

**RESPONSE TO DEVELOPMENT TEAM REVIEW COMMENTS 2<sup>nd</sup> Review 5/11/2020**

**CASE NAME/NUMBER PRC-2019-00018**

**Development Services, Planning**

**PLN2:** As currently designed, the front property line for Lot 7 would be its west lot line. The lot width should be measured from the front setback line. It appears that Lot 7 can meet the minimum lot width requirement and that Building 7 could meet the required setbacks for a principal structure in the R-2 zone district, but the applicant must update their site plan in order to confirm that the required setbacks can be met.

- a. The west property line of Lot 7 would be considered as the front property line, which requires a 20' setback for principal structures.  
**RESPONSE: Site Plan revised Lot 7 now has 20' west property line setback.**
- b. The south property line of Lot 7 would be considered as the side property line, which requires a 5' setback for principal structures with attached garages.  
**RESPONSE: Site Plan revised to show 5' setback.**
- c. The northeast property line of Lot 7 would be considered as the rear property line, which requires a 15' setback for principal structures (from the property line, not from the easement area). **RESPONSE: Revised to show 15' rear setback.**

**PLN3:** Staff believes that the irregular shape of Lot 7 may be a point of contention during public hearings. If the proposed density of this infill project becomes controversial, then this irregularly shaped lot may be viewed as a technique for adding an inappropriate amount of density to the site.

- a. Staff recommends extending the west lot line of Lot 7 north in order to connect to the northeast property line. Such a reconfiguration would create a perfect triangle for Lot 7.  
**RESPONSE: Revised the shape of Lot 7 has been modified. New Preliminary Plat attached showing changes.**
- b. The remaining area that was previously included as part of Lot 7 (north of the private road) could then be incorporated into Lot 3 or designated on the Preliminary Plat as a commonly maintained Tract.  
**RESPONSE: Revised the shape of Lot 7 has been modified. New Preliminary Plat attached showing changes.**

PLN4: Building 1 requires a side corner setback from the west lot line and from Decatur Street of 20'. Applicant must update site plan in order to show that this setback can be met. The required side setback for a principal structure with an attached garage from the east lot line is 5'. Corrected setback shows on new site plan.

***RESPONSE: Site Plan revised to show 20' setback from west property line and adjusted to show 5' setback on east lot line.***

PLN5: Section 5-03-03-08-01 from the County's Subdivision Design Standards discourages the creation of double-frontage lots. As currently shown, Lots 2 and 3 are double frontage lots, and Lot 1 has three frontages.

- a. Staff recommends including landscape tracts where street frontage landscaping and buffer yards between uses are required. Landscape tracts would require provisions for common maintenance.

***RESPONSE: Based on comments from Adams County Engineering staff, additional width will not be required to widen West 67<sup>th</sup> Place. We will continue to show a 20'-0 setback off of West 67<sup>th</sup> Place and wait for recommendations from the County on establishing a landscape tract.***

- b. Such a landscape tract along the north property line would enable Lots 2 and 3 to be platted with a single frontage while also allowing Lot 1 to be platted as a corner lot.

***RESPONSE: Based on comments from Adams County Engineering staff, additional width will not be required to widen West 67<sup>th</sup> Place. We will continue to show a 20'-0 setback off of West 67<sup>th</sup> Place and wait for recommendations from the County on establishing a landscape tract.***

PLN6: Applicant must describe how drainage facilities, common tracts (landscaping), and the common private street will be maintained as part of this proposal.

- a. Staff highly recommends the creation of a Homeowner's Association, as the best strategy for receiving approval for the Waiver from Subdivision Design Standards will be to demonstrate how the private road will be maintained. Section 5-04-11 (Waivers from Subdivision Design Standards) states that the request shall describe the proposed waiver and the facts concerning the hardship upon which the request is based.

***RESPONSE: Homeowner's Association will be formed at a later date.***

- b. The following Subdivision Design Standards directly address landscaping considerations associated with this issue: Section 5-03-05-4 (landscape maintenance plan), Section 5-03-07-02 (private open space maintenance plan),

Section 5-03-07-03 (uniform perimeter fencing), Section 5-04-01-06-01 (right-of-way, drainage pond, and open space landscaping).

***RESPONSE: Landscape Plan attached.***

PLN7:

Applicant must explain why the proposed private road is shown as connecting to the railroad right-of-way along the east property line. Would this proposal enable someone to drive directly onto the railroad right-of-way?

***RESPONSE: Revised New Preliminary Plat attached showing changes to road. Private road easement has been modified to stop short of the railroad right-of-way.***

PLN 8:

Applicant has indicated that a report was attached to the resubmittal that addressed Tri-County Health Department's recommendation to consider how noise mitigation measures could aid in the mitigation of nuisance noises from the nearby railroad.

- a. Applicant must clarify which report they are referencing and whether or not it includes any of Tri-County's recommendations to incorporate setbacks, sound walls, vegetative barriers, construction design, operational practices, or similar measures as part of the overall project.

***RESPONSE: Prior to building permit application, the design team will incorporate recommendations from the Tri-County Health Department into the site design.***

- b. When proposing noise mitigation measures for this project, the applicant can reference Section 5-03-02-05 from the County's Subdivision Design Standards which provides design guidance to mitigate noise impacts of roadways and railroads. Section 5-03-02-05 recommends noise barriers and barrier walls as mitigation techniques.

***RESPONSE: We are planning to install a fence adjacent to the railroad right-of-way. If the noise level from passing trains exceed 60dBA an noise barrier shall be constructed per Colorado Department of Transportation standards. If the noise level is less than 60dBA then we are planning to erect a 6'-0" architectural wood fence. If the noise level exceeds the prescribed 60dBA, then we will propose a noise barrier design prior to Building Permit application.***

PLN9:

Applicant must clarify if they are proposing a two car parking garage and one driveway parking space per dwelling unit for a total of three parking spaces per dwelling unit, or if they are providing a one car parking garage and one driveway parking space per dwelling unit for a total of two parking spaces per dwelling

unit. Applicant must provide additional details regarding provisions for visitor parking on the site.

***RESPONSE: New preliminary plan attached shows parking for two-car attached per unit and two car parking per unit on each driveway. 4 total per unit***

PLN10: The referral letter from the Colorado Geological Survey requires a response from the applicant. Additional information required by the CGS is listed in the first paragraph of the referral letter. Applicant should provide evidence through the resubmittal that they have contacted the CGS in order to provide those additional materials and in order to request a second external referral agency comment letter that confirms that their requirements for this proposal have been met.

***RESPONSE: Soils Report Attached (This was previously provided)***

#### **Development Services, Engineering**

ENG1: Although this is a preliminary plat, it appears that a preliminary drainage analysis was not completed because the plat does not show an easement for a water quality pond and/or detention pond that are typically required with the development of a subdivision. The applicant must provide documentation on why a water quality/detention pond is not required for this subdivision or they need to show an easement for the drainage facility on the preliminary plat.

***RESPONSE: New preliminary plat will show drainage.***

#### **Development Services, Right-of-way**

ROW1: Utility and access easements shall also be granted within any private streets in the subdivision. Said easements shall be clearly labeled to include width, use, and identification as public or private, if necessary. Clearly show and label all existing easements, to include width and recording information, that cross, abut, or are located within the subdivision boundary.

***RESPONSE: Utility, Ingress/Egress Easements are now shown within the private street/drive. The entire drive will be for above said purpose. All existing easements and widths are/have been shown on the plat.***

ROW2: Basis of Bearing and Point of Commencement must be labeled on plat drawing.

***RESPONSE: The basis of bearings, point of commencement and point of beginning are/have been shown on the plat. Please let us know if you can't find this information and we will point it out.***

ROW3: Existing street rights-of-way that intersect the subdivision boundary or are adjacent to said boundary lines shall be clearly labeled with the street name, right-of-way width, and appropriate deed or plat recording information wherein the right-of-way is defined.

***RESPONSE: Existing streets and ROW are shown. File and Map information has been added for the streets. The 5' ROW strip along Decatur is/has been shown with recording information.***

ROW4: “Existing easement” and “lot/row line” labels must be differentiated on plat drawing. Please update legend and provide different line weights in order to better differentiate the two labels.

***RESPONSE: The line types have been changed to make these clearer.***

ROW5: There appears to be one easement included in Schedule B (Part 2) of the submitted Title Commitment that is not shown on the Plat Drawing. Item #10 has a recording date of March 12, 2013, and a reception number of 2013000021210. If the location of any of the easements defined within the Schedule B – Part 2 Exceptions of the Title Commitment are not shown on the plat, please provide a statement or general note as to why (i.e. Exception 10 – Rec No: 2013000021210).

***RESPONSE: Exception No. 10 of the title commitment cannot be plotted. There is no specific location for this easement (court ordered easement). There is no visible communication equipment (Pedestal's, Vaults, Manholes, Buildings, etc.) along the RR ROW. However, this easement does grant access to/from the RR ROW for the telecom's to maintain/install their equipment. This easement shows up on any property in Colorado that abuts the main RR ROW but there are no specific locations of the easement provided. If this easement is an issue, then it must be resolved between the owner and telecom and/or Adams County. I am positive that this is not the first time that the county has seen this specific easement on property that abuts the RR ROW.***

ROW6: PRE2019-00073 provided ROW comments stating the following: “W 67th Place is classified as a local street per the 2012 Adams County Master Transportation Plan. As such it should have a half right-of-way width of 25 feet. Since the existing half right-of-way width is 20 feet, this would require a dedication of 5 feet additional right-of-way. If the plat is a major or minor subdivision plat, the right of way dedication can be directly by the plat.” Applicant must provide the required right-of-way dedication directly on the Plat.

***RESPONSE: It is our understanding that the county is NOT requesting an additional 5 feet of right-of-way for this project.***

ROW7: Please see “PRC2019-00018 Plat Redlines” document for additional comments. Additional redlines may be required as part of the next review.

***RESPONSE: Plat redlines have been addressed.***

ENV1: Condition Precedent 1. A nest survey to determine if any active nests are present in the project area shall be completed at least one week prior to the commencement of construction with survey findings reported to the County.

***RESPONSE: Nest Survey will be complete 2 weeks prior to construction.***



### Development Team Review Comments

The following comments have been provided by reviewers of your land use application. At this time, a resubmittal of your application is required before this case is ready to be scheduled for public hearing.

To prepare your resubmittal, you will be expected to provide:

- A response to each comment with a description of the revisions and the page of the response on the site plan;
- Any revised plans or renderings; and
- A list identifying any additional changes made to the original submission other than those required by staff.

Resubmittal documents must be provided in person to the One-Stop Customer Service Center of the Community and Economic Development Department. The following items will be expected by our One-Stop Customer Service Center:

- One paper copy of all new materials
  - Paper copies shall not exceed 11"x17" (exception shall be made only for construction drawings or engineering plan review)
  - All paper copies shall be accompanied by the attached Resubmittal Form
- One digital copy of all new materials
  - All digital materials shall be in a single PDF document
  - The single PDF document shall be bookmarked
  - If a Subdivision Improvements Agreement, Legal Description, or Development Agreement is required, then an additional Microsoft Word version of these documents shall also be provided



## Re-submittal Form

Case Name/ Number: \_\_\_\_\_

Case Manager: \_\_\_\_\_

### Re-submitted Items:

- Development Plan/ Site Plan
- Plat
- Parking/ Landscape Plan
- Engineering Documents
- Subdivision Improvements Agreement
- Other: \_\_\_\_\_

**\* All re-submittals must have this cover sheet and a cover letter addressing review comments.**

**Please note the re-submittal review period is 21 days.**

The cover letter must include the following information:

- Restate each comment that requires a response
- Provide a response below the comment with a description of the revisions
- Identify any additional changes made to the original document

For County Use Only:

Date Accepted:

Staff (accepting intake):

Resubmittal Active: ~~Addressing, Building Safety, Neighborhood Services,~~

~~Engineering, Environmental, Parks, Planner, ROW, SIA - Finance, SIA - Attorney~~



**Commenting Division:** Development Services, Planning

**Resubmittal Required**

**Name of Reviewer:** Holden Pederson

**Email and Phone Number:** [HPederson@adcogov.org](mailto:HPederson@adcogov.org) / 720-523-6847

PLN1: Lots 1 through Lot 6 appear to meet the minimum lot size and lot width requirements for the R-2 zone district. Buildings 2 through 6 appear to meet all required setbacks for the R-2 zone district.

PLN2: As currently designed, the front property line for Lot 7 would be its west lot line. The lot width should be measured from the front setback line. It appears that Lot 7 can meet the minimum lot width requirement and that Building 7 could meet the required setbacks for a principal structure in the R-2 zone district, but the applicant must update their site plan in order to confirm that the required setbacks can be met.

- a. The west property line of Lot 7 would be considered as the front property line, which requires a 20' setback for principal structures.
- b. The south property line of Lot 7 would be considered as the side property line, which requires a 5' setback for principal structures with attached garages.
- c. The northeast property line of Lot 7 would be considered as the rear property line, which requires a 15' setback for principal structures (from the property line, not from the easement area).

PLN3: Staff believes that the irregular shape of Lot 7 may be a point of contention during public hearings. If the proposed density of this infill project becomes controversial, then this irregularly shaped lot may be viewed as a technique for adding an inappropriate amount of density to the site.

- a. Staff recommends extending the west lot line of Lot 7 north in order to connect to the northeast property line. Such a reconfiguration would create a perfect triangle for Lot 7.
- b. The remaining area that was previously included as part of Lot 7 (north of the private road) could then be incorporated into Lot 3 or designated on the Preliminary Plat as a commonly maintained Tract.

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- b. Such a landscape tract along the north property line would enable Lots 2 and 3 to be platted with a single frontage while also allowing Lot 1 to be platted as a corner lot.

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- a. Staff highly recommends the creation of a Homeowner's Association, as the best strategy for receiving approval for the Waiver from Subdivision Design Standards will be to demonstrate how the private road will be maintained. Section 5-04-11 (Waivers from Subdivision Design Standards) states that the request shall describe the proposed waiver and the facts concerning the hardship upon which the request is based.
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PLN7: Applicant must explain why the proposed private road is shown as connecting to the railroad right-of-way along the east property line. Would this proposal enable someone to drive directly onto the railroad right-of-way?

PLN8: Applicant has indicated that a report was attached to the resubmittal that addressed Tri-County Health Department's recommendation to consider how noise mitigation measures could aid in the mitigation of nuisance noises from the nearby railroad.

- a. Applicant must clarify which report they are referencing and whether or not it includes any of Tri-County's recommendations to incorporate setbacks, sound walls, vegetative barriers, construction design, operational practices, or similar measures as part of the overall project.
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PLN9: Applicant must clarify if they are proposing a two car parking garage and one driveway parking space per dwelling unit for a total of three parking spaces per dwelling unit, or if they are providing a one car parking garage and one driveway parking space per dwelling unit for a total of two parking spaces per dwelling unit. Applicant must provide additional details regarding provisions for visitor parking on the site.

PLN10: The referral letter from the Colorado Geological Survey requires a response from the applicant. Additional information required by the CGS is listed in the first paragraph of the referral letter. Applicant should provide evidence through the resubmittal that they have contacted the CGS in order to provide those additional materials and in order to request a second external referral agency comment letter that confirms that their requirements for this proposal have been met.

PLN11: Applicant has provided a Will Serve Letter from Xcel Energy for natural gas and electrical service. Applicant has provided a letter from Adams County Fire Rescue stating that the subdivision plan meets fire district access requirements. Applicant has provided a Will Serve letter from the Crestview Water and Sanitation District confirming that public water and sewer can be provided to the project. Additional letters from Denver Water and the Colorado Division of Water Resources confirms that water is available. Applicant has provided responses to the two commenting members of the public.

PLN12: If the Preliminary Plat is approved by the Board of County Commissioners, a Subdivision Improvements Agreement will be required prior to scheduling the public hearing for the Final Plat. Below is a spreadsheet showing the Public Land Dedication (PLD) fees that will be required as part of the Subdivision Improvements Agreement and prior to the Final Plat being scheduled for public hearing:

<b>Duplex, Two-to-Four Family Attached and R-2 zoning</b>	
Number of Units=	14
Population generated=	35.4620
Student population generated=	5.0960
School Acreage Needed=	0.1325
Neighborhood Park Acreage Needed=	0.2100
Regional Park Acreage Needed=	0.1400
<b>Total Acres of PLD Needed=</b>	<b>0.4825</b>
Land Value per acre=	\$36,888.00
<b>PLD Fee in lieu=</b>	<b>\$17,798.31</b>
<b>Deposits:</b>	
School District {    } Account =	<b>\$4,887.51</b>
Neighborhood Parks {    } Account =	<b>\$7,746.48</b>
Regional Parks Account =	<b>\$5,164.32</b>

**Commenting Division:** Development Services, Engineering

**Resubmittal Required**

**Name of Reviewer:** Greg Labrie

**Email and Phone Number:** [GLabrie@adcogov.org](mailto:GLabrie@adcogov.org) / 720-523-6824

ENG1: Although this is a preliminary plat, it appears that a preliminary drainage analysis was not completed because the plat does not show an easement for a water quality pond and/or detention pond that are typically required with the development of a subdivision. The applicant must provide documentation on why a water quality/detention pond is not required for this subdivision or they need to show an easement for the drainage facility on the preliminary plat.

**Commenting Division:** Development Services, Right-of-Way

**Resubmittal Required**

**Name of Reviewer:** Holden Pederson

**Email and Phone Number:** [HPederson@adcogov.org](mailto:HPederson@adcogov.org) / 720-523-6847

ROW1: Utility and access easements shall also be granted within any private streets in the subdivision. Said easements shall be clearly labeled to include width, use, and identification as public or private, if necessary. Clearly show and label all existing easements, to include width and recording information, that cross, abut, or are located within the subdivision boundary.

ROW2: Basis of Bearing and Point of Commencement must be labeled on plat drawing.

ROW3: Existing street rights-of-way that intersect the subdivision boundary or are adjacent to said boundary lines shall be clearly labeled with the street name, right-of-way width, and appropriate deed or plat recording information wherein the right-of-way is defined.

ROW4: "Existing easement" and "lot/row line" labels must be differentiated on plat drawing. Please update legend and provide different line weights in order to better differentiate the two labels.

ROW5: There appears to be one easement included in Schedule B (Part 2) of the submitted Title Commitment that is not shown on the Plat Drawing. Item #10 has a recording date of March 12, 2013, and a reception number of 2013000021210. If the location of any of the easements defined within the Schedule B – Part 2 Exceptions of the Title Commitment are not shown on the plat, please provide a statement or general note as to why (i.e. Exception 10 – Rec No: 2013000021210).

ROW6: PRE2019-00073 provided ROW comments stating the following: “W 67th Place is classified as a local street per the 2012 Adams County Master Transportation Plan. As such it should have a half right-of-way width of 25 feet. Since the existing half right-of-way width is 20 feet, this would require a dedication of 5 feet additional right-of-way. If the plat is a major or minor subdivision plat, the right of way dedication can be directly by the plat.” Applicant must provide the required right-of-way dedication directly on the Plat.

ROW7: Please see “PRC2019-00018 Plat Redlines” document for additional comments. Additional redlines may be required as part of the next review.

**Commenting Division:** Development Services, Environmental Analyst

**Complete**

**Name of Reviewer:** Katie Keefe


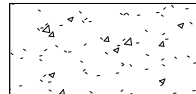
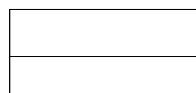

**Email and Phone Number:** [KKeefe@adcogov.org](mailto:KKeefe@adcogov.org) / 720-523-6986

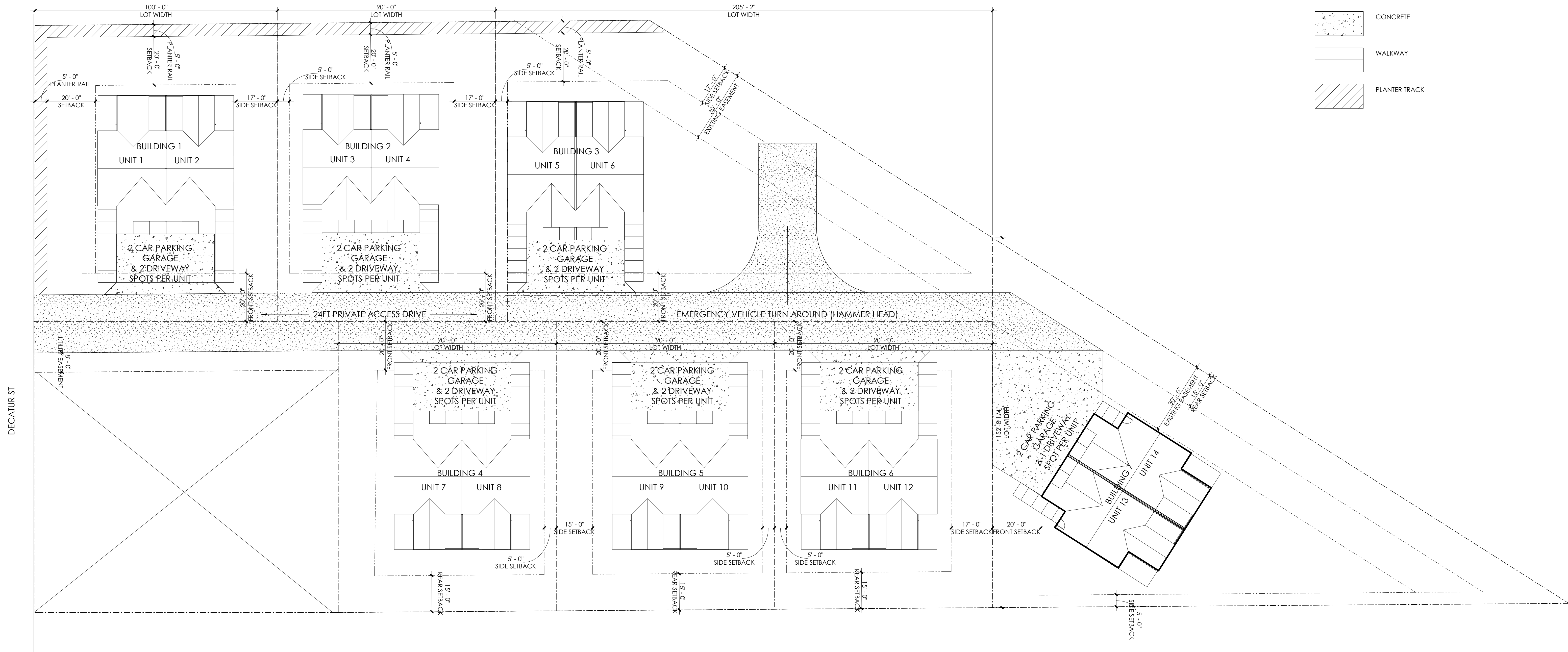
ENV1: Condition Precedent 1. A nest survey to determine if any active nests are present in the project area shall be completed at least one week prior to the commencement of construction with survey findings reported to the County.

SITE PLAN NOTES

1. -
2. -
3. -
4. -
5. -
6. -
7. -

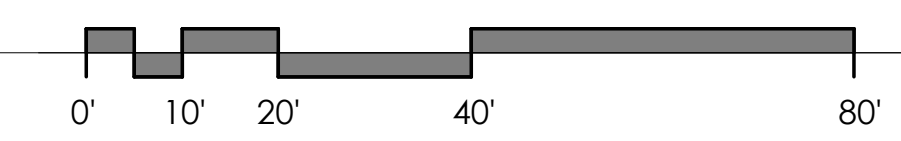
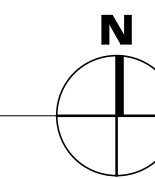
FLAGNOTES

-  ASPHALT
-  CONCRETE
-  WALKWAY
-  PLANTER TRACK



DECATUR ST

1 SITE PLAN  
1" = 20'-0"



DECATUR DUPLEXES

6642 DECATUR ST, DENVER, CO. 80221

PROJ. NO. 000000  
DRAWN: Author  
CHECKED: Checker  
APPROVED: Approver  
DATE: ISSUE DATE  
REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION  
© NEO STUDIO

SCALE: As indicated

SHEET TITLE: ARCHITECTURAL SITE PLAN

A1.01

CLOSURE LOTS 5-7-20.txt

Parcel name: Decatur Subdivision Overall

North: 4976.6230 East : 5262.0527  
Line Course: S 89-30-47 W Length: 253.10  
North: 4974.4720 East : 5008.9618  
Line Course: S 00-25-30 W Length: 143.22  
North: 4831.2560 East : 5007.8995  
Line Course: N 89-34-29 E Length: 125.08  
North: 4832.1844 East : 5132.9760  
Line Course: S 00-25-30 W Length: 100.06  
North: 4732.1271 East : 5132.2338  
Line Course: N 89-34-29 E Length: 509.28  
North: 4735.9072 East : 5641.4998  
Line Course: N 57-36-35 W Length: 449.36  
North: 4976.6220 East : 5262.0517

Perimeter: 1580.10 Area: 95,510 sq. ft. 2.19 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0014 Course: S 40-36-18 W  
Error North: -0.00109 East : -0.00093  
Precision 1: 1,128,642.86

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Parcel name: LOT 1

North: 4975.3216 East : 5108.9583  
Line Course: S 89-30-47 W Length: 100.00  
North: 4974.4717 East : 5008.9619  
Line Course: S 00-25-30 W Length: 123.72  
North: 4850.7551 East : 5008.0442  
Line Course: N 89-34-29 E Length: 101.84  
North: 4851.5110 East : 5109.8814  
Line Course: N 00-25-31 W Length: 123.81  
North: 4975.3176 East : 5108.9624

Perimeter: 449.37 Area: 12,489 sq. ft. 0.29 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0057 Course: S 46-06-36 E  
Error North: -0.00397 East : 0.00413  
Precision 1: 78,836.84

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Parcel name: LOT 2

North: 4976.0866 East : 5198.9551  
Line Course: S 89-30-47 W Length: 90.00  
North: 4975.3218 East : 5108.9583  
Line Course: S 00-25-31 E Length: 123.81  
North: 4851.5152 East : 5109.8773  
Line Course: N 89-34-29 E Length: 90.00  
North: 4852.1832 East : 5199.8748  
Line Course: N 00-25-31 W Length: 123.91  
North: 4976.0898 East : 5198.9551

Perimeter: 427.72 Area: 11,147 sq. ft. 0.26 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0031 Course: N 00-31-39 E  
Page 1

CLOSURE LOTS 5-7-20.txt  
East : 0.00003

Error North: 0.00313  
Precision 1: 137,974.19

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Parcel name: LOT 3

North: 4976.6230                      East : 5262.0527  
Line Course: S 89-30-47 W Length: 63.10  
          North: 4976.0868                      East : 5198.9550  
Line Course: S 00-25-31 E Length: 123.91  
          North: 4852.1802                      East : 5199.8747  
Line Course: N 89-34-29 E Length: 201.48  
          North: 4853.6757                      East : 5401.3491  
Line Course: N 00-25-31 W Length: 34.75  
          North: 4888.4247                      East : 5401.0912  
Line Course: N 57-36-35 W Length: 164.65  
          North: 4976.6250                      East : 5262.0576

Perimeter: 587.88    Area: 18,803 sq. ft. 0.43 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)  
Error Closure: 0.0053                      Course: N 68-29-20 E  
Error North: 0.00195                      East : 0.00495  
Precision 1: 110,922.64

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Parcel name: LOT 4

North: 4852.3405                      East : 5221.3500  
Line Course: S 89-34-29 W Length: 213.31  
          North: 4850.7572                      East : 5008.0459  
Line Course: S 00-25-30 W Length: 19.50  
          North: 4831.2578                      East : 5007.9013  
Line Course: N 89-34-29 E Length: 125.08  
          North: 4832.1862                      East : 5132.9778  
Line Course: S 00-25-30 W Length: 100.06  
          North: 4732.1289                      East : 5132.2356  
Line Course: N 89-34-29 E Length: 90.00  
          North: 4732.7969                      East : 5222.2331  
Line Course: N 00-25-31 W Length: 119.55  
          North: 4852.3436                      East : 5221.3458

Perimeter: 667.50    Area: 13,093 sq. ft. 0.30 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)  
Error Closure: 0.0053                      Course: N 53-34-22 W  
Error North: 0.00313                      East : -0.00425  
Precision 1: 125,943.40

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Parcel name: LOT 5

North: 4853.0086                      East : 5311.3476  
Line Course: S 89-34-29 W Length: 90.00  
          North: 4852.3406                      East : 5221.3500  
Line Course: S 00-25-31 E Length: 119.55  
          North: 4732.7939                      East : 5222.2374

CLOSURE LOTS 5-7-20.txt

Line Course: N 89-34-29 E Length: 90.00  
North: 4733.4619 East : 5312.2349  
Line Course: N 00-25-31 W Length: 119.55  
North: 4853.0086 East : 5311.3476

Perimeter: 419.09 Area: 10,759 sq. ft. 0.25 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0000 Course: S 90-00-00 E  
Error North: 0.00000 East : 0.00000  
Precision 1: 419,100,000.00

---

Parcel name: LOT 6

North: 4853.6767 East : 5401.3451  
Line Course: S 89-34-29 W Length: 90.00  
North: 4853.0086 East : 5311.3476  
Line Course: S 00-25-31 E Length: 119.55  
North: 4733.4619 East : 5312.2349  
Line Course: N 89-34-29 E Length: 90.00  
North: 4734.1300 East : 5402.2324  
Line Course: N 00-25-31 W Length: 119.55  
North: 4853.6767 East : 5401.3451

Perimeter: 419.09 Area: 10,759 sq. ft. 0.25 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0000 Course: S 90-00-00 E  
Error North: 0.00000 East : 0.00000  
Precision 1: 419,100,000.00

---

Parcel name: LOT 7

North: 4888.4226 East : 5401.0872  
Line Course: S 00-25-31 E Length: 154.29  
North: 4734.1368 East : 5402.2324  
Line Course: N 89-34-29 E Length: 239.28  
North: 4735.9129 East : 5641.5058  
Line Course: N 57-36-35 W Length: 284.71  
North: 4888.4273 East : 5401.0913

Perimeter: 678.28 Area: 18,459 sq. ft. 0.42 acres

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0063 Course: N 41-02-14 E  
Error North: 0.00474 East : 0.00413  
Precision 1: 107,663.49



# DECATUR SUBDIVISION FILING NO. 1- PRELIMINARY PLAT

CASE NO.: PRC2019-00018

A REPLAT OF LOT 1, LYNN PETERSON SUBDIVISION, A RESUBDIVISION OF LOT 10, BLOCK 4, NORTH FEDERAL HILLS

A PARCEL OF LAND LYING IN THE SOUTHEAST ONE-QUARTER OF SECTION 5, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,

COUNTY OF ADAMS, STATE OF COLORADO

SHEET 1 OF 2

### DEDICATION CERTIFICATE

KNOW ALL MEN BY THESE PRESENTS THAT THE UNDERSIGNED, BEING THE OWNER(S) OF THE FOLLOWING DESCRIBED PROPERTY:

A TRACT OF LAND LOCATED IN THE SOUTHEAST ¼ OF SECTION 5, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEING LOT 1, LYNN PETERSON SUBDIVISION, A RESUBDIVISION OF LOT 10, BLOCK 4, NORTH FEDERAL HILLS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTER ¼ CORNER OF SECTION 5, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEING A FOUND 3.25" DIAMETER ALLOY CAP STAMPED "CDOT" PLS 27259 IN RANGE BOX; THENCE S59°22'39"E, 1078.82 FEET TO THE POINT OF BEGINNING BEING THE NORTHWEST CORNER OF LOT 1, LYNN PETERSON SUBDIVISION, RECORDED IN FILE MAP 18 PAGE 58 OF THE ADAMS COUNTY RECORDS; THENCE N89°30'47"E, 253.10 FEET TO THE SOUTHWESTERLY RIGHT-OF-WAY LINE OF THE COLORADO AND SOUTHERN RAILROAD; THENCE S57°36'35"E ALONG THE SAID SOUTHWESTERLY RIGHT-OF-WAY LINE, 449.36 FEET TO THE NORTHWEST CORNER OF LOT 1, MESTQUITE VISTA, REVISION NO. 1, RECORDED AT RECEPTION NO. 2005001154130 OF THE ADAMS COUNTY RECORDS; THENCE S89°34'29"W, 509.28 FEET TO THE SOUTHWEST CORNER OF LOT 2, LYNN PETERSON SUBDIVISION; THENCE N00°25'30"E ALONG THE EAST LINE OF SAID LOT 2, 100.08 FEET TO THE NORTHEAST CORNER OF SAID LOT 2; THENCE S89°34'29"W ALONG THE NORTH LINE OF SAID LOT 2, 125.08 FEET TO A POINT ON THE EAST RIGHT-OF-WAY LINE OF DECATUR STREET; THENCE N00°25'30"E ALONG THE EAST RIGHT-OF-WAY LINE OF DECATUR STREET, 143.22 FEET TO THE POINT OF BEGINNING,

COUNTY OF ADAMS, STATE OF COLORADO.

THE ABOVE DESCRIBED PARCEL CONTAINS 95,510 SQUARE FEET OR 2.193 ACRES MORE OR LESS.

HAVE BY THESE PRESENTS LAID OUT AND PLATTED THE SAME INTO TRACTS, LOTS, EASEMENTS AND STREETS AS SHOWN ON THIS PLAT UNDER THE THE NAME AND STYLE OF **DECATUR SUBDIVISION FILING NO. 1** AND THE UNDERSIGNED DOES HEREBY DEDICATE, GRANT AND CONVEY TO ADAMS COUNTY THOSE PUBLIC EASEMENTS (AND TRACTS) AS SHOWN ON THE PLAT; AND FURTHER RESTRICTS THE USE OF ALL PUBLIC EASEMENT TO ADAMS COUNTY AND/OR ITS ASSIGNS, PROVIDED HOWEVER, THAT THE SOLE RIGHT AND AUTHORITY TO RELEASE OR QUITCLAIM ALL OR ANY SUCH PUBLIC EASEMENTS SHALL REMAIN EXCLUSIVELY VESTED IN ADAMS COUNTY.

### BASIS OF BEARINGS:

BASIS OF BEARINGS: AN ASSUMED BEARING OF S89°34'29"W BEING THE SOUTH LINE OF LOT 1, LYNN PETERSON SUBDIVISION BETWEEN TWO MONUMENTS 509.28 FEET APART. BOTH MONUMENTS BEING A NO. 5 REBAR WITH GREEN CAP STAMPED PLS 38284; ONE AT THE SOUTHWEST CORNER OF SAID LOT 1 AND THE OTHER BEING AT THE SOUTHEAST CORNER OF SAID LOT 1.

### ACCESS RESTRICTION STATEMENT:

ALL ACCESS RIGHTS SHALL BE RESTRICTED ACROSS RIGHT-OF-WAY LINES OF MAJOR HIGHWAYS, PARKWAYS, STREETS OR FREEWAYS, WHERE REQUIRED AS A PROVISION OF APPROVAL. WITH THE FILING OF DECATUR SUBDIVISION FILING NO. 1 PLAT THERE WILL BE NO ACCESS PROVIDED, OR ALLOWED, TO AND FROM EXISTING COLORADO AND SOUTHERN RAILROAD RIGHT-OF-WAY.

### EASEMENT STATEMENT:

UTILITY EASEMENTS ARE HEREBY DEDICATED ON PRIVATE PROPERTY AS SHOWN ON SUBDIVISION PLAT. THESE EASEMENTS ARE DEDICATED TO ADAMS COUNTY FOR THE BENEFIT OF THE APPLICABLE UTILITY PROVIDERS FOR THE INSTALLATION, MAINTENANCE, AND REPLACEMENT OF UTILITIES.

### STORM DRAINAGE FACILITIES STATEMENT:

THE POLICY OF THE COUNTY REQUIRES THAT MAINTENANCE ACCESS SHALL BE PROVIDED TO ALL STORM DRAINAGE FACILITIES TO ASSURE CONTINUOUS OPERATIONAL CAPABILITY OF THE SYSTEM. THE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL DRAINAGE FACILITIES INCLUDING INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, AND DETENTION BASINS LOCATED ON THEIR LAND UNLESS MODIFIED BY THE SUBDIVISION DEVELOPMENT AGREEMENT. SHOULD THE OWNER FAIL TO MAINTAIN SAID FACILITIES, THE COUNTY SHALL HAVE THE RIGHT TO ENTER SAID LAND FOR THE SOLE PURPOSE OF OPERATIONS AND MAINTENANCE. ALL SUCH MAINTENANCE COST WILL BE ASSESSED TO THE PROPERTY OWNERS.

THE APPROVED STORMWATER OPERATIONS AND MAINTENANCE MANUAL IS ON FILE WITH THE ADAMS COUNTY CLERK AND RECORDERS OFFICE AT RECEPTION NO. \_\_\_\_\_.

### FLOODPLAIN NOTE:

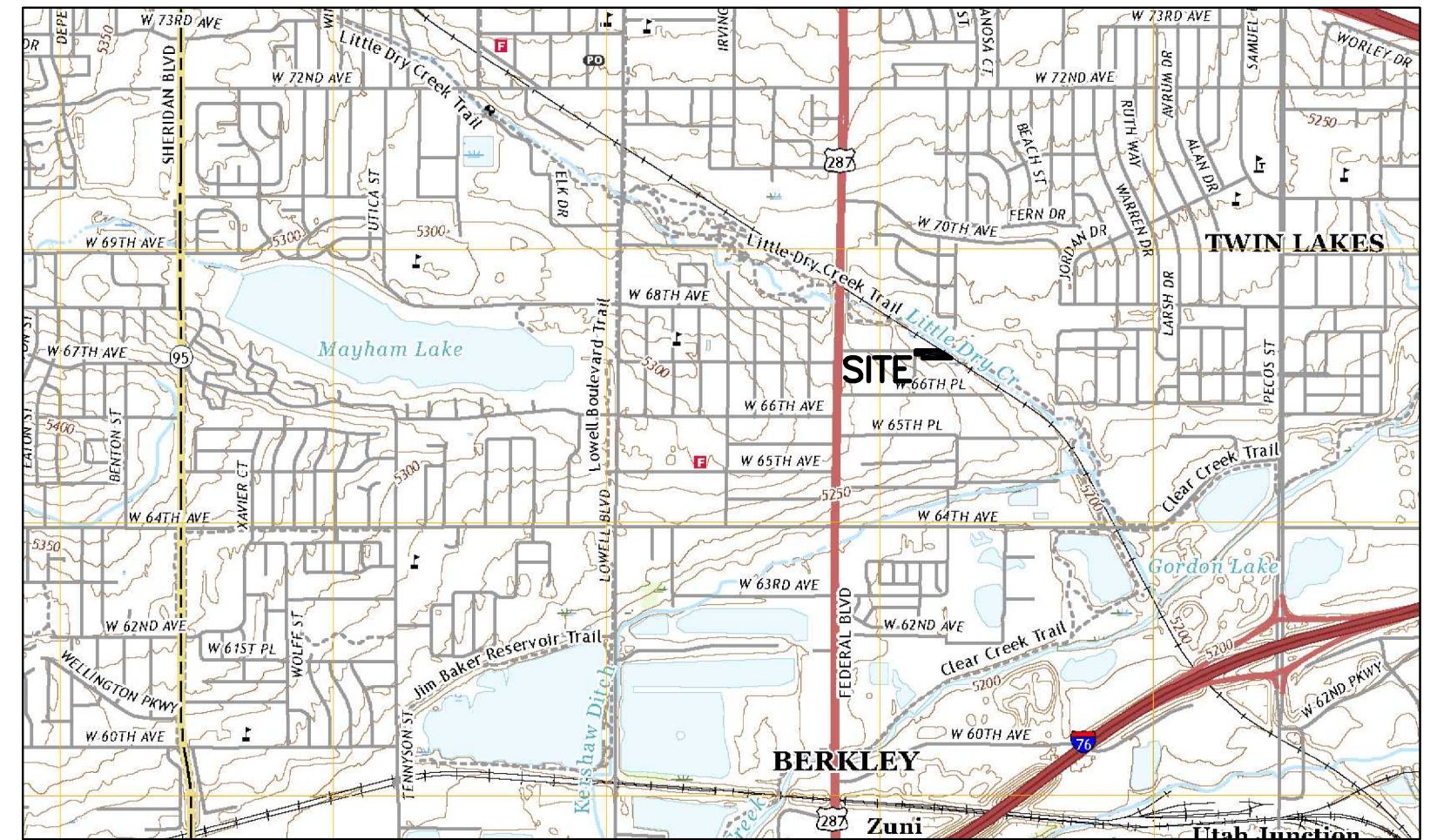
PROPERTY IS WITHIN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS PER FEMA FIRM MAP NO. 08001C0584H DATED MARCH 5, 2007, REVISED TO REFLECT LOMR CASE NO. 18-08-0635P DATED FEBRUARY 14, 2019.

### TITLE COMMITMENT NOTE:

SURVEYOR RELIED UPON THE TITLE REPORT PREPARED BY CHICAGO TITLE INSURANCE COMPANY FILE NO. 100-N0026225-030-TH WITH AN EFFECTIVE DATE OF FEBRUARY 26, 2020, FOR THE PREPARATION OF THIS PLAT.

### SHEET INDEX:

SHEET 1- COVER SHEET  
SHEET 2- PLAT



Vicinity Map  
1"=2000'

### OWNER:

BY: \_\_\_\_\_, ITS  
\_\_\_\_\_

### ACKNOWLEDGEMENT

STATE OF COLORADO )  
COUNTY OF \_\_\_\_\_ ) §  
THE FOREGOING PLAT AND DEDICATION WAS ACKNOWLEDGED BEFORE ME THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020, BY \_\_\_\_\_, OF \_\_\_\_\_, OWNER.

NOTARY PUBLIC

MY COMMISSION EXPIRES: \_\_\_\_\_

MY ADDRESS IS: \_\_\_\_\_

### LIENHOLDER CERTIFICATE

THE UNDERSIGNED HEREBY CONSENT(S) TO THE DEDICATION AND EASEMENTS SHOWN ON THIS PLAT AND RELEASE(S) THE SAME FROM ENCUMBRANCE RECORDED IN BOOK \_\_\_\_\_ AT PAGE(S) \_\_\_\_\_ OF THE RECORDS OF THE ADAMS COUNTY CLERK AND RECORDER.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

STATE OF COLORADO )  
COUNTY OF \_\_\_\_\_ ) §

THE FOREGOING LIENHOLDER CERTIFICATE WAS SUBSCRIBED AND SWORN BEFORE ME THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020, BY \_\_\_\_\_

NOTARY PUBLIC

MY COMMISSION EXPIRES: \_\_\_\_\_

MY ADDRESS IS: \_\_\_\_\_

SIGNED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

### SURVEYORS CERTIFICATE:

I, DAMIEN CAIN, A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS PLAN TRULY AND CORRECTLY REPRESENTS THE RESULTS OF A SURVEY MADE OCTOBER 2019, BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT SAID SURVEY HAS BEEN PREPARED IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS OF THE STATE OF COLORADO DEALING WITH SURVEYING OF LAND.

I ATTEST THE ABOVE ON THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020

DAMIEN CAIN  
STATE OF COLORADO PLS 38284  
FOR AND ON BEHALF OF  
39 NORTH ENGINEERING AND SURVEYING LLC

### PLANNING COMMISSION APPROVAL:

APPROVED BY THE ADAMS COUNTY PLANNING COMMISSION THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

CHAIR

### BOARD OF COUNTY COMMISSIONERS APPROVAL:

APPROVED BY THE ADAMS COUNTY BOARD OF COMMISSIONERS THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

CHAIR

### CLERK AND RECORDER CERTIFICATE:

THIS FINAL PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE ADAMS COUNTY CLERK AND RECORDER IN THE STATE OF COLORADO AT \_\_\_\_M. ON THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

COUNTY CLERK AND RECORDER

BY DEPUTY: \_\_\_\_\_

# DECATUR SUBDIVISION FILING NO. 1- PRELIMINARY PLAT

CASE NO.: PRC2019-00018

A REPLAT OF LOT 1, LYNN PETERSON SUBDIVISION, A RESUBDIVISION OF LOT 10, BLOCK 4, NORTH FEDERAL HILLS

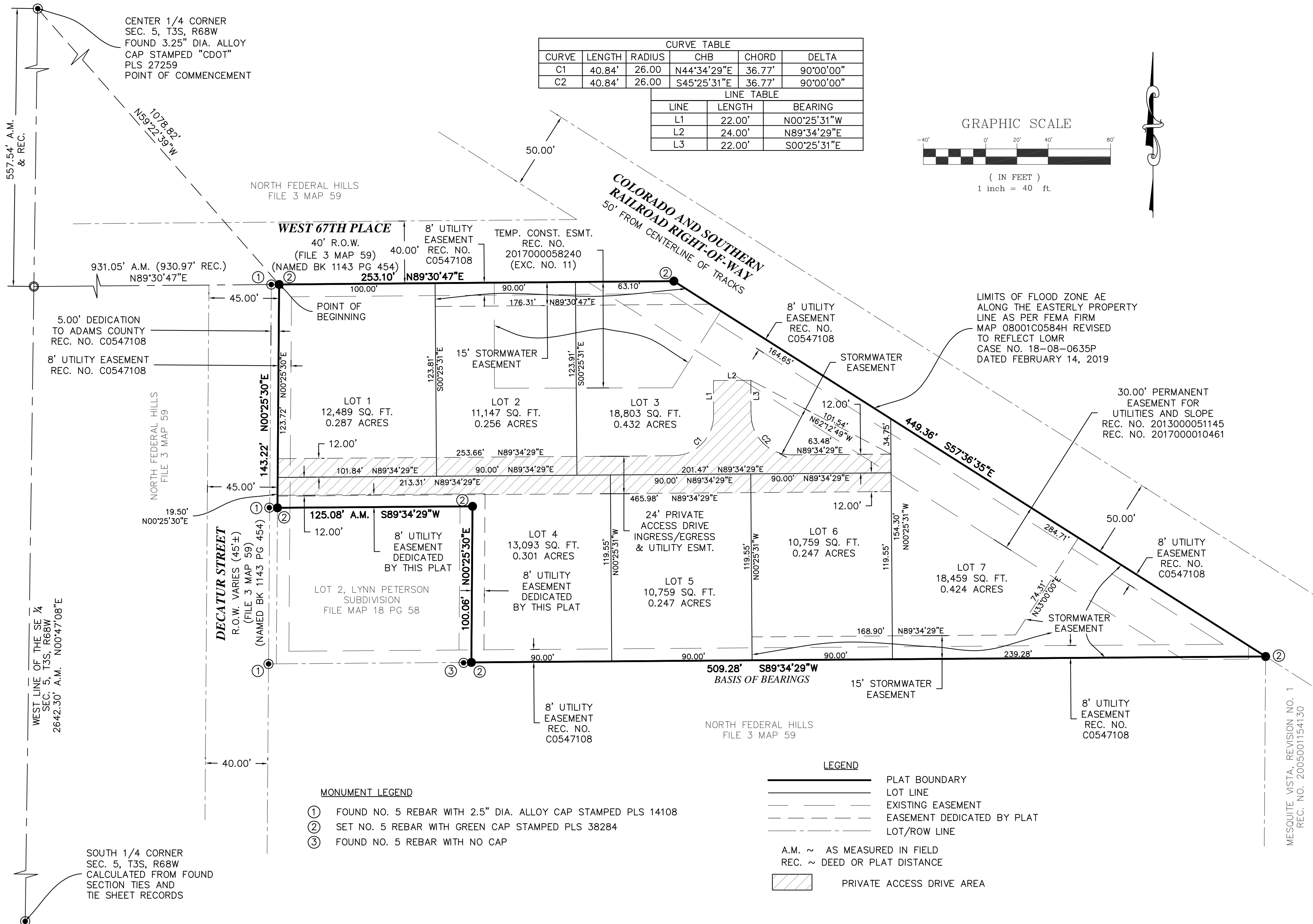
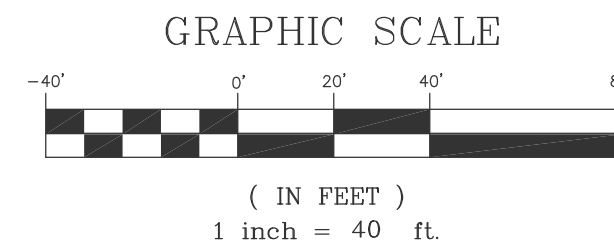
A PARCEL OF LAND LYING IN THE SOUTHEAST ONE-QUARTER OF SECTION 5, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,  
COUNTY OF ADAMS, STATE OF COLORADO

SHEET 2 OF 2

CURVE TABLE					
CURVE	LENGTH	RADIUS	CHB	CHORD	DELTA
C1	40.84'	26.00	N44°34'29"E	36.77'	90°00'00"
C2	40.84'	26.00	S45°25'31"E	36.77'	90°00'00"

LINE TABLE		
LINE	LENGTH	BEARING
L1	22.00'	N00°25'31"W
L2	24.00'	N89°34'29"E
L3	22.00'	S00°25'31"E



CENTER 1/4 CORNER  
SEC. 5, T3S, R68W  
FOUND 3.25" DIA. ALLOY  
CAP STAMPED "CDOT"  
PLS 27259  
POINT OF COMMENCEMENT

WEST LINE OF THE SE 1/4  
SEC. 5, T3S, R68W  
2642.30' A.M. N00°47'08"E

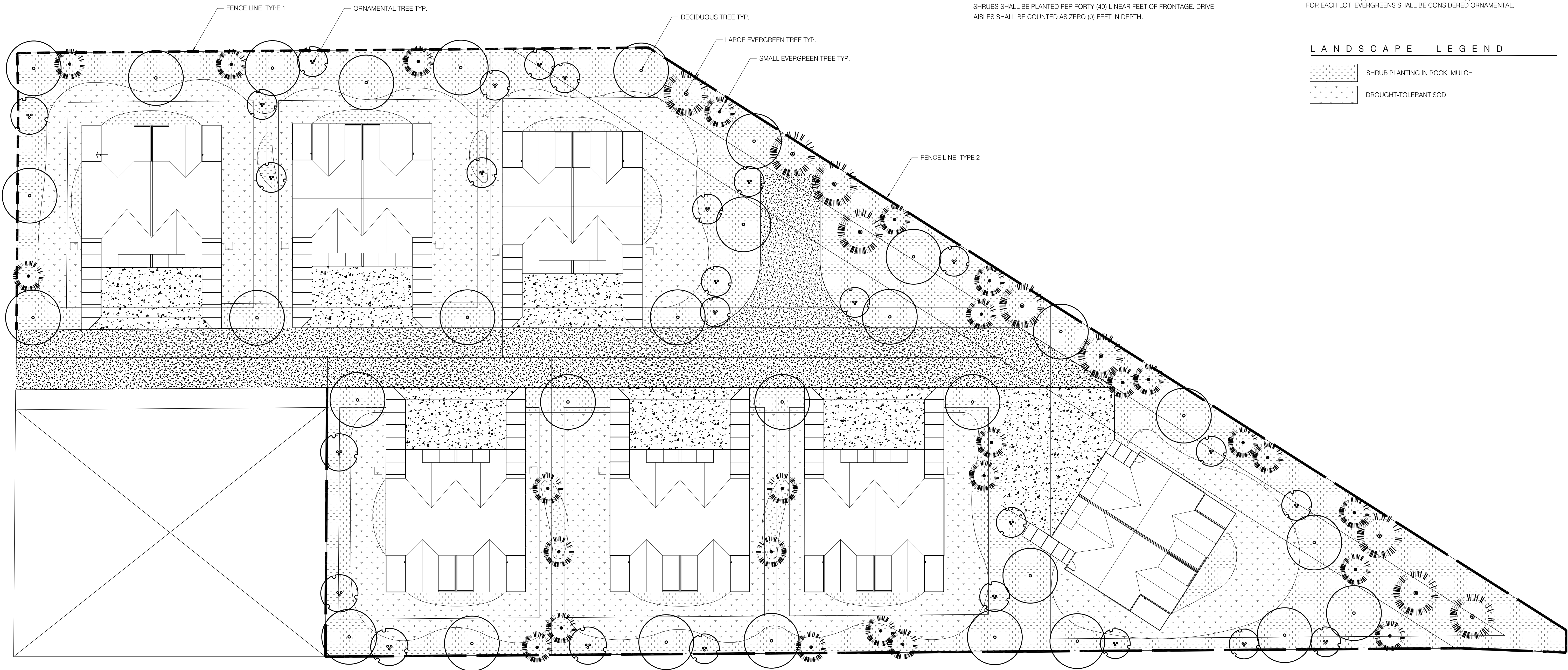
SOUTH 1/4 CORNER  
SEC. 5, T3S, R68W  
CALCULATED FROM FOUND  
SECTION TIES AND  
TIE SHEET RECORDS

LIMITS OF FLOOD ZONE AE  
ALONG THE EASTERLY PROPERTY  
LINE AS PER FEMA FIRM  
MAP 08001C0584H REVISED  
TO REFLECT LOMR  
CASE NO. 18-08-0635P  
DATED FEBRUARY 14, 2019

30.00' PERMANENT  
EASEMENT FOR  
UTILITIES AND SLOPE  
REC. NO. 2013000051145  
REC. NO. 2017000010461

MESQUITE VISTA, REVISION NO. 1  
REC. NO. 2005001154130

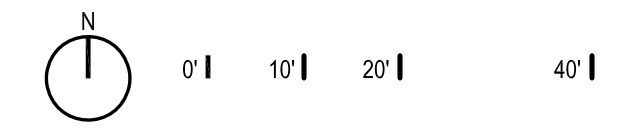
1. LANDSCAPED AREAS SHALL NOT BE ENCLOSED BY A FENCE, WHICH LIMITS ITS VISIBILITY. IF A SIGHT OBSCURING FENCE IS REQUIRED, IT SHALL BE SET BACK FROM THE LANDSCAPED AREA. THIS WILL HAVE THE EFFECT OF HAVING THE LANDSCAPED AREA ADJACENT TO THE RIGHT-OF-WAY AND THE FENCE WILL BE LOCATED BEHIND THE LANDSCAPED AREA.
2. ALL LANDSCAPING SHALL BE LOCATED SO IT DOES NOT INTERFERE WITH UTILITIES, EASEMENTS, ROAD LIGHTING OR FIRE HYDRANTS.
3. THE EXTERIOR BOUNDARIES OF A LOT WHICH DO NOT ABUT A PUBLIC ROAD RIGHT-OF-WAY SHALL MEET THE BUFFERYARD REQUIREMENTS, DEPENDING UPON THE ADJACENT LAND USE.
  - A. BUFFERYARD A: FIVE (5) FOOT MINIMUM BUFFERYARD WIDTH WITH ONE (1) TREE PER EIGHTY (80) LINEAR FEET OF LOT LINE.
4. ALL DEVELOPMENTS SHALL BE REQUIRED TO LANDSCAPE A MINIMUM OF TEN (10) PERCENT OF THE LOT AREA, WITH AT LEAST FIFTY (50) PERCENT OF THE REQUIRED LANDSCAPE AREA PLACED SO IT ABUTS ADJOINING PUBLIC RIGHTS-OF-WAY, EXCLUDING ALLEYS AND DRIVES.
5. THE AREA ALONG ANY PROPERTY LINE ABUTTING A PUBLIC ROAD RIGHT-OF-WAY SHALL BE LANDSCAPED USING ONE (1) OR ANY COMBINATION OF THE FOLLOWING LANDSCAPE OPTIONS:
  - A. OPTION 1: INSTALL A TWENTY-FIVE (25) FOOT WIDE AREA ALONG THE ROAD RIGHT-OF-WAY. WITHIN THE LANDSCAPE AREA, ONE (1) TREE AND TWO (2) SHRUBS SHALL BE PLANTED PER FORTY (40) LINEAR FEET OF FRONTAGE. DRIVE AISLES SHALL BE COUNTED AS ZERO (0) FEET IN DEPTH.
  - B. OPTION 2: INSTALL A TWENTY (20) FOOT LANDSCAPE AREA ALONG THE ROAD RIGHT-OF-WAY. WITHIN THE LANDSCAPE AREA, ONE (1) TREE AND TWO (2) SHRUBS SHALL BE PLANTED PER FORTY (40) LINEAR FEET OF FRONTAGE. DRIVE AISLES SHALL BE COUNTED AS ZERO (0) FEET IN DEPTH.
  - C. OPTION 3: INSTALL A TEN (10) FOOT LANDSCAPE AREA ALONG THE ROAD RIGHT-OF-WAY. WITHIN THE LANDSCAPE AREA, TWO (2) TREES AND FIVE (5) SHRUBS SHALL BE PLANTED PER FORTY (40) LINEAR FEET OF FRONTAGE. DRIVE AISLES SHALL BE COUNTED AS ZERO (0) FEET IN DEPTH.
  - D. OPTION 4: INSTALL A FIVE (5) FOOT LANDSCAPE AREA ALONG THE ROAD RIGHT-OF-WAY. WITHIN THE LANDSCAPE AREA, ONE (1) TREE AND TWO (2) SHRUBS SHALL BE PLANTED PER FORTY (40) LINEAR FEET OF FRONTAGE. A THIRTY (30) INCH HIGH DECORATIVE WALL OR THE BUILDING SHALL BE LOCATED BETWEEN THE PARKING AREA AND THE ROAD FRONTAGE. DRIVE AISLES SHALL BE COUNTED AS ZERO (0) FEET IN DEPTH.
  - E. OPTION 5: INSTALL A LANDSCAPE BERM WITH A TWO (2) FOOT MINIMUM AVERAGE HEIGHT. THE BERM SHALL HAVE A SLOPE OF NO GREATER THAN ONE (1) FOOT OF RISE TO EVERY FOUR (4) FEET OF RUN. WITHIN THE LANDSCAPE AREA, ONE (1) TREE AND FIVE (5) SHRUBS SHALL BE PLANTED PER SIXTY (60) LINEAR FEET OF FRONTAGE.
6. ALL REQUIRED LANDSCAPED AREAS AND BUFFERYARDS MUST CONTAIN A MINIMUM OF SEVENTY-FIVE PERCENT (75%) ORGANIC LANDSCAPING MATERIAL, WITH A MAXIMUM OF TWENTY-FIVE PERCENT (25%) NON-LIVING LANDSCAPING MATERIALS.
7. FOR SINGLE FAMILY ATTACHED LANDSCAPING:
  - A. FRONT AND SIDE SETBACKS: THE ENTIRE FRONT AND SIDE SETBACKS SHALL BE LANDSCAPED, EXCEPT FOR DRIVEWAYS.
  - B. BACK YARD SETBACK: A MINIMUM OF THIRTY PERCENT (30%) OF THE BACK YARD SHALL BE LANDSCAPED.
  - C. REQUIRED GROUNDCOVER: A MINIMUM OF THIRTY PERCENT (30%) OF THE REQUIRED FRONT AND SIDE LANDSCAPE AREA MUST BE COVERED BY LIVING GROUND MATERIAL.
  - D. REQUIRED TREES AND SHRUBS: A MINIMUM OF ONE (1) LARGE TREE AND FIVE (5) SHRUBS OR TWO (2) ORNAMENTAL TREES AND FIVE (5) SHRUBS, SHALL BE REQUIRED FOR EACH LOT. EVERGREENS SHALL BE CONSIDERED ORNAMENTAL.



**LANDSCAPE LEGEND**

	SHRUB PLANTING IN ROCK MULCH
	DROUGHT-TOLERANT SOD

**1 LANDSCAPE PLAN**  
 SCALE: 1"=20'-0"



**DECATUR DUPLEXES**  
 6642 DECATUR ST., DENVER, CO. 80221

PROJ. NO. 000000  
 DRAWN: Author  
 CHECKED: Checker  
 APPROVED: Approver  
 DATE: ISSUE DATE  
 REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION  
 © NEO STUDIO

SCALE: As indicated

SHEET TITLE: LANDSCAPE PLAN

**L1.01**

# COLORADO GEOLOGICAL SURVEY

1801 Moly Road  
Golden, Colorado 80401



Karen Berry  
State Geologist

January 31, 2020

Holden Pederson  
Adams County Community & Economic Development  
4430 S. Adams County Parkway, Suite W2410  
Brighton, CO 80601

**Location:**  
E NW SE Section 5,  
T3S, R68W, 6<sup>th</sup> P.M.  
39.8181, -105.0209

**Subject:** 6642 Decatur Major Subdivision Preliminary Plat  
Case No. PRC2019-00018; Adams County, CO; CGS Unique No. AD-20-0012

Dear Mr. Pederson:

Colorado Geological Survey has reviewed the 6642 Decatur major subdivision preliminary plat referral. I understand the applicant proposes 14 duplex units in seven buildings on approximately 2.2 acres located at 6642 Decatur Street. No geologic or geotechnical information was included with the available referral documents. NRCS soil survey data, included with the Level 1 Storm Drainage Plan, is typically valid for only the uppermost five feet below the ground surface.

The site does not contain steep slopes, is not undermined, and is not exposed to or located within any identified geologic hazard areas that would preclude the proposed residential use and density.

**Mineral resource potential.** According to the Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties (Schwochow et al, Colorado Geological Survey Special Publications 5-A, Plate 2, and 5-B, Arvada Quadrangle, 1974), the subject property does not contain a mapped aggregate resource.

A definitive determination of whether the property contains an economic mineral resource is outside the scope of CGS review. A site-specific investigation would be required to verify the presence or absence of a resource.

**Soils and bedrock engineering properties.** According to available geologic mapping (Lindvall, R.M., 1979, Geologic map of the Arvada quadrangle, Adams, Denver, and Jefferson Counties, Colorado: U.S. Geological Survey, Geologic Quadrangle Map GQ-1453, scale 1:24,000), the site is underlain by Piney Creek Alluvium consisting of interbedded sand, silt, and clay, and loess (wind-deposited sandy silt and clay). Clayey layers and lenses within the alluvium are likely expansive, and loess deposits commonly exhibit collapse under wetting and loading but, depending on the clay content, can also exhibit shrink/swell (volume changes in response to changes in water content). Shales and claystones within the underlying Denver Formation bedrock may be highly expansive.

A geotechnical investigation consisting of drilling, sampling, lab testing and analysis will be needed once building locations are finalized, if this has not been completed already, to: characterize soil and bedrock engineering properties such as density, strength, swell/consolidation potential and bearing capacity; evaluate groundwater levels and determine basement feasibility, if basements are planned; determine

Holden Pederson  
January 31, 2020  
Page 2 of 2

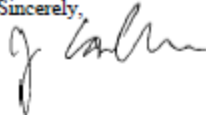
subgrade preparation and structural fill requirements; and design foundations, floor systems, surface and subsurface drainage, pavements, etc.

**Artificial fill.** Evidence of stockpiled materials and possible disturbance is visible in historic aerial imagery. The site may be underlain by fill and/or debris from past onsite or adjacent uses. If fill is identified during the geotechnical investigation and documentation cannot be located which verifies proper placement and compaction, the fill should be removed and replaced as densely compacted fill. Any debris-laden fill encountered will need to be removed and replaced with clean, properly placed and compacted structural fill.

**Shallow groundwater.** Based on the site's close proximity to Little Dry Creek and Clear Creek, groundwater should be expected to occur at fairly shallow depths beneath the site. Below-grade space (basements and crawl spaces) should allowed only if site-specific water level observations indicate that a separation distance of *at least* three feet can be maintained year round between lowermost floor levels and shallowest anticipated seasonal groundwater levels.

Thank you for the opportunity to review and comment on this project. If you have questions or require additional review, please call me at (303) 384-2643, or e-mail [carlson@mines.edu](mailto:carlson@mines.edu).

Sincerely,



Jill Carlson, C.E.G.  
Engineering Geologist

SUBSURFACE STUDY  
FOR  
THE PLANNED DECATUR TOWNHOMES  
DECATUR STREET AND WEST 67TH PLACE  
ADAMS COUNTY, COLORADO

Job Number 19-492  
October 7, 2019

PREPARED FOR

Unique Properties, Inc.  
400 South Broadway  
Denver, Colorado 80209

 **Hollingsworth**  
Associates, Inc.

Sheridan, Colorado  
(303) 781 - 5188

# Contents

0.1	Purpose and scope of work . . . . .	1
0.2	Proposed construction . . . . .	1
0.3	Site conditions . . . . .	1
0.4	Field exploration . . . . .	2
0.5	Laboratory testing . . . . .	2
0.5.1	Index properties . . . . .	3
0.5.2	Swell-consolidation . . . . .	3
0.5.3	Proctor compaction . . . . .	3
0.5.4	Remolded California bearing ratio . . . . .	4
0.5.5	Water soluble sulfate content . . . . .	4
0.6	Subsurface conditions . . . . .	4
0.7	Potential foundation systems . . . . .	5
0.7.1	Foundation design parameters - Mat stiffened with ribs . . . . .	6
0.7.2	Foundation design parameters - spread footings . . . . .	7
0.8	Floor slabs . . . . .	8
0.9	Foundation walls . . . . .	9
0.10	Water soluble sulfates . . . . .	10
0.11	Underdrain system . . . . .	10
0.12	Surface drainage . . . . .	11
0.13	Pavement design . . . . .	11
0.13.1	Subgrade materials . . . . .	12
0.13.2	Design traffic . . . . .	12
0.13.3	Flexible pavements . . . . .	12
0.13.4	Rigid pavements . . . . .	12
0.13.5	Subgrade preparation . . . . .	13
0.13.6	Drainage . . . . .	13
0.14	Limitations . . . . .	13

**List of Figures**

Fig. 1 - Locations of Exploratory Borings

Fig. 2 - Logs of Exploratory Borings

Fig. 3 - Legend and Notes of Exploratory Borings

Figs. 4 through 9 - Gradation Test Results

Figs. 10 through 12 - Swell-Consolidation Test Results

Fig. 13 - Proctor Test Results

Table I - Summary of Laboratory Testing Results

Appendix A - Pavement Design Calculations



## **0.1 Purpose and scope of work**

This report presents the results of a subsurface study for the planned Decatur Townhomes to be located at the intersection of Decatur Street and West 67th Place in Adams County, Colorado. The subsurface study was conducted for the purpose of developing foundation recommendations. The project site is shown on Fig. 1. The study was conducted in accordance with our proposal P19-283 dated September 5, 2019.

A field exploration program consisting of drilling five exploratory borings was conducted to obtain information on subsurface conditions. Material samples obtained during the field exploration were tested in the laboratory to determine the classification and engineering characteristics of the on-site soils. The results of the field exploration and laboratory testing were analyzed to develop foundation recommendations and allowable bearing pressures. The results of the field exploration and laboratory testing are presented herein.

This report has been prepared to summarize the data obtained during this study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction of the planned townhomes are included in the report.

## **0.2 Proposed construction**

It is our understanding that seven two-story non-basement townhome buildings and an interior drive are planned. Foundation loads are expected to be light as is typical for this type of construction. We understand that the site will be graded with minor cuts on the south side of the site and fills on the north side of the site. The fill materials may be imported. If the design varies from the project description above, the recommendations presented in this report should be reevaluated.

## **0.3 Site conditions**

At the time of our field investigation, the site was vacant with a sparse native grass and weed cover. Soils had been dumped on the site especially on the north side of the site. The south side of the site appeared to be undisturbed

and the north had areas of fill. The site sloped down from the southeast to the northwest with a difference in elevation of approximately 8 feet.

## 0.4 Field exploration

The field exploration for the project was conducted on September 18, 2019. Five exploratory borings were drilled at the locations shown on Fig. 1 to explore the subsurface conditions. The exploratory borings were located within the footprints of the planned building footprints by Hollingsworth Associates personnel.

The borings were advanced through the soils with a 4-inch diameter continuous flight auger. The borings were logged by a project engineer.

Samples of the subsurface materials were taken with a 2-inch I.D. spoon sampler and a 1 3/8-inch I.D. sampler. The samplers were driven into the various strata with blows from a 140-pound hammer falling 30 inches. This test is similar to the standard penetration test described by ASTM Method D-1586. Penetration resistance values, when properly evaluated, indicate the relative density or consistency of the soils and bedrock. Depths at which the samples were taken and the penetration resistance values are shown on the Logs of Exploratory Borings, Fig. 2 with a legend and notes shown on Fig. 3.

Measurement of the water level was made in the borings by lowering an M-scope into the open holes shortly after completion of drilling and two days later.

## 0.5 Laboratory testing

Laboratory testing was conducted to study the engineering characteristics of the materials obtained in the exploratory borings. Samples obtained from the exploratory borings were examined and visually classified in the laboratory by the project engineer. Laboratory testing was performed on selected samples to determine their classification, moisture content, dry density, moisture-volume change characteristics, water soluble sulfate content, standard Proctor compaction and remolded California bearing ratio. Results of the laboratory testing are shown on Figs. 4 through 13 and are summarized in Table I. A discussion of the laboratory testing procedures is

presented below. The testing was conducted in general accordance with recognized test procedures, primarily those of the American Society for Testing and Materials (ASTM).

### **0.5.1 Index properties**

In order to identify the soils and to classify them into categories of similar engineering properties, the Unified Soil Classification System (ASTM D-2487) was used. This system is based on index property tests, including liquid limits and plastic limits (ASTM D-4318) and grain size distribution (ASTM D-422). Moisture contents were determined in accordance with ASTM D-2216. Moisture contents, dry densities, liquid and plastic limits, and the percent of soil fractions are summarized in Table I. Grain size distribution curves are shown on Figs. 4 through 8.

### **0.5.2 Swell-consolidation**

Swell-consolidation tests, similar to ASTM D-2435, were conducted on five typical samples of the upper soils in order to determine their compressibility or swell characteristics under loading when submerged in water. Each sample was prepared and placed in an oedometer ring between porous discs. An initial seating load of either 500 psf or 1,000 psf was placed on the sample. The sample was then submerged in water and the change in sample height was measured with a dial gauge. Samples that swelled after wetting were loaded incrementally until returning to their original height. The sample height was monitored until deformation practically ceased under each load increment.

Results of the consolidation tests are plotted as a curve of the final strain at each increment of pressure against the log of the pressure. Swell-consolidation test results are shown on Figs. 9 through 12.

### **0.5.3 Proctor compaction**

The moisture-density relationships of one composite sample of the subgrade materials were conducted using the procedures of ASTM D-698, Method A. The sample was processed through the #4 screen before testing. The moisture-density relationships are shown on Fig. 13.

#### **0.5.4 Remolded California bearing ratio**

A sample of the potential pavement subgrade material was tested to determine its subgrade support properties for use in pavement design. A sample of the material was remolded to approximately 95% of the standard Proctor density (ASTM D-698) approximately 2% above the optimum moisture content.

A California Bearing Ratio (CBR) test (ASTM D-1883) was performed on the remolded sample after being submerged in water for a period of 96 hours. The CBR test is a penetration test wherein a standard piston penetrates the soil at a rate of 0.05 inches per minute. The CBR value is the ratio of the test load to a standard unit load and is an indication of the strength of the soil. It is empirically related to the required thickness of pavement structure for a given traffic loading. Results of the CBR test are summarized in Table I.

#### **0.5.5 Water soluble sulfate content**

The percentage of water soluble sulfates was determined in general accordance with "Standard Methods for the Examination of Water and Wastewater, 15th ed.", for three selected samples. The test results are shown in Table I.

### **0.6 Subsurface conditions**

The subsurface conditions at the site were quite varied, as indicated by exploratory borings B-1 through B-5. On the north side of the site, as indicated by borings B-1 and B-2, the subsurface conditions consisted of 12 inches of topsoil and 13 feet of very stiff to hard sandy to very sandy clay which occasionally grades into a gravelly clayey sand overlying medium dense to dense clean to silty sand and gravel for the depth drilled, 20.5 feet. Eight feet of stiff sandy clay fill was encountered at the ground surface in boring B-2. In the southeast corner of the site, as indicated by boring B-3, the subsurface conditions consisted of 12 inches of topsoil overlying medium dense to dense clean to silty sand and gravel for the depth drilled, 16 feet. For the remainder of the south side of the site, as indicated by Borings B-4 and B-5, the subsurface conditions consisted of 12 inches of topsoil and 10 feet to at least 29 feet of very stiff to hard sandy to very sandy clay which occasionally grades

into a gravelly clayey sand overlying medium dense to very dense clean to silty sand and gravel for the depth drilled, 30 feet.

Free water was encountered only in exploratory boring B-2 at depth 13.3 feet at the time of drilling and depth 13.0 feet when the borings were checked two days later. No free water was encountered in the other exploratory borings at the time of drilling and when checked two days later.

Gradations of typical samples of the sandy clay are shown on Fig. 4. The sandy clay ranged from settling upon loading and when wetted under constant load to possessing a high swell potential with a percent swell of 6.6% and an uplift pressure of 9,500 psf when wetted under constant load as indicated by the swell-consolidation test results shown on Fig. 10. Gradations of typical samples of the very sandy clay are shown on Figs. 5 and 7 through 9. The very sandy clay ranged from settling upon loading and when wetted under constant load to possessing a low swell potential with a percent swell of 0.4% and an uplift pressure of 300 psf when wetted under constant load as indicated by the swell-consolidation test results shown on Figs. 11 and 12. A gradation of a typical sample of the gravelly clayey sand is shown on Fig. 7. The gravelly clayey sand settled upon loading and when wetted under constant load as indicated by the swell-consolidation test results shown on Fig. 11. Gradations of typical samples of the other granular soils are shown on Figs. 4, 6, and 8. The laboratory test results are summarized in Table I.

## 0.7 Potential foundation systems

The majority of the site is suitable for the use of a normal spread footing foundation system. The sandy clay soils in the northwest corner of the site in boring B-1 are not suitable for the use of normal spread footings because of their high swell potential and the existing fill in boring B-2 which could have erratic consolidation characteristics. A mat stiffened with ribs foundation system is suitable for the three buildings that may be founded on the sandy clay soils in the northwest corner of the site. The mat stiffened with ribs foundation system will also provide a stable floor. However, if the grading plan allows for the placement of at least 5 feet of non-expansive granular soils over the existing soils for the building foundations to bear on, those buildings may also be founded on spread footings. Design parameters and construction considerations are given below for both a mat stiffened with ribs foundation system and a spread footing foundation system.

### **0.7.1 Foundation design parameters - Mat stiffened with ribs**

The design and construction criteria presented below should be observed for a mat stiffened with ribs foundation system. This foundation system will withstand differential settlement and provide a stable floor for the planned buildings. The construction details should be considered when preparing project documents.

1. Mats bearing on the on-site materials should be designed for a maximum allowable soil bearing pressure of 3,000 psf.
2. Based on experience, we estimate differential settlements between interior stiffening ribs will be negligible.
3. The ribs on the exterior of the mat should be provided with adequate soil cover above their bearing elevation for frost protection. Placement of foundations at least 36 inches below the exterior grade is typically used in this area.
4. The lateral resistance of a mat foundation placed on the on-site materials will be a combination of the sliding resistance of the mat on the foundation materials and passive earth pressure against the sides of the ribs. Resistance to sliding at the bottom of the mat can be calculated based on a coefficient of friction of 0.35. Passive pressure against the sides of the ribs can be calculated using an equivalent fluid unit weight of 200 pcf. The coefficient of friction and passive pressure values recommended above assume mobilization of the ultimate soil strength. Suitable factors of safety should be included in the design to limit the strain that will occur at the ultimate strength, particularly in the case of passive resistance. Compacted fill placed against the sides of the ribs to resist lateral loads should be placed and compacted to at least 95% of the maximum standard Proctor (ASTM D-698) density at a moisture content above optimum.
5. The stiffening ribs should be spaced across the mat and reinforced to resist an uplift of at least 1-inch between ribs. While the layout of the foundation system is the responsibility of the project structural engineer, the following suggestions are offered based on our experience with similar projects. In general, ribs should be provided around the

exterior of the mat. On the interior of the mat, ribs should be provided at an approximate maximum spacing between ribs of 10.0 feet.

6. The following design parameters should be used:
  - (a) Edge Lift,  $e_m = 2.5$  ft.,  $y_m = 0.615$  inch
  - (b) Center Lift,  $e_m = 5.5$  ft.,  $y_m = 1.120$  inch
  - (c) Soil Subgrade Modulus,  $k_s = 87.0$  lb/in<sup>3</sup>.
7. The fill materials required beneath the foundation to achieve finish grade should similar to the on-site soils and be approved by the geotechnical engineer prior to placement. The fill should be placed and compacted to at least 95% of the maximum standard Proctor (ASTM D-698) density at a moisture content above optimum.
8. A representative of the geotechnical engineer should observe all foundation excavations prior to concrete placement.

### 0.7.2 Foundation design parameters - spread footings

The design and construction criteria presented below should be observed for a spread foundation system. The construction details should be considered when preparing project documents.

1. Footings bearing on undisturbed natural soils or compacted structural fill should be designed for an allowable soil bearing pressure of 3,000 psf. Footings should also be designed for a minimum dead load pressure of 800 psf. The compacted structural fill should consist of non-expansive granular soils compacted to 100% of the maximum standard Proctor (ASTM D-698) within 2 percentage points of the optimum moisture content.
2. Based on one-dimensional consolidation theory, we estimate total settlement for footings designed and constructed as discussed in this section will be approximately 1 inch. Differential settlements across individual buildings are estimated to be approximately 1/2 inch.
3. Exterior footings and footings beneath unheated areas should be provided with adequate soil cover above their bearing elevation for frost

protection. Placement of foundations at least 36 inches below exterior grade is typically used in this area.

4. The lateral resistance of a spread footing bearing on undisturbed natural soils and compacted structural fill will be a combination of the sliding resistance of the footing on the foundation materials and passive earth pressure against the side of the footing. Resistance to sliding at the bottoms of the footings can be calculated based on a coefficient of friction of 0.40. Passive pressure against the sides of the footings can be calculated using an equivalent fluid unit weight of 250 pcf. The coefficient of friction and passive pressure values recommended above assume mobilization of the ultimate soil strength. Suitable factors of safety should be included in the design to limit the strain that will occur at the ultimate strength, particularly in the case of passive resistance.
5. Continuous foundation walls should be reinforced top and bottom to span an unsupported length of at least 12 feet.
6. Areas of loose material encountered within the foundation excavation should be removed and the footings extended to adequate bearing material. As an alternative, the loose material may be removed and replaced with non-expansive fill material compacted to 100% of the maximum standard Proctor (ASTM D-698) density within 2 percentage points of the optimum moisture content. New fill should extend down from the edges of the footings at a 1 horizontal to 1 vertical projection.
7. A representative of the soil engineer should observe all footing excavations prior to concrete placement.

## 0.8 Floor slabs

Floor slabs present a problem where expansive materials are present near floor slab elevation because sufficient dead load cannot be imposed on them to resist the uplift pressure generated when the materials are wetted and expand. Based on the moisture-volume change characteristics of the materials encountered, we believe slab-on-ground construction may be used, provided the risk of distress resulting from slab movement is accepted by the owner.



The following measures should be taken to reduce damage which could result from movement should the underslab materials be subjected to moisture changes.

1. Floor slabs should be separated from all bearing walls and columns with expansion joints that allow unrestrained vertical movement.
2. Interior non-bearing partitions resting on floor slabs should be provided with slip joints at the bottoms so that, if the slabs move, the movement can not be transmitted to the upper structure. This detail is also important for wallboards, stairways, and door frames. Slip joints that will allow at least 4 inches of vertical movement are recommended.
3. Floor slab control joints should be used to reduce damage due to shrinkage cracking. We suggest joints be provided on the order of 15 feet on center. The requirements for slab reinforcement should be established by the designer based on experience and the intended slab use. A minimum 4-inch thick layer of free-draining gravel should be placed beneath the slabs. This material should consist of minus 1 1/2 inch aggregate with less than 10% passing the No. 4 sieve and less than 5% passing the No. 200 sieve. The granular layer will aid drainage.
4. All plumbing lines should be tested before operation. Where plumbing lines enter through the floor, a positive bond break should be provided. Flexible connections should be provided for slab-bearing mechanical equipment.

## 0.9 Foundation walls

Foundation walls that are laterally supported and can be expected to undergo only a moderate amount of deflection should be designed for a lateral earth pressure computed based on an equivalent fluid unit weight of 50 pcf for backfill consisting of the on-site soils.

All foundation walls should be designed for appropriate hydrostatic pressures. The pressures recommended above assume drained conditions behind the walls and a horizontal backfill surface. The buildup of water behind a wall or an upward sloping backfill surface will increase the lateral pressure imposed on a foundation wall.

The lateral resistance of foundation walls footings placed on undisturbed natural soils and compacted structural fill will be a combination of the sliding resistance of the footing on the foundation materials and passive earth pressure against the side of the footing. Resistance to sliding at the bottoms of the footings can be calculated based on a coefficient of friction of 0.4. Passive pressure against the sides of the footings can be calculated based on an equivalent fluid unit weight of 250 pcf. The coefficient of friction and passive pressure values recommended above assume mobilization of the ultimate soil strength. Suitable factors of safety should be included in the design to limit the strain that will occur at the ultimate strength, particularly in the case of passive resistance.

Compacted fill placed against the sides of the footings to resist lateral loads should be a non-expansive material. Fill should be placed and compacted to at least 95% of the maximum standard Proctor (ASTM D-698) density at a moisture content near optimum.

## 0.10 Water soluble sulfates

The concentration of water soluble sulfates measured in samples obtained from the exploratory borings ranged from 0.01% to 0.04%. This concentration of water soluble sulfates represents a negligible degree of sulfate attack on concrete exposed to these materials. The degree of attack is based on a range of negligible, positive, severe, and very severe as presented in the U.S. Bureau of Reclamation Concrete Manual.

Based on this information, we believe special sulfate resistant cement will not be required for concrete exposed to the on-site soils.

## 0.11 Underdrain system

If the planned buildings have crawlspaces, the crawlspaces should be protected by an underdrain system.

The underdrain system should consist of perimeter drains. Free-draining granular material used in the drain system should contain less than 5% passing the No. 200 sieve, less than 10% passing the No. 4 sieve and have a maximum size of  $1\frac{1}{2}$  inch.

The drains should consist of drainpipe placed in the bottom of a trench

and surrounded above the invert level with free-draining granular material. The free-draining material should extend 1 foot above the crawlspace excavation level for an exterior drain or to the interior grade for an interior drain. The perimeter drains should be at least 4 inches in diameter. The drain lines should be placed at least 1 foot below the interior grade and graded to sumps at a minimum slope of  $\frac{1}{2}\%$ . The underdrain system should be sloped to a sump where water can be removed by pumping or gravity drainage.

## 0.12 Surface drainage

The following drainage precautions should be observed during construction and maintained at all times after the buildings have been completed.

1. Excessive wetting or drying of the foundation excavations and under-slab areas should be avoided during construction.
2. Exterior backfill should be adjusted to near optimum moisture and compacted to at least 95% of the maximum standard Proctor (ASTM D-698) density in pavement areas and to at least 90% of the maximum standard Proctor (ASTM D-698) density in landscape areas.
3. The ground surface surrounding the exterior of the buildings should be sloped to drain away from the foundation in all directions. We recommend a minimum slope of 6 inches in the first 10 feet in unpaved areas and a minimum slope of 3 inches in the first 10 feet in paved areas.
4. Roof downspouts and drains should discharge well beyond the limits of all backfill.

## 0.13 Pavement design

A pavement section is a layered system designed to distribute concentrated traffic loads to the subgrade. Performance of the pavement structure is directly related to the physical properties of the subgrade soils and traffic loadings. Soils are represented for pavement design purposes by means of a soil support value for flexible pavements and a modulus of subgrade reaction for rigid pavements. Both values are empirically related to strength.

Pavement design procedures are based on strength properties of the subgrade and pavement materials assuming stable, uniform conditions. Certain soils, such as those encountered on this site, are potentially expansive and require additional precautions be taken to provide for adequate pavement performance. Expansive soils are problematic only if a source of water is present. If those soils are wetted, the resulting movements can be large and erratic. Therefore, pavement design procedures address expansive soils only by assuming they will not become wetted. Proper surface drainage is essential for adequate performance of pavement on these soils. The pavement design calculations are given in Appendix A.

### **0.13.1 Subgrade materials**

Based on the results of the field and laboratory studies, the subgrade materials at the site classify as A-6 with a group index of 8.7 in accordance with the American Association of State Highway and Transportation Officials (AASHTO) classification. A minimum CBR value of 3.9% was determined for a composite sample of the very sandy clay subgrade materials.

### **0.13.2 Design traffic**

The interior drive should be designed for an equivalent 18-kip daily load application (EDAL) of 8. The pavement sections presented below are based on laboratory test results, the design traffic loadings and pavement design procedures presented in the AASHTO Guide for Design of Pavement Structures.

### **0.13.3 Flexible pavements**

The pavement should consist of 6.0-inches of high quality aggregate base course and a 4.0-inch asphalt surface. An alternate full-depth asphalt section of 5.0-inches may be used.

### **0.13.4 Rigid pavements**

As an alternative, the pavement may consist of 5-inches of Portland cement concrete. All concrete should be based on a mix design established by a qualified engineer that will result in a minimum 28-day compressive strength of 4,000 psi. The concrete should be air entrained with approximately 6%

air. The concrete should be provided with longitudinal and transverse joints to control cracking.

#### **0.13.5 Subgrade preparation**

Prior to placing the pavement section, the entire subgrade area should be scarified to a depth of 8 inches, adjusted to a moisture content above optimum and compacted to 95% of the maximum standard Proctor density. The pavement subgrade should be proofrolled with a heavily loaded pneumatic-tired vehicle. Pavement design procedures assume a stable subgrade. Areas which deform excessively under heavy wheel loads are not stable and should be removed and replaced to achieve a stable subgrade prior to paving.

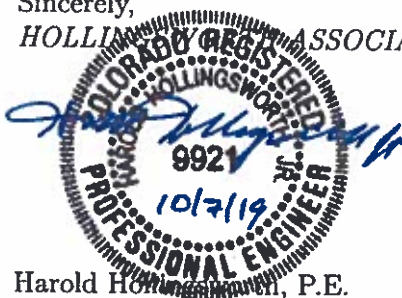
#### **0.13.6 Drainage**

The collection and diversion of surface drainage away from paved areas is extremely important to the satisfactory performance of pavement. Drainage design should provide for the removal of water from paved areas and prevent the wetting of the subgrade soils.

### **0.14 Limitations**

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in this area for use by the client for design purposes. The conclusions and recommendations submitted in this report are based upon the data obtained from the exploratory borings drilled at the locations shown on the exploratory boring plan and the proposed type of construction. The nature and extent of subsurface variations across the site may not become evident until excavation is performed. If during construction, fill, soil, rock, or water conditions appear to be different from those described herein, this office should be advised at once so reevaluation of the recommendations may be made. We recommend on-site observation of excavations and foundation bearing strata by a representative of the soil engineer.

Sincerely,  
HOLLINGSWORTH ASSOCIATES, INC.

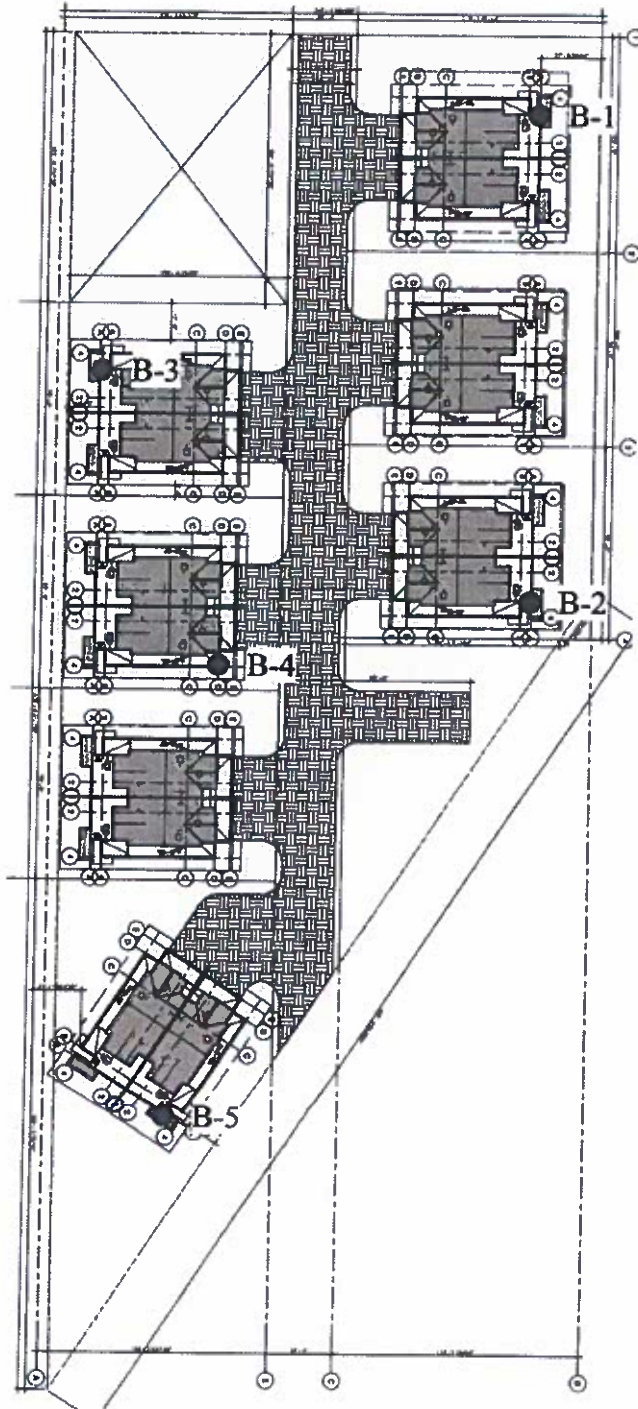


Harold Hollingsworth, P.E.  
HH: cm  
Reviewed by: TRH  
Attachments

Harold Hollingsworth, P.E. Digitally signed by Harold Hollingsworth, P.E.  
Date: 2019.10.09 12:19:06 -06'00'



Not to scale



● B-1      --Exploratory boring

Base map provided by the client

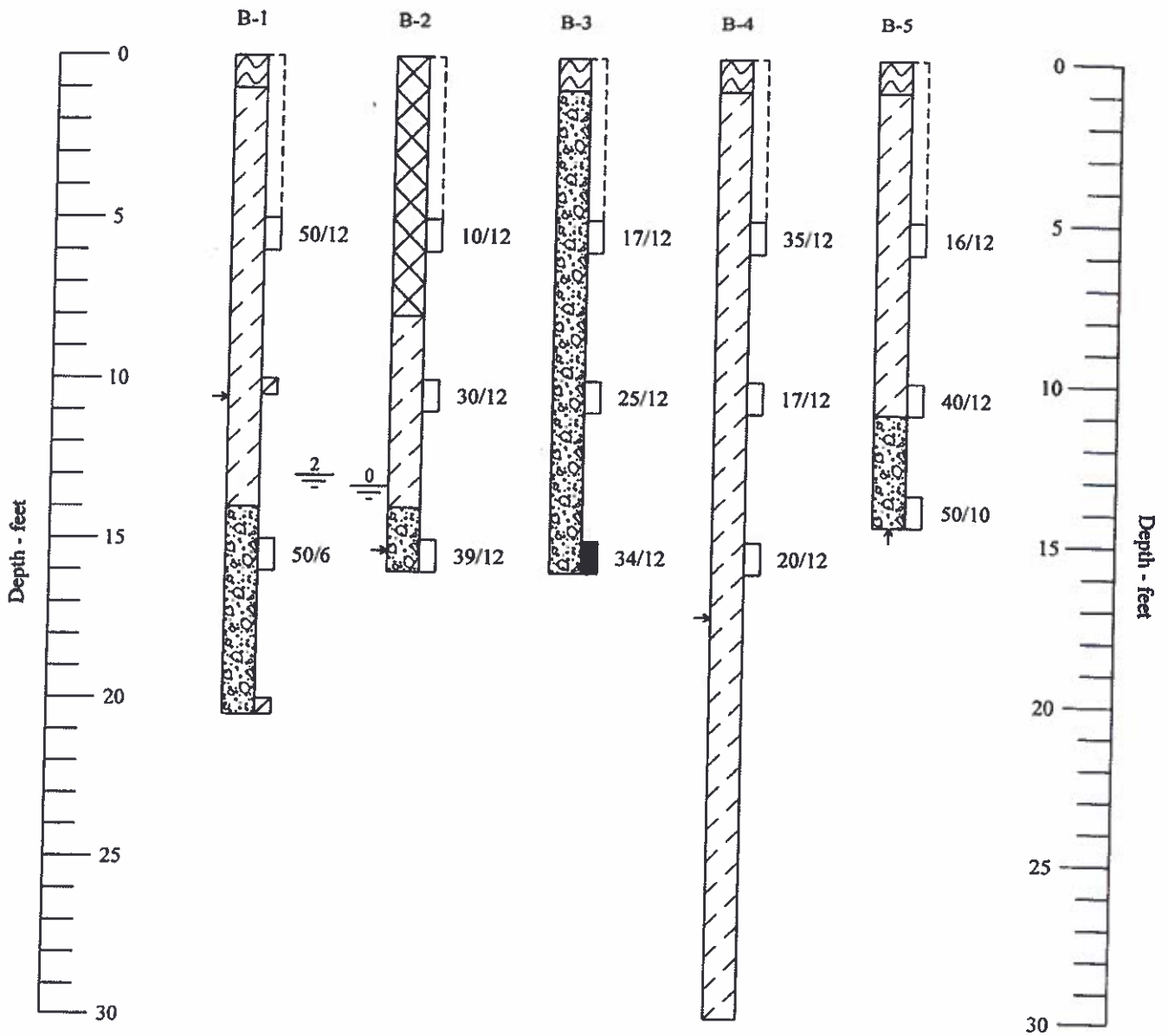
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HOLLINGSWORTH ASSOCIATES  
Geotechnical/Environmental Engineers

Locations of Exploratory Borings

Fig. 1





## LEGEND



Topsoil.



Clay (CL), sandy to very sandy, very stiff to hard, occasionally grades into a gravelly clayey sand, calcareous, light brown to dark brown, moist.



Fill: Clay (CL), sandy, stiff, scattered construction debris, brown, moist.



Sand and gravel (SP-GP), clean to silty, medium dense to very dense, numerous scattered cobble, light brown to brown, moist.



Disturbed bulk sample taken from auger cuttings.



Drive sample, 2-inch I.D., California liner sample.



Drive sample, 1 3/8-inch I.D., split spoon sample.

50/12

Drive sample blow count. Indicates that 50 blows of a 140-pound hammer falling 30 inches were required to drive the California or split spoon sampler 12 inches.



Small, discrete bag sample.

$\frac{0.2}{-}$

Depth to water level and number of days after drilling measurement was made.



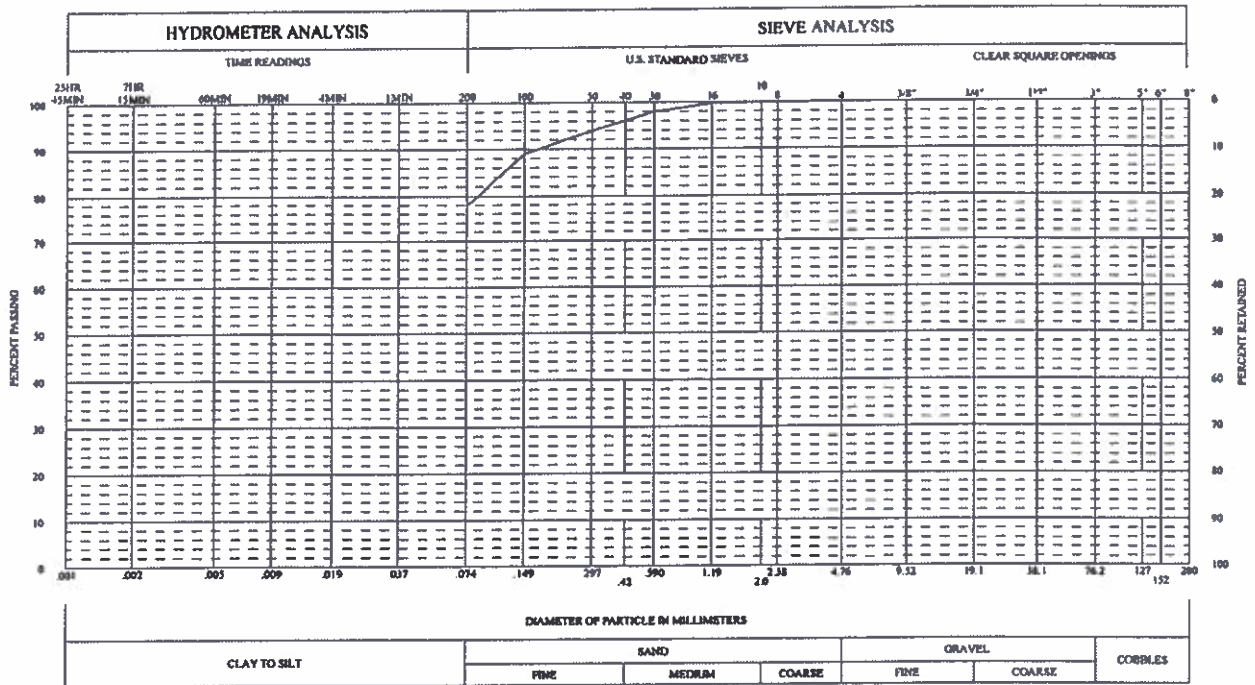
Depth at which boring caved.



Practical drill rig refusal.

## NOTES

1. The exploratory borings were drilled on September 18, 2019, with a 4-inch diameter continuous flight auger.
2. The exploratory borings were drilled within the planned building footprints.
3. Logs are drawn to depth.
4. The lines between materials shown in the borings represent the approximate boundaries between material types and the transitions may be gradual.
5. Water level readings shown on the log were made at the time and under conditions indicated. Fluctuations in the water levels may occur with time.



GRAVEL 0 %

SAND 22 %

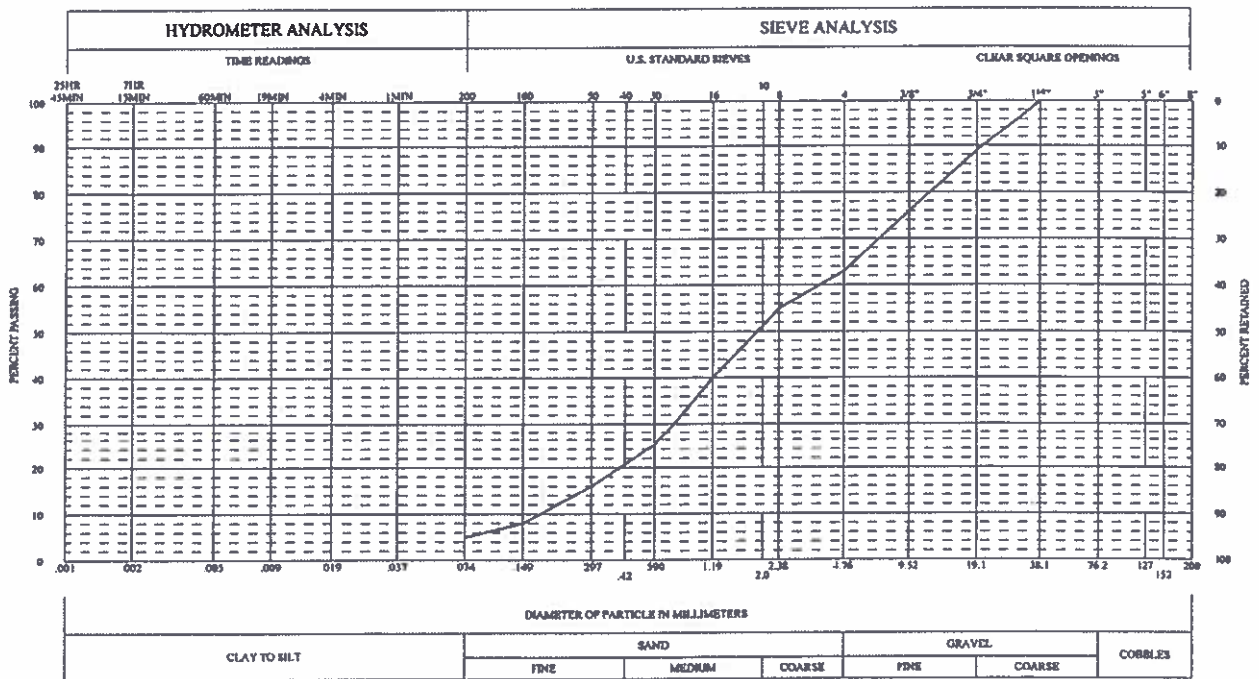
SILT AND CLAY 78 %

LIQUID LIMIT 48 %

PLASTICITY INDEX 31 %

SAMPLE OF Sandy clay

FROM Boring B-1 at 5'-0"



GRAVEL 37 %

SAND 58 %

SILT AND CLAY 5 %

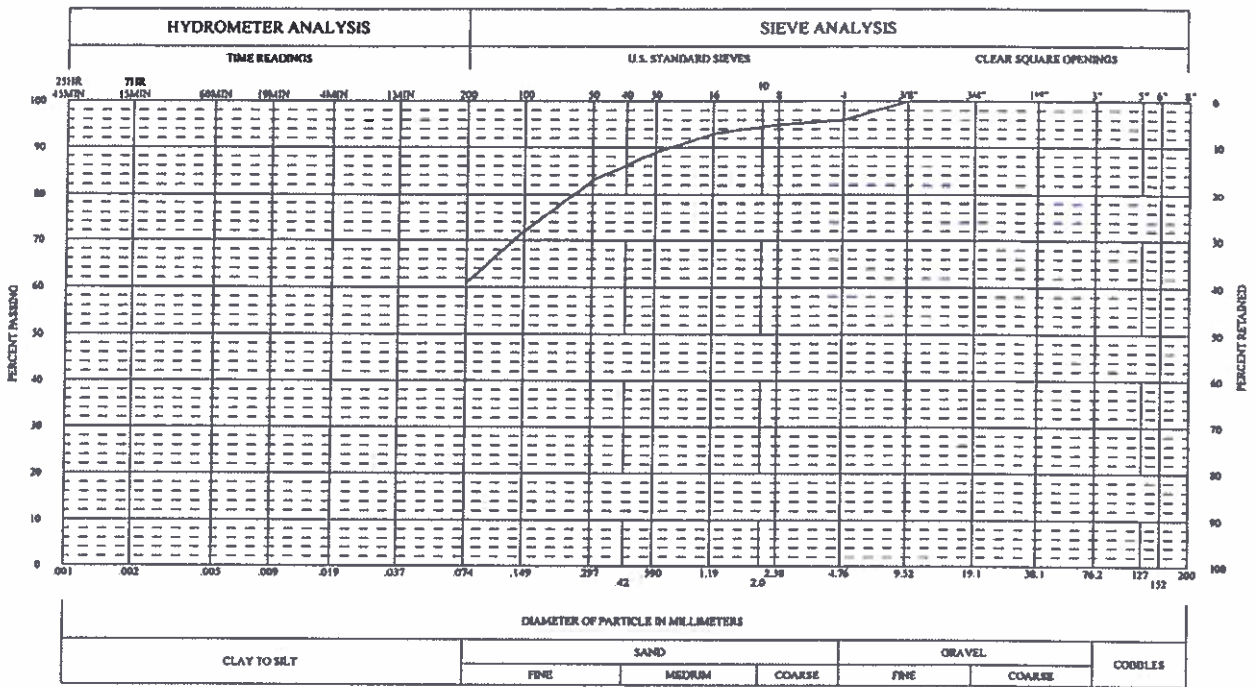
LIQUID LIMIT %

PLASTICITY INDEX NP %

SAMPLE OF Gravelly sand

FROM Boring B-1 at 15'-0"

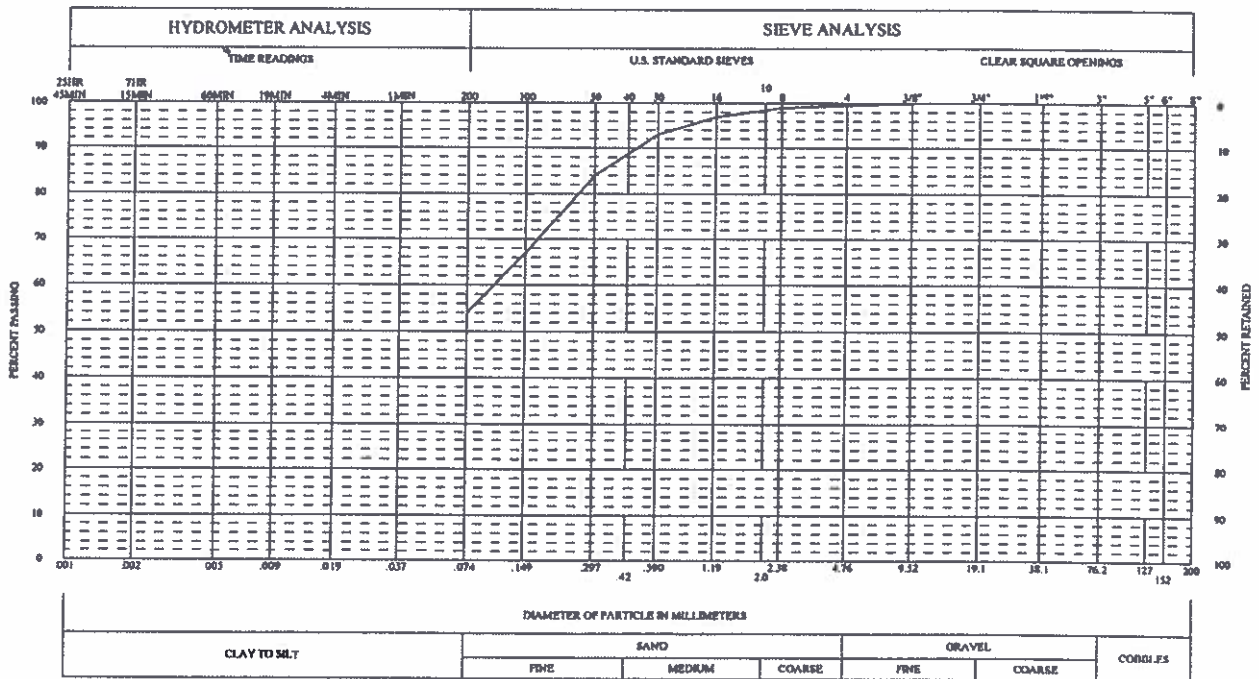




GRAVEL 4 %                      SAND 35 %                      SILT AND CLAY 61 %

LIQUID LIMIT 45 %                      PLASTICITY INDEX 28 %

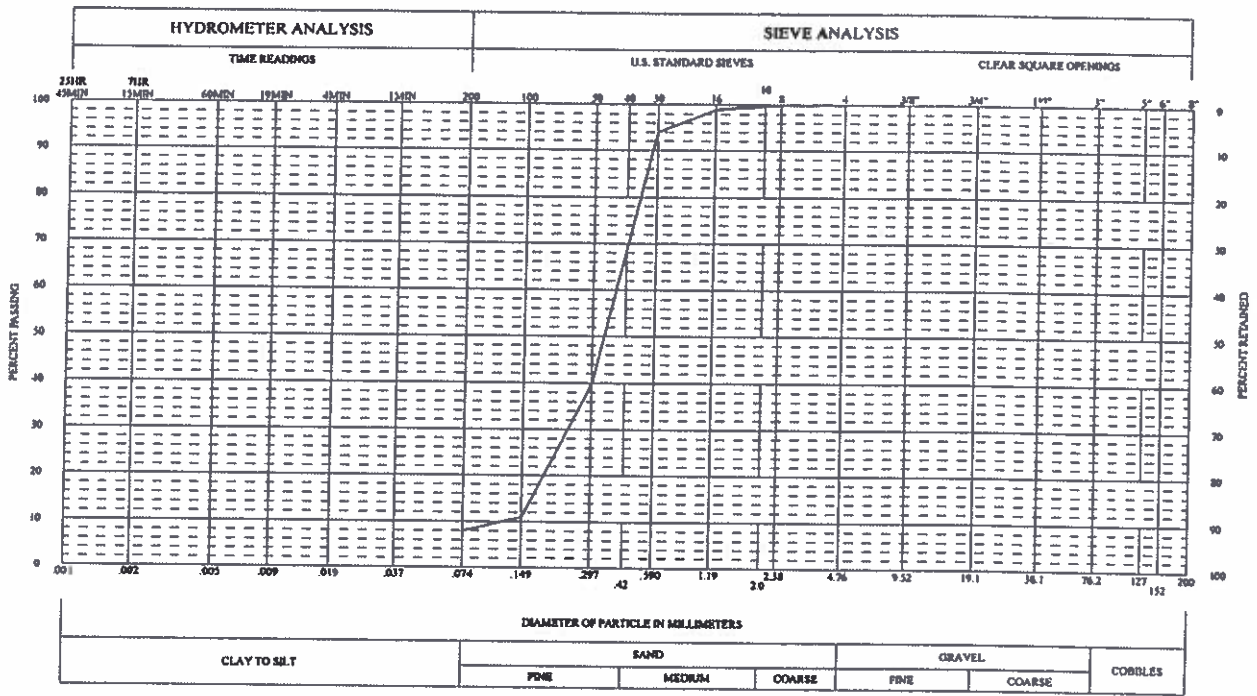
SAMPLE OF Sandy clay                      FROM Boring B-2 at 5'-0"



GRAVEL 1 %                      SAND 45 %                      SILT AND CLAY 54 %

LIQUID LIMIT 49 %                      PLASTICITY INDEX 33 %

SAMPLE OF Very sandy clay                      FROM Boring B-2 at 10'-0"



GRAVEL 0 %

SAND 92 %

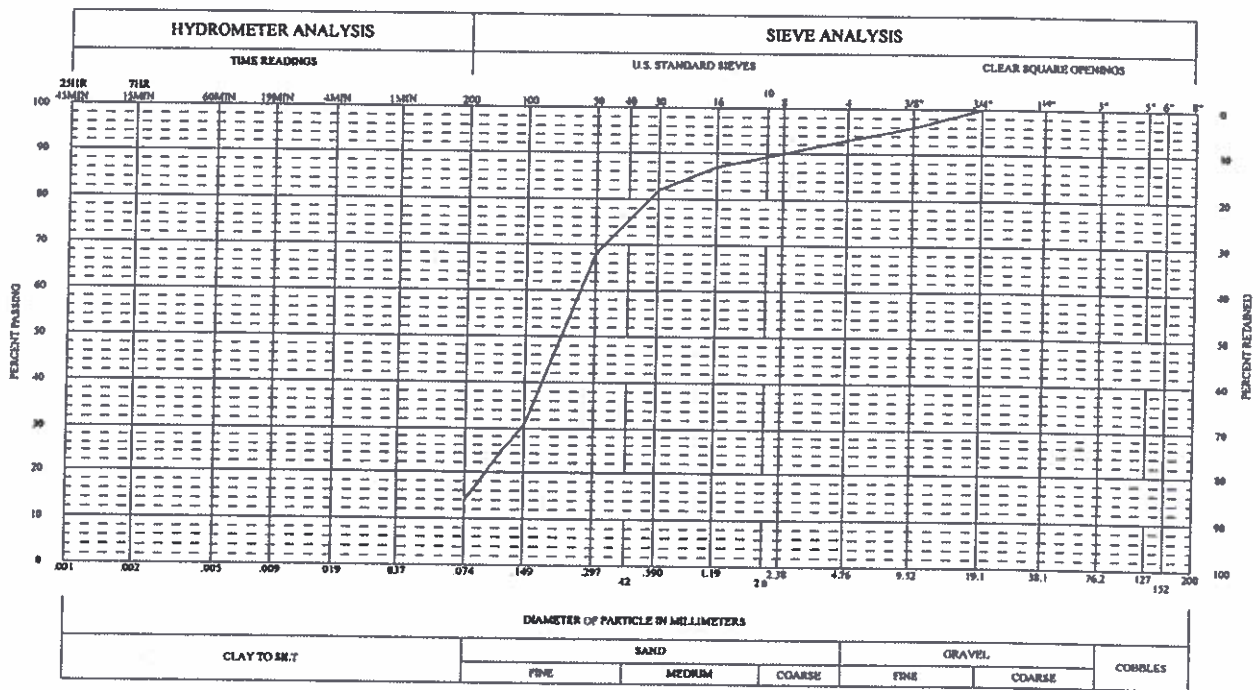
SILT AND CLAY 8 %

LIQUID LIMIT %

PLASTICITY INDEX NP %

SAMPLE OF Slightly silty sand

FROM Boring B-3 at 5'-0"



GRAVEL 7 %

SAND 79 %

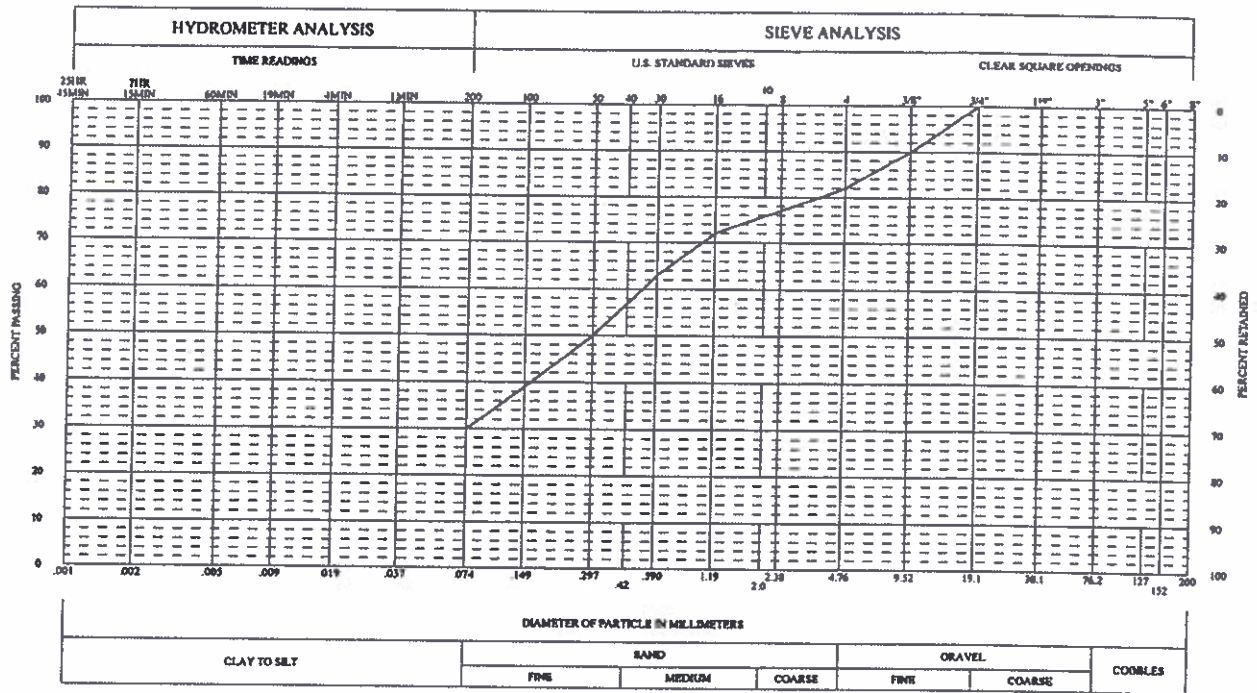
SILT AND CLAY 14 %

LIQUID LIMIT %

PLASTICITY INDEX NP %

SAMPLE OF Slightly gravelly silty sand

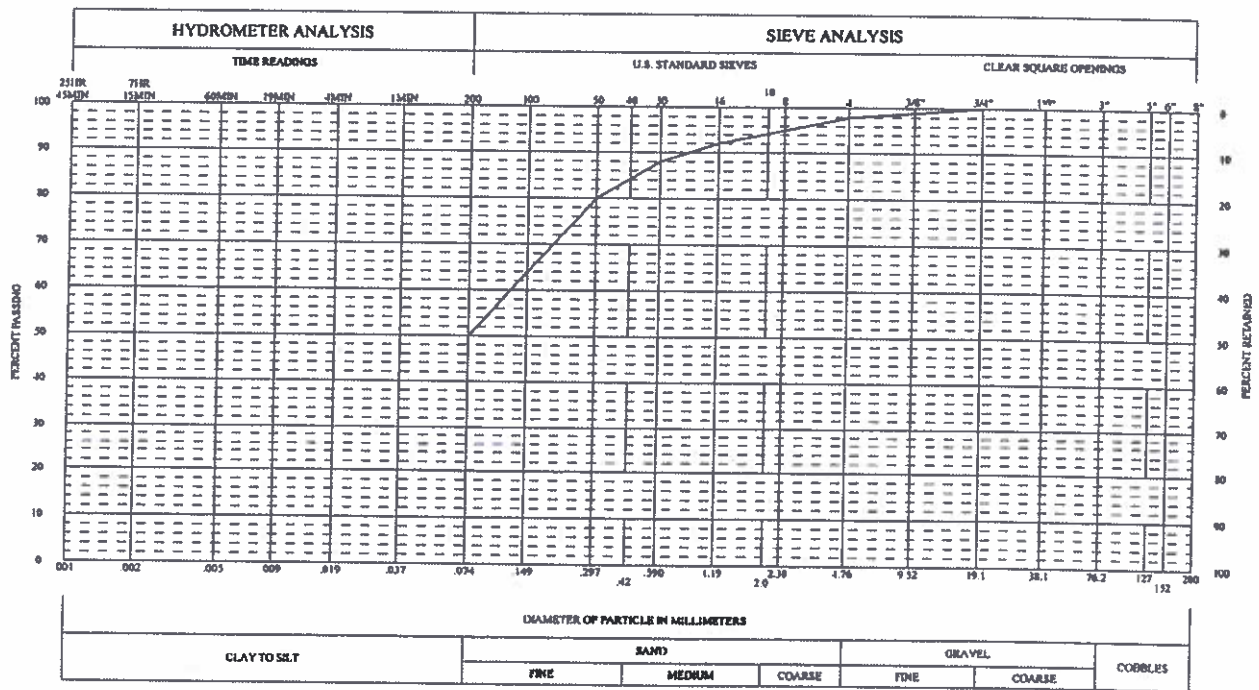
FROM Boring B-3 at 10'-0"



GRAVEL 18 %                      SAND 52 %                      SILT AND CLAY 30 %

LIQUID LIMIT 31 %                      PLASTICITY INDEX 16 %

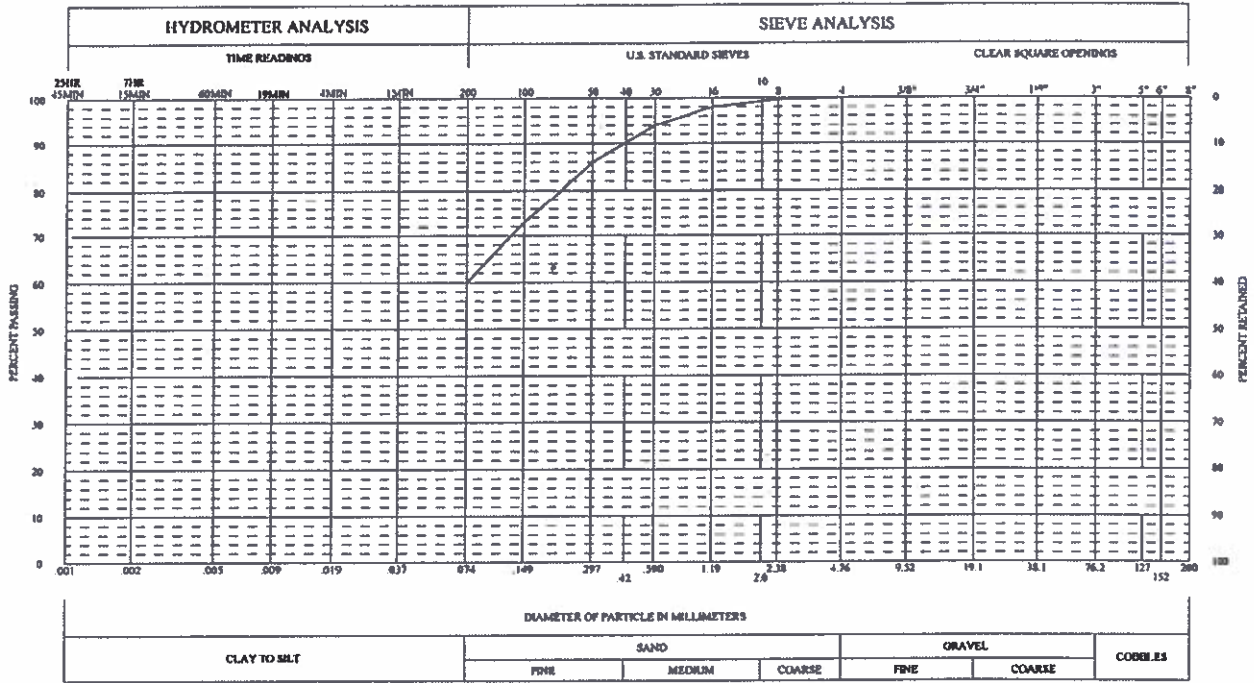
SAMPLE OF Gravelly clayey sand                      FROM Boring B-4 at 5'-0"



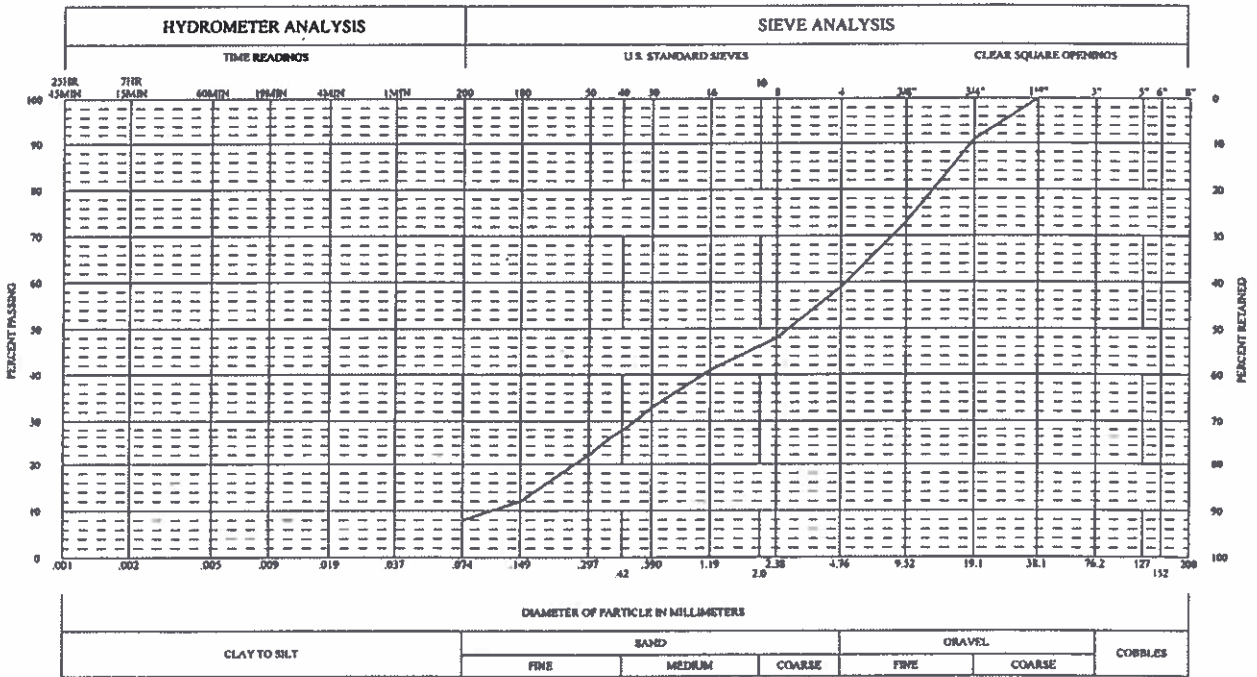
GRAVEL 3 %                      SAND 47 %                      SILT AND CLAY 50 %

LIQUID LIMIT 47 %                      PLASTICITY INDEX 31 %

SAMPLE OF Very sandy clay                      FROM Boring B-4 at 10'-0"

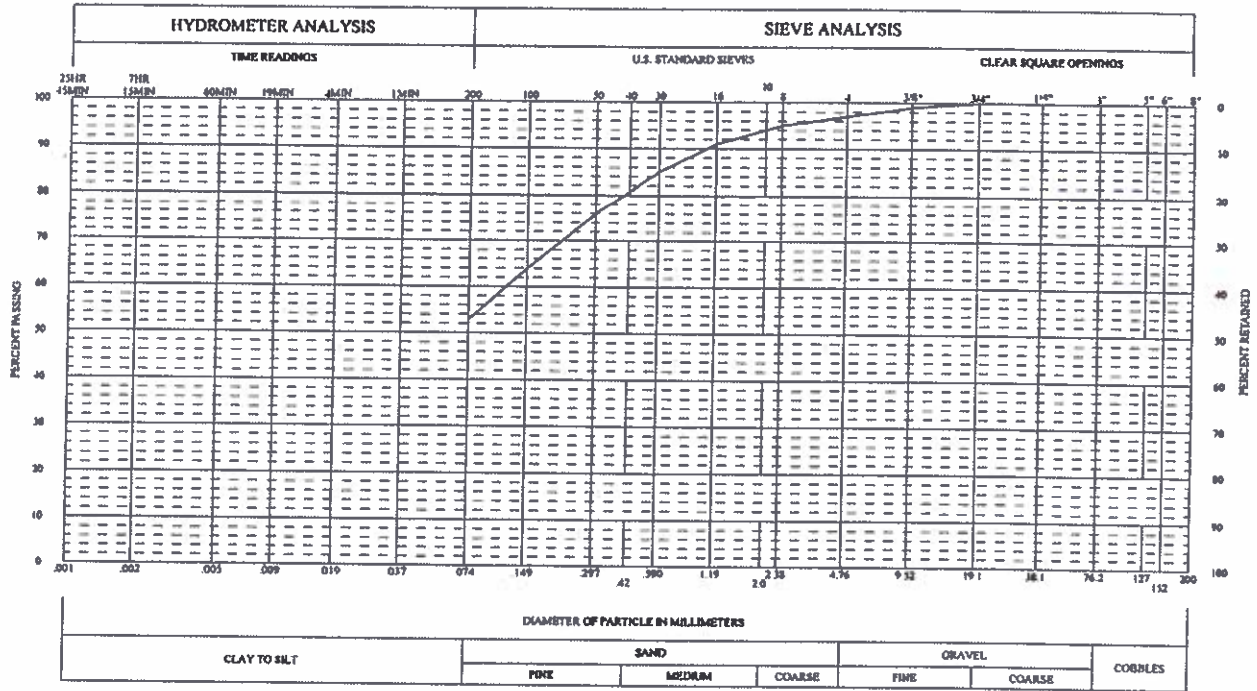


**GRAVEL 0 %                      SAND 40 %                      SILT AND CLAY 60 %**  
**LIQUID LIMIT 41 %                      PLASTICITY INDEX 23 %**  
**SAMPLE OF Very sandy clay                      FROM Boring B-5 at 5'-0"**

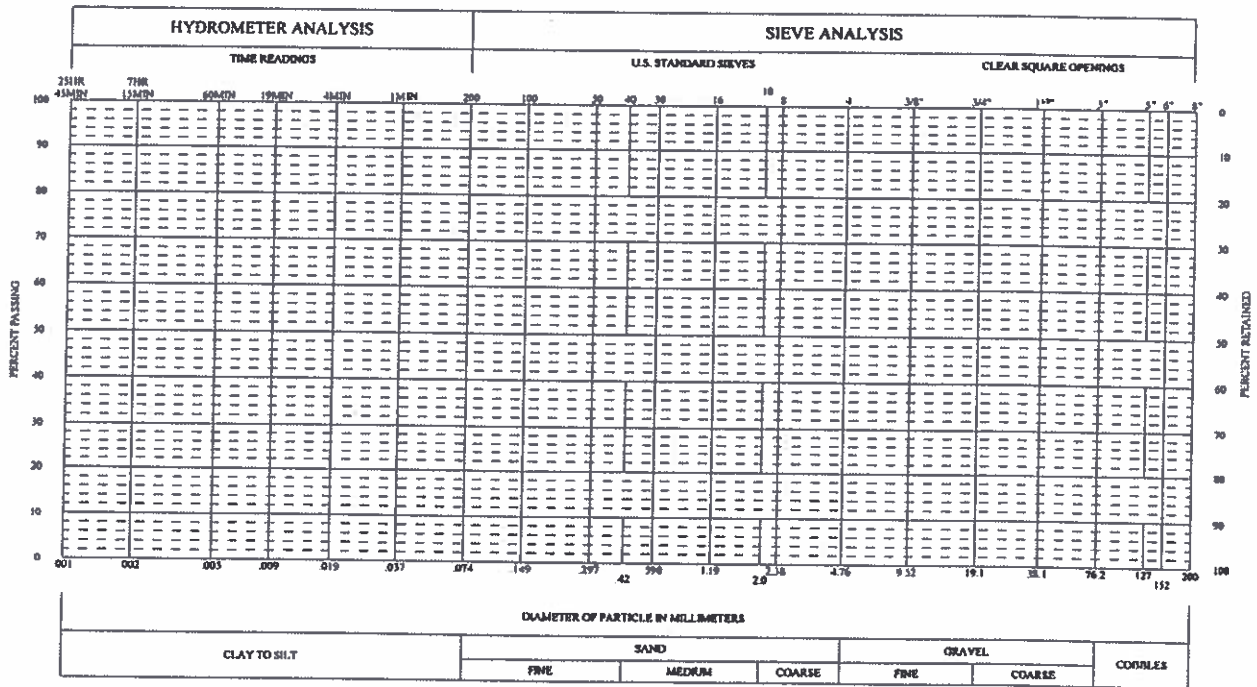


**GRAVEL 41 %                      SAND 51 %                      SILT AND CLAY 8 %**  
**LIQUID LIMIT %                      PLASTICITY INDEX NP %**  
**SAMPLE OF Slightly silty very gravelly sand                      FROM Boring B-5 at 15'-0"**

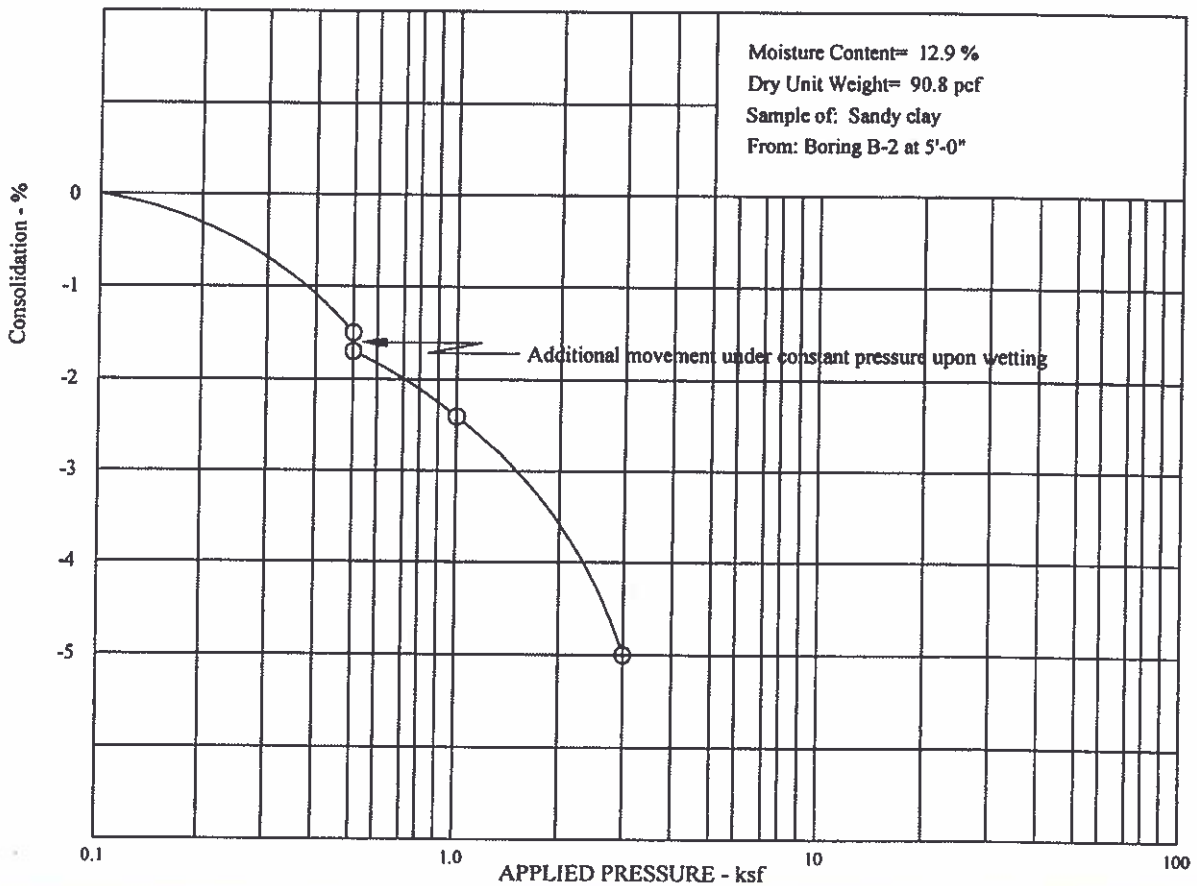
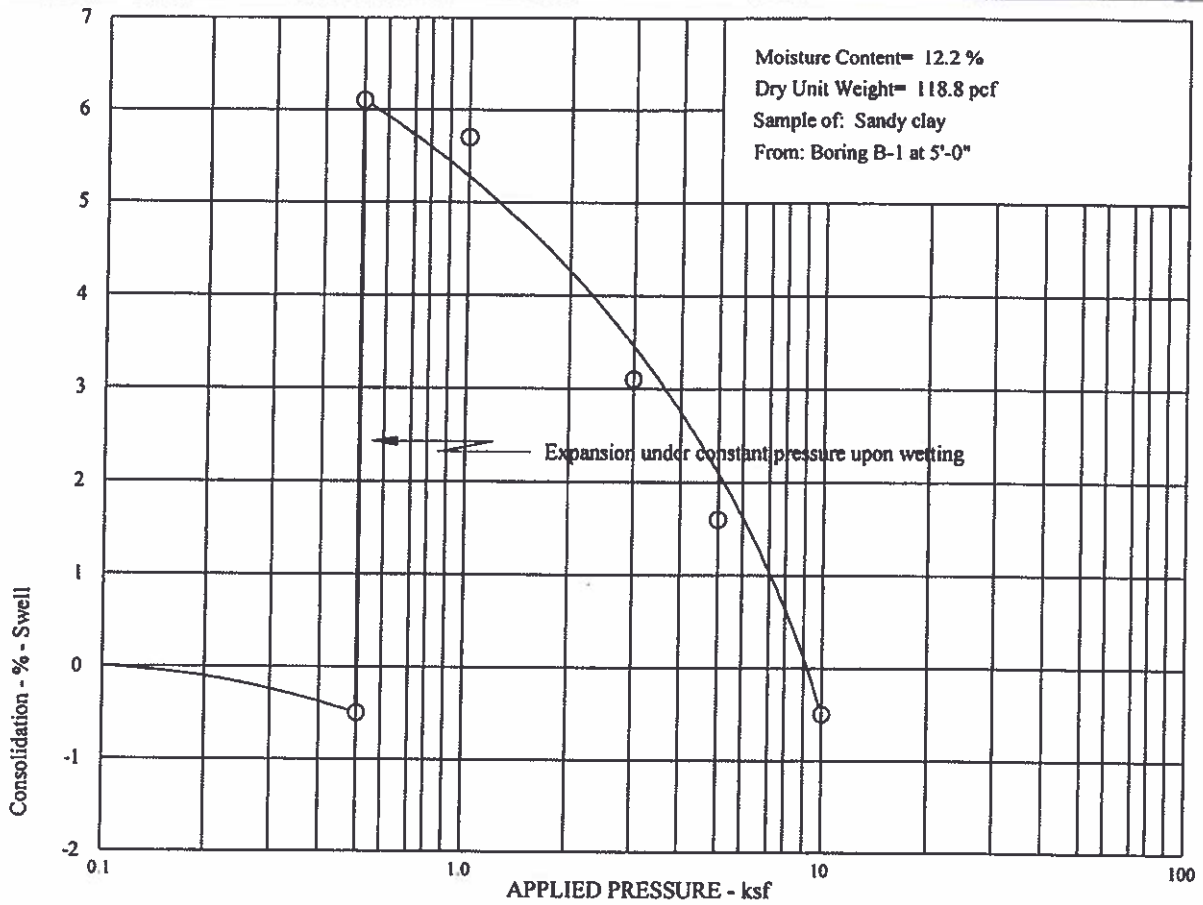




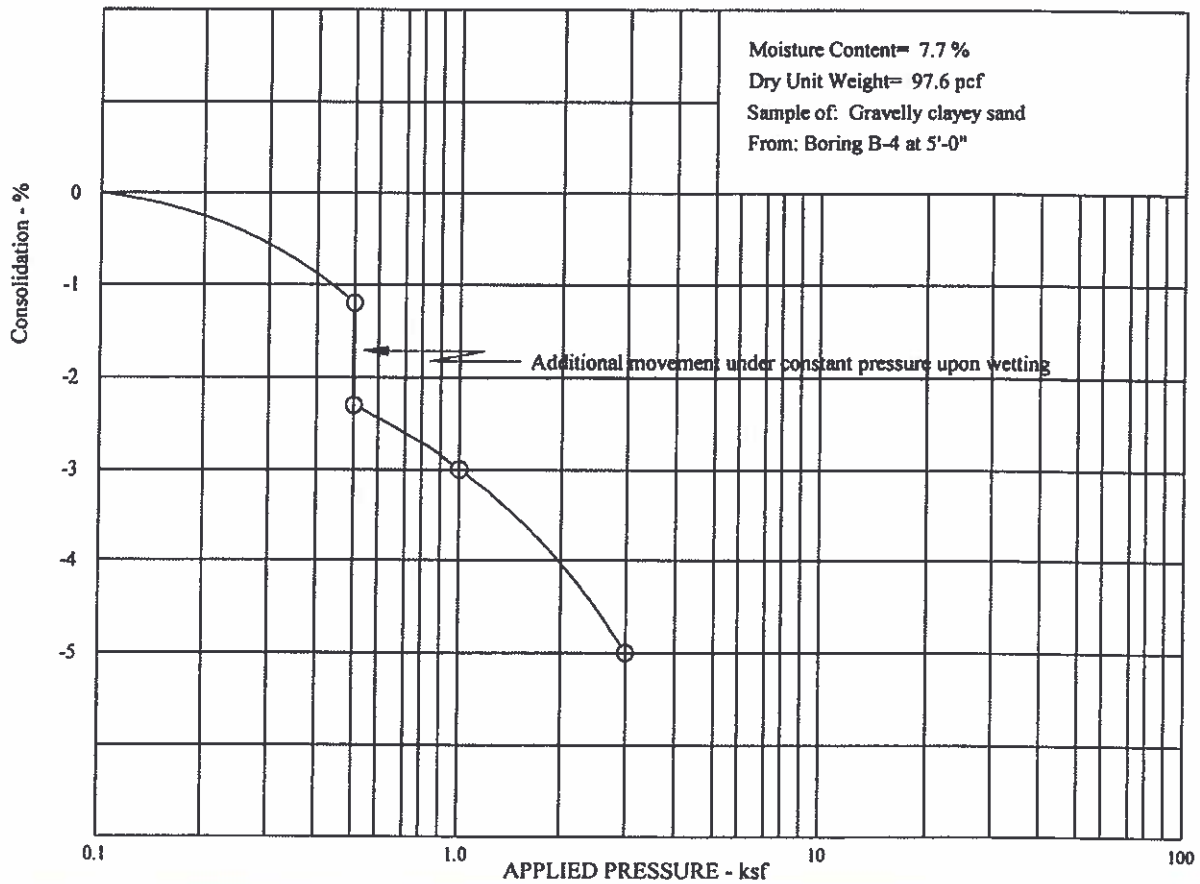
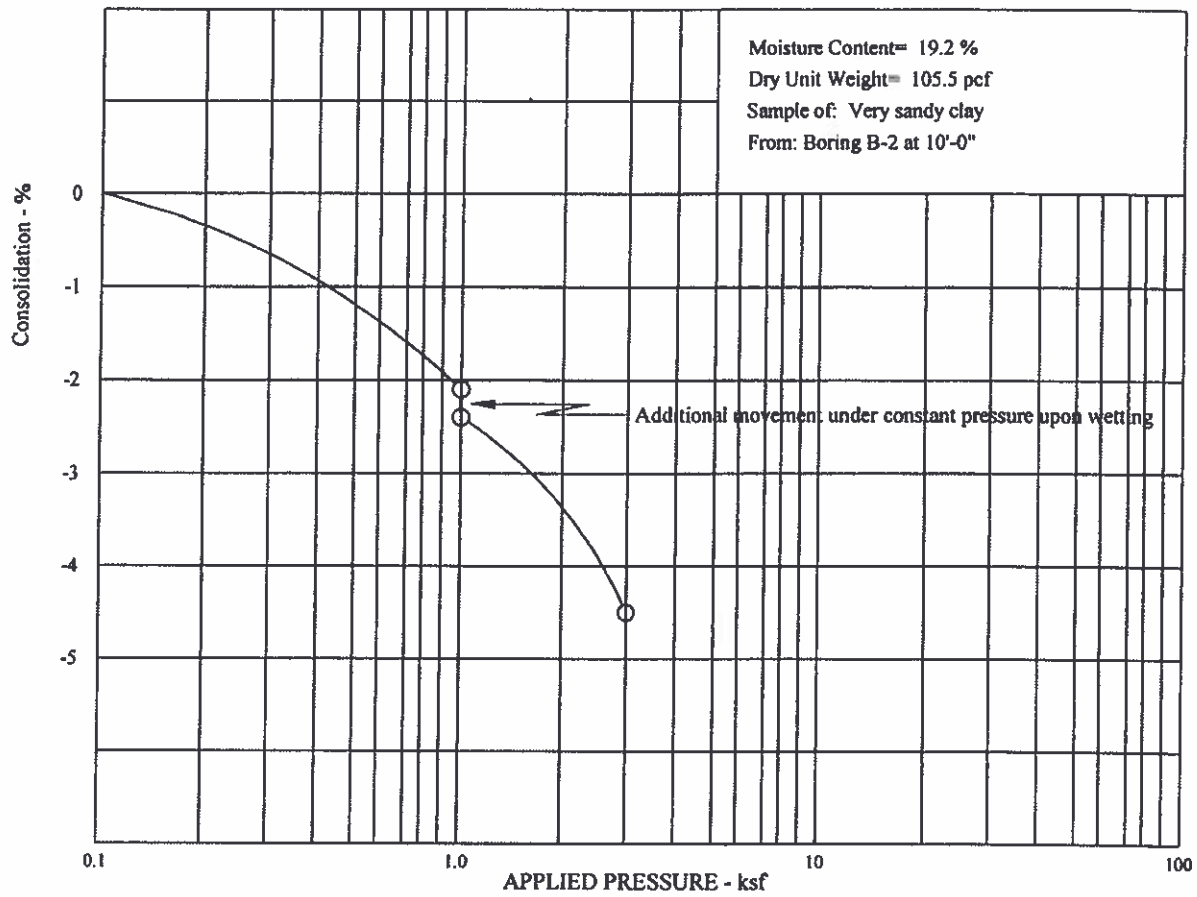
GRAVEL 3 %                      SAND 44 %                      SILT AND CLAY 53 %  
 LIQUID LIMIT 37 %                      PLASTICITY INDEX 23 %  
 SAMPLE OF Very sandy clay                      FROM Composite A

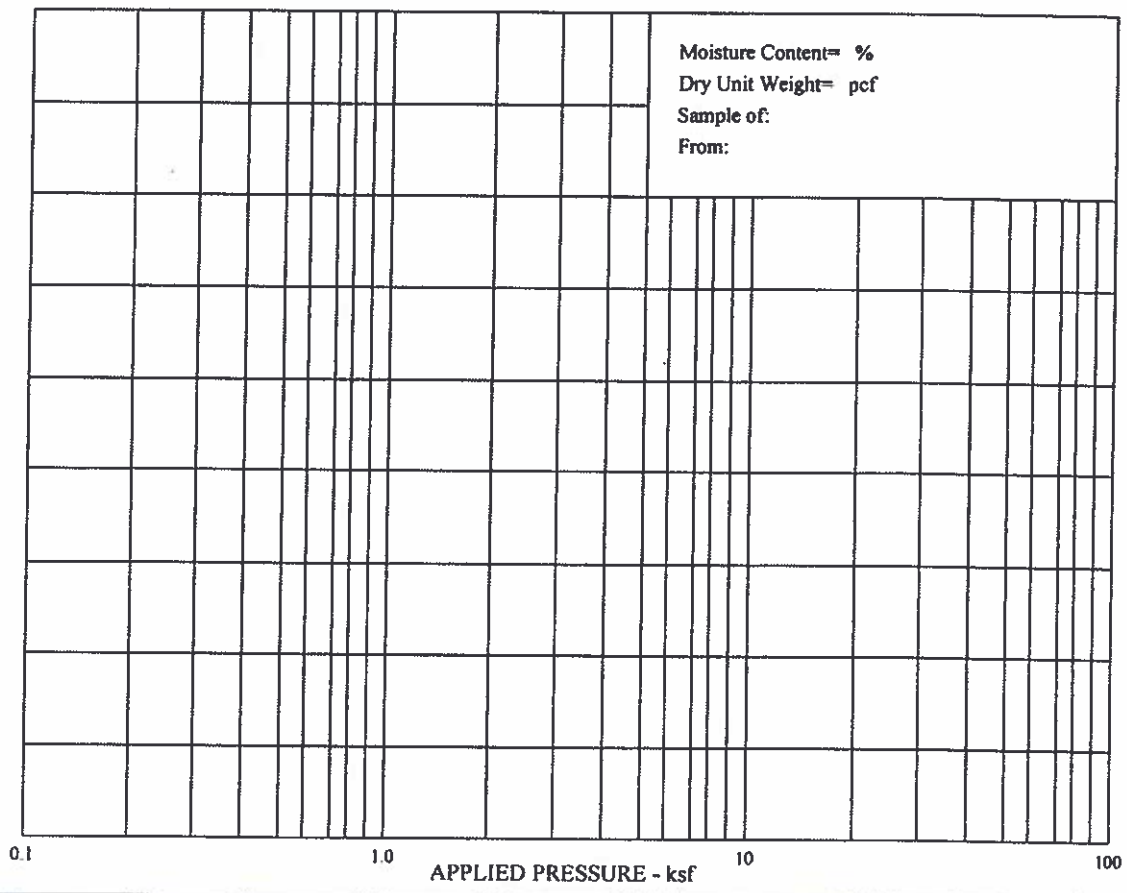
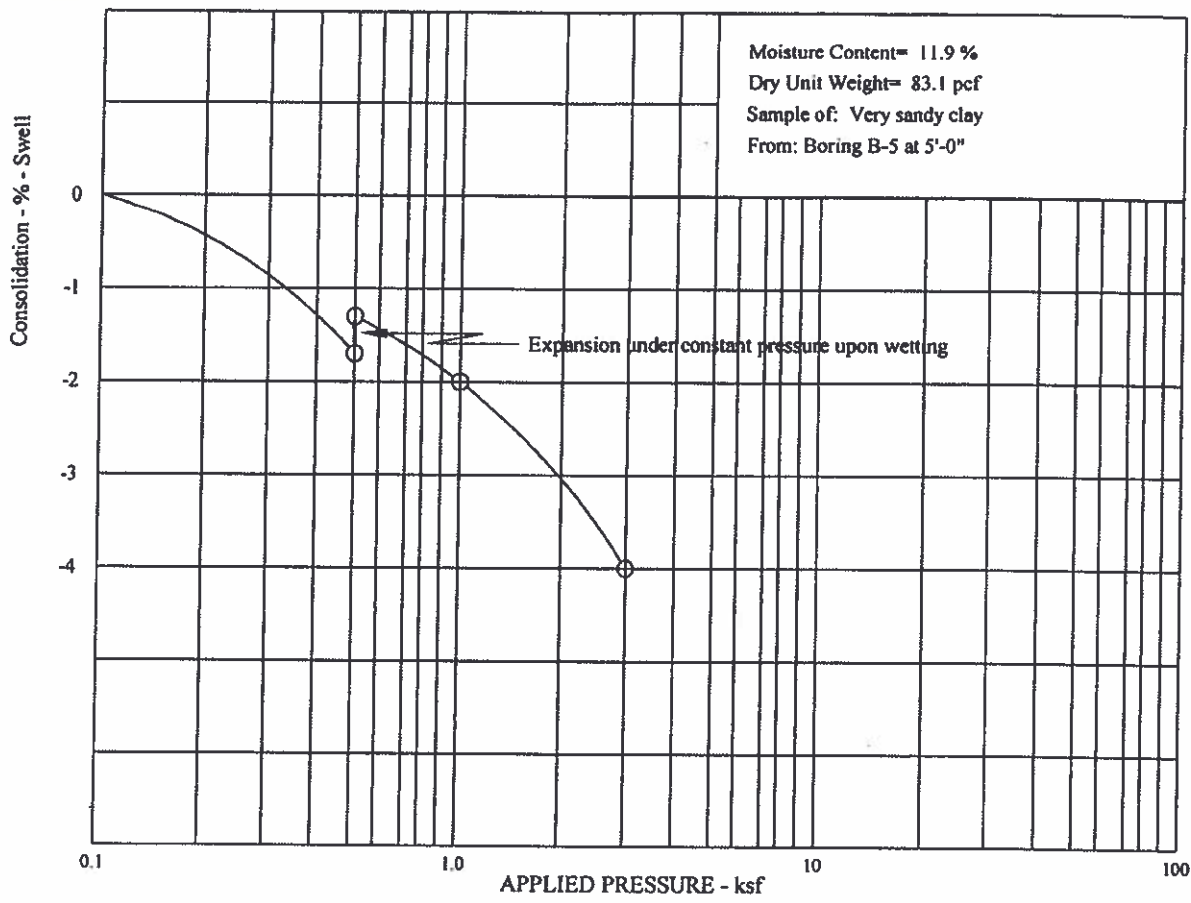


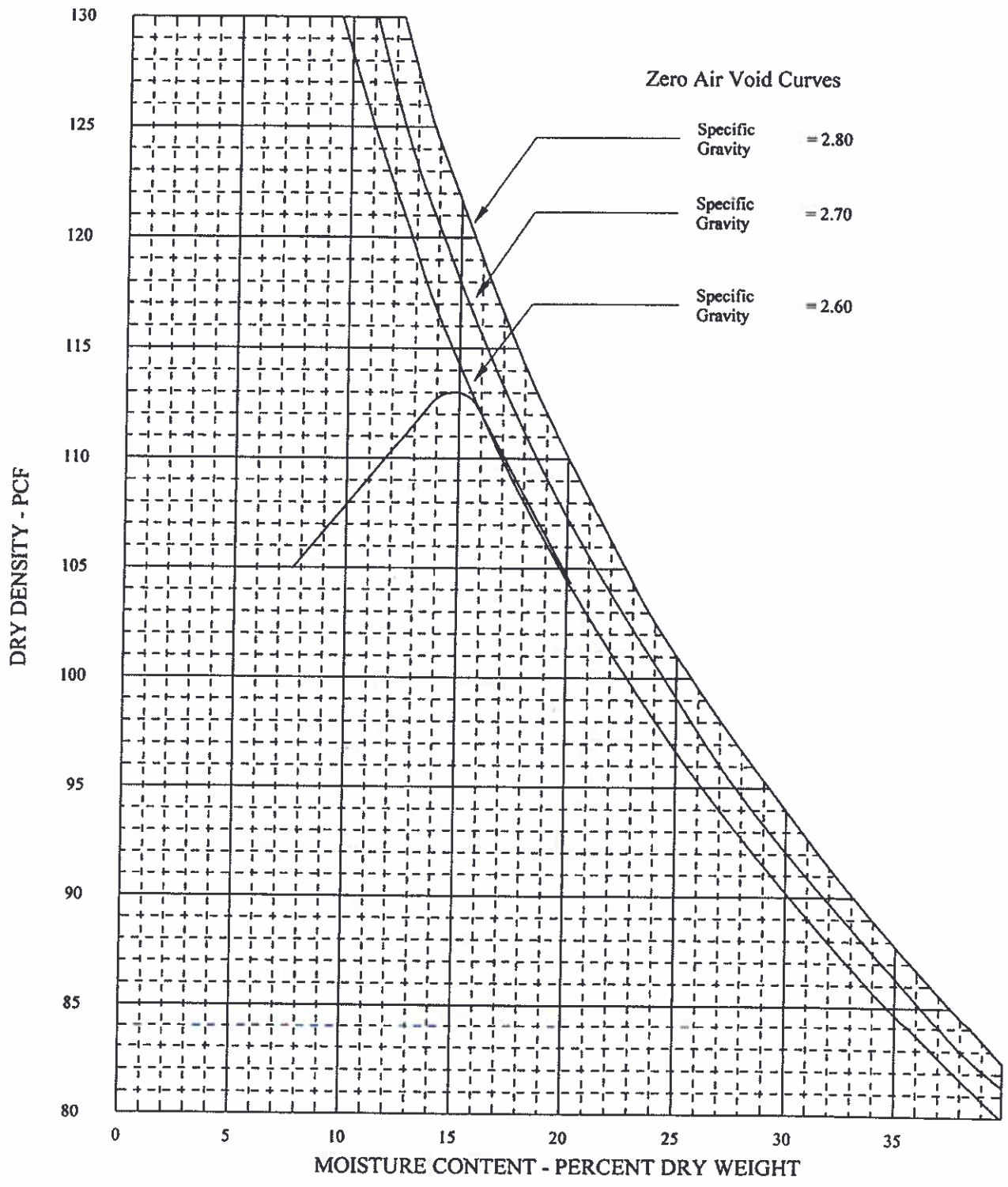
GRAVEL %                      SAND %                      SILT AND CLAY %  
 LIQUID LIMIT %                      PLASTICITY INDEX %  
 SAMPLE OF                      FROM











Location: 6642 Decatur Street, Denver, Colorado	Max Dry Density: 113.0 pcf
Sample: Composite A	Opt. Moist. Content: 14.9 %
Sample Description: Very sandy clay	Gravel 3 %    Sand 44 %    Silt and Clay 53 %
Procedure: ASTM D698, A	Liquid Limit: 37 %    Plasticity Index: 23 %




**APPENDIX A**

**Pavement Design Calculations**

Job No: 19-442

Project: Decatur Townhomes  
Interior Drive

 HOLLINGSWORTH ASSOCIATES  
Geotechnical/Environmental Engineers  
28975 W. Oxford Ave #7 Sheridan, Colorado 80110  
303-781-5188/fax 303-781-5224

Date: 10/7/19

Page 1 of 3

### Pavement Design:

Subgrade is a very sandy clay:  $A=6$ ,  $GP=8.7$   $CBR=3.9$   
 $BDLA=8$

### Flexible Pavement

Strength coefficient:  $HMA=0.44$  aggregate base course = 0.12

Design structural number = 2.41 from chart on page 3.

$SN = a_1 d_1 + a_2 d_2$   $a_1$  = thickness of asphalt  $a_2$  = thickness of base course

assume 6 inches of base course

$$2.4 = (0.44) a_1 + (0.12) (6)$$

$\frac{2.4 - 0.72}{0.44} = 3.8$  inches use 4 inches of asphalt over 6 inches of aggregate base course

### Rigid Pavement

working stress of concrete = 500 psi

required thickness of concrete pavement is less than 5 inches  
from page 3, use 6 inches of concrete pavement

# Design Nomographs for Pavements

Table 4.5

## Design Nomograph for Flexible Pavements Serviceability Index 2.0

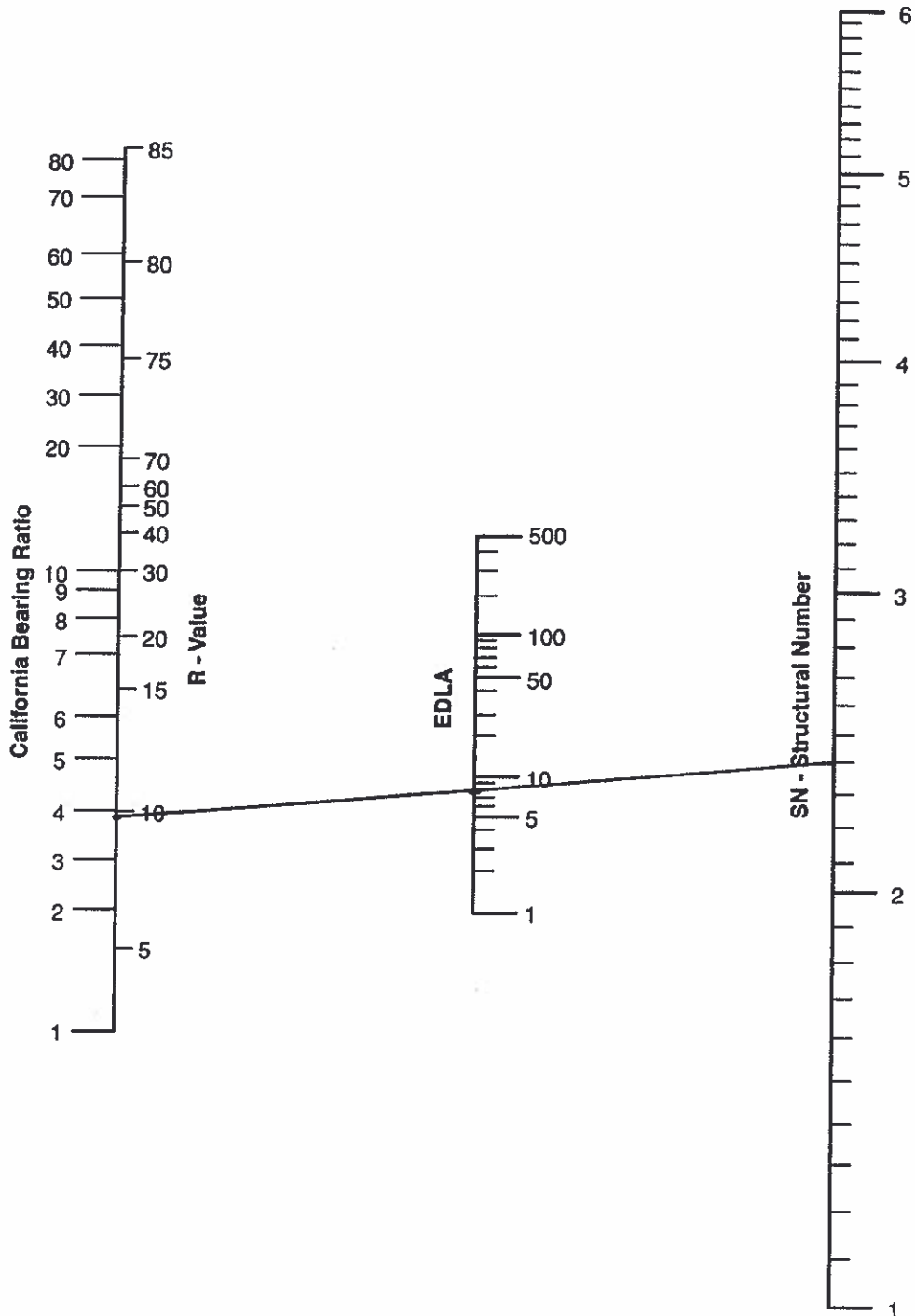


Table 4.7

**Design Nomograph for Rigid Pavements**  
Serviceability Index 2.0

