND, slightly silty, fine to coarse grained, gravelly, dense, slightly moist, brown
5		B		13.7	1,2	CL	FILL-CLAY, very sandy, fine to medium grained, moist, brown
10	21	R	108	19.2	1	SC	NATURAL GROUND-SAND, very clayey, fine to coarse grained, medium dense, moist, brown
15	NR	S		0.6		GP	GRAVEL, sand, poorly graded, medium to coarse grained, dense, slightly moist, light brown, small cobbles, sampler bounce after 6"
20	47	S		10.0	1,2	CL	CLAY, very sandy, fine to medium grained, trace of fine gravel, medium moist, brown
	88	S		7.7	1		
25	55	S		1.1	1	SP	SAND, poorly graded, fine to medium grained, slight fine gravel, dense, slightly moist, light brown
30	34	S		1.3			Clay lense
				13.1	1		
35							Bottom of Hole @ 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 9

V & A

LOG OF TEST HOLE NO. 9

Project: Parcel 6 of the Science & Tech. Center | Project No.: 99-1-51
Elevation - Top of Test Hole: N/A | Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered | Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	15	B		3.2	1	GP-GM	FILL-GRAVEL, slightly silty, fine to coarse grained, medium dense, medium moist, very brown
5	20	R		3.6	1	SM	FILL-SAND, silty, fine to medium grained, medium dense, medium moist, brown, rubble and asphalt throughout
	NR						
10	31	S					Asphalt
15	38	S		3.4	1	SP-SM	FILL-SAND, slightly silty, poorly graded, fine to medium grained, trace of gravel, dense, slightly moist, light brown
20	11	S		2.9			Medium dense
25	16	S		3.8			Asphalt in sampler
							Trash in cuttings, construction rubble, bricks
30	25	S		3.7			Concrete rubble, trace of asphalt
35							Bottom of Hole @ 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 10

V & A

LOG OF TEST HOLE NO. 10

Project: Parcel 6 of the Science & Tech. Center
Project No.: 99-1-51
Elevation - Top of Test Hole: N/A
Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SM	FILL-SAND, silty, fine to medium grained, slight gravel, loose, medium moist, brown
	9	B		3.0	1		
	NR						
5							
	6	B		5.7	1		Very silty
	NR						Trash in sampler
10							
		B					Sampler refusal, no sample recovered, trash in cutting
							Drilled through rubble
15							
		S		5.6			Sampler bounce after 9", trash and construction rubble in sampler
							Bottom of Hole @ 18'
20							Auger refusal @ 18' on rubble
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 11

V & A

LOG OF TEST HOLE NO. 11

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/22/99
Depth to Groundwater: Not Encountered Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	9	R	102	7.3	1	SM	SAND, very silty, fine to medium grained, loose, slightly moist, light brown
5	7	R	101	8.1	1		Possible fill to 7'
10	48	S		1.5		SP	SAND, poorly graded, fine to medium grained, dense, slightly moist, light brown
15	68	S		2.1			Trace of gravel
20	64	S		4.0			
25							Bottom of Hole @ 21-1/2'
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 12

V & A

LOG OF TEST PIT NO. 12

Project: Parcel 6 of the Science & Tech. Center
Project No.: 99-1-51
Elevation - Top of Test Hole: N/A
Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered
Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5						SM	FILL-SAND, silty, fine to medium grained, slightly moist, brown At 3-4' siltier
10							Bottom of Pit 5' No trash

LOG OF TEST PIT NO. 13

Elevation - Top of Test Hole: N/A
Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered
Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							FILL-SAND, silty to slightly silty, fine to coarse grained, gravelly, rubble, concrete, asphalt to 5' depth Hard digging at 6', dense with concrete, 2' alternating layers of soil, rubble
10							NATURAL GROUND-SAND, very silty, fine to coarse grained, gravelly, moist, brown Bottom of Pit @ 9'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 13

V & A

LOG OF TEST PIT NO. 14

Project: Parcel 6 of the Science & Tech. Center
Project No.: 99-1-51
Elevation - Top of Test Hole: N/A
Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered
Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							FILL-3' soil over 2' rubble layers, asphalt and concrete, some rubble @ surface to 3' diameter
							NATURAL GROUND-SAND, silty, fine to medium grained, moist, yellow/brown
10							Bottom of Pit @ 8'

LOG OF TEST PIT NO. 15

Elevation - Top of Test Hole: N/A
Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered
Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							FILL-with rubble, 2' sandy gravelly soil over 5' of concrete, asphalt, wood, bricks, metal in soil matrix, blocks to 4' diameter
10							Bottom of Pit @ 7' Refusal on rubble @ 7'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 14

V & A

LOG OF TEST PIT NO. 16

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							NATURAL GROUND-SAND, silty to very silty, fine to coarse, grained, gravelly, moist, dark brown
10							Bottom of Pit @ 5'

LOG OF TEST PIT NO. 17

Elevation - Top of Test Hole: N/A Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							FILL-rubble, asphalt and concrete to 4', bricks in soil matrix
							NATURAL GROUND-SAND, slightly silty to trace of silt, fine to coarse grained, gravelly to very gravelly, gravel to 2", grey/brown
10							Bottom of Pit @ 7'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 15

V & A

LOG OF TEST PIT NO. 18

Project: Parcel 6 of the Science & Tech. Center Project No.: 99-1-51
Elevation - Top of Test Hole: N/A Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							FILL-rubble and soil, concrete, bricks and re-bar
5							Bottom of Pit 3'
10							

LOG OF TEST PIT NO. 19

Elevation - Top of Test Hole: N/A Date Drilled: 3/23/99
Depth to Groundwater: Not Encountered Drilling Method: Backhoe

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5							FILL-rubble and soil, wood, metal, pipe, bricks, concrete, tile, oil filters
10							Bottom of Pit 5' Refusal @ 5'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 16

SUMMARY OF LABORATORY TEST DATA

Test Hole No	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	2	SC-SM	116	6.1	22	8		100	95	91	82	74	66	56	46	29.3	SAND, very clayey-silty, slight gravel
	5	SC-SM	106	2.3			100	96	87	80	69	59	48	33	23	13.9	SAND, clayey-silty, gravelly
	10	SC-SM		3.4	25	8		100	91	85	72	61	50	38	27	15.5	SAND, clayey-silty, gravelly
2	2	SM	113	7.4				100	87	81	73	65	59	52	44	29.9	SAND, very silty, gravelly
	5	SM	114	7.5			100	91	88	82	75	67	60	52	44	30.2	SAND, very silty, gravelly
	10	SC-SM		9.2	25	8		100	95	89	81	74	67	59	50	36.4	SAND, very clayey-silty, very gravelly
	11	SC		9.4	29	14		100	96	94	90	87	84	79	69	49.6	SAND, very clayey
3	2	SC-SM	120	7.7				100	96	91	82	74	66	57	45	30.8	SAND, very clayey-silty, slight gravel
	5	SC-SM	106	6.0	20	7		100	98	94	87	79	72	64	52	35.1	SAND, very clayey-silty, slight gravel
	10	SM		2.1			100	78	73	64	54	45	37	28	21	13.8	SAND, silty, very gravelly
	15	SC		7.9			100	90	88	84	79	74	68	59	49	37.8	SAND, very clayey, gravelly
	17	SC		8.4	38	16		100	92	88	87	84	78	70	60	46.9	SAND, very clayey, gravelly
4	2	SM	118	1.8				100	83	75	63	51	41	33	25	14.3	SAND, silty, very gravelly
	5	SM	124	1.3			100	92	90	83	72	61	50	38	27	17.0	SAND, silty, gravelly

Project No.: 99-1-51
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
5	2	GM		4.6			100	74	65	57	51	46	40	34	27	15.8	GRAVEL, silty, very sandy
	5	GM		7.7			100	80	69	61	55	50	42	31	22	13.1	GRAVEL, silty, very sandy
	10	GM		2.8			100	81	73	63	54	45	38	32	25	16.1	GRAVEL, silty, very sandy
	15	SC		6.1				100	99	97	91	84	78	72	63	43.5	SAND, very clayey, trace gravel
	20	CL		16.7	38	15							100	99	97	83.1	CLAY, very sandy
	25			2.3													
	30			4.5													
6	5	SM	103	5.3	NV	NP	100	92	79	74	69	65	52	25	13	6.9	SAND, slightly silty, very gravelly
	11	SC		17.6					100	94	89	85	79	66	50	36.4	SAND, very clayey, trace gravel
	15	SC		11.7					100	99	95	89	84	78	71	47.4	SAND, very clayey, trace gravel
	17	CL		17.9	31	14				100	99	98	98	97	93	71.2	CLAY, very sandy
	20	SM		4.7								100	99	90	40	14.0	SAND, silty
	25			3.5													
	26	SM		10.2							100	99	99	94	66	22.1	SAND, very silty
	30			6.3													

Project No.: 99-1-51
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
7	2	SP-SM	119	4.1			100	87	83	76	64	51	41	30	20	10.8	SAND, slightly silty, very gravelly
	5	SP-SM	114	3.8				100	88	76	61	46	35	24	15	8.1	SAND, slightly silty, very gravelly
	10	SP-SM		4.4				100	94	83	70	58	45	31	19	9.9	SAND, slightly silty, gravelly
	15	ML		12.3	31	7		100	96	92	88	83	79	74	69	54.0	SILT, very sandy, slight gravel
	20	ML		13.0	25	NP			100	99	96	94	91	88	83	61.2	SILT, very sandy, trace gravel
	25	CL		13.6	26	10			100	99	98	96	93	90	85	65.7	CLAY, very sandy, trace gravel
	26	SM		6.4							100	99	99	94	64	31.7	SAND, very silty
	30			1.8													
8	2	SP-SM	117	1.7				100	98	84	64	40	18	11	8	5.3	SAND, slightly silty, gravelly
	3	CL		13.7	40	18				100	98	95	91	88	84	75.6	CLAY, very sandy
	5	SC	108	19.2					100	97	90	84	80	75	65	47.3	SAND, very clayey, trace gravel
	10			0.6													
	15	CL		10.0	32	12		100	99	97	93	89	86	82	77	54.3	CLAY, very sandy, trace gravel
	20	CL		7.7					100	98	95	90	86	82	75	54.2	CLAY, very sandy, trace gravel
	25	SP		1.1				100	99	92	75	57	38	20	11	3.9	SAND, poorly graded, slight gravel
	30			1.3													
	31	CL		13.1						100	99	99	99	98	93	66.5	CLAY, very sandy

Project No.: 99-1-51
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
9	2	GP-GM		3.2				100	65	54	48	44	40	33	24	15.7	GRAVEL, slightly silty, very sandy
	5	SM	99	3.6				100	98	90	82	72	62	51	38	20.2	SAND, very silty, slight gravel
	15	SM		3.4			100	86	77	68	62	56	51	42	31	17.6	SAND, silty, very gravelly
	20			2.9													
	25			3.8													
	30			3.7													
10	2	SM		3.0				100	98	91	82	74	65	53	37	19.7	SAND, silty, slight gravel
	5	SM		5.7				100	99	96	90	81	74	66	55	34.8	SAND, very silty, trace gravel
	15			5.6													
11	2	SM	102	7.3				100	99	97	96	94	93	84	60	21.7	SAND, very silty, trace gravel
	5	SM	101	8.1				100	98	96	96	95	94	86	60	20.4	SAND, very silty, trace gravel
	1			1.5													
	15			2.1													
	20			4.0													

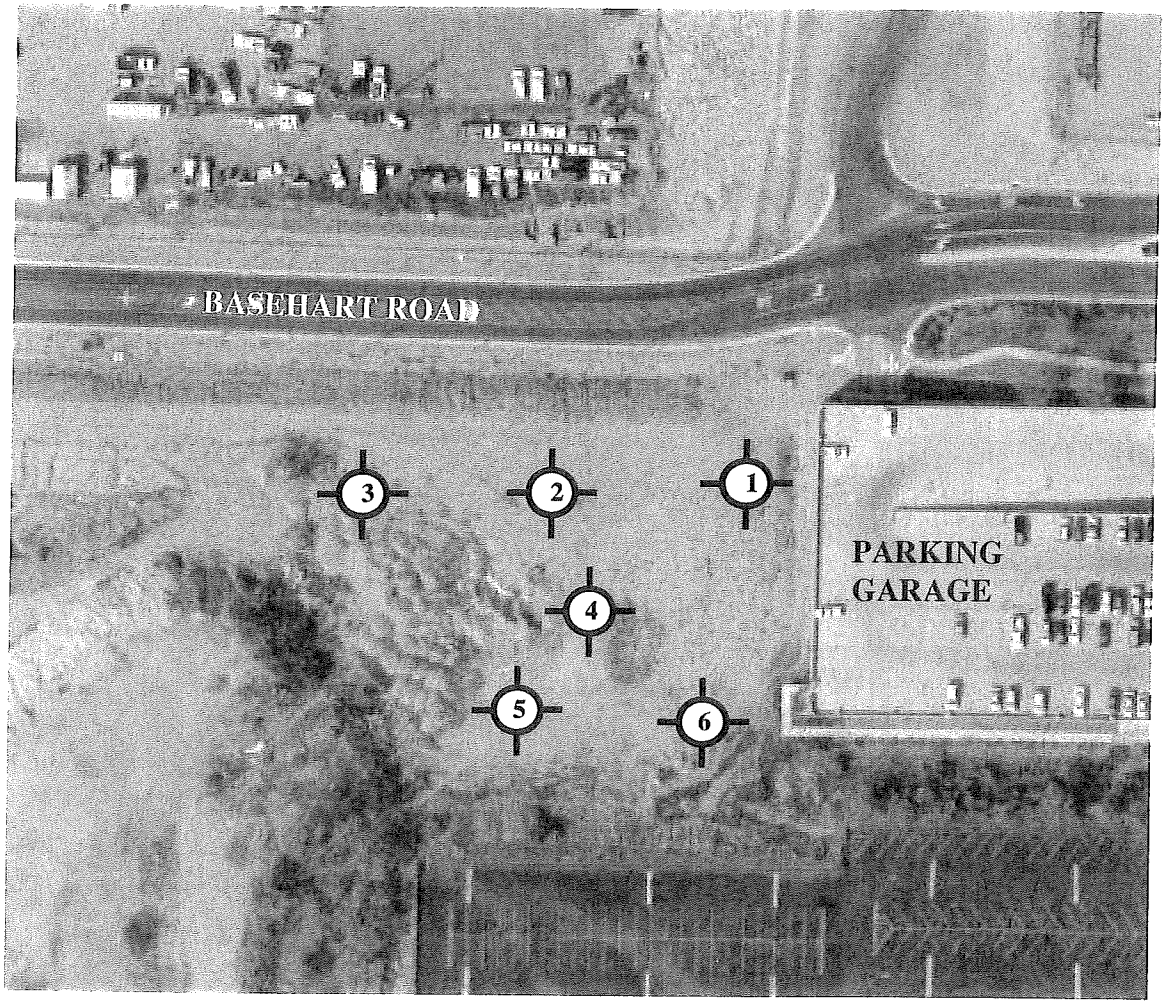
Project No.: 99-1-51
Table No.: 1

APPENDIX D

V & A PROJECT NO.: 05-1-306 (excerpt)

SITE PLAN

*Scale Unknown



V&A Project No.: 05-1-306

TEST HOLE LOCATION

FIGURE 1.

V & A

LOG OF TEST HOLE NO. 1

Project: Office/Warehouse at UNM
Project No.: 05-1-306
Elevation - Top of Test Hole: N/A
Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered
Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	45	R	131	3.2		SC	FILL - SAND, very clayey, fine to coarse grained, trace gravel, dense, medium moist, light brown, trace debris
5	38	R	128	5.2	1,2		Faint odor
10	19	S		4.6	1	SM	FILL - SAND, silty, fine to coarse grained, slight gravel, blended with concrete debris and charcoal, medium dense, medium moist, brown to black
15	7	S		5.5			With soft very moist clay balls
							Increasing clay
20	8	S		3.2		SP-SM	FILL -SAND, slightly silty, fine to coarse grained, trace gravel, loose, moist, brown to black, blended with asphalt debris
25	9	S		10.8	1,2	SC	FILL - SAND, very clayey, fine to medium grained, trace gravel, loose, very moist, brown, with black stains
30	16	S		3.3		SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, trace gravel, medium dense, light brown to gray
	26	S		2.5			
35							Bottom of hole at 34'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2

V & A

LOG OF TEST HOLE NO. 2

Project: Office/Warehouse at UNM | Project No.: 05-1-306
Elevation - Top of Test Hole: N/A | Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered | Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
		B		2.6	1,2	SC	FILL - SAND, very clayey, fine to coarse grained, trace gravel, medium moist, light brown
5	13	S		4.7			Fine to coarse grained, medium dense, moist, clayey to silty, brown
10	27	S		6.6			Grading to clay with trace debris
15	20	S		4.2			Blended with concrete debris
20	56	S		5.7	1	SP-SM	FILL -SAND, slightly silty, fine to coarse grained, dense, medium moist, light brown, blended with clay balls and concrete and asphalt debris
25	9 NR	S					Loose
30	13	S		8.4		SC	FILL - SAND, very clayey, fine to medium grained, medium dense, very moist, brown, with trace debris and cobbles
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

V & A

LOG OF TEST HOLE NO. 2 cont'd

Project: Office/Warehouse at UNM | Project No.: 05-1-306
Elevation - Top of Test Hole: N/A | Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered | Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	54	S		1.7		SC	FILL - SAND, very clayey, fine to medium grained, medium dense, very moist, brown, with trace debris and cobbles
						SP	NATURAL GROUND - SAND, trace silt, fine to medium grained, dense, slightly moist, gray at 35' depth
40							Bottom of hole at 36½'
45							
50							
55							
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3 cont'd

V & A

LOG OF TEST HOLE NO. 3

Project: Office/Warehouse at UNM | Project No.: 05-1-306
Elevation - Top of Test Hole: N/A | Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered | Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5		B		1.8		SM-SC	FILL - SAND, very silty-clayey, fine to medium grained, gravelly, loose, medium moist, light brown
	18	S		3.9	1,2		Medium dense, trace debris
10						SP-SM	FILL -SAND, slightly silty, fine to coarse grained, trace gravel, medium dense, medium moist, light brown
	13	S		12.0			
15						CL	FILL - CLAY, very sandy, fine grained, trace gravel, stiff, medium moist, mottled brown
	12	S		14.7	1,2		Slightly sandy, moist, dark gray-brown, strong odor
20	25	S		3.4	1	SM	FILL -SAND, silty, fine to medium grained, blended with clay balls and debris, medium dense, moist, medium brown
25	7	S		8.3		CL	FILL - CLAY, very sandy, fine to medium grained, stiff, moist, brown to dark gray, trace debris
30	7	S		7.1		ML	NATURAL GROUND - SILT, very sandy, fine grained, medium stiff, medium moist, light brown, with thin lenses of coarse sand
35						SP-SM	SAND, slightly silty, fine to coarse grained, very gravelly, dense, slightly moist, light brown

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4

V & A

LOG OF TEST HOLE NO. 3 cont'd

Project: Office/Warehouse at UNM
Project No.: 05-1-306
Elevation - Top of Test Hole: N/A
Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered
Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	100	S		1.1		SP-SM	SAND, slightly silty, fine to coarse grained, very gravelly, dense, slightly moist, light brown
							Bottom of hole at 36'
40							
45							
50							
55							
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4 cont'd

V & A

LOG OF TEST HOLE NO. 4

Project: Office/Warehouse at UNM Project No.: 05-1-306
Elevation - Top of Test Hole: N/A Date Drilled: 9/1/2005
Depth to Groundwater: Not Encountered Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SC	FILL - SAND, very clayey, fine to coarse grained, slight gravel, dense, medium moist, medium brown, blended with debris
		B		2.0			
5							
	30	S		3.0	1,2		
10							
	38	S		6.4			Mixture of sand, clay balls, and asphalt debris
15							
	32	S		3.2	1,2		Less asphalt
20							
	22	S		1.7			Medium dense
25						SP-SM	NATURAL GROUND - SAND, slightly silty to silty, fine to medium grained, trace gravel, medium dense, medium moist, light brown
	11	S		4.0			
30							
	11	S		4.2			Alternating lenses of silt and sugar sand
35							Bottom of hole at 31½'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 5

V & A

LOG OF TEST HOLE NO. 5

Project: Office/Warehouse at UNM
Project No.: 05-1-306
Elevation - Top of Test Hole: N/A
Date Drilled: 9/6/2005
Depth to Groundwater: Not Encountered
Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
						SC	FILL - SAND, very clayey, fine to meidum grained, trace gravel, loose, medium moist, medium brown
		B		3.6	1,2		
5	36	S		1.7			Dense asphalt debris at 4'
10	9	S		5.7	1,2		Silty sand blended with clay balls, loose
15	9	S		7.7			With trace debris, increasing clay balls
20	19	S		1.5	1	SP-SM	NATURAL GROUND - SAND, trace silt to slightly silty, fine to coarse grained, gravelly, medium dense, medium moist, light brown
25	6	S		1.9			Loose
30	32	S		1.9			Dense
35							Bottom of hole at 31½'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 6

V & A

LOG OF TEST HOLE NO. 6

Project: Office/Warehouse at UNM
Project No.: 05-1-306
Elevation - Top of Test Hole: N/A
Date Drilled: 9/6/2005
Depth to Groundwater: Not Encountered
Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
		B		4.0	1,2	SM-SC	FILL - SAND, very silty to silty, fine to coarse grained, loose, medium moist, light brown, blended with clay balls and asphalt debris
5	9	S		9.1			
							Dense concrete debris at 8'
10	11	S		11.2	1,2		Very clayey, very moist, medium dense
							Grading to clay
15	40	S		4.0	1	SM	FILL -SAND, silty, fine to coarse grained, gravelly, dense, medium moist, light brown, trace debris and cobbles
20	9 NR	S					Loose
25	7	S		5.8		SC	SAND, very clayey, fine to medium grained, trace gravel, loose, very moist, brown
30	14	S		1.8			Grading to very moist brown clay
35						SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, very gravelly, medium dense, slightly moist, light brown to gray

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 7

V & A

LOG OF TEST HOLE NO. 6 cont'd

Project: Office/Warehouse at UNM | Project No.: 05-1-306
Elevation - Top of Test Hole: N/A | Date Drilled: 9/6/2005
Depth to Groundwater: Not Encountered | Drilling Method: 7" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	34	S		2.3		SP	NATURAL GROUND - SAND, trace silt, fine to coarse grained, very gravelly, medium dense, slightly moist, light brown to gray
							Trace gravel, dense at 35' depth
40							Bottom of hole at 36½'
45							
50							
55							
60							
65							
70							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 7 cont'd

V
&
A

NOTES - LOGS OF TEST HOLES

Test hole locations were determined by compass bearing and pacing distances from known topographic points.

"Drilling Method" refers to the equipment utilized to advance the test hole. A six-inch outside diameter, continuous flight, hollowstem auger was utilized.

"S" under "Sample Type" indicates a Standard Penetration test (ASTM D-1586). The Standard Penetration sampler is 2 inches in outside diameter and 1 3/8 inches inside diameter.

"R" under "Sample Type" indicates a 3-inch outside diameter by 2.5-inch inside diameter sampler. The sampler is lined with 1-inch high brass rings.

"B" under "Sample Type" indicates a bulk sample.

"Blows Per Foot" indicates the number of blows of a 140-pound hammer falling 30 inches required to drive the indicated sampler 12 inches.

"NR" under "Blows/Foot" indicates that no sample was recovered.

"Dry Density PCF" indicates the laboratory determined soil dry density in pounds per cubic foot.

"Water Content %" indicates the laboratory determined soil moisture content in percent (ASTM D-2216).

"Unified Classification" indicates the field soil classification as per ASTM D-2488. When appropriate, the field classification is modified based upon subsequent laboratory tests.

Variations in soil profile, consistency, and moisture content may occur between test holes. Subsurface conditions may also vary between test holes and with time.

Figure No.: 8

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	2		131	3.2													
1	5	SC	128	5.2	25	9		100	93	86	80	74	68	62	50	34.0	SAND, clayey, gravelly
1	10	SP		4.6			100	94	76	60	51	44	36	26	9	2.4	SAND, gravelly
1	15			5.5													
1	20			3.2													
1	25			10.8	NV	NP		100	99	94	88	83	78	74	62	45.9	SAND, very silty
1	30			3.3													
1	32.5			2.5													
2	2			2.6	20	6		100	95	90	82	76	69	63	49	32.0	SAND, silty-clayey
2	5			4.7													
2	10			6.6													
2	15			4.2													
2	20			5.7			100	91	83	76	69	65	60	53	45	39.2	SAND, silty, gravelly
2	30			8.4													
2	35			1.7													

V & A Project No.: 05-1-306

Project : Office/Warehouse @ UNM Science & Technology Park

Table No. : 1

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
3	2			1.8													
3	5	SM-SC		3.9	22	7		100	84	75	68	58	55	44	29	28.9	SAND, silty-clayey, gravelly
3	10			12.0													
3	15	CL		14.7	33	18				100	98	91	90	87	78	69.0	CLAY, sandy
3	20	SM-SC		3.4				100	93	85	79	67	61	50	38	23.2	SAND, silty
3	25			8.3													
3	30			7.1													
3	35			1.1													
4	2			2.0													
4	5	SM-SC		3.0	20	6		100	99	93	85	77	70	63	49	33.7	SAND, silty-clayey
4	10			6.4													
4	15	SM-SC		3.2	21	7	100	91	90	88	85	82	77	70	55	37.8	SAND, silty-clayey
4	20			1.7													
4	25			4.0													
4	30			4.2													

V & A Project No.: 05-1-306

Project : Office/Warehouse @ UNM Science & Technology Park

Table No. : 1

SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
5	2	SM-SC		3.6	23	5		100	98	93	87	81	76	69	58	41.0	SAND, silty-clayey
5	5			1.7													
5	10	SM		5.7	NV	NP		100	89	85	80	74	66	56	43	30.2	SAND, silty, gravelly
5	15			7.7													
5	20	SP		1.5			100	94	74	64	58	53	42	22	8	4.4	SAND, gravelly
5	25			1.9													
5	30			1.9													
6	2	SM		4.0	NV	NP		100	97	88	78	69	60	50	39	25.9	SAND, silty, gravelly
6	5			9.1													
6	10	SM-SC		11.2	25	6		100	90	87	83	79	74	68	58	44.7	SAND, silty-clayey, gravelly
6	15	SM		4.0			100	87	80	70	60	52	43	35	26	15.9	SAND, silty, gravelly
6	25			5.8													
6	30			1.8													
6	35			2.3													

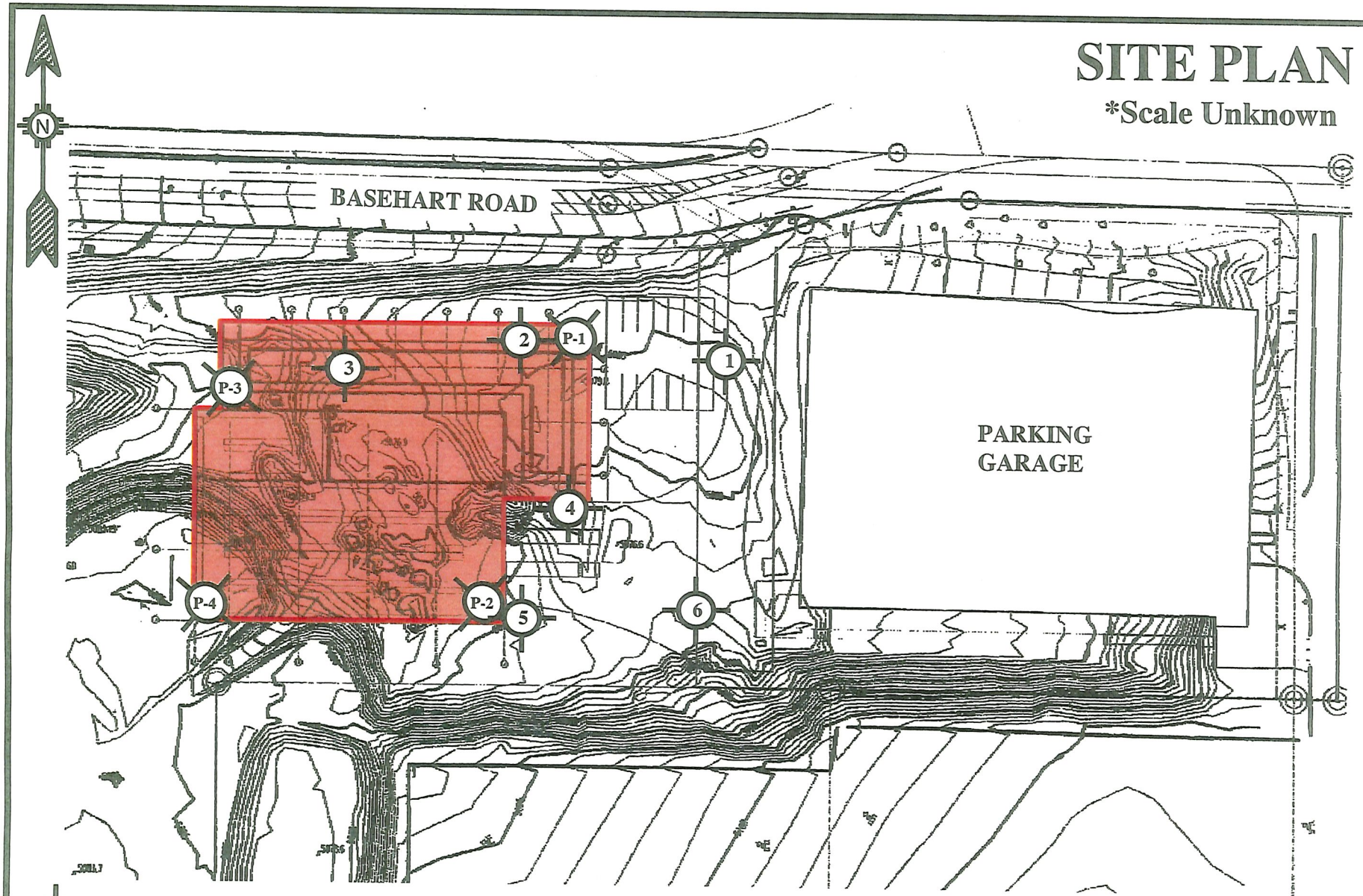
V & A Project No.: 05-1-306

Project : Office/Warehouse at the UNM Science & Tech Park

Table No. : 1

SITE PLAN

*Scale Unknown



TEST HOLE LOCATION

TRACKHOE TEST PIT LOCATION

V&A Project No.: 05-1-306

FIGURE 1.rev

Test Pit #1 – Debris in fill

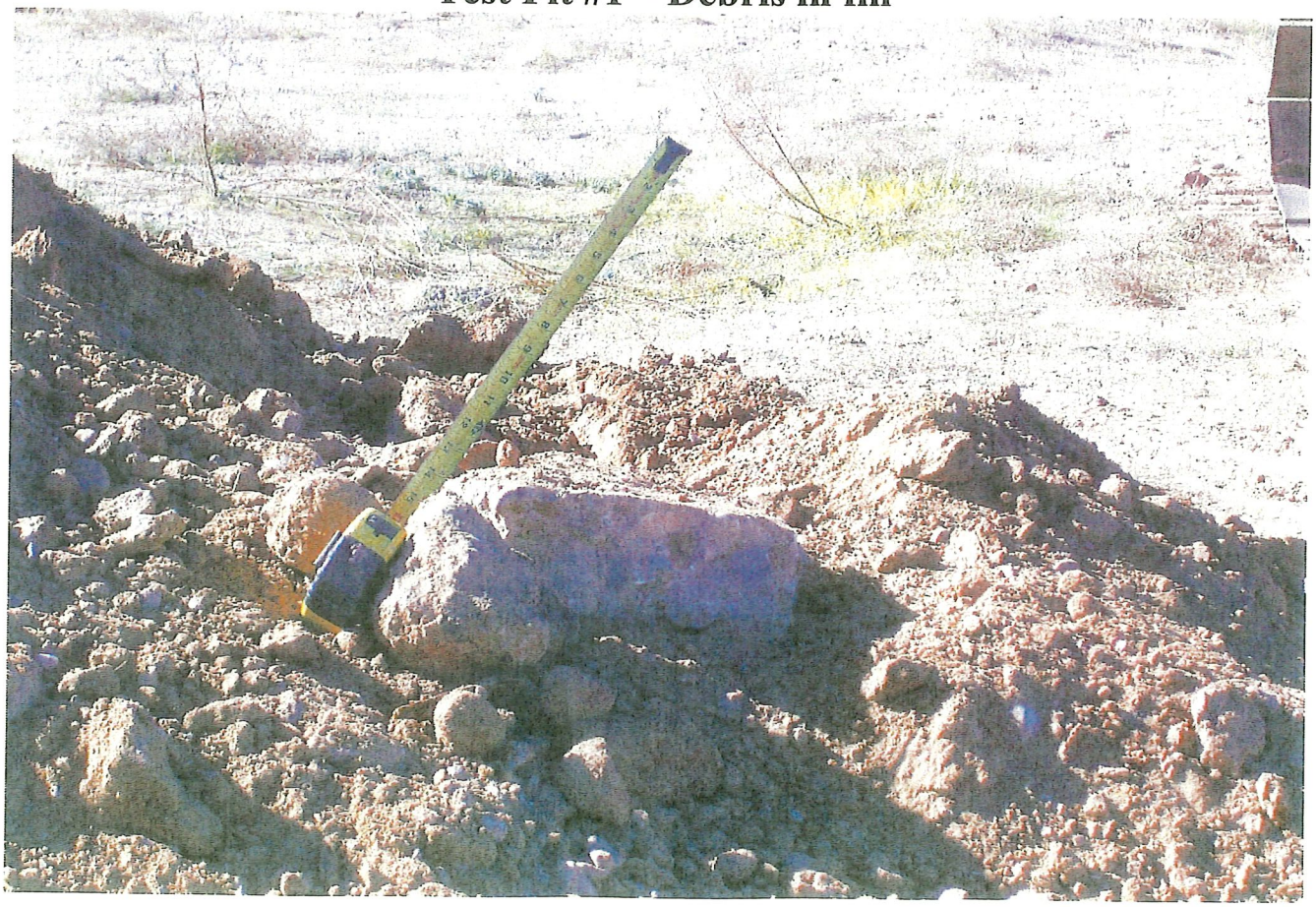
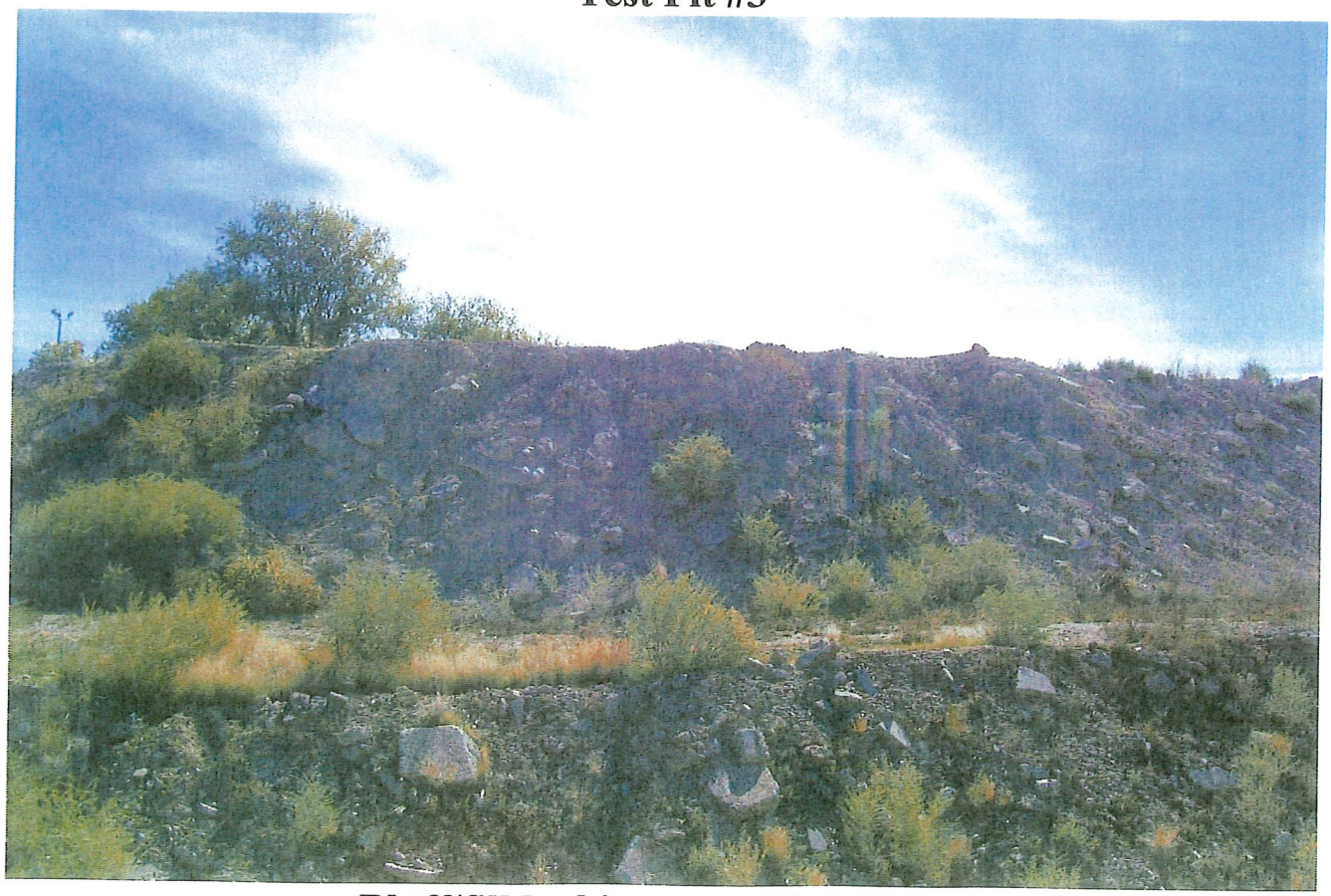


Figure 2

Test Pit #2 – Debris in fill

Figure 3

Test Pit #3



Bluff/fill looking up to Test Pit #4

Figure 4

Close up of Test Pit #4 bluff

Fill in Test Pit #3

Figure 5

Test Pit #4 – Loose gravelly fill collapsing

Figure 7