



ADDENDUM #1
AVENUE OF THE OAKS REALIGNMENT
BID # 21/22-005 / PWP # WA-2022-084
BIDS DUE NO LATER THAN: 1:45 PM ON DECEMBER 16, 2021
PUBLIC BID OPENING: 2:00 PM ON DECEMBER 16, 2021

This addendum is to notify all potential proposers of clarifications made to the Bid documents as stated below.

COVID-19 Precautions – Due to the City’s response to the COVID-19 virus and associated reduction in staff, in-person staff availability is limited. Bidders wishing to physically deliver their bids on the bid due date shall note that the Purchasing Office will receive bids in the lobby of City Hall beginning at 1PM on December 16th. Bids are due no later than 1:45PM. Bids may also be delivered to the Purchasing Department physical dropbox/mailbox, also located in the lobby of City Hall at any time the building is open.

Bid Document Changes, Clarifications and Additions

Included with this addendum are multiple items intended to supplement areas of the original bid document:

- 1) **Bid Item Schedule Revision** – Bidders shall replace the original Bid Item Schedule (Pages 5-10 of the original Bid Book) with the Revised Bid Item Schedule provided with this addendum.
- 2) **Bid Item Clarifications – Addendum 1** – The details concerning Bid Items 36, 37a, 37b, 38 and 56 are revised as provided with this addendum. All other portions of the original section shall remain.
- 3) **Technical Specifications-Addendum 1** – Section 305 of the original Technical Specifications are revised as provided in this Addendum. All other portions of the original section shall remain.
- 4) **Pre-Bid Meeting Agenda** – The agenda document for the pre-bid meeting is included in this addendum and includes answers to RFI’s made at, and subsequent to this meeting.
- 5) **Geotechnical Investigation Report** – The Geotechnical Investigation Report drafted by Black Eagle Consulting is included as an additional reference.
- 6) **Plan Sheet Revisions** – Four (4) revised plan sheets are included in this addendum.

Please note and adjust your bid according to the revisions, additions, deletions, clarifications or modifications as presented on this Addendum #1, which are made a part of this bid. NOTE: To avoid disqualification, this Addendum 1 (and any other addenda) must be signed by an authorized

representative of the bidding firm in the space provided and must be submitted with your firm's sealed proposal. Failure to return this addendum, duly signed, may be cause for rejection of the bid. ALL ADDENDA SHOULD BE SIGNED AND PLACED IN SEQUENTIAL ORDER AND ATTACHED TO THE FRONT OF THE BID PACKAGE, COMPLETE WITH ALL REQUIRED DOCUMENTS.

CONTRACTOR BUSINESS NAME

Dan Marran, C.P.M., CPPO
Contracts and Risk Manager

X _____
Authorized Signature

December 13, 2021

Printed Name of Person Signing

CITY OF SPARKS
BID ITEM SCHEDULE – REVISED BY ADDENDUM 1

BID TITLE: AVENUE OF THE OAKS REALIGNMENT
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PRICES must be valid for 90 calendar days after the bid opening.

COMPLETION of this project is expected **PURSUANT TO CONTRACT DOCUMENTS.**

BIDDER acknowledges receipt of _____ Addenda.

Bidder Name

(signature)

Refer to Special Technical Section for a map depicting the street locations and plan sheets provided

Item No.	Quantity	Unit	Description	Unit Price	Total Price
1	13	EA	Remove Existing Street Lights including Foundations and Appurtenances, complete.	\$ _____ /EA	\$ _____
2	23	EA	Remove Existing Bollard Lights including Foundations and Appurtenances, complete.	\$ _____ /EA	\$ _____
3	8	EA	Remove and Dispose of Cast Stone Pedestals, complete.	\$ _____ /EA	\$ _____
4	1	LS	Remove Existing Hardscape Composite Materials to Subgrade Depth as outlined on Avenue of the Oaks Project Plan sheets DM-1 and DM-2, complete,	\$ _____ /LS	\$ _____
5	5,800	SF	Remove Existing Roadway Composite Materials to Subgrade Depth, complete.	\$ _____ /SF	\$ _____
6	1	LS	Remove / Abandon Fountain Vault Structure and all Appurtenances, as outlined in Avenue of the Oaks Project Plan Sheets DM-1 through DM-5, complete	\$ _____ /LS	\$ _____
7	1	LS	Remove / Abandon Fountain Electrical Vault Structure and all Appurtenances, as outlined in Avenue of the Oaks Plan Sheets DM1 Through DM-5, complete,	\$ _____ /LS	\$ _____
8	125	CY	Over-Excavation of Unsuitable Material,	\$ _____ /CY	\$ _____

CITY OF SPARKS
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			complete, in place (Contingent)		
9	1	EA	Remove, Salvage and Relocate Existing Event Power Station, complete, in place	\$ _____ /EA	\$ _____
10	21	EA	Remove Existing Light Pull Boxes, complete.	\$ _____ /EA	\$ _____
11	1	LS	Remove / Abandon Miscellaneous Pipe, Ducts, Conduits and Appurtenances, complete.	\$ _____ /LS	\$ _____
12	2	EA	Remove Existing Drop Inlet and Appurtenances, complete.	\$ _____ /EA	\$ _____
13	1	LS	Salvage and Delivery of Plaques, Manhole Covers, Victorian Square Logo Nozzle Covers, Tree Grates, Bollards, and Light Poles to City of Sparks Salvage Site Located at 701 E. Nugget Ave or 431 Prater Way, complete.	\$ _____ /LS	\$ _____
14	248	LF	Install 12-Inch, SDR-35 PVC Storm Drain Pipe, Inserta-Tee, and All Appurtenances, Removal and Disposal of Existing Pipe, complete, in place.	\$ _____ /LF	\$ _____
15	2	EA	Install Type I – 48” Storm Drain Manhole, and Temporary Grate Cover, and All Appurtenances, complete, in place.	\$ _____ /EA	\$ _____
16	2	EA	Install Type IV – 60” Storm Drain Manhole and All Appurtenances, complete, in place.	\$ _____ /EA	\$ _____
17	5	EA	Install Type 3R Storm Drain Drop Inlet and All Appurtenances, complete, in place.	\$ _____ /EA	\$ _____
18	295	LF	Excavation and Backfill for NV Energy 2" and 4" PE Main/Service Replacements, complete, in place	\$ _____ /LF	\$ _____
19	4	EA	Excavation and Backfill for NV Energy Main and Service Tie-Ins, complete, in place.	\$ _____ /EA	\$ _____

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20	300	LF	Install Two (2) - 4" AT&T PTS-77 (Type C) or Schedule 40 Conduits, complete, in place	\$ _____ /LF	\$ _____
21	1	EA	Install AT&T PTS-65 Intercept Telephone Manhole, complete, in place	\$ _____ /EA	\$ _____
22	1	EA	Install 48" Traffic Rated Electrical Manhole and All Appurtenances, complete, in place	\$ _____ /EA	\$ _____
23	330	LF	Install 3-Inch (3") Schedule 40 PVC Conduit, Including Trenching and Backfill, complete, in place	\$ _____ /LF	\$ _____
24	260	LF	Install 1-1/2-Inch (1-1/2") Schedule 40 PVC Conduit, Including Trenching and Backfill, complete, in place,	\$ _____ /LF	\$ _____
25	110	LF	Install 3/4-Inch (3/4") Schedule 40 PVC Conduit, Including Trenching and Backfill, complete, in place,	\$ _____ /LF	\$ _____
26	8	EA	Remove and Replace Existing Electrical Pull Boxes, complete, in place.	\$ _____ /EA	\$ _____
27	8	EA	Install N16 Handhole, Traffic Rated Box, complete, in place	\$ _____ /EA	\$ _____
28	1	EA	Install 50Amp, 208V, 1ph Power Panel, complete, in place	\$ _____ /EA	\$ _____
29	330	LF	Install #10 THWN Copper Wire, complete, in place	\$ _____ /LF	\$ _____
30	780	LF	Install #3 THWN Copper Wire, complete, in place	\$ _____ /LF	\$ _____
31	1,980	LF	Install #2 THWN Copper Wire, complete, in place	\$ _____ /LF	\$ _____
32	570	LF	Install Plaza Tapered PCC Curb, complete, in place.	\$ _____ /LF	\$ _____
33	50	LF	Install 8" PCC Retaining Curb, complete, in place	\$ _____ /LF	\$ _____

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34	45	LF	Install Handrail, complete, in place	\$ _____ /LF	\$ _____
35	4	EA	Install ADA Accessible Ramps, complete, in place.	\$ _____ /EA	\$ _____
36	830	SF	Install 8-inch PCC Decorative/Colored Crosswalk, complete, in place.	\$ _____ /SF	\$ _____
37.a	8,350	SF	Install 8-inch PCC for Roadway, including Dowels, complete, in place.	\$ _____ /SF	\$ _____
37.b	6,600	SF	Install 6-inch PCC for PCC Pave Area, complete, in place.	\$ _____ /SF	\$ _____
38	360	SF	Install Permanent PCC Pavement Trench Patching, complete, in place	\$ _____ /SF	\$ _____
39	3,230	SF	Install Concrete Pavers and All Appurtenances, complete, in place.	\$ _____ /SF	\$ _____
40	5	EA	Lower and Raise Manholes, including New Frame and Covers, complete, in place.	\$ _____ /EA	\$ _____
41	8	EA	Lower and Raise Utility Valve Boxes, Sewer and Storm Drain Cleanouts, complete, in place.	\$ _____ /EA	\$ _____
42	39	EA	Install Decorative Bollard and All Appurtenances, complete, in place	\$ _____ /EA	\$ _____
43	8	EA	Install Collapsible Bollard and All Appurtenances, complete, in place	\$ _____ /EA	\$ _____
44	8	EA	Install New Light Pole with new Decorative LED Fixture Including Foundation, complete, in place	\$ _____ /EA	\$ _____
45	4	EA	Remove & Replace Existing Plastic Irrigation Control Valve Box & Lid with Traffic Rated Control Valve Box & Lid, complete, in place.	\$ _____ /EA	\$ _____

CITY OF SPARKS
BID ITEM SCHEDULE – REVISED BY ADDENDUM 1

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46	2	EA	Install Ground Hydrant and All Appurtenances, complete, in place.	\$ _____ /EA	\$ _____
47	120	LF	Install 1-1/4" CTS HDPE Water Service and All Appurtenances, complete, in place.	\$ _____ /LF	\$ _____
48	200	LF	Install 4-Inch (4") Schedule 40 PVC Conduit, Including Trenching and Backfill, complete, in place (Contingent Item)	\$ _____ /LF	\$ _____
49	200	LF	Install 12-Strand Irrigation Control Wire, complete, in place (Contingent Item)	\$ _____ /LF	\$ _____
50	4	EA	Install 3-1/2" Caliper "Red Oak" Tree, including Porous Pave per plan & details, complete, in place	\$ _____ /EA	\$ _____
51	4	EA	Install Exterior Receptacles under Tree Grates, complete, in place.	\$ _____ /EA	\$ _____
52	4	EA	Install Irrigation to Street Tree per plan & details, complete, in place.	\$ _____ /EA	\$ _____
53	280	LF	Install 4-inch Solid Double Yellow Stripe (Type II Waterborne), complete, in place.	\$ _____ /LF	\$ _____
54	60	LF	Install 24-Inch Stop Bar (Thermoplastic), complete, in place.	\$ _____ /LF	\$ _____
55	2	EA	Install 8-foot Stop Legend (Thermoplastic), complete, in place.	\$ _____ /EA	\$ _____
56	18	EA	Install Roadway Delineators, complete, in place.	\$ _____ /EA	\$ _____
57	9	EA	Install Permanent Traffic Sign, complete, in place	\$ _____ /EA	\$ _____
58	70	LF	Paint Curb, complete, in place.	\$ _____ /LF	\$ _____
59	1	LS	Force Account	\$75,000	\$75,000

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<p>Total Price for AVENUE OF THE OAKS REALIGNMENT</p> <p>\$ _____</p> <p style="text-align: center;">(written total bid price)</p>	<p>\$ _____</p>
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BID ITEM CLARIFICATIONS – Addendum 1
AVENUE OF THE OAKS REALIGNMENT
BID #21/22-005, PWP# WA-2022-084

BID ITEMS 36, 37.a, 37.b and 38 ~ Install 8-inch PCC Decorative/Colored Crosswalk, Install 8-inch PCC for Roadway, including dowels, Install 6-inch PCC Pavement Area and Install Permanent PCC Pavement Trench Patching

The item includes providing all labor, equipment, materials, and incidentals necessary, but not limited to, excavation and disposal of existing unsuitable sub grade material including existing base, installation of new Type 2 aggregate base to a depth of six inches (6”) compact to 95% MDD, and placement of PCC for pave area, roadway, decorative crosswalks and permanent pavement trench patching, including fiber reinforcement, steel reinforcement, jointing, dowels, joint sealant, sawcutting, integral concrete colors, stamp patterns, shop drawings for joint layout and reinforcement, per Standard Specifications and Details.

Quantity for payment will be per square feet placed, complete, in place for actual quantities measured in the field.

BID ITEM 56 ~ Install Roadway Delineators

This item includes providing all labor, materials, equipment, tools, loading, hauling, unloading, and all incidentals necessary to complete the installation of roadway delineators at locations as shown on the plans. This item includes surface mounting of the delineators in accordance with manufacturer’s specifications on a PCC surface including all labor, survey layout, materials, hardware, and all necessary appurtenances and incidentals necessary to complete the work specified.

Delineators shall be 3” Tuff Post Short Squeeze 36” Tall Delineator Post with Base, Reflective Yellow, or approved equal.

Quantity for payment will be per each unit placed, complete, in place for actual quantities measured in the field.

TECHNICAL SPECIFICATIONS – Addendum 1
AVENUE OF THE OAKS REALIGNMENT
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305 TRENCH EXCAVATION AND BACKFILL

305.01 Description. This item shall include furnish all materials, equipment and labor for excavating, trenching, backfilling and temporary patching of all storm drain work delineated on the Improvement Plans, in these Specifications or as directed by the Engineer.

Contractor performing tasks related to the trenching and backfilling of NV Energy gas facilities shall be listed on the NV Energy Gas Contractors or Backfill Contractors list. If prime contractor is not on the approved list, the prime contractor shall hire a subcontractor that is qualified. Qualified contractors are listed at <https://www.nvenergy.com/business/building-and-new-construction/gas-backfill-contractors>. All-natural gas work being performed as part of this project shall conform to NV Energy's Volume 15, ENGINEERING & CONSTRUCTION STANDARD, Section 3, TRENCHING AND EXCAVATION and/or Orange Book.

The Contractor shall verify all inverts, sizes of connection point, confirm grades, and make exploratory excavations as required to locate all possible conflicting utilities and notify the Engineer in writing of all conflicts prior to ordering materials and prior to commencement of underground construction.

It is anticipated that storm, surface and ground or other waters will be encountered at various times during the work herein contemplated. The contractor shall be responsible for all removal of said water to facilitate the work. All costs associated with removal of groundwater including, but not limited to, bypass pumping shall not be subject to additional payment and be included in applicable pipe installation bid item. Disposal of groundwater into the storm drain system shall not be allowed. The Contractor, by submitting a Proposal, acknowledges that they have investigated the risks arising from such waters and has prepared the Proposal accordingly, and the Contractor by submitting a Proposal assumes all of said risk.

The Contractor shall conduct their operation in such a manner that storm or other waters may proceed uninterrupted along their existing street and drainage courses. Drainage of water from existing catch basins and inlets shall be maintained at all times. Diversion of water for short reaches to protect construction in progress will be permitted if public or private properties are not damaged, or in the opinion of the Engineer, are not subject to probability of damage.

If public or private property becomes damaged by flood or other waters because of the Contractor's operations, the Contractor shall repair such damage to the satisfaction of the appropriate owner at their expense. The Contractor shall obtain written permission from the applicable public agency or property owner before any diversion of water will be permitted by the Engineer.

Wherever necessary in order to provide proper evacuation of water from the trench and construction area, the Contractor shall at their expense, furnish and operate all necessary pumping equipment, drainage sumps, wellpoint systems and other drainage facilities. Discharge of pumpage shall be at points approved by the Engineer.

AVENUE OF THE OAKS REALIGNMENT
Bid#21/22-005 PWP#WA-2022-084
Tuesday, December 7, 2021, 1:00 P.M.
Pre-Bid Meeting - Notes

1. City of Sparks Team:

- a. City Engineer/Project Engineer – Jon Ericson (775) 691-8340
- b. Project Manager – Bob Schricker – (775) 691-4573
- c. Design Engineer – Doug Buck – Christy Corp. (775) 236-2482
- d. Inspection and Testing – CME – Andy Echeita (775) 741-1381

2. Project Overview:

- a. The work includes but is not limited to the realignment of a section of roadway, Avenue of the Oaks, in downtown Sparks. The project includes the demolition of an underground water fountain structure, removal and replacement of curb, gutter sidewalk, ADA ramps, drain inlets; removal of existing composite roadway improvements and placing PCC Pavement; placement of new striping on new PCC roadway on Avenue of the Oaks

3. Critical Project Dates:

- a. Bid Due – December 16, 2021, 1:45 PM
- b. Bids Opened – December 16, 2021, 2:00 PM
- c. Council Date for Project award – January 24, 2022
- d. Tentative Notice to Proceed (NTP) – February 21, 2022
- e. Project Completion Date – No later than May 20, 2022 (40 working day contract)
- f. Project Work Hours – Monday – Friday, 7:00 AM to 7:00 PM. Extended hours may be requested but must be approved. Hours outside of the legally approved hours will require submittal of a Temporary Use Permit (T.U.P.)

4. Critical Elements of the Project:

- a. Demo of the two (2) underground vaults to the depths called out on the plans (3-feet for electrical and 4-feet for the fountain)
- b. Salvage and delivery of specific items identified prior to demo operations.
- c. Placement of new electrical – Lighting, outlets, etc.
- d. Placement of new landscape improvements.
- e. Maintain access to local business, residence, garbage, etc.

5. Clarification of a few Bid Items:

- a. Bid Item 4-Remove Existing Hardscape Composite Materials to Subgrade Depth as outlined on Avenue of the Oaks Project Plan sheets DM-1 and DM-2, complete
 - i. Item to include all the pavers, curb, sidewalk, Misc concrete (excluding existing roadway) – this is like a “Clear and Grub” item
- b. Bid Item 6 and 7 - Remove / Abandon Fountain Vault Structure and all Appurtenances, as outlined in Avenue of the Oaks Project Plan Sheets DM-1 through DM-5, complete AND Remove / Abandon

AVENUE OF THE OAKS REALIGNMENT

Bid#21/22-005 PWP#WA-2022-084

Tuesday, December 7, 2021, 1:00 P.M.

Pre-Bid Meeting - Notes

Fountain Electrical Vault Structure and all Appurtenances, as outlined in Avenue of the Oaks Plan Sheets DM1 Through DM-5, complete

- i. Item includes the removal of all equipment in the vault, demo of the sidewalls to 4-feet below finish grade, plug of existing penetrations, placement of drainage holes in the bottom of the vault, drain rock, fabric and aggregate base to subgrade elevation.

 - c. Bid Item 13 - Salvage and Delivery of Plaques, Manhole Covers, Victorian Square Logo Nozzle Covers, Tree Grates, Bollards, and Light Poles to City of Sparks Salvage Site Located at 701 E. Nugget Ave or 431 Prater Way, complete.
 - i. Delivery of items marked for salvage as outlined on the project plans and specifications. Items to be identified and marked by City staff prior to demo operations

 - d. Bid items 36 and 37 - Install PCC Decorative/Colored Crosswalk, complete, in place. AND Install PCC for Roadway and PCC Pave Area, complete, in place.
 - i. Dowels with dowel baskets will be required in the Decorative crosswalk and the PCC Roadway. Dowels will not be required in the PCC Pave Areas.
 1. Decorative Concrete Crosswalk and PCC Roadway thickness may be increased to 8-inches. Will be covered in an addendum. If this happens – Bid Item 37 will become two (2) bid items to address the difference in the item thickness and dowel requirements.
6. Additional Comments or Questions: **Comments and/or questions came in during or after the pre-bid meeting**
1. Question - Please provide the Geotech Report dated April 28, 2020, referenced on Sheet N-1.
Response - Geotechnical Report for Black Eagle Consulting, Inc Dated April 28, 2020 is attached
 2. Question - The gas line on Drawing DM-1, DM-2 note 31 states to remove 4" gas pipe. South of the fountain, the location for a portion of the line is outside the demo limits. Can it be abandoned in place where it is shown outside the demo limits?
Response - Gas line removal shown on DM-2, shall removed to limits of the new tie-in as shown on Sheet U-2, Station 4+33, Left. No removal will be required outside of the demo limits.
 3. Question - Is there a drawing that shows how or where ATT relocation work will be routed?
Response – The AT&T fiber will be relocated into an existing conduit that is in the approximate same location as the existing gas line as shown on Sheets DM-1 and DM-2, just south of the project demo limits. This line will be relocated by AT&T prior to the beginning of work on the Avenue of the Oaks Realignment project and should cause no delays to the project.
 4. Question - In reference to Bid Item 57 Install Permanent Traffic Sign, complete, in place, the Bid Quantity is 11 each. I can only find 5 signs in the plans. Will the City confirm the item quantity for this bid item?
Response – There are a total of nine (9) signs for the project: (Bid Schedule has been revised to show the revised quantity)
(2 EA) Install Stop Sign and Do Not Enter Sign (single pole installation), complete and in place.
(7 EA) Install Traffic Control Sign, complete and in place.
Bid 9 items with 11 total signs. Stop Sign and Do Not Enter sign are bid together as one item.
Individual sign count:
 1. 2 EA DOUBLE SIGNS – STOP AND DO NOT ENTER (S-2)
 2. 2 EA NO PARKING ANYTIME SIGNS (S-1/S-2)
 3. 2 EA STOP SIGNS (S-1/S-2)
 4. 3 EACH NO PARKING LOADING ZONE SIGNS (S-1/S-2)

AVENUE OF THE OAKS REALIGNMENT

Bid#21/22-005 PWP#WA-2022-084

Tuesday, December 7, 2021, 1:00 P.M.

Pre-Bid Meeting - Notes

5. Question - In reference to Bid Item 56 -Install Roadway Delineators, the Bid Item Clarifications states' "Delineators shall be Safe-Hit Type 2 Guide Posts, surface mounted, amber reflector, yellow post, 48" Height..". However, the plans refer to 3" Tuff Post Short Squeeze 36" Tall Delineator Post with Base. Which of the two items are required?

Answer – Bid Item Clarifications have been revised to read: "Delineators shall be 3" Tuff Post Short Squeeze 36" Tall Delineator Post with Base, Reflective Yellow, or approved equal". Revised Bid Item Clarification has been included as part of Addendum 1.

Mr. Doug Buck, P.E.
Christy Corporation, LTD
1000 Kiley Parkway
Sparks, NV 89436

Project No.: 1651-06-1
April 28, 2020

RE: Geotechnical Investigation
Avenue of the Oaks Realignment
Sparks, Nevada

Dear Mr. Buck:

Black Eagle Consulting, Inc. (BEC) is pleased to submit the results of our geotechnical investigation and pavement design for the proposed realignment of an approximately 200-foot-long segment of Avenue of the Oaks in Sparks, Nevada. This report provides the results of our field exploration, laboratory testing and engineering analysis, which form the basis for the pavement structural section and construction recommendations. The area covered by this report is shown on Plate 1 (Plot Plan). The services described within this report were conducted in accordance with the BEC Professional Geotechnical Agreement dated October 18, 2019, which was signed by Mr. Doug Buck, Engineering Manager of Christy Corporation, LTD.

Project Description

The proposed project will realign Avenue of the Oaks which is currently diverted around a water fountain on the north side of the roadway. The roadway is currently surfaced by pavers underlain by Portland cement concrete (PCC) pavement. The pavers/PCC roadway and water fountain will be demolished, and a new, straightened roadway alignment with associated PCC curbs, gutters and sidewalks/flatwork will be constructed. The realignment will require rerouting and/or abandoning of several utilities, including buried water lines associated with the water fountain feature which the new alignment will pass through. Minimal grading will be completed during the realignment project because finished grades are already established.

Site Conditions

The proposed project site consists of an approximately 200-lineal-foot portion of Avenue of the Oaks located in Sparks, Nevada. The roadway alignment is entirely contained in Section 5, Township 19 North, Range 20 East, Mount Diablo Meridian. The roadway is bordered to the north by a movie theater, to the south by parking areas and a courtyard, and to the east and west by multi-family residential developments. The site is located in the overall Victorian Square area. Access to the site is obtained by Avenue of the Oaks.

The site currently hosts a fountain and adjacent walkway as an entrance to the movie theater. The current roadway is constructed of approximately 2-inch-thick pavers, a 3-inch-thick PCC pavement section, and 5 inches of aggregate base. The roadway wraps around the south side of the fountain in a semi-circle alignment. Traffic block posts approximately 8 feet apart are located along the outside of the walkway in front of the roadway. A significant amount of utilities underlie the project area.



Black Eagle Consulting, Inc.
Geotechnical & Construction Services

1345 Capital Boulevard, Suite A
Reno, Nevada 89502-7140

Tel: 775/359-6600

Fax: 775/359-7766

Email: mail@blackeagleconsulting.com

The site is essentially flat, with minimal slope gradients and topographic relief. Vegetation on the site consists of trees and planters at various locations in the walkway.

Exploration

Black Eagle Consulting, Inc. coordinated and obtained an encroachment permit from City of Sparks for the exploration. We also obtained public utility clearance from Underground Service Alert for the exploration and hired a private utility locator to select appropriate boring locations without conflict from underground utilities. Additionally, we hired a concrete cutting subcontractor to core the pavers and underlying PCC at the boring locations.

The Avenue of the Oaks site was explored on March 4, 2020, by drilling 2 test borings. The borings were drilled using 8-inch-outside-diameter (O.D.), hollow-stem augers and a truck-mounted CME 55 soils sampling drill rig. The maximum depth of exploration was 7.5 feet below the existing ground surface. The borings were drilled near the east and west ends of the realignment segment within the walkway area surrounding the water fountain, as shown on Plate 1.

The native soils were sampled in-place every 2.5 feet by use of a standard, 2-inch-O.D., split-spoon sampler driven by a 140-pound safety drive hammer with a 30-inch stroke operated with a rope and cathead. The number of blows to drive the sampler the final 12 inches of an 18-inch penetration (Standard Penetration Test [SPT] - American Society for Testing and Materials [ASTM] D 1586) into undisturbed soil is an indication of the density and consistency of the material.

Groundwater was not encountered in our borings. In addition to the above-noted SPT samples, bulk samples were collected from selected intervals below the existing structural section for laboratory testing.

Due to the relatively small diameter of the samplers, the maximum particle size that could be obtained was approximately 1.25 inches. The final logs may not, therefore, adequately represent the actual quantity or presence of cobbles or boulders.

A geotechnical engineering technician examined and identified all soils in the field in accordance with ASTM D 2488 and also measured the existing structural sections at the boring locations. During drilling exploration, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada, laboratory for testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing, as described in the **Laboratory Testing** section. Logs of the borings are presented as Plate 2 (Boring Logs), and a USCS chart has been included as Plate 3 (USCS Soil Classification Chart).

The thickness of the existing structural section, as well as the subgrade soil type, are summarized below in Table 1 (Existing Structural Section and Subgrade Soil Conditions).



TABLE 1 – EXISTING STRUCTURAL SECTION AND SUBGRADE SOIL CONDITIONS

Boring (B) Number	Location	Existing Structural Section (Walkway)	Subgrade Soil Description	Subgrade R-Value
B-01	East End of Walkway	2-Inch Pavers Over 3 Inches of PCC Over 5 Inches of Aggregate Base	Clayey Sand with Gravel	18
B-02	West End of Walkway	2-Inch Pavers Over 3 Inches of PCC Over 5 Inches of Aggregate Base	Clayey Sand with Gravel	Not Tested

Laboratory Testing

All soils testing performed in the BEC soils laboratory is conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards.

Representative subgrade soil samples were analyzed to determine the in-situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). The results of this testing are shown on Plate 4 (Index Test Results). The test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate. The index test results were also utilized to develop geotechnical recommendations for the project.

A resistance value (R-value) test (ASTM D 2844) was performed on a sample of the subgrade soils. R-value testing is a measure of subgrade strength and expansion potential and is used to design roadways. R-value testing was performed by Wood Rodgers of Reno, Nevada. The results of the R-value test are shown on Plate 5 (R-Value Test Report).

Geologic and General Soil Conditions

The site lies on the broad flood plain of the Truckee River in an area mapped by the Nevada Bureau of Mines and Geology ([NBMG] Bonham and Bingler, 1973) as Quaternary Age Tahoe Outwash. These native soil deposits generally include sand and gravel soils with an upper zone that is weathered into clay-rich soils. Native soils encountered in our exploration generally conform to the NBMG mapping.

The materials encountered during site exploration consist of clayey sand with gravel soils. Boring B-01 encountered a very loose layer at 3.5 feet below the existing grade; as such, soils encountered in boring B-01 may be fill material associated with grading and/or utility construction in the area. Boring B-02 encountered medium dense to dense subsurface soils. The subsurface soils through the maximum exploration depth (about



7.5 feet below the existing walkway grade) are described as dark brown to brown, moist, and as consisting of 23 to 33 percent low plasticity fines and 18 to 34 percent gravel.

Groundwater was not encountered during exploration and is expected to lie at a depth well below that which would affect design or construction of the proposed roadway realignment project. The project site contains a water fountain; however, it is understood the water fountain has been inactive for a significant amount of time. Any leaky pipe connections may show moist to wet soils within the limits of the water fountain.

Pavement Structural Section Analysis

Paved structural sections are determined from subgrade soil strength and traffic volumes, particularly truck traffic. Portland cement concrete pavement (rigid pavement) is proposed for the realigned segment of Avenue of the Oaks to match the existing section beyond the realignment. Rigid pavement designs are typically conducted for longer performance lives. The costs of material and construction are higher, but the cost of maintenance is typically lower.

Equivalent 18-Kip Single-Axle Loads

Pavement design is based on the volume of heavy truck traffic anticipated on the road as well as the axle loads of the trucks over the design life. All standard design methods require that truck traffic be normalized to reflect the total number of equivalent 18-kip single-axle loads (ESALs) that will be applied to the pavement during its design life. The design for PCC pavement is commonly 40 years and was used in the analysis.

No specific traffic data is available for the subject Avenue of the Oaks roadway segment. The annual average daily traffic (AADT) is provided in the Nevada Department of Transportation (NDOT) *Annual Traffic Report* for 2018 (NDOT, 2018) for C Street (which is the western extension of Avenue of the Oaks) east of Rock Boulevard (station number 0310923). Annual average daily traffic increased moderately from 2014 to 2018, and the highest AADT was selected for the analysis. An approximate growth rate of 1 percent was used in the analysis because the area has been built out but recent AADTs show some slight increase. The 2009 NDOT *Annual Traffic Report* (NDOT, 2009) is the most recent traffic report that includes truck factors for various roadway classifications based on functional classification. Avenue of the Oaks is considered a local street, and based on the traffic report (NDOT, 2009), the truck percentage is 4.51 for local roads. No truck/ESAL factor is provided for local roads in the 2009 NDOT traffic report; as such, we used the average truck/ESAL factor of 0.715 provided for a minor arterial, and this factor may be slightly conservative for Avenue of the Oaks.

Data used to calculate the 40-year design ESAL ($ESAL_{40}$) for PCC pavement and the calculated design $ESAL_{40}$ value are summarized below in Table 2 (Design $ESAL_{40}$ Data for Avenue of the Oaks). The pavement design analysis calculations are contained in Appendix A (Pavement Design Calculations).



TABLE 2 – DESIGN ESAL₄₀ DATA FOR AVENUE OF THE OAKS

Location	Two-Way AADT ¹	Percent Trucks ²	Average Truck Factor ³	Percent Trucks in Design Direction	Percent Trucks in Design Lane	Average Annual Growth Percentage ⁴	Design Life (years)	Design ESAL ₂₀
Avenue of the Oaks	970	4.51	0.715	50	100	1.0	40	2.79 x 10 ⁵

¹ AADT year 2017 (NDOT, 2018).

² NDOT (2009).

³ Truck factor for a minor arterial (NDOT, 2009), the lowest functional classification this is provided for.

⁴ Assumed based on area build-out and recent trends in traffic count (NDOT, 2018).

Rigid Pavement Design

The American Association of State Highway and Transportation Officials (AASHTO) design method (AASHTO, 1993) was employed in the design of rigid pavement and, as noted earlier, a standard 40-year design life was used. The traffic loading utilized in the rigid pavement design is discussed earlier. The design of rigid pavements incorporates the flexural strength of PCC and the modulus of subgrade reaction. The design of PCC rigid pavement assumes the PCC will exhibit a minimum unconfined compressive strength of 4,000 pounds per square inch ([psi] modulus of rupture [3 point flexural strength] of 600 psi). The modulus of subgrade reaction for the subgrade materials has been estimated from the R-value of the subgrade materials. An estimated 150 pounds per cubic inch was incorporated in the rigid pavement design for material exhibiting a design R-value of 15.

Table 3 (Rigid Pavement Design Values) identifies design parameters incorporated into our rigid pavement design calculations. The calculations associated with the rigid pavement are contained in Appendix A.



TABLE 3 – RIGID PAVEMENT DESIGN VALUES

Factor	Value
Reliability (R)	90%
Overall Standard Deviation (S_o)	0.45
Initial Serviceability	4.2
Terminal Serviceability	2.5
Load Transfer Coefficient	2.8 (Dowelled Joints)
Concrete Elastic Modulus	3,600,000 psi
Concrete Modulus of Rupture	600 psi
Drainage Coefficient	1.0
Effective Modulus of Subgrade Reaction	150 pci ¹
Design ESAL ($ESAL_{40}$)	2.79×10^5

¹ Pounds per cubic inch.

The results of our design indicate a recommended minimum structural section of 6 inches of PCC pavement over at least 6 inches of Type 2, Class B aggregate base (*Standard Specifications for Public Works Construction [SSPWC]*, 2016). The PCC shall have a minimum unconfined compressive strength of 4,000 psi in 28 days, with vertical and lateral displacement controlled by dowels (deformed bars) at all joints. We recommend PCC pavement reinforcement (dowels and tie bars) and joint details follow the NDOT *Standard Plans for Road and Bridge Construction* Sheet No. R-10.1.2 *Doweled Concrete Pavement Details* (NDOT, 2017).

Civil Design and Construction Recommendations

As noted above, we recommend the realigned section of the Avenue of the Oaks consist of 6 inches of PCC underlain by 6 inches of Type 2, Class B aggregate base (*SSPWC*, 2016). The existing aggregate base present beneath the current improvements may be reused as structural fill, as needed.

Structural areas referred to in this report include all areas of PCC pavements and miscellaneous PCC flatwork. The term engineer, as presented below, pertains to the engineer that has prepared this report for the project or who serves as a qualified geotechnical professional on behalf of the owner.

All compaction requirements presented in this report are relative to ASTM D 1557.



The site subgrade soils consist of granular clayey sand with gravel. When properly prepared, these materials will provide adequate support for the new pavement section and also for the miscellaneous PCC flatwork. Our geotechnical-related civil engineering and construction recommendations for the project are presented below.

1. Landscape trees and associated top soils within the landscape island that will come within the project alignment should be removed. Associated roots greater than ½ inch in diameter shall be removed to a minimum depth of 12 inches below the proposed pavement subgrade elevation. The resulting excavation should be backfilled with structural fill densified to at least 90 percent relative compaction. Irrigation to the landscaping should be abandoned well before construction activities to reduce subgrade soils being excessively moist and unstable.
2. All pavers and PCC flatwork shall be saw-cut at the improvement limits and removed. Demolishment within the limits should include removal of all utilities that are to be abandoned and subsurface structures/features associated with the water fountain. When practical, the existing aggregate base section below the existing improvements may be removed and stockpiled for reuse as structural fill.
3. The subsurface soils encountered in our exploration were generally below or near the optimum moisture for compaction at the time of our field investigation. However, if these materials are exposed to excess moisture they will begin to pump and rut, especially after the existing hardscape improvements are removed. It is also common to find very moist to wet subgrade soils beneath pavements. Areas of soft soils that cannot be scarified and air-dried will need to be over-excavated and stabilized. Typically, an over-excavation depth of 12 to 18 inches below subgrade is adequate if a separation geotextile, such as Mirafi® 160N or an equal, is placed on the over-excavated surface and backfill consists of compacted Type 2, Class B aggregate base (*SSPWC*, 2016) or asphalt concrete grindings. Shallow utilities may limit the depth of practical over-excavation, such that geogrid/aggregate base “sandwiches” or even soil-cement backfill may need to be used on a case-by-case basis. Black Eagle Consulting, Inc. can provide problem-specific recommendations during construction.
4. All subgrades should be scarified a minimum 9 inches, moisture conditioned, and densified to a minimum 90 percent relative compaction. The subgrades should be firm and stable. Additional verification of stable subgrade via proof rolling with large, rubber-tired equipment such as a loaded water truck is also recommended before the delivery of aggregate base.
5. Onsite soils will be suitable for use as structural fill provided particles larger than 4 inches are removed. Where imported structural fill is required on this project, we recommend it satisfy the specifications presented in Table 4 (Guideline Specification for Imported Structural Fill).



TABLE 4 - GUIDELINE SPECIFICATION FOR IMPORTED STRUCTURAL FILL		
Sieve Size	Percent by Weight Passing	
4 Inch	100	
3/4 Inch	70 – 100	
No. 40	15 – 50	
No. 200	5 – 20	
Percent Passing No. 200 Sieve	Maximum Liquid Limit	Maximum Plastic Index
5 – 10	50	10
11 – 20	40	5
Minimum R-Value	30	

6. All structural fill shall be placed in maximum 8-inch-thick loose lifts, moisture conditioned, and densified to a minimum 90 percent relative compaction.
7. Grading shall not be performed with or on frozen soils. Concrete shall not be placed on frozen in-place soils.
8. The project will include the construction of new PCC curbs, gutters, and sidewalks. All concrete slabs shall be directly underlain by imported Type 2, Class B aggregate base (*SSPWC*, 2016). The thickness of base material beneath PCC flatwork shall be 6 inches beneath curbs and gutters and 4 inches beneath sidewalks.
9. Northern Nevada is a region with exceptionally low relative humidity. As a consequence, concrete flatwork is prone to excessive shrinking and curling. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of concrete and result in cracking, curling, and the spalling of slabs. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute (2011) and this report. Special considerations shall be given to concrete placed and cured during hot or cold weather temperatures, low humidity conditions, and windy conditions such as are common in the Truckee Meadows area.
10. All aggregate base beneath PCC pavements and flatwork shall be densified to at least 95 percent relative compaction.
11. Type II cement can be used for all PCC flatwork.



Anticipated Construction Problems

Significant underground utilities are present within the project area and will require proper coordination for their in-place protection, abandonment or realignment.

Subgrade soils that are excessively moist and difficult to compact may be encountered in local areas; when encountered, these soils should be stabilized per the recommendations above. Shallow utilities may pose difficulties in any needed stabilization measures.

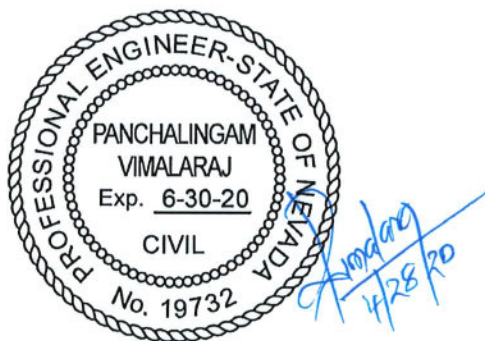
Closing

This geotechnical report has been prepared with generally accepted geotechnical/pavement engineering practices. The analyses and recommendations presented are based upon field exploration performed at the locations shown on Plate 1. This report does not reflect subgrade soil variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary. The recommendations presented in this report are based on the assumption that sufficient field testing and construction review will be provided during all phases of construction. We should review the final plans and specifications for conformance with the intent of our recommendations. We recommend our firm be retained to perform construction observation.

We appreciate having the opportunity to work with you on this project. If you have any questions regarding the content of the attached report, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.



Vimal P. Vimalaraj, P.E. G.E.
Engineering Division Manager

JP:PV:cjr



Enclosures: Plate 1 – Plot Plan
Plate 2 – Boring Logs
Plate 3 – USCS Soil Classification Chart
Plate 4 – Index Test Results
Plate 5 – R-Value Test Report
Appendix A – Pavement Design Calculations

Copies to: Addressee (3 copies and PDF via email)

References

American Association of State Highway and Transportation Officials (AASHTO), 1993, Design Manual for *Design of Rigid and Flexible Pavements*.

American Concrete Institute, 2011, *ACI Manual of Concrete Practice: Parts 1 through 5*.

American Society for Testing and Materials (ASTM), 2018, *Soil and Rock (I and II)*, Volumes 4.08 and 4.09.

Bonham, H. F. and E. C. Bingler, 1973, *Geologic Map, Reno Quadrangle*: Nevada Bureau of Mines and Geology, Map 4Ag.

Nevada Department of Transportation (NDOT), 2018, *Annual Traffic Report*.

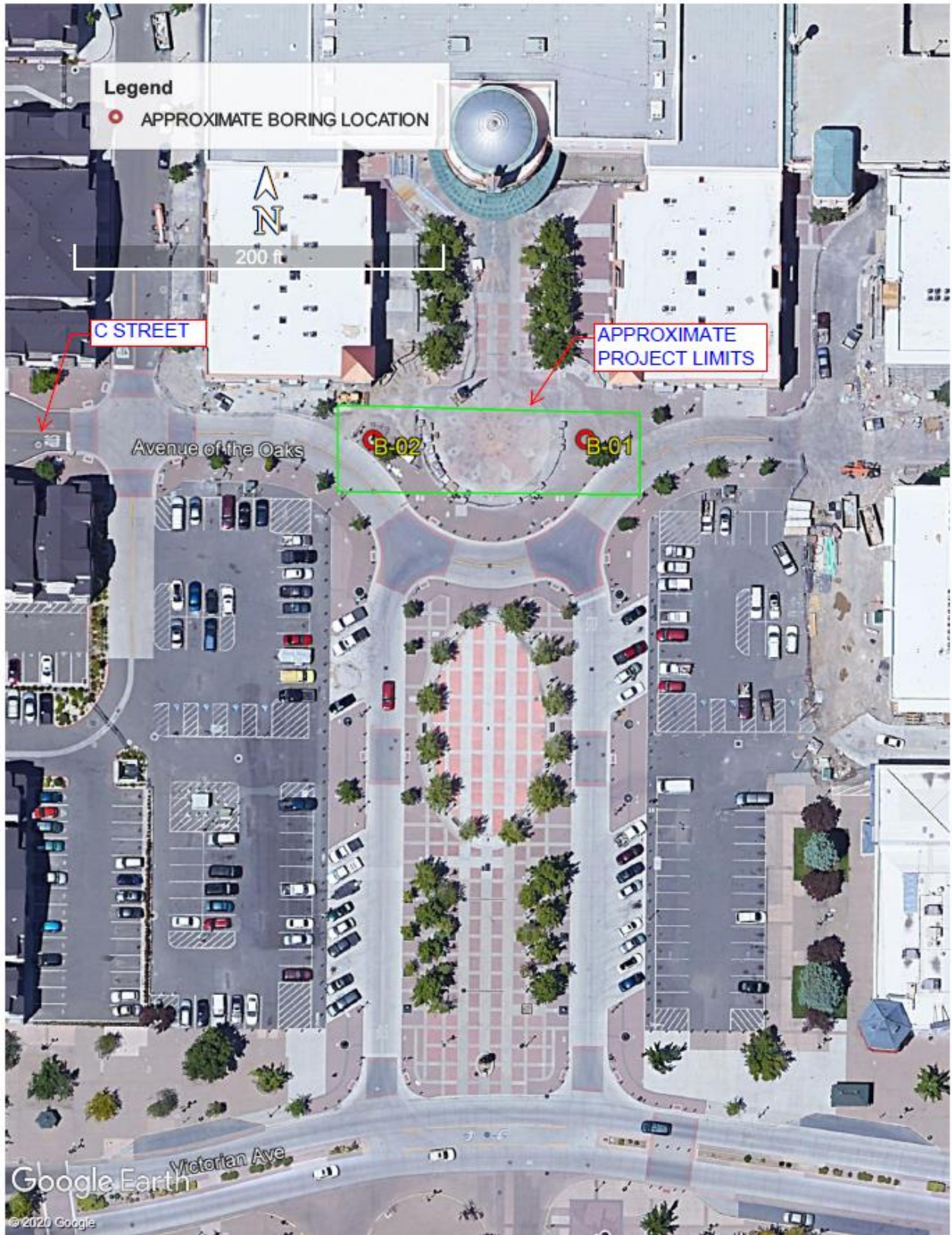
NDOT, 2017, *Standard Plans for Road and Bridge Construction*, 2017 Edition.

NDOT, 2009, *Annual Traffic Report*.

Standard Specifications for Public Works Construction (SSPWC), 2016 (Washoe County, Sparks-Reno, Carson City, Yerington, Nevada).



PLATES



CHRISTY CORPORATION
PLOT PLAN
 AVENUE OF THE OAKS REALIGNMNET
 SPARKS, NEVADA

Black Eagle Consulting, Inc.
 Project No. 1651-06-1

BORING LOG

BORING NO.: B-01





DATE: 3/4/20

TYPE OF BORING: HSA (CME 55)

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: KC

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	BLOWS/12"	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								Pavers An approximate 2-inch-thick layer of pavers.
								Portland Cement Concrete An approximate 3-inch-thick layer of Portland cement concrete (PCC).
A	SPT	13						Aggregate Base An approximate 5-inch-thick layer of aggregate base.
			12.2	12				Clayey Sand with Gravel Dark brown, moist, very loose to medium dense, with 23% medium plasticity fines, 43% fine to coarse sand, and 34% subrounded gravel up to 1.5 inches in diameter. Bulk sample collected for lab testing from an approximate depth of 2.8 feet to 6.8 feet beneath ground surface (bgs).
B	SPT	2			5	SC		
cC	SPT	13						

BORING LOG 1651061.GPJ BLKEAGLE.GDT 4/28/20



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1345 Capital Blvd., Suite A
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Telephone: (775) 359-6600

Christy Corporation LTD
Avenue of the Oaks Realignment
Sparks, NV

PROJECT NO.:

1651-06-1

PLATE:

2
SHEET 1 OF 1

BORING LOG

BORING NO.: B-02






DATE: 3/4/20

TYPE OF BORING: HSA (CME 55)

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: KC

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	BLOWS/12"	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								Pavers An approximate 2-inch-thick layer of pavers.
								Portland Cement Concrete An approximate 3-inch-thick layer of Portland cement concrete (PCC).
A	SPT	39	8.7	13		SC		Aggregate Base An approximate 5-inch-thick layer of aggregate base.
								Clayey Sand with Gravel Brown, moist, medium dense, with an estimated 30% medium plasticity fines, 50% fine to coarse sand, and 20% subrounded to subangular gravel up to 1 inch in diameter. Bulk sample collected for lab testing from an approximate depth of 1.8 feet to 5 feet bgs.
B	SPT	22				SP-SM		Poorly Graded Sand with Silt Brown to reddish brown, moist, loose, with an estimated 10% non-plastic fines, 80% fine to coarse sand, and 10% subrounded to subangular gravel up to 1 inch in diameter.
					5			Drilling refusal at an approximate depth of 5 feet.

BORING LOG 1651061.GPJ BLKEAGLE.GDT 4/28/20



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Avenue of the Oaks Realignment
Sparks, NV

PROJECT NO.:

1651-06-1

PLATE:

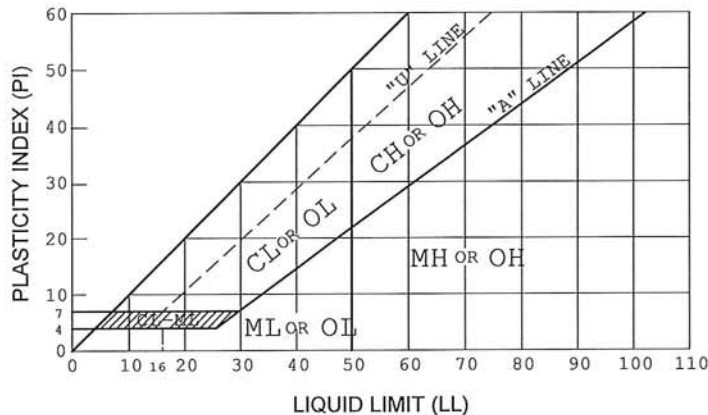
2
SHEET 1 OF 1

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
		LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		LIQUID LIMIT LESS THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
		LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
		LIQUID LIMIT GREATER THAN 50		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	
FILL MATERIAL			--	FILL MATERIAL, NON-NATIVE	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

PLASTICITY CHART



EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample		Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	# 4 to #200 sieve (4.75mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

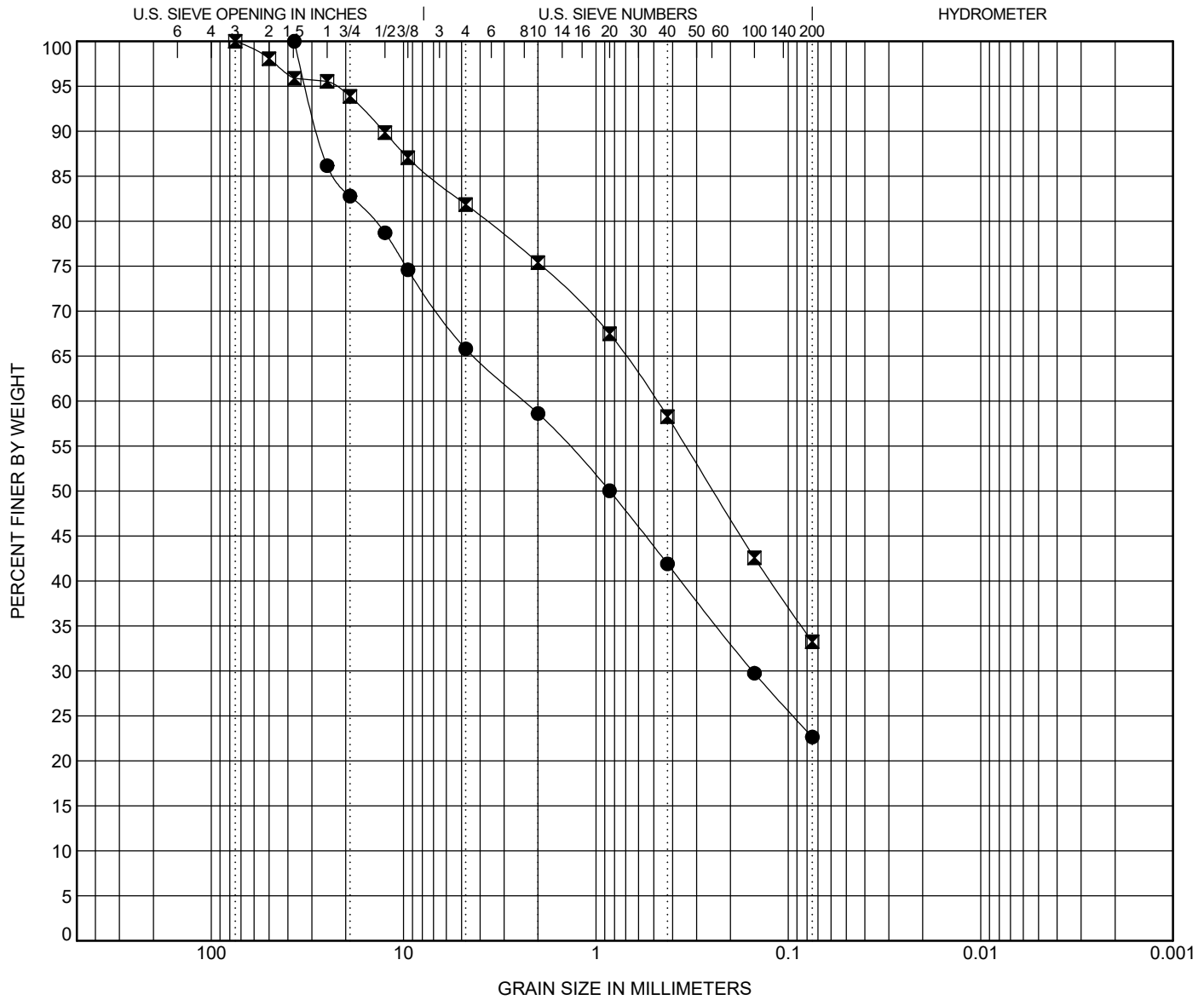
USCS CHART 1825041.GPJ US LAB.GDT 7/24/2019



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Fax: (775) 359-7766

USCS Soil Classification Chart

Project: Avenue of the Oaks Realignment
Location: Sparks, Nevada
Project Number: 1651-06-1 Plate: 3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-01	2.8	CLAYEY SAND with GRAVEL(SC)	27	15	12		
☒ B-02	1.8	CLAYEY SAND with GRAVEL(SC)	26	13	13		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-01	2.8	37	2.363	0.153		34.2	43.2	22.7	
☒ B-02	1.8	75	0.484			18.1	48.6	33.2	

GRAIN SIZE 1651061.GPJ GINT STD US LAB.GDT 4/28/20



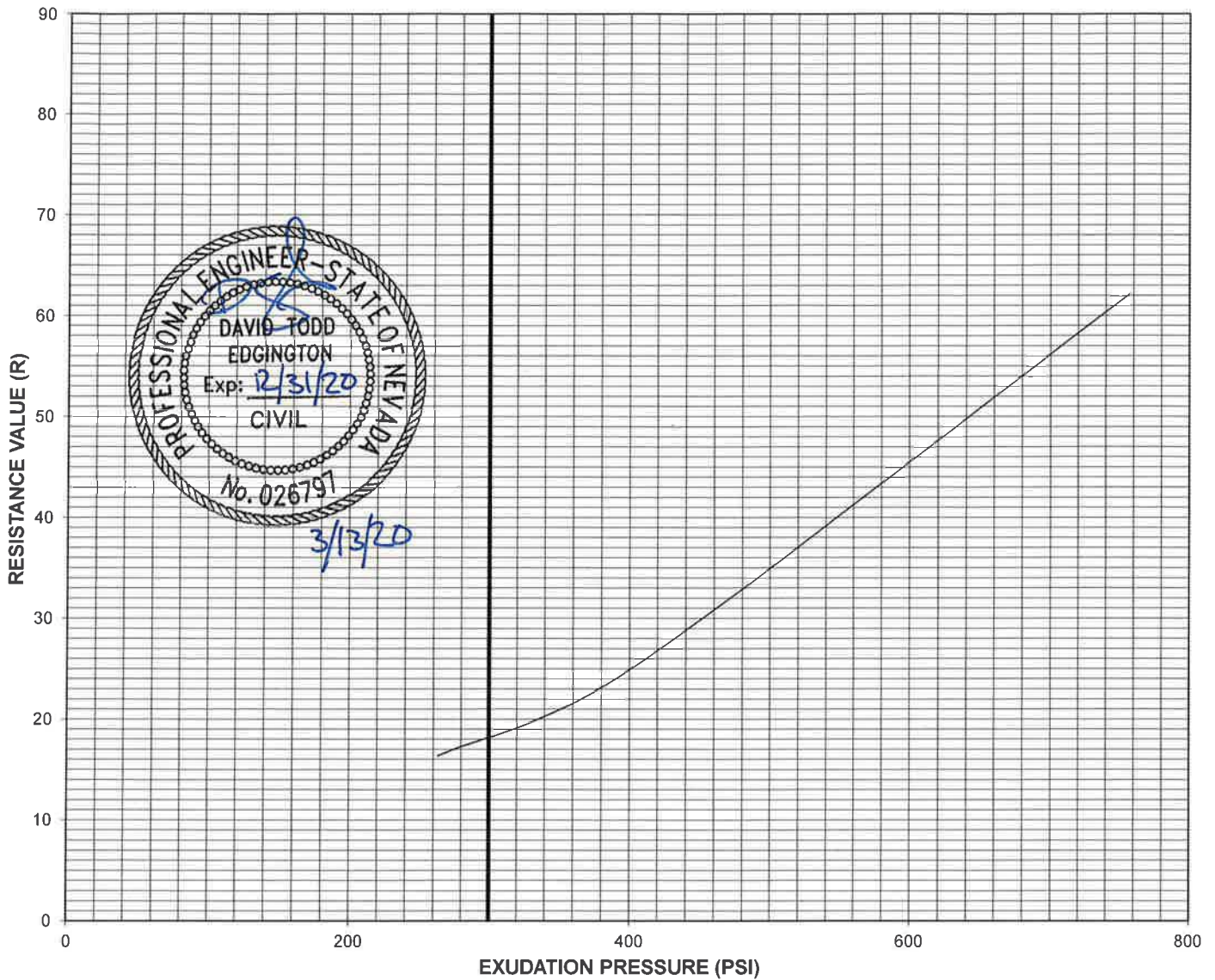
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GRAIN SIZE DISTRIBUTION

Project: Avenue of the Oaks Realignment
 Location: Sparks, NV
 Project Number: 1651-06-1

PLATE: 4a

R-Value and Expansion Pressure of Compacted Soils AASHTO T190 / ASTM D2844



Lab Log #	Sample Source	Material	Expansion Pressure (psf) @ 300 (psi)	R-Value @ 300 (psi)
5298	B - 01C @ 2.8"	Clayey Sand w/ Gravel (SC)	0	18

POINT #	WATER CONTENT (%)	DRY DENSITY (PCF)	EXUDATION PRESS. (PSI)	EXPANSION PRESS. (PSF)	RESISTANCE VALUE (R)
1	11.4	123.7	263	0	16
2	10.5	127.6	396	0	25
3	9.6	128.6	757	0	62
4					
5					

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 1361 Corporate Blvd, Reno, NV 89502
 Phone: 775-823-4068 Fax: 775-823-4066

Avenue of the Oaks Realignment
 B - 01C @ 2.8"



TESTED BY B. LaBarr	JOB NUMBER 2892.062	APPROVED	DATE 3/13/2020	REVISED	DATE
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APPENDIX A

PAVEMENT DESIGN CALCULATIONS

BLACK EAGLE CONSULTING
 Geotechnical and Construction Services
 Sheet 1 of 3
 Designed By: PV
 Checked By: mcd

Date: April 27 2020
 Project No. 1651-16-1

PROJECT NAME: Avenue of the Oaks

STRUCTURAL SECTION DESIGN for RIGID PAVEMENT USING AASHTO/NDOT METHOD

- References: 1.) AASHTO, 1993 : *Design manual for design of rigid and flexible pavements*
 2.) Nevada Dept. of Transportation, 1997: *Pavement structural section design and policy manual*

CALCULATION OF SIMPLE EQUIVALENT SINGLE AXLE LOAD, ESAL

DATA:

Design Life in Years: $L := 40$
 Initial Two-Way Daily Traffic: $ADT := 970$
 Percent (of ADT) Heavy Trucks: $T := 4.51$
 Percent of All Trucks in Design Lane: $T_1 := 100$
 Percent Trucks in Design Direction: $T_d := 50$
 Average Initial Truck Factor (ESAL/Trucks): $T_f := .715$
 Average Truck Factor Growth Rate: $T_g := 1.00$
 Average Annual Growth Rate: $G_a := 1.01$
 Growth Factor (instead of L): $G_f = 48.886$

2017 AADT from NDOT Traffic Report in on C Street
 AADT change over last several years
 vary 850 to 1100
 Assumed Average annual Growth: 1.0%

$$G_f := \frac{G_a^L - 1}{G_a - 1}$$

$$W_{18} := 365 \cdot ADT \cdot \frac{T}{100} \cdot \frac{T_1}{100} \cdot \frac{T_d}{100} \cdot T_f \cdot T_g^L \cdot G_f$$

$$W_{18} = 2.791 \times 10^5$$

MODULUS OF SUBGRADE REACTION, k, in pci

Estimate k-value from R-value or index testing: $k := 150$ psi

Based on a Design R-value of 15

CONCRETE STRENGTH PARAMETERS

Sheet 2 of 3

Based on 28 day unconfined compressive strength of 4000 psi:

Modulus of Rupture (3 point flexural strength): $S_c := 570$ psi

Modulus of Elasticity: $E_c := 3.6 \cdot 10^6$ psi

SOLVE THE RIGID PAVEMENT DESIGN EQUATION FOR THICKNESS, D, in inches

$$\log(W_{18}) = 5.446$$

$$Z_R \cdot S_o + 7.35 \cdot \log(D + 1) - .06 + \frac{\log\left(\frac{\Delta PSI}{4.5 - 1.5}\right)}{\frac{1.624 \cdot 10^7}{(D+1)^{8.46}}} + (4.22 - .032 \cdot P_t) \cdot \log \left[S_c \cdot C_d \cdot \frac{D^{.75} - 1.132}{215.63 \cdot J \cdot \left[D^{.75} - \frac{18.42}{\left(\frac{E_c}{k}\right)^{.25}} \right]} \right]$$

DEFINE VARIABLES:

Reliability: Use 90% for W_{18} less than 54,000,000 and 95% for $> 54,000,000$

$$R := 90$$

Standard Deviation: $S_o := .45$

Initial Design Serviceability Index: $P_o := 4.5$ always; entered in equations as 4.5)

Terminal Serviceability Index: Use 2.5 for Urban or 2.0 for Rural $P_t := 2.5$

Drainage Coefficient: Use 1.00 for Aggregate Base and CTB; 1.25 for bases with extensive drainage systems

$$C_d := 1.00$$

Load Transfer Coefficient: Use 3.9 for Aggergate Interlock and 2.8 for Dowelled Joints

$$J := 2.8$$

$$\Delta\text{PSI} := P_o - P_t \quad \Delta\text{PSI} = 2$$

Interpolate Value for Z_R for the selected Reliability, R:

Sheet 3 of 3

$$r := \begin{pmatrix} 50 \\ 60 \\ 70 \\ 80 \\ 90 \\ 95 \\ 99 \\ 99.9 \end{pmatrix} \quad z := \begin{pmatrix} .000 \\ -.253 \\ -.524 \\ -.841 \\ -1.28 \\ -1.64 \\ -2.32 \\ -3.09 \end{pmatrix}$$

$$Z_R := \text{linterp}(r, z, R) \quad Z_R = -1.28$$

$$\underline{A} := Z_R \cdot S_o - \log(W_{18}) - .06 \quad A = -6.082 \quad B := \log\left(\frac{\Delta\text{PSI}}{4.5 - 1.5}\right) \quad B = -0.176$$

$$\underline{C} := 4.22 - 0.32 \cdot P_t \quad C = 3.42 \quad E := S_c \cdot C_d \quad E = 570$$

$$\underline{F} := 215.63 \cdot J \quad F = 603.764 \quad \underline{G} := \frac{18.42}{\left(\frac{E_c}{k}\right)^{.25}} \quad G = 1.48$$

Estimate thickness for iteration:

$$D := 8.0 \text{ inches}$$

$$\underline{D} := \text{root} \left[A + 7.35 \cdot \log(D + 1) + \frac{B}{1 + \frac{1.624 \cdot 10^7}{(D + 1)^{8.46}}} + C \cdot \log \left[E \cdot \frac{D^{.75} - 1.132}{F \cdot (D^{.75} - D = 5.555)} \right], D \right]$$

Minimum PCC Thickness: $D = 5.555$ inches

6" PCC is structurally adequate for Avenue of Oaks.

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Station	Route/Location	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
0310893	4th St, 50ft S of Devere Way	3300	2400	2300	2200	2200	2000	2200	2500	2700	1950
0310894	4th St, 100ft N of Queen Way	960	1100	1000	950	950	900	1000	830	810	810
0310895	Gear St, 100ft W of Williams Ave	990	870	800	750	900	750	650	820	830	770
0310896	Grove St, 400ft E of Virginia St.	4200	4200	4000	3400	3700	3300	3300	3300	3300	3500
0310898	Holcomb Ave, 135ft N of Stewart St	3700	3600	3400	3300	3400	3400	3300	3300	3500	3650
0310901	Lake St, 200ft S of E 1st St	6700	7600	7500	7400	6500	6500	6600	6700	6900	6200
0310902	Wells Ave, 100ft N of Kuenzli Ln	22000	22000	22000	14000	16000	19500	19500	20000	22000	23200
0310904	Vine St, 160ft N of 7th St	1800	2100	1700	2000	1900	2000	2100	2100	2000	2200
0310905	Washington St, 240ft S of 7th St.	4500	4500	4200	4100	4000	4100	4200	4000	4150	3300
0310906	Ralston St, 190ft N of Elm St.	3200	3300	3200	3300	3200	3300	3300	3200	3000	3200
0310908	Virginia St, 150ft S of 8th St	16000	17000	16000	15000	17000	13500	14000	13000	13000	14000
0310910	Evans Ave, 100ft N of 8th St.	2000	2300	2000	2500	2400	2100	2300	2300	2300	1850
0310911	Valley Rd, 90ft S of 8th St	3800	3600	3300	3200	3400	3300	3500	3500	3400	3100
0310912	Booth St, 75ft S of Idlewild Dr.	2300	2700	2800	2700	2400	2400	2700	2800	2900	2950
0310914	Villanova Dr, 95ft W of Market St	2700	2500	2300	2400	2600	2200	2200	2500	2500	2600
0310915	Robb Dr, 290ft W of Sharlands Ave	22000	23000	22000	22000	21500	22000	23000	23000	22000	22700
0310916	Ramsey Way, 285ft S of Lemmon Dr	690	760	590	600	550	650	650	610	640	910
0310917	Chickadee Way, 160ft E of Lemmon Dr.	330	340	210	250	300	250	300	280	220	210
0310919	S Verdi Rd, 620ft E of Bridge St	360	280	280	300	350	250	250	340	480	360
0310920	Military Rd, .2 mi N of Lemmon Dr	7300	8200	7700	7500	7400	8300	9100	9200	9700	10100
0310921	Foothill Rd, 100ft E of Thomas Creek Rd	1100	1200	1000	900	900	1100	1200	1200	1300	1350
0310922	W Hidden Valley Dr, 200ft N of Mira Loma Dr	1900	1800	1800	1300	1300	1300	1400	1600	1500	1150
0310923	'C' St, 150ft E of Rock Blvd	1100	1000	940	950	900	850	850	830	860	970

Color indicates that the AADT value is estimated

NDOT 2018 Traffic Report

URBAN

VEHICLE DISTRIBUTION and AVERAGE ESAL's

by ROADWAY FUNCTIONAL CLASSIFICATION

STATE: NEVADASTATE FIPS CODE: 32DATA YEAR: 2009DATE: 25-May-10

FUNCTIONAL CLASSIFICATION	PERCENT OF TRAVEL												TRUCK PERCENT [T%]
	PASSENGER VEHICLES			LIGHT TRUCKS			HEAVY TRUCKS						
	MOTOR-CYCLES	AUTO-MOBILES	LIGHT TRUCKS [2 AXLE, 4 TIRE]	SINGLE-UNIT TRUCKS			SINGLE-TRAILER TRUCKS			MULTI-TRAILER TRUCKS			
				BUSSES	2 AXLE, 6 TIRE	3 AXLE OR MORE	4 AXLE OR LESS	5AXLE	6 AXLE OR MORE	5 AXLE OR LESS	6 AXLE	7 AXLE OR MORE	AVERAGE ESAL
URBAN													
INTERSTATE	0.09%	90.26%	1.54%	0.45%	1.14%	0.57%	0.30%	4.83%	0.14%	0.32%	0.11%	0.26%	8.11%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	0.812	0.259	0.569	0.615	1.221	1.357	1.558	0.961	2.185	1.038
RIGID ESAL by VEHICLE GROUP	*	*	*	0.921	0.228	0.752	0.613	1.837	2.016	1.418	0.866	2.750	1.441
OTHER FREEWAY & EXPRESSWAY	0.09%	90.16%	5.73%	0.28%	1.35%	0.35%	0.26%	1.34%	0.06%	0.10%	0.04%	0.24%	4.02%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	0.717	0.198	1.026	0.598	1.191	1.380	1.426	0.761	1.539	0.797
RIGID ESAL by VEHICLE GROUP	*	*	*	0.746	0.175	1.481	0.586	1.780	2.080	1.305	0.656	2.301	1.078
OTHER PRINCIPAL ARTERIALS	0.38%	88.82%	4.08%	0.65%	1.70%	0.58%	0.80%	2.15%	0.13%	0.25%	0.11%	0.34%	6.72%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	1.012	0.269	0.906	1.088	1.223	1.313	2.253	0.952	1.920	0.989
MINOR ARTERIALS	0.18%	87.03%	7.83%	0.46%	2.25%	0.30%	0.54%	1.01%	0.05%	0.16%	0.05%	0.14%	4.96%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	0.839	0.239	0.938	0.681	1.285	1.265	2.099	0.593	1.852	0.715
MINOR COLLECTORS	0.19%	95.20%	1.23%	0.40%	0.72%	0.35%	0.55%	0.31%	0.04%	0.23%	0.14%	0.82%	3.56%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	*	*	*	*	*	*	*	*	*	*
LOCAL ROADS	0.19%	91.22%	4.08%	0.38%	2.93%	0.55%	0.04%	0.46%	0.03%	0.01%	0.01%	0.10%	4.51%
FLEXIBLE ESAL by VEHICLE GROUP	*	*	*	*	*	*	*	*	*	*	*	*	*

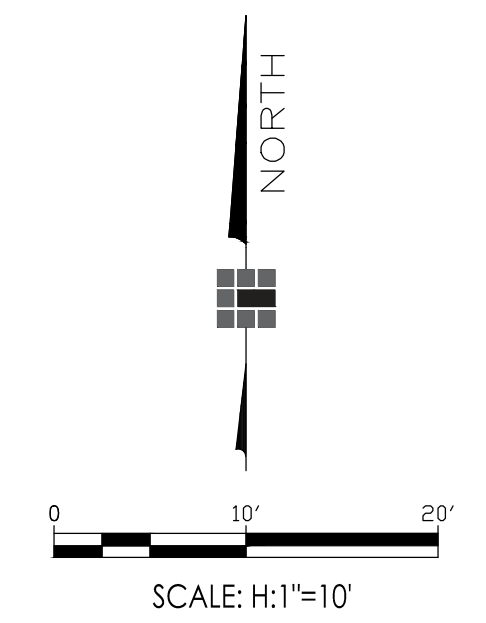
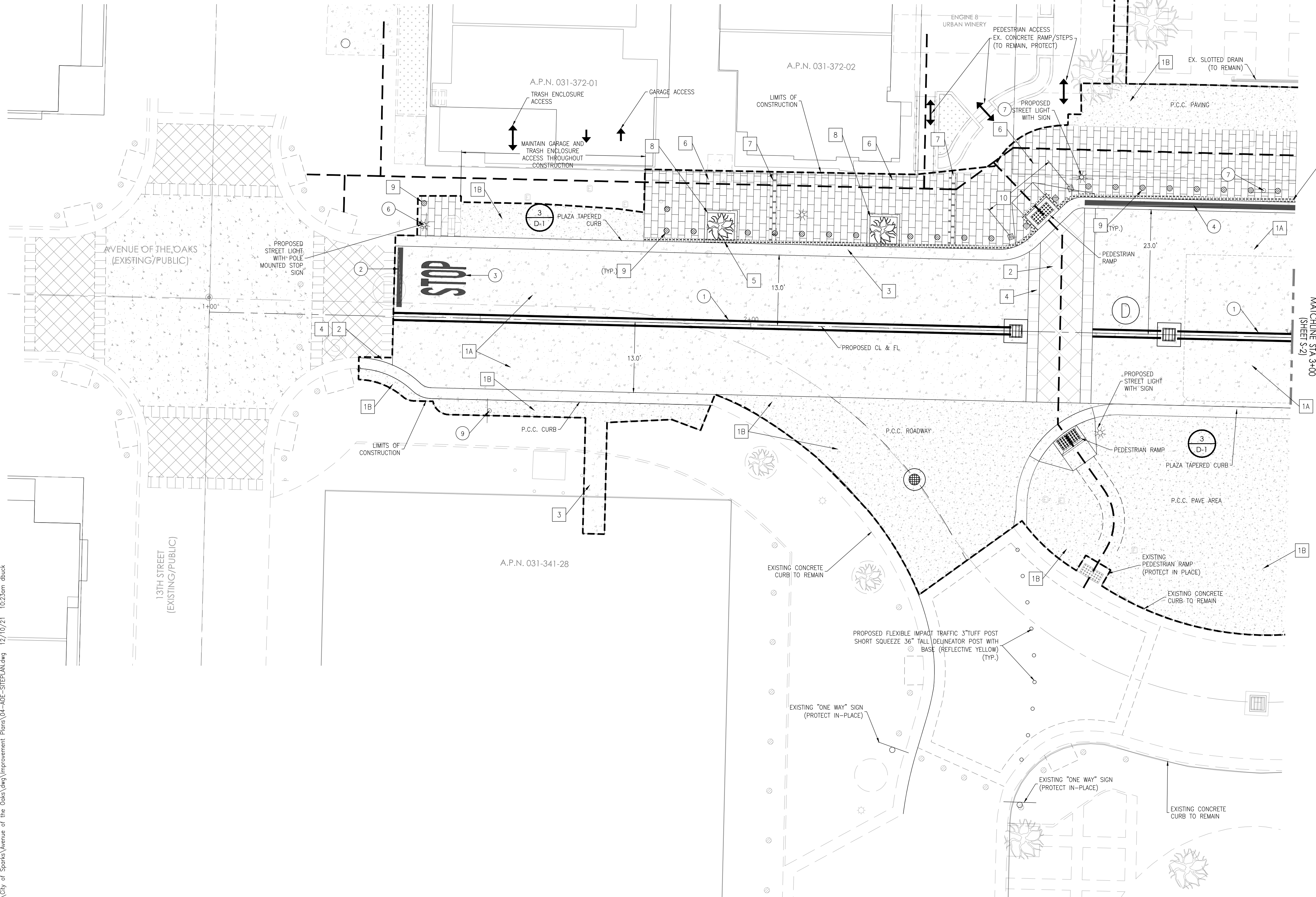
* Data not available for these Roadway Items

NOTES

- ALL CONCRETE PAVERS TO BE PLACED ON 1" SAND ON 4" P.C.C. SUB-SLAB WITH 6" TYPE 2, CLASS 9 AGGREGATE BASE. PROVIDE EXPANSION JOINTS IN SUB-SLAB AT APPROXIMATELY 20' O.C. SPACING EACH WAY.
- ALL CONCRETE SLAB PAVEMENT SHALL BE P.C.C. PAVING REINFORCED WITH SYNTHETIC MACRO FIBER. MACRO FIBERS SHALL BE POLYOLEFIN MACRO-FIBERS ENGINEERED AND DESIGNED FOR USE IN CONCRETE, COMPLYING WITH ASTM C1116/C1116M, TYPE III WITH ASTM C 1116/C 1116M, TYPE III AND SECTION 4.1.3 NOTE 2, 1 1/2" TO 2" LONG, MINIMUM EQUIVALENT RESIDUAL FLEXURAL STRENGTH RATIO (R_u) OF 31% PER MOST RECENT VERSION OF ASTM C1609 FROM AN ACCREDITED INDEPENDENT LAB. SYNTHETIC MACRO-FIBER SHALL UNIFORMLY DISPERSE IN CONCRETE MIXTURE AT MANUFACTURER'S RECOMMENDED ADDITION RATE, BUT NOT LESS THAN 5-6 LBS/CY. MACRO FIBER SHALL BE TUF STRAND SF FIBERS OR APPROVED EQUAL.
 - P.C.C. ROADWAY SECTION SHALL BE 8" THICKNESS P.C.C. DOWELED PAVEMENT.
 - P.C.C. PAVET AREAS SHALL BE 6" THICKNESS P.C.C. SECTION WITH PLAIN JOINTS.
- PROVIDE JOINTING PER PLAN AND DETAILS.
- SAWCUT AND REMOVE EXISTING SIDEWALK TO THE LIMIT AS SHOWN. PROTECT EXISTING PAVEMENT EDGE. PROVIDE 6" P.C.C. SIDEWALK ON 6" TYPE 2 AGGREGATE BASE. IF REPAIRS NEED TO BE MADE DUE TO DEMOLITION AND WORK, CONTRACTOR TO PROVIDE NEW SIDEWALK WITH NEW FINISH, COLOR AND JOINTING TO MATCH EXISTING SIDEWALK.
- PROVIDE 1/8" WIDE BY D/3 SAWCUT JOINT OR TOOLED CONSTRUCTION JOINT AT 5' O.C. EACH WAY ON BRICK PAVEMENT P.C.C. SUB-SLAB. DRILL OR CORE 1/2" DIAMETER DRAINAGE HOLES THROUGH P.C.C. SUB-SLAB AT CONTROL JOINT INTERSECTION AND ALONG SLAB PERIMETER, 1 FOOT FROM SLAB PERIMETER, AND 5" O.C. JOINT LAYOUT AND DRAINAGE NOT SHOWN AT EACH LOCATION FOR CLARITY.

ARCHEOLOGICAL STATEMENT:

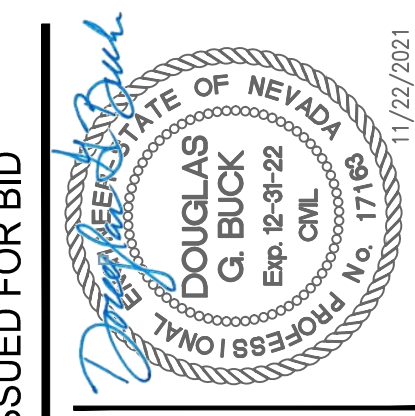
SHOULD ANY PREHISTORIC OR HISTORIC REMAINS/ARTIFACTS BE DISCOVERED DURING SITE DEVELOPMENT, WORK SHALL TEMPORARILY BE HALTED AT THE SPECIFIC SITE AND THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY, SHALL BE NOTIFIED TO RECORD AND PHOTOGRAPH THE SITE. THE PERIOD OF TEMPORARY DELAY SHALL BE LIMITED TO A MAXIMUM OF TWO WORKING DAYS FROM THE DATE OF NOTIFICATION.



Know what's below.
Call before you dig.

LEGEND

- | | | | | | |
|----|--|--|-------|--|--|
| 1A | | PORTLAND CEMENT CONCRETE (P.C.C) ROADWAY | 5A | | INSTALL "STOP" SIGN (R1-1) |
| 1B | | PORTLAND CEMENT CONCRETE (P.C.C.) PAVE AREAS | D-1 | | INSTALL "NO PARKING LOADING ZONE" SIGN (R7-6) (MAY BE LIGHT MOUNTED) |
| 2 | | STAMPED CONCRETE - INTEGRALLY COLORED CONCRETE WITH 1.5"x1.5" SAW CUT PATTERN AND ACID ETCH FINISH SET AT 45 DEG. ANGLE. LM SCOFFIELD CHROMIX ADMIXTURE FRENCH GREY NO. C-14 | SB | | INSTALL "DO NOT ENTER" SIGN (R5-1) |
| 3 | | PORTLAND CEMENT CONCRETE FLATWORK - CURB AND GUTTER, SIDEWALK TRENCH REPAIR | D-1 | | INSTALL "NO PARKING ANY TIME" SIGN (R7-1) |
| 4 | | STAMPED CONCRETE: 2" WIDE INTERGRALLY COLORED CONCRETE BAND WITH BOMANTE STAMPED PATTERN. PATTERN: 12"x12" TILE. COLOR: LM SCOFFIELD CHROMIX ADMIXTURE CORAL RED NO. C-22 | 6 | | |
| 5 | | CONCRETE PAVERS, BASALITE MENDICINO. COLOR: TRUCKEE PATTERN: SINGLE HEADER BAND | D-1 | | |
| 6 | | CONCRETE PAVERS, BASALITE MENDICINO COLOR-MENDICINO BLEND. PATTERN: RUNNING BOND WITH DIRECTION PERPENDICULAR TO BACK OF CURB | D-1 | | |
| 7 | | CONCRETE PAVERS, BASALITE MENDICINO. COLOR: TRUCKEE PATTERN: DOUBLE HEADER BAND | D-1 | | |
| | | ACCESSIBLE ROUTE | | | |
| 8 | | TREE WELL - REFERENCE LANDSCAPING PLANS | 1 | | |
| 9 | | BOLLARD | D-3 | | |
| 10 | | COLLAPSIBLE BOLLARD | S-413 | | |
| | | 4" DOUBLE YELLOW SOLID CENTERLINE WITH BLACK ENHANCING STRIPE - PERMANENT WATER BOURNE PAINT | | | |
| | | 24" WIDE STOP BAR - THERMOPLASTIC | | | |
| | | "STOP" SYMBOL MARKING - THERMOPLASTIC | | | |
| | | PAINT FRONT FACE OF CURB YELLOW | | | |
| | | NOT USED | | | |

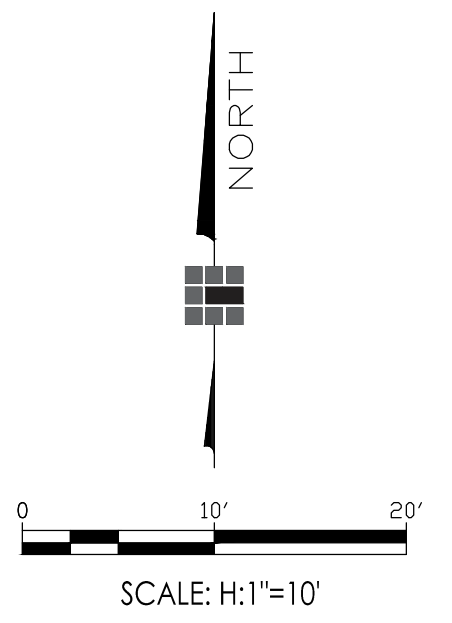
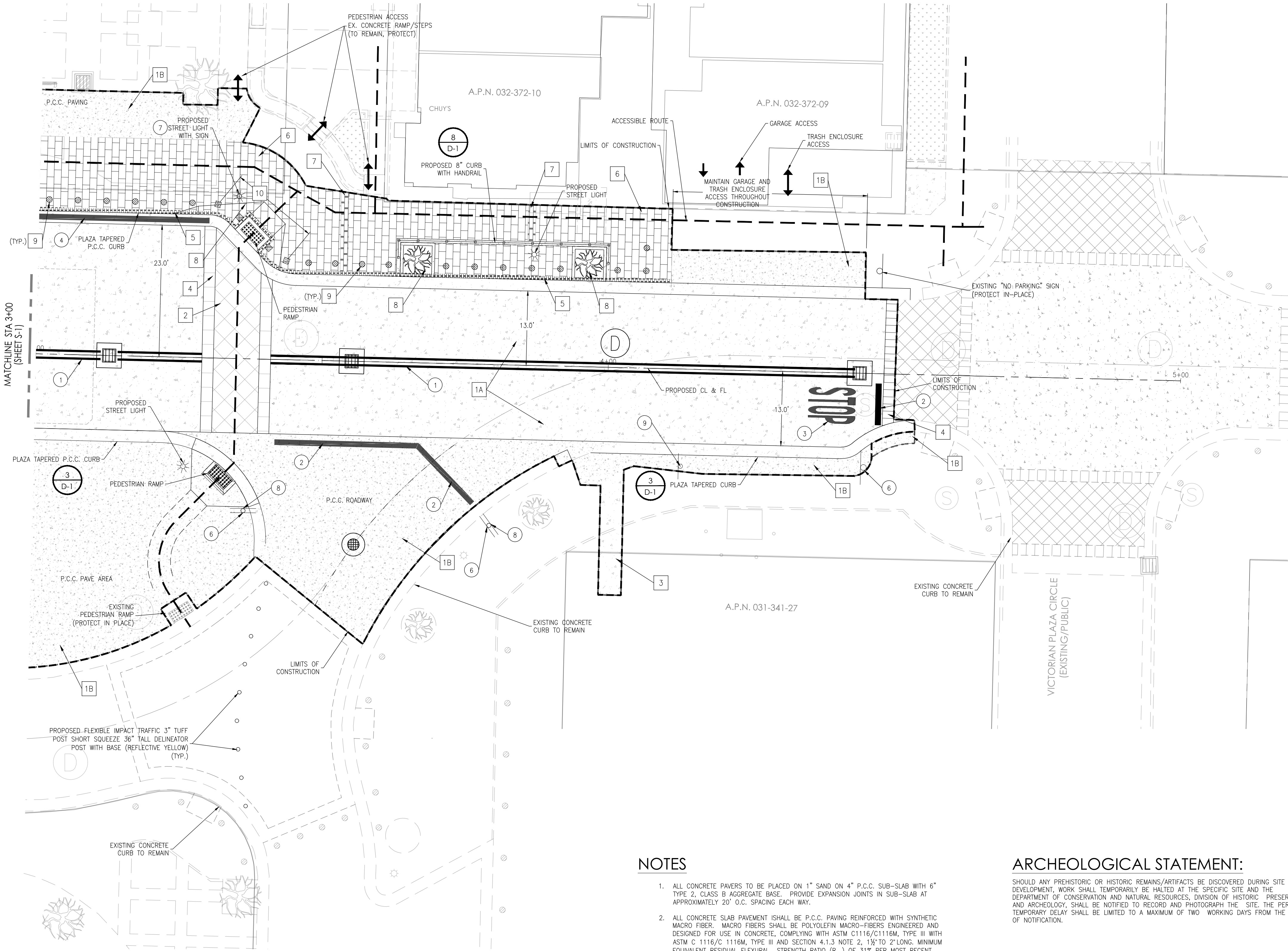


CHRISTY CORPORATION
1000 Milley Parkway | Sparks, Nevada 89436
775.502.8552 christynv.com

REV.	DATE	DESCRIPTION

CIVIL IMPROVEMENT PLANS FOR
AVENUE OF THE OAKS REALIGNMENT
SITE PLAN - WEST
CITY OF SPARKS, NEVADA

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Date: 11/9/2021
Designed by: SAJ
Checked by: DGB
Job No. 1594.001







Know what's below.
Call before you dig.

LEGEND

- 1A PORTLAND CEMENT CONCRETE (P.C.C) ROADWAY (SA D-1)
- 1B PORTLAND CEMENT CONCRETE (P.C.C.) PAVE AREAS (SB D-1)
- 2 STAMPED CONCRETE. INTEGRALLY COLORED CONCRETE WITH 1.5"x1.5" SAW CUT PATTERN AND ACID ETCH FINISH SET AT 45 DEG. ANGLE. COLOR: LM SCOFFIELD CHROMIX ADMIXTURE FRENCH GREY NO. C-14 (6 D-1)
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- 6 CONCRETE PAVERS, BASALITE MENDICINO COLOR/MENDICINO BLEND. PATTERN: RUNNING BOND WITH DIRECTION PERPENDICULAR TO BACK OF CURB (6 D-1)
- 7 CONCRETE PAVERS, BASALITE MENDICINO. COLOR: TRUCKEE PATTERN: DOUBLE HEADER BAND (6 D-1)
- 8 TREE WELL - REFERENCE LANDSCAPING PLANS (1 L-3)
- 9 BOLLARD (1 D-3)
- 10 COLLAPSIBLE BOLLARD (S-413 D-3)

- 1 4" DOUBLE YELLOW SOLID CENTERLINE WITH BLACK ENHANCING STRIPE - PERMANENT WATER BOURNE PAINT
- 2 24" WIDE STOP BAR - THERMOPLASTIC
- 3 "STOP" SYMBOL MARKING - THERMOPLASTIC
- 4 PAINT FRONT FACE OF CURB YELLOW
- 5 NOT USED

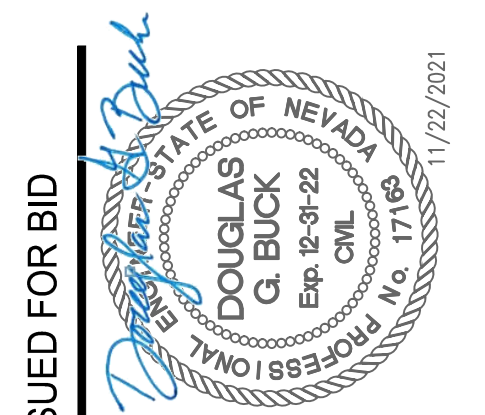
- 6 INSTALL "STOP" SIGN (R1-1) 
- 7 INSTALL "NO PARKING LOADING ZONE" SIGN (R7-6) (MAY BE LIGHT MOUNTED) 
- 8 INSTALL "DO NOT ENTER" SIGN (R5-1) 
- 9 INSTALL "NO PARKING ANY TIME" SIGN (R7-1) 

NOTES

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- 2.1. P.C.C. ROADWAY SECTION SHALL BE 8" THICKNESS P.C.C. DOWELED PAVEMENT.
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4. SAWCUT AND REMOVE EXISTING SIDEWALK TO THE LIMIT AS SHOWN. PROTECT EXISTING PAVEMENT EDGE. PROVIDE 6" PCC SIDEWALK ON 6" TYPE 2 AGGREGATE BASE. IF REPAIRS NEED TO BE MADE DUE TO DEMOLITION AND WORK, CONTRACTOR TO PROVIDE NEW SIDEWALK WITH NEW FINISH, COLOR AND JOINTING TO MATCH EXISTING SIDEWALK.
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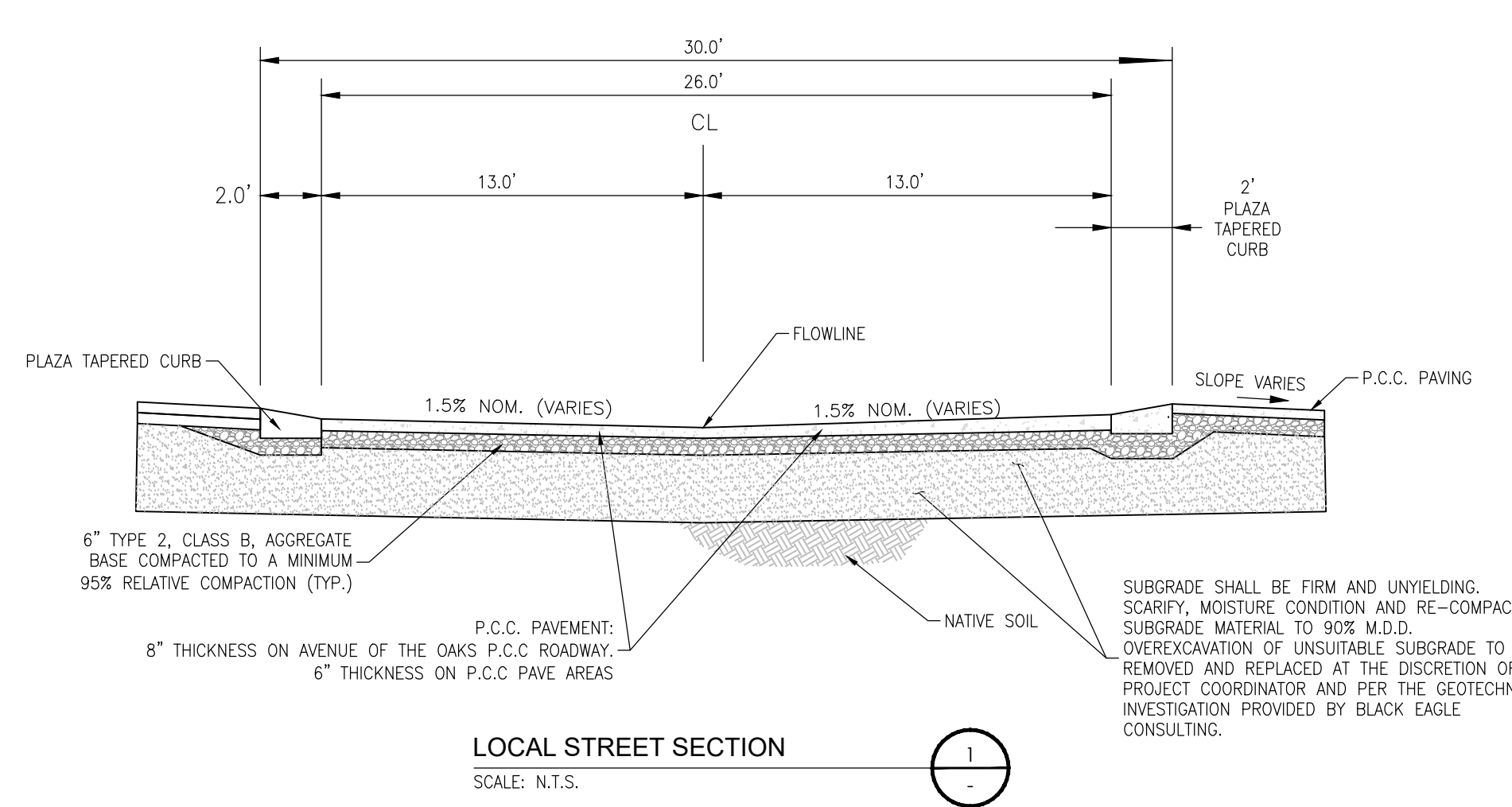
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1000 Willey Parkway | Sparks Nevada 89436
775.502.8552 christynv.com

REV.	DATE	DESCRIPTION

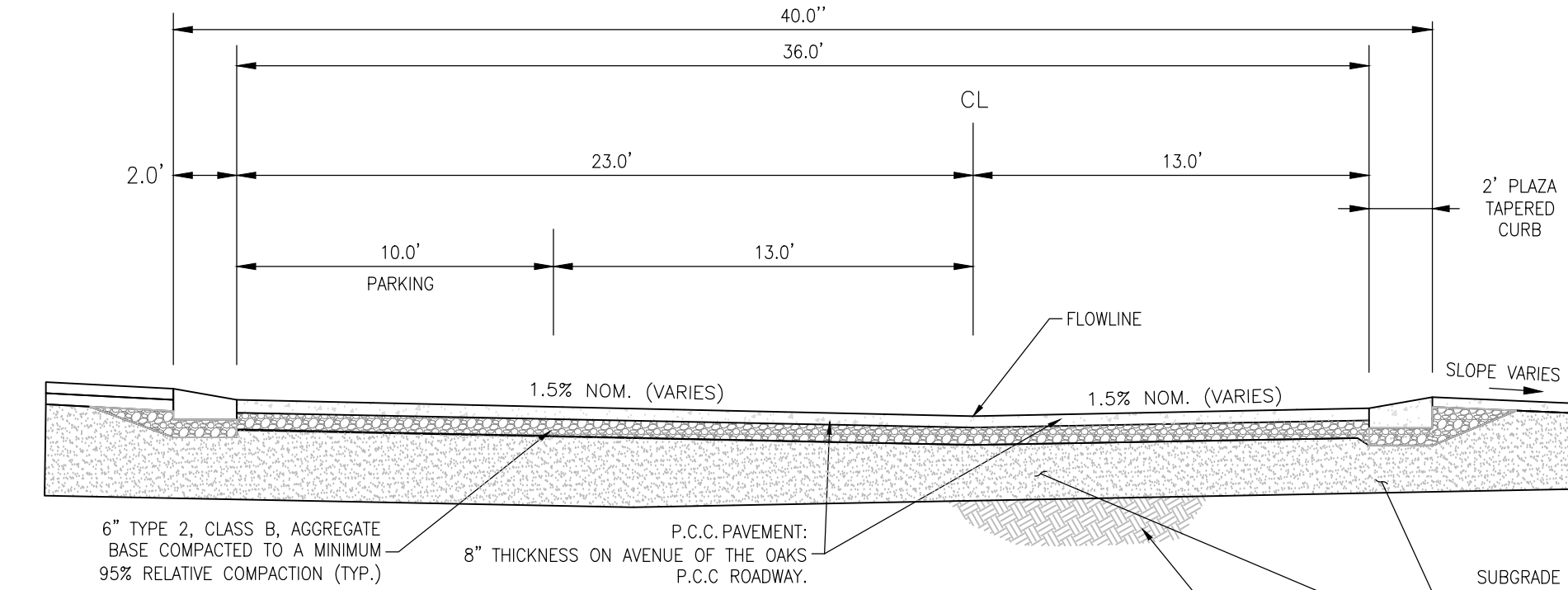
CIVIL IMPROVEMENT PLANS FOR AVENUE OF THE OAKS REALIGNMENT SITE PLAN - EAST
CITY OF SPARKS, NEVADA

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Checked by: DGB
Job No. 1594.001

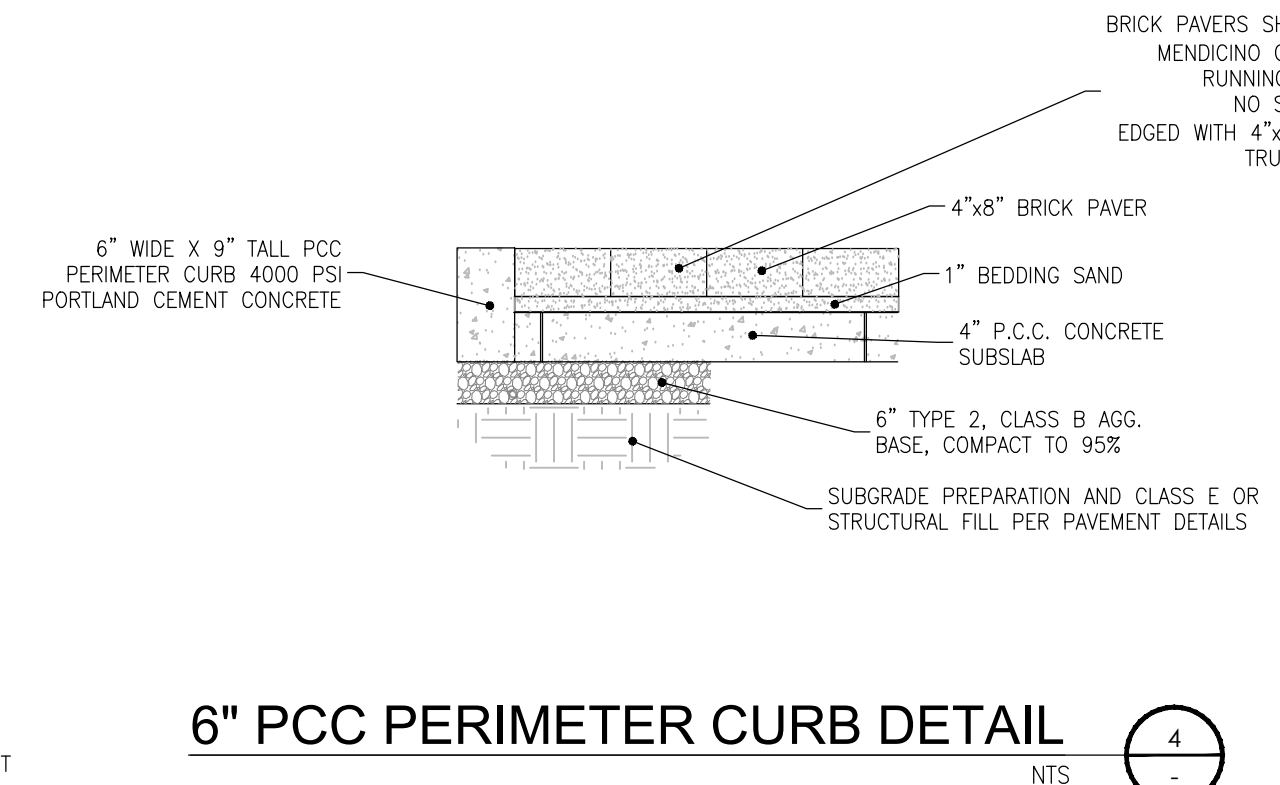
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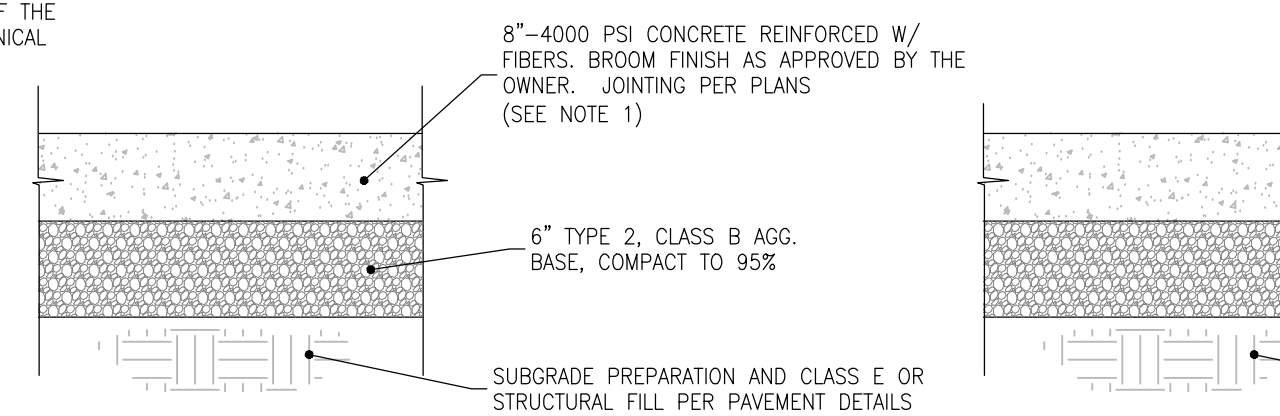
LOCAL STREET SECTION
SCALE: N.T.S. (1)



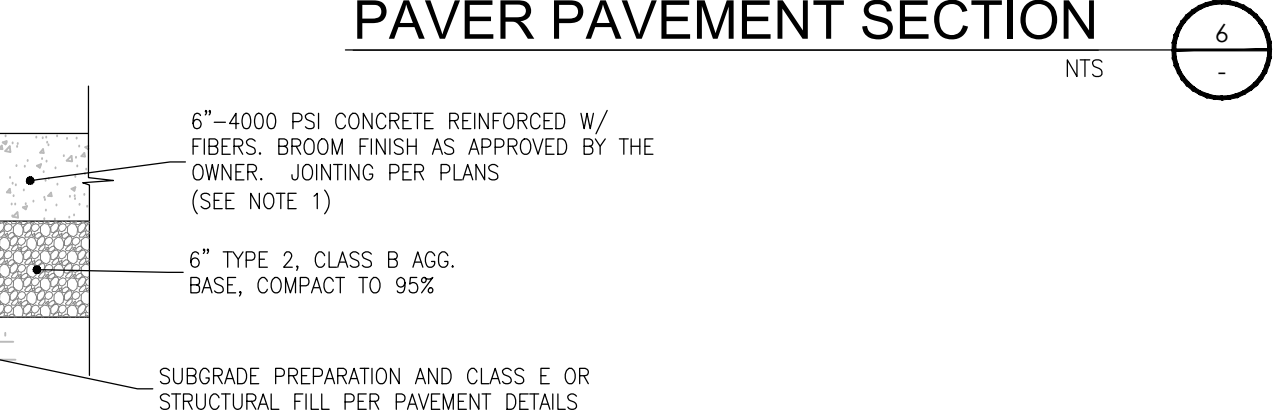
LOCAL STREET SECTION - LOADING ZONE
SCALE: N.T.S. (2)



6\"/>



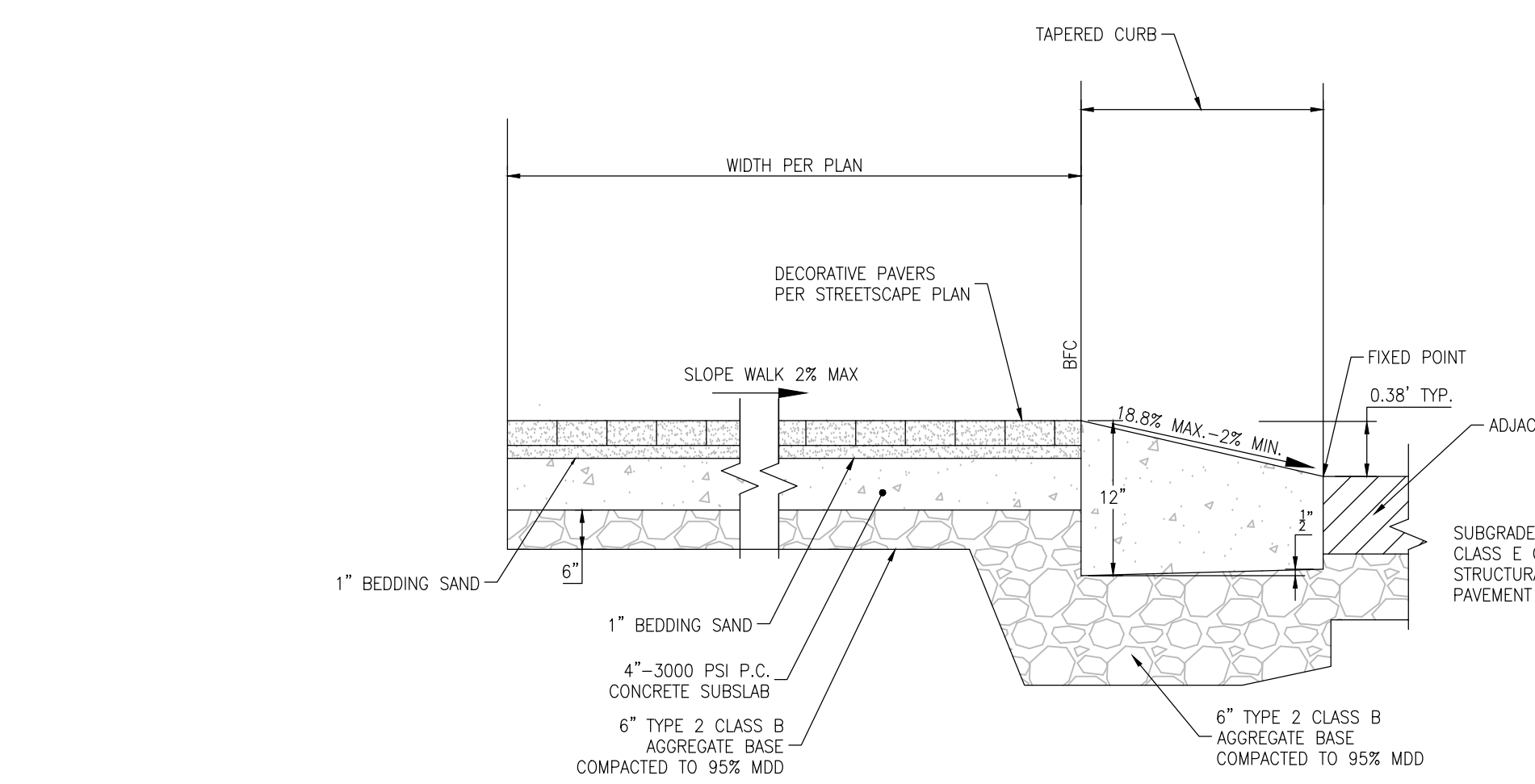
**P.C.C. ROADWAY SECTION:
8\"/>**



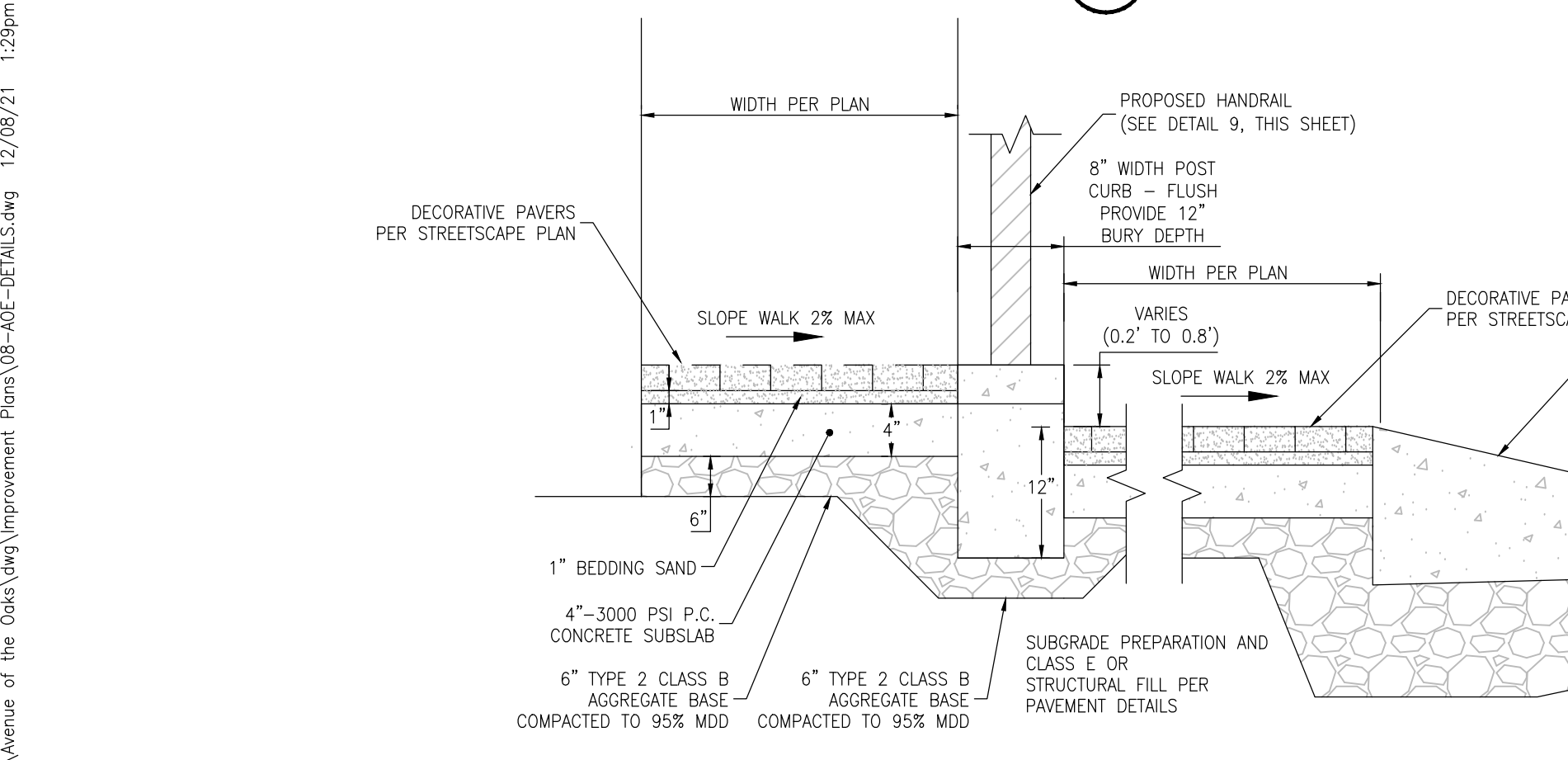
**P.C.C. PAVE SECTION:
6\"/>**

TYPICAL P.C.C. PAVEMENT SECTIONS NTS

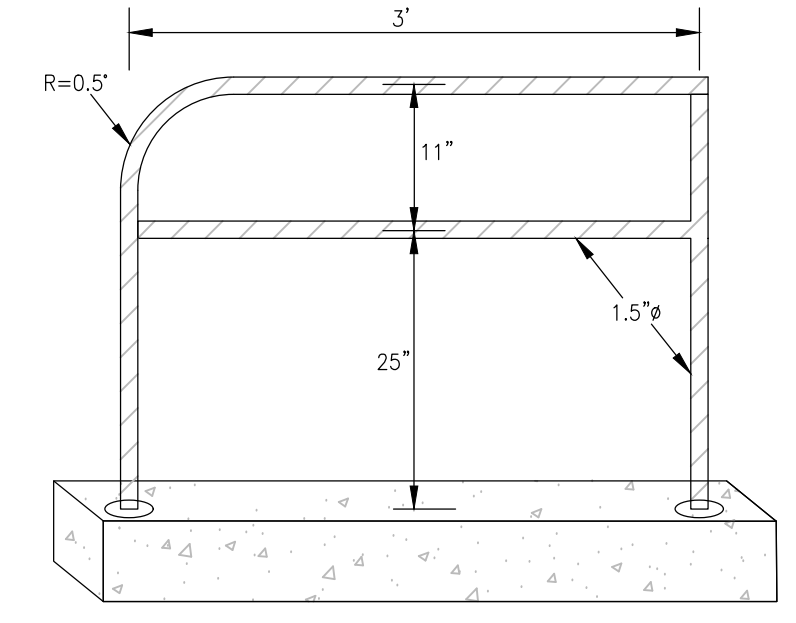
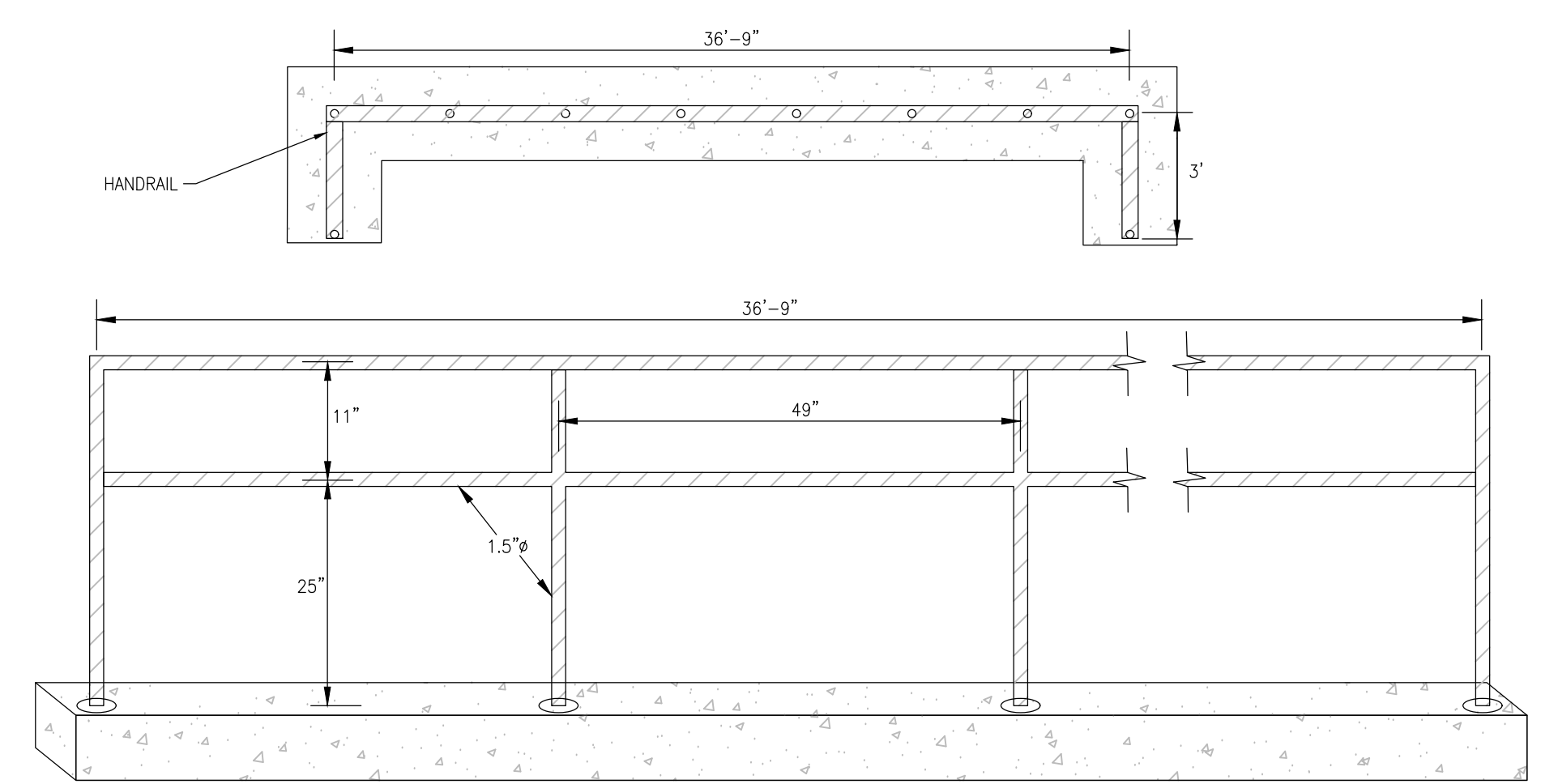
NOTE 1. ALL CONCRETE SLAB PAVEMENT SHALL BE P.C.C. PAVING REINFORCED WITH SYNTHETIC MACRO FIBER. MACRO FIBERS SHALL BE POLYOLEFIN MACRO-FIBERS ENGINEERED AND DESIGNED FOR USE IN CONCRETE, COMPLYING WITH ASTM C1116/C1116M, TYPE III WITH ASTM C 1116/C 1116M, TYPE III AND SECTION 4.1.3 NOTE 2, 1 1/2\"/>



PLAZA TAPERED CURB
NTS (3)



8\"/>

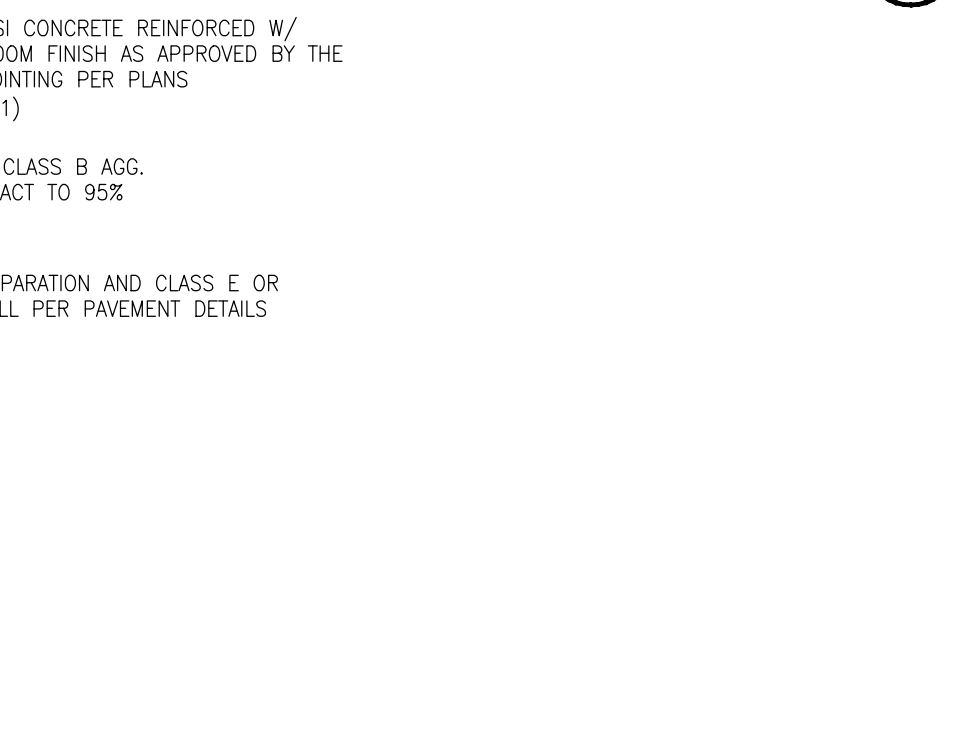


ITEM NO.	DESCRIPTION	MATERIAL
1	1.5\"/>	S.S. 304
2	1.5\"/>	S.S. 304
3	1.5\"/>	S.S. 304
4	S.S. FLOOR FLANGE	S.S. 304

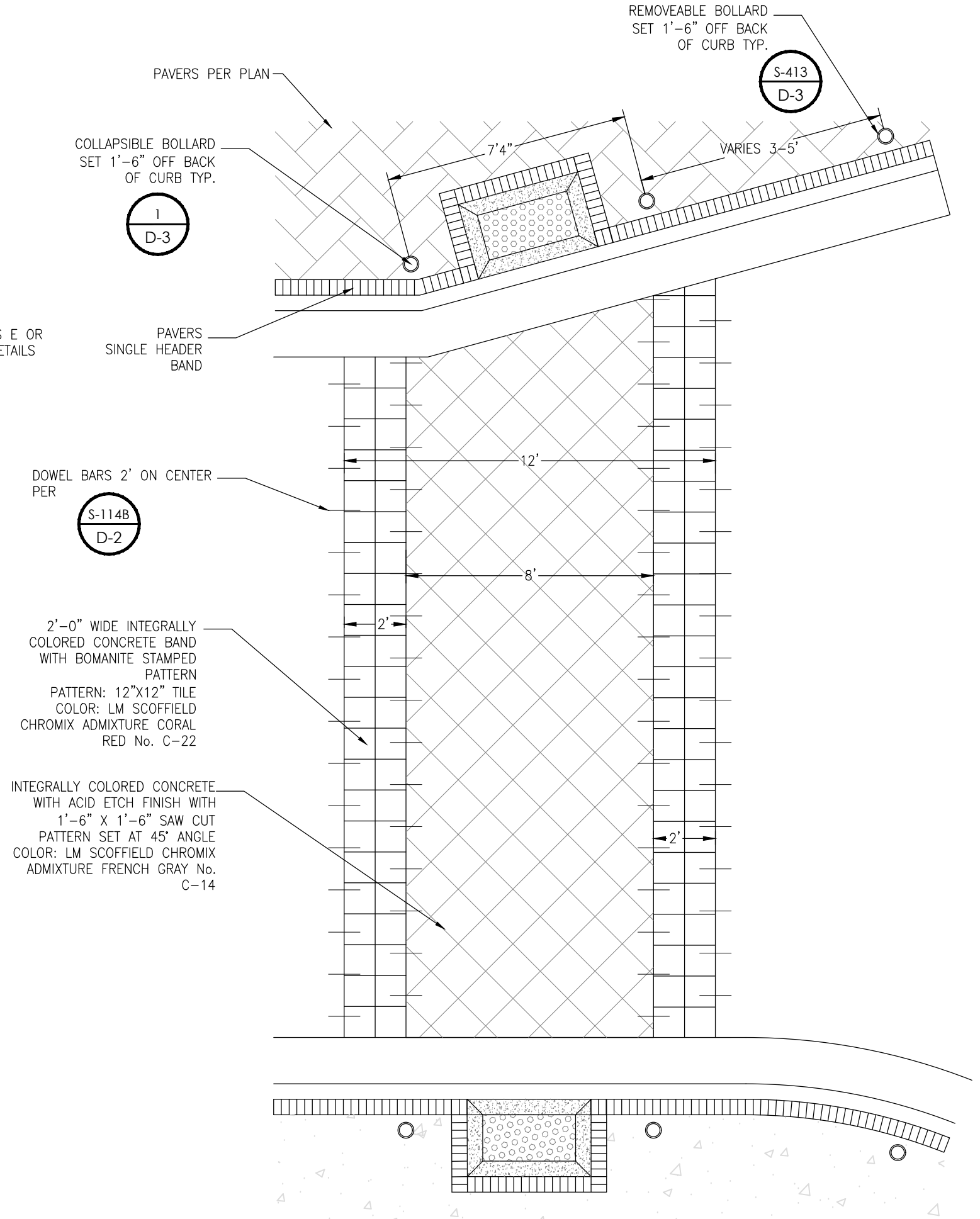
HANDRAIL
NTS (9)

- CONTRACTOR TO MATCH COLOR OF EXISTING HAND RAILS AT ADJACENT BUSINESSES.
- ALL WELDS SHALL BE GROUND SMOOTH.
- TRUBOLT WEDGE ANCHORS, OR APPROVED EQUIVALENT, SHALL BE USED TO BOLT DOWN S.S. FLOOR FLANGE.
- COAT RAILINGS IN ALL SURFACE ENAMEL OIL BASE.
- SHOP DRAWINGS SHOULD BE SUBMITTED AND APPROVED BY ENGINEER.

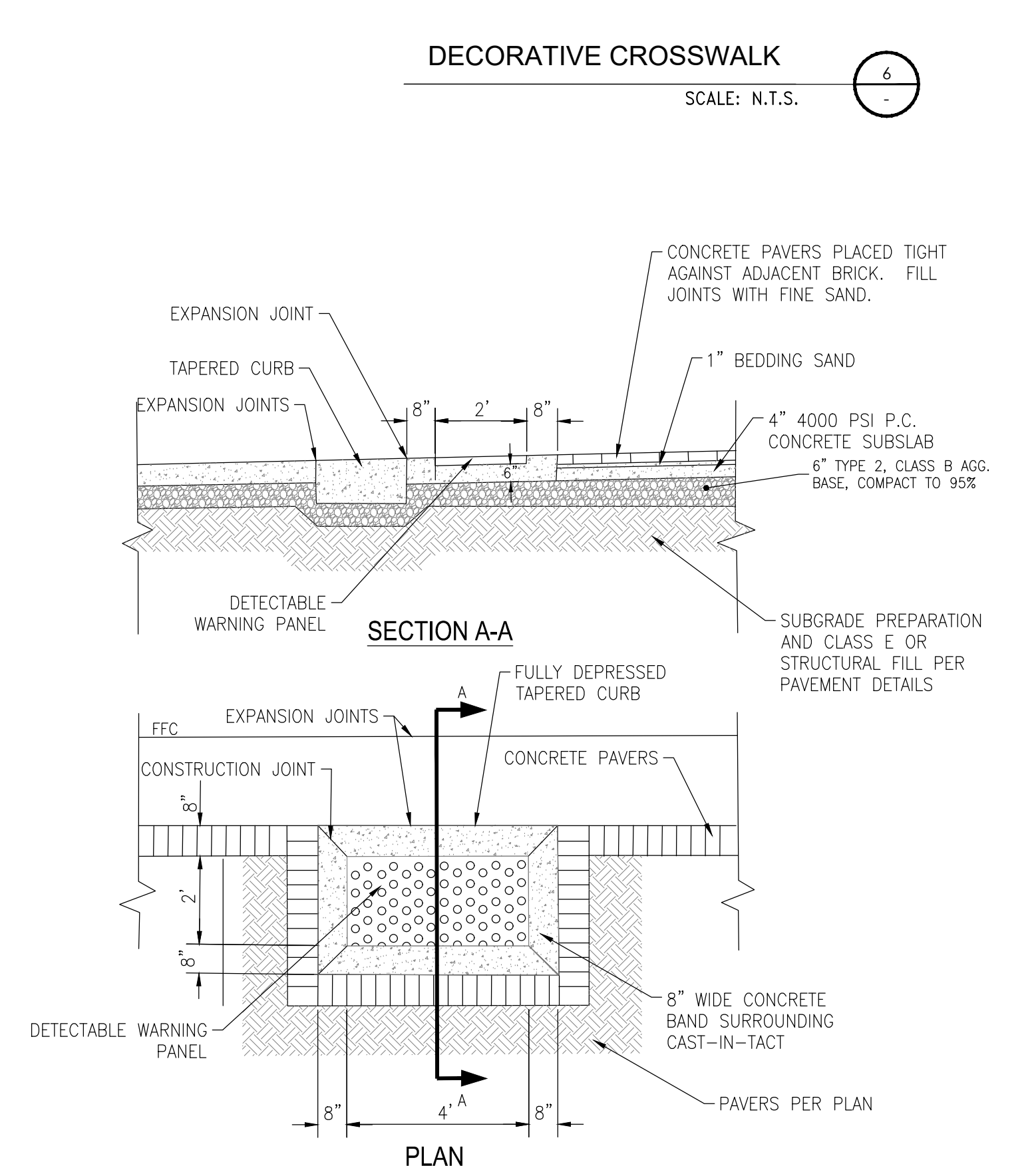
**NON-VEHICULAR TRAFFIC AREA
BRICK PAVEMENT SECTION** (6)



NOTE: PROVIDE 1/8\"/>



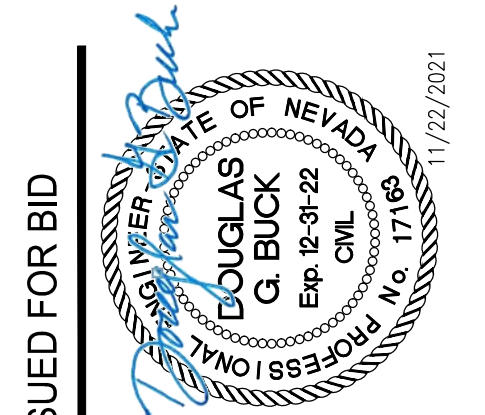
DECORATIVE CROSSWALK
SCALE: N.T.S. (6)



TACTILE WARNINGS
NTS (7)

- USE DETAIL SPECIFIC ITEMS FROM DETAILS ON THIS SHEET WHEN CONFLICTING WITH STANDARD DETAILS.

S-106E D-2 S-106S D-2



CHRISTY CORPORATION
1000 Milley Parkway | Sparks Nevada 89436
775.502.8552 christynv.com

REV.	DATE	DESCRIPTION

**CIVIL IMPROVEMENT PLANS FOR
AVENUE OF THE OAKS REALIGNMENT
DETAILS**
CITY OF SPARKS
SPARKS, NEVADA

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