Tentative Subdivision Map and Variance Application

Grandview Terrace

Submitted to Washoe County

September 14, 2020

Prepared for

Douglas T Barker (Hero Land)

979 Melba Drive

Reno, NV 89503

Prepared by

WOOD RODGERS

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

1361 Corporate Blvd • Reno, NV 89502 • Tel: 775.823.4068

Table of Contents

Section 1

Washoe County Development Application

Your entire application is a public record. If you have a concern about releasing personal information, please contact Planning and Building staff at 775.328.6100.

Project Information	**Staff Assigned Case No.:**

Project Name: **Grandview Terrace Tentative Map**

Project Description: 18 Lot Single Family Residential Common Open Space Tentative Map and Variance on grading requirements specifically Washoe County Code Sections 110.438.45 (b), (c), (e), (g), (i), (j), (k)

Project Address: 100 Malcolm Avenue, 145 Heindel Road, 230 Medgar Avenue

Project Area (acres or square feet): +/- 6.85 Acres

Project Location (with point of reference to major cross streets **AND** area locator):

Site is located east of the intersection of Kennedy Dr and Malcolm Ave, northwest of Virginia St and Lemmon Dr in Washoe County.

Assessor's Parcel No.(s):	Parcel Acreage:	Assessor's Parcel No.(s):	Parcel Acreage:
570-263-13	2.59	082-262-21	3.55
082-262-19	0.72		

Indicate any previous Washoe County approvals associated with this application:

Case No.(s).

Applicant Information (attach additional sheets if necessary)

Property Owner:		**Professional Consultant:**	
Name: Hero Land Holdings LLC		Name: Wood Rodgers, Inc.	
Address: 2241 Harvard Street Ste 200		Address: 1361 Corporate Blvd	
Sacramento CA	Zip: 95815	Reno, NV	Zip: 89502
Phone: 775-762-2027	Fax:	Phone: 775-828-7742	Fax:
Email: nnnexchange@gmail.com		Email:	
Cell: 775-762-2027	Other:	Cell: 775-771-0066	Other:
Contact Person: Doug Barker		Contact Person: Derek Kirkland, AICP	
Applicant/Developer:		**Other Persons to be Contacted:**	
Name: Douglas T Barker (Also Owner of one parcel)		Name:	
Address: 979 Melba Drive		Address:	
Reno, NV	Zip: 89503		Zip:
Phone: 775-762-2027	Fax:	Phone:	Fax:
Email: nnnexchange@gmail.com		Email:	
Cell: 775-762-2027	Other:	Cell:	Other:
Contact Person: Doug Barker		Contact Person:	

For Office Use Only

Date Received:	Initial:	Planning Area:	
County Commission District:		Master Plan Designation(s):	
CAB(s):		Regulatory Zoning(s):	

Property Owner Affidavit

Applicant Name: Douglas Barker

The receipt of this application at the time of submittal does not guarantee the application complies with all requirements of the Washoe County Development Code, the Washoe County Master Plan or the applicable area plan, the applicable regulatory zoning, or that the application is deemed complete and will be processed.

STATE OF NEVADA)
)
COUNTY OF WASHOE)

I, Douglas Barker,
(please print name)

being duly sworn, depose and say that I am the owner* of the property or properties involved in this application as listed below and that the foregoing statements and answers herein contained and the information herewith submitted are in all respects complete, true, and correct to the best of my knowledge and belief. I understand that no assurance or guarantee can be given by members of Planning and Building.

(A separate Affidavit must be provided by each property owner named in the title report.)

Assessor Parcel Number(s): 082-262-19

Printed Name Douglas Barker

Signed

Address 979 Melba Drive

Reno, NV 89503

Subscribed and sworn to before me this 15 day of June, 2020.

(Notary Stamp)

Washoe County, NV

Notary Public in and for said county and state

* By Douglas Thomas Barker *

My commission expires: July 30, 2023

Notary

ELSA DIAZ-GONZALEZ
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 19-5212-02 - Expires July 30, 2023

*Owner refers to the following: (Please mark appropriate box.)

- ■ Owner
- ☐ Corporate Officer/Partner (Provide copy of record document indicating authority to sign.)
- ☐ Power of Attorney (Provide copy of Power of Attorney.)
- ☐ Owner Agent (Provide notarized letter from property owner giving legal authority to agent.)
- ☐ Property Agent (Provide copy of record document indicating authority to sign.)
- ☐ Letter from Government Agency with Stewardship

Property Owner Affidavit

Applicant Name: Douglas Barker

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STATE OF NEVADA)
)
COUNTY OF WASHOE)

I, Todd Scrima,
(please print name)

being duly sworn, depose and say that I am the owner* of the property or properties involved in this application as listed below and that the foregoing statements and answers herein contained and the information herewith submitted are in all respects complete, true, and correct to the best of my knowledge and belief. I understand that no assurance or guarantee can be given by members of Planning and Building.

(A separate Affidavit must be provided by each property owner named in the title report.)

Assessor Parcel Number(s): 570-263-13, 082-262-21

Printed Name Todd Scrima

Signed

Address 2241 Harvard St. Suite 200

Sacramento, CA 95815

Subscribed and sworn to before me this _____ day of _____, _____.

(Notary Stamp)

Notary Public in and for said county and state

My commission expires: _____

*Owner refers to the following: (Please mark appropriate box.)

- ■ Owner
- ☐ Corporate Officer/Partner (Provide copy of record document indicating authority to sign.)
- ☐ Power of Attorney (Provide copy of Power of Attorney.)
- ☐ Owner Agent (Provide notarized letter from property owner giving legal authority to agent.)
- ☐ Property Agent (Provide copy of record document indicating authority to sign.)
- ☐ Letter from Government Agency with Stewardship

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Sacramento)

On 06/15/2020 before me, Arleen E Barlow Notary Public
(insert name and title of the officer)

personally appeared Todd Scrima,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

ARLEEN E. BARLOW
Notary Public - California
Sacramento County
Commission # 2277372
My Comm. Expires Feb 15, 2023

Signature _____ (Seal)

PROPERTY OWNER AFFIDAVIT/

Tentative Subdivision Map Application
Supplemental Information

(All required information may be separately attached)

1. What is the location (address or distance and direction from nearest intersection)?

100 Malcolm Avenue, 145 Heindel Road, 230 Medgar Avenue

2. What is the subdivision name (proposed name must not duplicate the name of any existing subdivision)?

Grandview Terrace

3. Density and lot design:

a. Acreage of project site	+/- 6.85 Acres
b. Total number of lots	18 lots and two open space parcels
c. Dwelling units per acre	2.63
d. Minimum and maximum area of proposed lots	Min Lot Size: 6,122 sqft; Max Lot Size: 15,242 sqft
e. Minimum width of proposed lots	60 feet
f. Average lot size	8,471 square feet

4. What utility company or organization will provide services to the development:

a. Sewer Service	Truckee Meadows Water Reclamation Facility (TMWRF)
b. Electrical Service	NV Energy
c. Telephone Service	AT&T
d. LPG or Natural Gas Service	NV Energy
e. Solid Waste Disposal Service	Waste Management
f. Cable Television Service	Charter
g. Water Service	TMWA (Lot 17 to remain on existing well)

5. For common open space subdivisions (Article 408), please answer the following:

   a. Acreage of common open space:

   +/- 2.63 acres

   b. What development constraints are within the development and how many acres are designated slope, wetlands, faults, springs, and/or ridgelines:

   Development constraints include an oddly shaped parcel and a drainageway and steep slopes exceeding 30% in some portions, approximately 1.9 acres

   c. Range of lot sizes (include minimum and maximum lot size):

   Minimum: 6,122 SF Maximum: 15,242 SF

d. Proposed yard setbacks if different from standard:

Common Open Space Development: Front - 10 feet, Garage - 20 feet, Rear - 15 feet, Side - 5 feet

e. Justification for setback reduction or increase, if requested:

The setback reductions are due to site shape and existing constraints and are necessary to minimize the grading to the extent feasible

f. Identify all proposed non-residential uses:

No non-residential uses

g. Improvements proposed for the common open space:

Improvements to existing drainagway, retention basin, fitness node

h. Describe or show on the tentative map any public or private trail systems within common open space of the development:

Common open space is 2.63 acres with no connecting trails nearby. No trails are proposed with the project.

i. Describe the connectivity of the proposed trail system with existing trails or open space adjacent to or near the property:

There are no trail systems near the project area, and no trails proposed with the project

j. If there are ridgelines on the property, how are they protected from development?

There are no ridgelines within the project site.

k. Will fencing be allowed on lot lines or restricted? If so, how?

6' tall wooden fencing will be allowed on property lines.

l. Identify the party responsible for maintenance of the common open space:

The Applicant will set up a Drainage Maintenance Association for the common open space

6. Is the project adjacent to public lands or impacted by "Presumed Public Roads" as shown on the adopted April 27, 1999 Presumed Public Roads (see Washoe County Engineering website at http://www.washoecounty.us/pubworks/engineering.htm). If so, how is access to those features provided?

N/A

7. Is the parcel within the Truckee Meadows Service Area?

■ Yes	❑ No

8. Is the parcel within the Cooperative Planning Area as defined by the Regional Plan?

❑ Yes	■ No	If yes, within what city?

9. Has an archeological survey been reviewed and approved by SHPO on the property? If yes, what were the findings?

No

10. Indicate the type and quantity of water rights the application has or proposes to have available:

a. Permit #	TMWA	acre-feet per year	
b. Certificate #		acre-feet per year	
c. Surface Claim #		acre-feet per year	
d. Other #		acre-feet per year	

a. Title of those rights (as filed with the State Engineer in the Division of Water Resources of the Department of Conservation and Natural Resources):

TMWRF

11. Describe the aspects of the tentative subdivision that contribute to energy conservation:

The proposed units will utilize modern construction practices and energy efficient appliances.

12. Is the subject property in an area identified by Planning and Building as potentially containing rare or endangered plants and/or animals, critical breeding habitat, migration routes or winter range? If so, please list the species and describe what mitigation measures will be taken to prevent adverse impacts to the species:

The project site is an infill project surrounded by existing development. None of the items mentioned above are a concern.

13. If private roads are proposed, will the community be gated? If so, is a public trail system easement provided through the subdivision?

Two private roads are proposed, but will not be gated. No public trail system is located in this area.

14. Are there any applicable policies of the adopted area plan in which the project is located that require compliance? If so, which policies and how does the project comply?

No specific policies needed to be addressed. The proposed Project is in compliance with the North Valleys Area Plan

15. Are there any applicable area plan modifiers in the Development Code in which the project is located that require compliance? If so, which modifiers and how does the project comply?

The proposed Project is in compliance with all the North Valleys Area Plan Regulations for Manufactured Homes.

16. Will the project be completed in one phase or is phasing planned? If so, please provide that phasing plan:

One Phase

17. Is the project subject to Article 424, Hillside Development? If yes, please address all requirements of the Hillside Ordinance in a separate set of attachments and maps.

■ Yes	❑ No	If yes, include a separate set of attachments and maps.

18. Is the project subject to Article 418, Significant Hydrologic Resources? If yes, please address Special Review Considerations within Section 110.418.30 in a separate attachment.

❑ Yes	■ No	If yes, include separate attachments.

Grading

Please complete the following additional questions if the project anticipates grading that involves: (1) Disturbed area exceeding twenty-five thousand (25,000) square feet not covered by streets, buildings and landscaping; (2) More than one thousand (1,000) cubic yards of earth to be imported and placed as fill in a special flood hazard area; (3) More than five thousand (5,000) cubic yards of earth to be imported and placed as fill; (4) More than one thousand (1,000) cubic yards to be excavated, whether or not the earth will be exported from the property; or (5) If a permanent earthen structure will be established over four and one-half (4.5) feet high:

19. How many cubic yards of material are you proposing to excavate on site?

9,300 cubic yards

20. How many cubic yards of material are you exporting or importing? If exporting of material is anticipated, where will the material be sent? If the disposal site is within unincorporated Washoe County, what measures will be taken for erosion control and revegetation at the site? If none, how are you balancing the work on-site?

Cut: 9,300 cy, Fill: 21,300 cy; Net Import: 12,000 cy. All exported material, if any, will be exported in accordance with code.

21. Can the disturbed area be seen from off-site? If yes, from which directions, and which properties or roadways? What measures will be taken to mitigate their impacts?

The project site is infill surrounded by existing development and existing roads. No new impacts will be created.

22. What is the slope (Horizontal/Vertical) of the cut and fill areas proposed to be? What methods will be used to prevent erosion until the revegetation is established?

All constructed slopes will be 3:1 or flatter and will be revegetated following construction. Retaining walls will be used where necessary. The interior sideslopes for the main drainageway are proposed to be 2:1 rip-rap slopes.

23. Are you planning any berms and, if so, how tall is the berm at its highest? How will it be stabilized and/or revegetated?

No berms are proposed.

24. Are retaining walls going to be required? If so, how high will the walls be, will there be multiple walls with intervening terracing, and what is the wall construction (i.e. rockery, concrete, timber, manufactured block)? How will the visual impacts be mitigated?

Wall heights will vary from 2 ft to 10 ft and may be a combination of landscape walls, rockery walls, or other wall types

25. Will the grading proposed require removal of any trees? If so, what species, how many, and of what size?

There are trees located within the drainage area (cotton woods). Several trees will be removed as a result of drainage improve

26. What type of revegetation seed mix are you planning to use and how many pounds per acre do you intend to broadcast? Will you use mulch and, if so, what type?

Revegetation will be used for disturbed slope areas and will be a native seed mix to be approved by Washoe County.

27. How are you providing temporary irrigation to the disturbed area?

Irrigation will be provided to the common areas within the project site. Temp irrigation will be provided where necessary.

28. Have you reviewed the revegetation plan with the Washoe Storey Conservation District? If yes, have you incorporated their suggestions?

A final landscape and irrigation plan will be provided at time of final map and will utilize suggestions from this plan.

Request to Reserve New Street Name(s)

The Applicant is responsible for all sign costs.

Applicant Information

Name: Hero Land Holdings LLC

Address: 2241 Harvard Street Ste 200

100 Malcolm Avenue, 145 Heindel Road, 230 Medgar Avenue

Phone : 775-762-2027 Fax: _____

‰ Private Citizen ‰ Agency/Organization

Street Name Requests

(No more than 14 letters or 15 if there is an "**i**" in the name. Attach extra sheet if necessary.)

N/A - Existing Street Names	

If final recordation has not occurred within one (1) year, it is necessary to submit a written request for extension to the coordinator prior to the expiration date of the original

Location

Project Name: Grandview Terrace Tentative Map

‰ Reno ‰ Sparks ‰ Washoe County

Parcel Numbers: _____

‰ Subdivision ‰ Parcelization ‰ Private Street

Please attach maps, petitions and supplementary information.

Approved: _____ Date: _____

Regional Street Naming Coordinator

‰ Except where noted

Denied: _____ Date: _____

Regional Street Naming Coordinator

Washoe County Geographic Information Services
1001 E. Ninth Street
Reno, NV 89512-2845
Phone: (775) 328-2325 - Fax: (775) 328-6133

Variance Application
Supplemental Information

(All required information may be separately attached)

1. What provisions of the Development Code (e.g. front yard setback, height, etc.) must be waived or varied to permit your request?

Grading requirements will be varied, specifically Washoe County Code Sections 110.438.45 (b), (c), (e), (g), (i), (j), (k)

You must answer the following questions in detail. Failure to provide complete and accurate information will result in denial of the application.

2. What are the topographic conditions, extraordinary or exceptional circumstances, shape of the property or location of surroundings that are unique to your property and, therefore, prevent you from complying with the Development Code requirements?

The shape of the subject infill parcel, existing drainage area bisecting the site & adjacent existing residences limit allowable grading in the area.

3. What steps will be taken to prevent substantial negative impacts (e.g. blocking views, reducing privacy, decreasing pedestrian or traffic safety, etc.) to other properties or uses in the area?

This variance will enhance this area with a high quality affordable housing project while protecting adjacent properties from adverse impacts.

4. How will this variance enhance the scenic or environmental character of the neighborhood (e.g. eliminate encroachment onto slopes or wetlands, provide enclosed parking, eliminate clutter in view of neighbors, etc.)?

This variance will improve the existing drainageway and develop a property currently cluttered with debris due to illegal dumping.

5. What enjoyment or use of your property would be denied to you that is common to other properties in your neighborhood?

This property is challenging to develop with the existing Washoe County grading requirements. Adjacent properties within the City of Reno allow for this grading requirement.

6. Are there any restrictive covenants, recorded conditions or deed restrictions (CC&Rs) that apply to the area subject to the variance request?

❑ Yes	■ No	If yes, please attach a copy.

7. How is your current water provided?

Water will be provided by TMWA for 16 lots. Lot 17 will remain on a shared well agreement with adjacent neighbors.

8. How is your current sewer provided?

Sewer collection is provided by Washoe County and has been recently rerouted to TMWRF.

Washoe County Treasurer
P.O. Box 30039, Reno, NV 89520-3039
ph: (775) 328-2510 fax: (775) 328-2500
Email: tax@washoecounty.us

Washoe County Treasurer
Tammi Davis

Account Detail

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CollectionCart

Collection Cart	Items	Total	
	0	$0.00	Checkout View

Pay Online

No payment due for this account.

Washoe County Parcel Information

Parcel ID	Status	Last Update
08226221	Active	6/4/2020 2:12:22 AM

Current Owner:
HERO LAND HOLDINGS LLC

2241 HARVARD ST STE 200
SACRAMENTO, CA 95815

SITUS:
100 MALCOLM AVE
WCTY NV

Taxing District
4030

Geo CD:

Tax Bill (Click on desired tax year for due dates and further details)

Tax Year	Net Tax	Total Paid	Penalty/Fees	Interest	Balance Due
2019	$571.54	$579.25	$0.00	$0.00	$0.00
2018	$545.36	$563.35	$0.00	$0.00	$0.00
2017	$529.48	$549.30	$0.00	$0.00	$0.00
2016	$516.06	$516.06	$0.00	$0.00	$0.00
2015	$411.71	$415.83	$0.00	$0.00	$0.00
				Total	$0.00

Disclaimer

- ALERTS: If your real property taxes are delinquent, the search results displayed may not reflect the correct amount owing. Please contact our office for the current amount due.
- For your convenience, online payment is available on this site. E-check payments are accepted without a fee. However, a service fee does apply for online credit card payments. See Payment Information for details.

Pay By Check

Please make checks payable to:
WASHOE COUNTY TREASURER

Mailing Address:
P.O. Box 30039
Reno, NV 89520-3039

Overnight Address:
1001 E. Ninth St., Ste D140
Reno, NV 89512-2845

Payment Information

Special Assessment District

Installment Date Information

Assessment Information

Washoe County Treasurer
P.O. Box 30039, Reno, NV 89520-3039
ph: (775) 328-2510 fax: (775) 328-2500
Email: tax@washoecounty.us

Washoe County Treasurer
Tammi Davis

Account Detail

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CollectionCart

Collection Cart	Items	Total	
	0	$0.00	Checkout View

Pay Online

No payment due for this account.

Washoe County Parcel Information

Parcel ID	Status	Last Update
08226219	Active	6/4/2020 2:12:22 AM

Current Owner:
BARKER, DOUGLAS

979 MELBA DR
RENO, NV 89503

SITUS:
145 HEINDEL RD
WCTY NV

Taxing District
4030

Geo CD:

Tax Bill (Click on desired tax year for due dates and further details)

Tax Year	Net Tax	Total Paid	Penalty/Fees	Interest	Balance Due
2019	$463.01	$463.01	$0.00	$0.00	$0.00
2018	$441.80	$441.80	$0.00	$0.00	$0.00
2017	$423.99	$423.99	$0.00	$0.00	$0.00
2016	$413.25	$413.25	$0.00	$0.00	$0.00
2015	$412.43	$412.43	$0.00	$0.00	$0.00
				Total	$0.00

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P.O. Box 30039, Reno, NV 89520-3039
ph: (775) 328-2510 fax: (775) 328-2500
Email: tax@washoecounty.us

Washoe County Treasurer
Tammi Davis

Account Detail

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CollectionCart

Collection Cart	Items	Total	
	0	$0.00	Checkout View

Pay Online

No payment due for this account.

Washoe County Parcel Information

Parcel ID	Status	Last Update
57026313	Active	6/4/2020 2:12:22 AM

Current Owner:
HERO LAND HOLDINGS LLC

2241 HARVARD ST STE 200
SACRAMENTO, CA 95815

SITUS:
230 MEDGAR AVE
WCTY NV

Taxing District
4030

Geo CD:

Tax Bill (Click on desired tax year for due dates and further details)

Tax Year	Net Tax	Total Paid	Penalty/Fees	Interest	Balance Due
2019	$977.47	$988.84	$0.00	$0.00	$0.00
2018	$893.74	$925.02	$0.00	$0.00	$0.00
2017	$867.71	$879.89	$0.00	$0.00	$0.00
2016	$845.72	$845.72	$0.00	$0.00	$0.00
2015	$844.03	$844.03	$0.00	$0.00	$0.00
				Total	$0.00

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Pay By Check

Please make checks payable to:
WASHOE COUNTY TREASURER

Mailing Address:
P.O. Box 30039
Reno, NV 89520-3039

Overnight Address:
1001 E. Ninth St., Ste D140
Reno, NV 89512-2845

Payment Information

Special Assessment District

Installment Date Information

Assessment Information

Section 2

Project Description

Executive Summary

Commission District:	5 – Commissioner Herman
Property Owners:	Hero Land Holdings LLC & Douglas T Barker
Applicant:	Douglas T Barker
APN Numbers:	570-263-13, 082-262-19, 082-262-21
Project Site Size:	±6.85 Acres
Request:	1) Request for an 18-lot Single-Family Residential, Common Open Space Tentative Subdivision Map. 2) Request for a Variance for the following Washoe County Development Code Sections: Sec 110.438.45(b) - fills exceeding 4 feet within yard setbacks; Sec 110.438.45(c) - finish grade exceeding the natural slope by 10 feet; Section 110.438.45(e) - retaining walls greater than 6 ft in side and rear yard setbacks; Section 110.438.45(g) - engineered slopes intersecting natural slopes at an angle greater than 45 degrees; Section 110.438.45(i) – clear zone fill slopes set at 3:1; Section 110.438.45(j) - exposed cuts exceeding height of structure; and Section 110.438.45(k) - for channel slopes greater than 3:1.
Location:	The ±6.85-acre site is generally located east of the intersection of Kennedy Drive and Malcolm Avenue, northwest of Virginia Street and Lemmon Drive in Washoe County.
Master Plan Categories:	Suburban Residential (SR)
Regulatory Zones:	Medium Density Suburban (MDS)
Area Plan:	North Valleys

Background & Site Characteristics

The ±6.85-acre Project Site is located in Washoe County within the existing Grandview Terrace Subdivision and includes three infill parcels (APNs 570-263-13, 082-262-19 & 082-262-21) surrounded by existing manufactured homes to the north, west and south, and some existing industrial uses to the east. Although the Project Site is within Washoe County, this area is surrounded on four sides by the City of Reno. The Project Site is primarily undeveloped with the exception of three existing single-family residential buildings and a drainage area that bisects the Project Site. Currently the drainage area consists of informal dirt roads and has become a popular dumping ground. The Project Site is accessed primarily via Kennedy Drive and Malcolm Avenue from North Virginia Street. Both Kennedy Drive and Malcolm Avenue are paved and do not have sidewalks. Walner Street is a dirt road connecting between Kennedy and Malcolm providing access to the Project Site and to adjacent existing residences.

As slopes within the Project Site exceed 15% on 35% of the site, the Hillside Development ordinance will apply. Although the Project Site triggers Hillside Development the majority of the slopes are within the 0-20% range with only 3.9% of the site containing slopes of 30% or greater. There are existing utilities stubbed to several locations near the Project Site, including the corner of Kennedy / Malcolm and the end of APN 082-262-19 for the existing residence. *(Refer to Utilities Plan Sheet in Section 3 and the Map Pocket.)*

Intersection of Walner Street and Kennedy Drive looking north

Intersection of Walner Street and Malcom Ave looking south

Malcom Ave looking east, turns to dirt road through the drainage area

Debris and fill slopes in the drainage area

Master Plan, Zoning, and Character Management Area

The Project Site is within the North Valleys Area Plan in the Rural Character Management Area with a master plan designation of Suburban Residential (SR) and a zoning designation of Medium Density Suburban (MDS) that allows 3 units per acre.

The proposed Project is in substantial conformance with the goals of the North Valleys Area Plan and will help support the Vision and Character Statement. Project benefits which support the North Valleys Area Plan include, but are not limited to:

- ✓ Creating an **affordable product type** that supports the Vision of providing a range of housing opportunities
- ✓ **Infill development** with access to existing utilities that can support the proposed 18 units that will help meet the Vision of ensuring infrastructure is coincident to development
- ✓ 18 proposed units at **2.63 units per acre** fits within the desired and allowed 3 units per acre as identified in the zoning of MDS and encourages compatible growth in the North Valleys, as discussed in the Character Statement and Vision
- ✓ Utilizing Common Open Space Development standards will help **accommodate for the grading constraints** of the proposed project, given the oddly shaped parcel and ultimately allowing for the affordable housing product type, as well as help to accommodate existing drainageway improvements.

Project Evaluation

The current request is to develop an 18-lot common open space single-family residential development on approximately 6.85± acres with a density of 2.63 dwelling units per acre. In order to develop the Project Site given the oddly shaped infill parcel, reduce grading impacts while dealing with the existing site constraints, and improve the drainageway, the Project is proposed as a Common Open Space (COS) development with modified lot standards as proposed below in the Common Open Space Standards Design Standards Section. As an infill site with an oddly shaped parcel and existing edge condition constraints from previous development of the area, the smaller lot standards are necessary to allow the applicant to move forward with development of modern manufactured housing essential to help fill a gap in affordable housing product types for this area. The new modern affordable housing units and clean up of an area that has become a popular dumping grounds will help to enhance the Grandview Terrace Subdivision. The Project also includes a work out station centrally located within the Project Site that will provide a new community element. Overall, the proposed Project will be a great addition to the area and help supply workforce housing for the new employment center developing adjacent to the Project Site along N. Virginia Street and Lemmon Drive.

The current regulatory zoning is MDS (3 units per acre) allowing for a total of 20 units. At 18 units, the proposed Project meets density requirements providing fewer lots than what would be allowed under MDS zoning. The Project includes 2.63± acres of common area open space, consisting of two open space parcels that will include the existing drainage area and associated improvements. A community element consisting of a fitness node has also been included within the common area and connected via sidewalk.

Development Statistics Summary

The following is a summary of the development statistics of the site:

Total Site Area:	6.85± acres
Total Dwelling Units:	18 single family residences
Gross Density:	2.63± d.u./acre
Total Lot Area:	3.5± acres (51%±)
Average Lot Size:	8,471± square feet
Maximum Lot Size:	15,242± square feet
Minimum Lot Size:	6,122 ± square feet
Total Right of Way Area:	1.2± acres (17%±)
Total Common Area/Open Space	2.63± acres (38%±)

Common Open Space Tentative Map Design Standards

The tentative subdivision map has been designed to comply with the density requirements of MDS (3 units per acre) with smaller lot standards (*Refer to Development Constraints and Opportunities Map in Section 3 of this submittal packet).* Due to the challenging shape of the property, existing edge constraints and manmade steeper slopes within the drainage area, lots have been clustered into the flatter areas utilizing the proposed small lot standards to meet setback requirements, avoid impacts to adjacent residences, and minimize grading impacts as much as possible. Infill parcels are challenging due to edge constraints, and in this case drainageways, that have transformed due to illegal dumping and informal roadways, which the small lot standards will help overcome. Although smaller lot standards are proposed, the average lot size for the proposed Project is 8,310± square feet and the Project is proposing fewer lots than what would be allowed under the current zoning. Specific development standards proposed for this common open space development are as follows:

Minimum Lot Size: 6,000± square feet
Minimum Lot Width: 50± feet

Minimum Setbacks:

Front Yard Setback =	10 feet (20 feet to garage)
Side Yard Setback =	5 feet
Rear Yard Setback =	15 feet

The area that incorporates the drainage channel, identified in the site plan, will be owned and maintained by a Drainage Maintenance Association (DMA) that will be established by the Applicant.

House Design

Modern manufactured houses are proposed on the single-family residential lots. The proposed development will be a modern single-family subdivision that will include a mix of manufactured home floor plan options and house sizes ranging from 1400 square feet to 1700 square feet, a 10x20 detached garage for most, and a multitude of interior finishing options. Modern manufactured homes provide the same level of amenities and similar styles as stick-built homes, but at a more affordable price point thanks to the construction methods used. Although a negative connotation has previously been associated with manufactured housing, the more modern style of manufactured housing has few differences from stick-built homes, other than the home is pre constructed and shipped to the site. This provides a benefit for the workforce who are looking for quality lower priced housing starting around the mid $200,000s, but with the modern amenities you would expect with a new house.

Below are samples of the proposed floor plans and elevations:


26'-8"
master bedroom
15'-4" x 12'-8"
bedroom 2
10'-4" x 12'-7"
bedroom 3
11'-10" x 10'-4"
living
room
20'-9" x 11'-4"
57'-0"
60'-0"
26'-8"
REAR
PORCH
master
bedroom
16'-10" x 12'-8"
bedroom 3
10'-1" x 12'-8"
bedroom 2
11'-6" x 10'-7"
living
room
17'-4" x 12'-11"
8' PORCH
60'-0"
60'-0"
great
room
26'-8" x 12'-8"
includes dr.
bedroom 2
12'-8" x 10'-5"
master
bedroom
13'-10" x 12'-8"
bedroom 3
12'-8" x 11'-2"
family room
26'-8" x 12'-8"
includes nook
40'-0"

Community Element

As part of the Common Open Space Development, a fitness node connected via the proposed sidewalk has been included in the site plan. The fitness node is centrally located within the Project Site and will provide a community element that will serve the proposed development.

Grading, Variance & Hillside Development

Although the site does trigger Hillside Development, there are minimal 30% or greater slopes that will remain in common open space parcels. The majority of the site is within the 0-15% slope range *(Slope Map provided in Section 3 of this submittal packet).* Existing dirt roads are located within the site to the northeast and the west, cutting across several locations of the drainage.

The Site Analysis required for both Hillside Development and Common Open Space Development is provided later in this Project Description and a Development Constraints and Opportunities Map is provided in Section 3 of this submittal packet. The Development Constraints and Opportunities Map and Site Analysis demonstrate that the Project Site has minimal constraints other than the drainage area, some steeper slopes in limited areas, and existing roadways.

The Project Site is a ±6.85-acre infill site with an oddly shaped parcel surrounded by existing single-family residences, roadways, and drainageway that serves a larger area. Site grading has been designed to improve the drainage, improve the roadways and overall connectivity, as well as avoid the existing residences adjacent to the site. In order to accommodate the necessary grading for the proposed Project, which includes an affordable housing product type, a Variance is included with this application.

Variance Request:

1. Sec 110.438.45(b) - fills exceeding 4 feet within yard setbacks.
    - Maximum fill within yard setbacks proposed at up to 10 feet.
2. Sec 110.438.45(c) - finish grade exceeding the natural slope by 10 feet.
    - Finish grade will exceed the natural slope by up to 15 feet.
3. Section 110.438.45(e) - retaining walls > 6 ft in side and rear yard setbacks
    - Maximum wall height proposed at up to 10-feet tall within setbacks. Minimal use of walls taller than 6-feet and only where absolutely necessary.
4. Section 110.438.45(g) - engineered slopes intersecting natural slopes at an angle > 45 degrees
5. Section 110.438.45(i) – clear zone fill slopes set at 3:1
    - Guardrail or barrier will be provided where no curb and gutter proposed. Limited space to accommodate wider and flatter fill slopes. Areas where this occurs are low speed, low volume residential streets. Per AASHTO Roadside Design Guide Table 3-1 and Chapter 12, for very low volume local streets clear zone requirements may not be practical, cost effective or necessary.
6. Section 110.438.45(j) - exposed cuts exceeding height of structure
    - Use of stacked walls proposed where this occurs
7. Section 110.438.45(k) - for channel slopes > 3:1
    - Per code, 2:1 rip rap slopes are allowed with approval of the County Engineer. 2:1 rip rap slopes will help better accommodate the drainage improvements given the constrained site area due to the shape of the parcel.

These variances are necessary to allow the proposed Project and provide affordable housing options for the surrounding are due to: the infill site and oddly shaped parcel, edge constraints created from existing development, and in order to accommodate grading in very constrained areas. One of the largest constraints that has made grading of the infill site difficult is the adjacent developed residences. In order to avoid grading onto other properties and tie into to existing grades to accommodate the proposed Project, larger fills exceeding 4 feet within yards setbacks of proposed lots and building taller walls in some locations are necessary with no other alternatives due to limited area created by the oddly shaped parcel. In order to construct roadways to improve connectivity and improve the drainageway the proposed Project will have finish grades that exceed the natural slope by more than 10 feet. The natural slope was manmade, created from previous development of Grandview Terrace. With infill properties, you are left dealing with what others left behind and what has occurred on the site over the years with limited area to make improvements.

Washoe County staff has indicated that they understand the Washoe County grading standards are not conducive for infill projects like the proposed, which ultimately led to this variance request. It should also be noted that the Project Site is within an area surrounded by the City of Reno where the proposed grading would be allowed. In fact, larger cuts and fills, taller walls, and major grading efforts have been approved and completed as the adjacent industrial development has occurred along North Virginia and Lemmon Drive within the City of Reno over the past few years. The area surrounding Grandview Terrace is shifting from its previously rural character to a growing area with large industrial buildings, newly rezoned mixed use and general commercial uses approved for adjacent vacant properties. The variance will not create anything out of character for the area and this project would be appropriate for development of an infill parcel. The variance will be beneficial to the surrounding area by cleaning up the existing drainageway, improving overall connectivity, and providing new modern affordable housing product types. *A grading plan and cut/fill map are provided in the Tentative Map Plan Set in Section 3 and the Map Pocket of this submittal packet.*

Mitigation strategies to offset the variance request are identified with the variance request above and include limiting the use of the variances to the more constrained areas, utilizing a mix of terraced landscape walls where feasible, varying wall heights and using stacked walls where feasible in areas where taller walls are necessary. The use of taller walls and deeper fills will be limited to the extent feasible in more constrained areas. Fill material will be placed in the drainageway for the extension of Malcolm Avenue at the drainage crossing. A culvert will be added in this location. The proposed roadways have been designed to follow contours limiting the street grades as much as possible while helping balance the earth work required for the site.

Drainage

The drainageway in the center of the Project Site has been previously disturbed, is poorly defined in many areas, and is used as a common dumping ground. Improvements will be made to the drainage area as part of the proposed Project, which provides a major improvement for the surrounding area. The proposed Project has been designed using Common Open Space Development Standards, which will also help to accommodate for and allow improvements to the existing drainage area. A full drainage report is included in Section 4 of this Submittal Packet.

The watershed contributing to the drainage wash bisecting the project generates a peak flow of approximately 432 cubic feet per second (cfs) for the 100-year, 24-hour storm event. In order to accommodate the flows on-site the existing, poorly defined drainage area will need to be improved. Improvements include creating a more defined flow line and constructing a rip-rap-lined trapezoidal

channel to safely route these flows through the site to its outlet. Runoff will be discharged into the existing drainage at the northeast corner of the Project. A 3x10 concrete box culvert will be installed to manage flows under the Malcolm Avenue embankment. For storage of runoff generated within the development, a retention basin will be designed on the upstream side of the proposed Malcolm Avenue embankment. The basin will retain the volumetric difference between pre- and post-development conditions for the 100-year, 10-day storm event. The preliminary analysis indicates the volume to be retained is 1.4 acre-feet.

The two residential street extensions (Malcolm Avenue, Medgar Avenue) will have concrete curb and gutter to collect runoff from the streets and adjacent properties. Gutter flow will be captured by catch basins and discharged into the central drainage channel. No other drainage facilities are proposed for the development. *A drainage plan and report are provided in Section 4 and Map Pocket of this submittal packet.*

Water, Sewer and Utilities

The Applicant has been working with the Truckee Meadows Water Authority (TMWA). TMWA has indicated they can provide water service to the Project Site via a mainline in North Virginia Street. Lot 17 has an existing structure that will remain and is currently on a shared well agreement with the adjacent neighbors. Lot 17 will continue to be served from the existing well. The Applicant will provide water infrastructure to the Project Site as required by TMWA. A formal discovery with TMWA is underway and will be provided to Washoe County once completed.

Sewer collection is provided by Washoe County and has recently been rerouted to the Truckee Meadows Water Reclamation Facility (TMWRF). There is currently an existing 8" sewer main running through the parcels that is flowing approximately 60,000 GPD (gallons per day) from surrounding residential developments. This development would add an additional 15,925 GPD to the existing flow, totaling to approximately 75,925 GPD total. An 8" sanitary sewer main running at 0.4% slope can flow approximately 213,000 GPD at 75% full. Therefore, there is still plenty of capacity in the existing main for the flows contributed by this 18-unit development.

NV Energy will provide gas and electrical service to the Project. Telephone service will be provided by AT&T while cable service will be from Charter Communications.

Traffic and Circulation

The main access to the site will be provided via North Virginia Street to the existing Kennedy Drive, and via extensions of Malcolm Avenue and Medgar Avenue. The extension of Malcolm and Medgar Avenue are proposed to be paved with curb and gutter and a 4-foot sidewalk on one side, and are planned to be dedicated to Washoe County. The eastern terminus of Malcolm Avenue will include a gate to notify the dead end and will include an appropriate fire turnaround utilizing the private access to lots 15 and 16.

Walner Street will provide access to lot 1 and is currently a dirt road with an access easement providing access to existing residences. As part of the proposed Project Walner Street will be regraded and improved with an all-weather surface and will remain private with an access easement. A new loop road will be graded with a paved surface providing access to lots 5, 6, and 7. The bottom portions of the loop road, Access Parcel 1 and 2, will remain in private ownership with an access easement. The Applicant intends to have these parcels remain in private ownership and will have a maintenance agreement with the future residences who will utilize the private access. Keeping Access Parcel 1 and 2 in private ownership is due to the fact that other private residences utilize existing dirt roads within these parcels

and are in the process of working with the Applicant on a maintenance agreement including future improvements.

The proposed 18-lots will only generate 18 PM peak hour trips (ITE Manual 9th Edition Land Use 210 Single Family Detached), which is much less than the traffic report threshold of 80 peak hour trips. Therefore, a traffic report was not prepared for this Project. Traffic generation is minimal and existing and proposed streets can adequately serve the proposed 18 lots.

Fencing

Fencing is allowed within the proposed Project at a maximum of 6-foot wood fencing along rear and side yards. Installation will be the responsibility of the individual home owners if desired.

Schools

Students residing in the Project area will attend Lemmon Valley Elementary School, O'Brien Middle School and North Valleys High School.

Police and Fire Service

The Project Site is an infill site in an area already served by police and fire services. Police services will be provided by the Washoe County Sheriff and fire service will be provided by the Truckee Meadows Fire Protection District (TMFPD). The closest fully staffed fire station is TMFPD Station 44 which is located approximately 2.4 miles from the site at the corner of Stead Boulevard and Silver Lake Road. The Washoe County Sheriff's Office services this area for police protection. The closest station is approximately 4.1 miles from the site.

Parks

The Project is located approximately 0.2 miles from Martin Luther King Jr. Park containing a playground, basketball court, picnic areas, greenspaces, and a community center. The Project is 2 miles from North Valleys Regional Park. As part of the common open space development, the Applicant is also proposing to include a community element consisting of a fitness node within the common open space connected via sidewalk. *Refer to the included Site Plan sheet in section 4.*

Site Analysis

Land Use: The site is currently an undeveloped infill area with a Master Plan designation of Suburban Residential and corresponding zoning designation of Medium Density Suburban (MDS) 3 dwelling units per acre. The proposed use is single family residential at less than 3 dwelling units per acre, which meets the policies of the Master Plan and Zoning designations. Surrounding property designations are shown on the Zoning Map included in Section 3 of this Submittal Packet. The use of Common Open Space Development Standards will help accommodate the grading constraints the proposed project has given the oddly shaped parcel as well as help to accommodate drainage improvements on the site. The proposed Project will provide a new affordable housing option for the surrounding area.

Existing Structures: The majority of the Project Site is currently undeveloped but also contains three single-family residences: one structure on lots 3&4 (to be demolished), one structure on lots 12&13 (to be demolished) and one structure on lot 17 (to remain.) *Refer to Site Plan in Section 3 of this document.*

Existing Vegetation: The subject site consists primarily of native shrubs, junipers, sagebrush and desert grasses. Five trees will be removed within the grading footprint, and is necessary in order to improve the drainage for the surrounding area.

Topography: The Project Site is in an infill area, which previously has been disturbed with dirt roads and paths traversing through the site and drainage area. Generally, the Project Site has mild to moderate slopes (0-25% range) sloping from north to south with some flatter areas. The Project Site is developable and constraints can be mitigated (drainage across the center of the site) through the use of Common Open Space Development Standards and the grading variances, as proposed.

Soil: A preliminary geotechnical investigation was completed for the Project Site. A final geotechnical report will address any concerns at the final map stage.

Natural Drainageways: There is a drainageway in the center of the Project Site, which has been previously disturbed with placed fill materials and dirt roads and pathways that traversing through it. The previous disturbance has created the drainage to be poorly defined in many cases that can lead to flooding issues for the surrounding area. The proposed Project includes cleaning up the drainage area and constructing a defined channel and retention basin to handle both the off-site and on-site flows while protecting the existing and future residences. A new box culvert and properly placed fill material will be used to improve the area where Malcolm Ave crosses the drainageway. Overall the proposed Project will accommodate for the drainageway while improving the overall drainage for the surrounding area.

Wetlands and Water Bodies: There are no water bodies or wetlands on the site.

Flood Hazards: The Project Site is located in FEMA Zone X – Minimal Flood Hazard. For current conditions, flows meander through the site in a poorly-defined channel from the SW corner to NE corner. The existing drainage emerges at the SW corner of the Project Site through a 48”-diameter pipe under North Virginia Street. Approximately 1,200 feet upstream from North Virginia Street, flows also pass through a culvert under a railroad embankment. To minimize flooding risk, the proposed Project will improve the drainageway within the Project Site with a more formalized channel and retention basin. Proposed residential unit finish grades are also much higher than the drainageway. The proposed channel will follow the same general path and will pass under the Malcolm Avenue embankment in a 3x10 concrete box culvert.

Seismic Hazards: There are no known seismic hazards on or near the subject site.

Avalanche Hazards: There are no known avalanche or other landslide hazards on the site.

Sensitive Habitat and Migration Routes: There are no sensitive habitats or migrations routes on the site.

Significant Views: The Project Site is an infill site located in the valley surrounded by major roadways including US 395, North Virginia Street, and Lemmon Drive. Proposed lots have been clustered into the more developable areas with grades similar to existing residences utilizing Common Open Space standards. There are not any significant views within the Project Site.

Easements: Existing easements will not be impacted, including access, phone, electric, water, and sewer easements on the site. Any existing easements that need to be adjusted will be accommodated for by the proposed Project. *Refer to the Existing Easement Map exhibit in section 3 and the Tentative Map sheets in section 4 for easement locations.*

Utilities: Refer to Tentative Map Utility Sheets. The Project Site is an infill site with direct access to existing utilities to serve the Project. TMWA has indicated they will serve the Project Site via a mainline

within North Virginia Street. There is an existing 8" sewer line which runs through the middle of the Project Site. *Refer to the Existing Easement Map exhibit in section 3 for utility easement locations and Utility Plans in section 4.*

Appropriate Access Points: Access to the site will be provided via several roadways, including using the existing Kennedy Drive, as well as constructing extensions of Malcolm Avenue and Medgar Avenue, closing a gap in the local roadway network (Refer to Site Plan and Access Exhibit in section 3). Walner Street, an unpaved roadway, will be improved with an all-weather surface. Future public roads built to Washoe County standards will include the extension of Medgar Avenue and Malcolm Avenue. The new proposed loop roadway providing access to lots 5, 6, and 7 connecting to North Virginia Street will be private and paved. A 4-foot sidewalk will be located on the west side of Medgar Avenue and north side of Malcolm Avenue. Access to the proposed community element, fitness node, will be provided via the proposed sidewalks.

TENTATIVE MAP FINDINGS

(a) Plan Consistency. That the proposed map is consistent with the Master Plan and any specific plan;

The proposed map is consistent with the current Master Plan designation of Suburban Residential and meets applicable goals and policies of the Washoe County Master Plan and the North Valleys Area Plan. The proposed Project will provide several benefits for the surrounding area including cleaning up and improving the existing drainageway, improving connectivity with the extension and improvement of existing roadways, and providing a more modern affordable housing option in an area that is seeing growing industrial and employment.

(b) Design or Improvement. That the design or improvement of the proposed subdivision is consistent with the Master Plan and any specific plan;

The proposed subdivision is consistent with the Master Plan and the North Valleys Area Plan, particularly as related to the allowed density of 3 units per acre, and is consistent with all other elements of those plans. More specifically the proposed Project is in substantial conformance with the goals of the North Valleys Area Plan and will help support the Vision and Character Statement. Project benefits which support the North Valleys Area Plan include, but are not limited to:

- ✓ Creating an **affordable product type** that supports the Vision of providing a range of housing opportunities, while also **protecting existing residences**
- ✓ **Infill development** with access to existing utilities that can support the proposed 18 units that will help meet the Vision of ensuring infrastructure is coincident to development
- ✓ 18 proposed units at **2.63 units per acre** fits within the desired and allowed 3 units per acre as identified in the zoning of MDS and encourages compatible growth in the North Valleys, as discussed in the Character Statement and Vision
- ✓ Utilizing Common Open Space Development standards will help **accommodate for the grading constraints** the proposed project has given the oddly shaped parcel, ultimately allowing for the affordable housing product type, as well as help to accommodate existing drainageway improvements.

(c) Type of Development. That the site is physically suited for the type of development proposed;

The Project is proposed as a Common Open Space Development clustering the proposed units with small lot standards in order to accommodate for the existing constraints created by the oddly shaped infill parcel including grading limitation due to adjacent existing residences. The small lot standards will also help to accommodate for drainage improvements to the existing drainage area in the center of the site. The Project Site does trigger Hillside Development; however, the site is an infill site with previously disturbed slopes for dirt roads *(Refer to Aerial Map in Section 3).* The majority of the slopes within the site are generally less than 20%, with the steeper slopes being preserved in the drainage area as common open space. The number of dwellings and configuration of the proposed subdivision is consistent with the requirements of the master plan and zoning. The site is suitable for development utilizing the Common Open Space Development standards proposed in order to cluster the lots within the flatter more developable areas. A community element consisting of a fitness node will be provided within the common area and connected via sidewalk as part of the Common Open Space Development.

(d) Availability of Services. That the subdivision will meet the requirements of Article 702, Adequate Public Facilities Management System;

In accordance with Article 702, the proposed Project has been designed to ensure that public infrastructure necessary to support the Project is available concurrently with the impacts of the Project without causing the level of service to fall below adopted standards. Existing utilities are located within or adjacent to the Project Site. The Developer will be installing public infrastructure within the Project Site to Washoe County standards to ensure that sanitary sewer service is provided to all new dwelling units. The Project Site is within the Truckee Meadows Water Reclamation Facility (TMWRF) service area. Water service for the Project Site will be provided by TMWA who has an existing water line in North Virginia Street. Lot 17 will remain on the existing shared well.

(e) Fish and Wildlife. That neither the design of the subdivision nor any proposed improvements is likely to cause substantial environmental damage, or substantial and avoidable injury to any endangered plant, wildlife or their habitat;

The proposed subdivision is not located within an environmentally sensitive location. The improvements associated with the proposed Project are not anticipated to cause substantial environmental damage or harm to endangered plants or wildlife habitats.

(f) Public Health. That the design of the subdivision or type of improvement is not likely to cause significant public health problems;

The proposed subdivision has been designed in accordance with environmental and health laws and regulations concerning water and air pollution, solid waste disposal, water service and sewer service. All necessary infrastructure to serve the proposed Project will be constructed by the Developer. Refer to attached engineering reports in Section 4 of this Submittal Packet for detailed information.

(g) Easements. That the design of the subdivision or the type of improvements will not conflict with easements acquired by the public at large for access through, or use of property within, the proposed subdivision;

Existing easements through the subdivision have been incorporated into the proposed Project. As designed, there are no conflicts with easements for access through or use of the property within the proposed subdivision.

(h) Access. That the design of the subdivision provides any necessary access to surrounding, adjacent land and provides appropriate secondary access for emergency vehicles;

The proposed subdivision is an infill site surrounded by existing roads. Due to topographic constraints, access will be provided via several roads either new or improved (Refer to Site Plan and Access Easement Exhibit in section 3). The proposed Project will provide several improvements to circulation in the area including for existing residences. These improvements include the extension of Malcolm and Medgar Avenue to County standards with sidewalk on one side, improvements to Walner Street with an all-weather surface, and a new paved access roadway from North Virginia Street providing access to lots 5, 6, and 7 as well as the private residences currently using dirt roads in this area.

(i) Dedications. That any land or improvements to be dedicated to the County is consistent with the Master Plan; and

The proposed common open space and drainage channel will be maintained by a Drainage Maintenance Association (DMA), or equivalent, as approved by Washoe County.

(j) Energy. That the design of the subdivision provides, to the extent feasible, for future passive or natural heating or cooling opportunities in the subdivision.

Specific building designs will meet current energy and building codes. It is anticipated that new high-performance building and material technologies will be used for energy efficiency.

VARIANCE FINDINGS

(a) **Special Circumstances. Because of the special circumstances applicable to the property, including either the:**

- **(1) Exceptional narrowness, shallowness or shape of the specific piece of property, or**
- **(2) By reason of exceptional topographic conditions, or**
- **(3) Other extraordinary and exceptional situation or condition of the property and/or location of surroundings, the strict application of the regulation results in exceptional and undue hardships upon the owner of the property.**

The proposed Project and requested Variance meets all of the above special circumstances as outlined below:

(1) Exceptional narrowness, shallowness or shape of the specific piece of property
The shape of the Subject Parcels create several very narrow sections, are oddly shaped, has an existing drainageway that bisect the parcels, and has adjacent existing residences and streets creating unusual edge conditions.

(2) By reason of exceptional topographic conditions
The topographic conditions of the infill site are exceptional mainly due to the existing drainageway that bisects the parcels. The drainageway has become a dumping grounds promoted by the informal dirt roads that have been created within the drainageway over the years. There are also main roadways that do not cross the drainageway leading to additional informal dirt roads. Adjacent residences have also created unique grading situations and additional fills that have created unique edge conditions. The topography of the Project Site was manmade as a result of previous development activities in the area and is by no means natural. The proposed Project will clean up the drainageway and improve overall drainage for the surrounding area, will clean up existing dirt roadways, and will extend Malcolm over the drainageway improving overall connectivity for Grandview Terrace.

(3) Other extraordinary and exceptional situation or condition of the property and/or location of surroundings, the strict application of the regulation results in exceptional and undue hardships upon the owner of the property.

The extraordinary and exceptional circumstances mentioned above are unique to infill developments and create challenges especially for grading. The applicant is proposing to build an affordable housing product type with modern manufactured housing that will help fill a major need for the surrounding area. The applicant and the future homeowners of the affordable housing units do have a hardship in that the existing constraints of the property and the Washoe County Grading Standards make the property undevelopable. Washoe County staff indicated that they understood that their grading standards are not conducive for these infill type developments, which ultimately led to the request for the Variance. The grading proposed with the Project is nothing that the surrounding area has not already seen. As the Project Site is surrounded by the City of Reno and large Industrial development, these types of grading practices have already been approved and are allowed under City of Reno standards. The Variance will allow the project to move forward and for additional affordable housing options to be made available for an area that continues to see large industrial developments.

(b) No Detriment. The relief will not create a substantial detriment to the public good, substantially impair affected natural resources or impair the intent and purpose of the Development Code or applicable policies under which the variance is granted.

This Project, as designed, will be an overall improvement to the surrounding area cleaning up and improving the existing drainage way through the site, extending and improving existing roadways that will improve overall connectivity for the Grandview Terrace Subdivision, and will provide new modern affordable housing options for the surrounding area. The grading proposed with the Project is consistent with the surrounding area and would be allowed by the City of Reno, which surrounds the Project Site. Washoe County staff has recognized that the Washoe County Grading Standards do not work well for infill parcels such as this Project Site, which ultimately led to this request for a Variance. As part of the proposed grading the applicant is proposing to include mitigation for varying the standards including a mix of varying

wall heights and the use of stacked walls where feasible, as well as limiting the areas of varied grading standards as much as possible.

(c) No Special Privileges. The granting of the variance will not constitute a grant of special privileges inconsistent with the limitations upon other properties in the vicinity and the identical regulatory zone in which the property is situated.

The shape of the property, drainageway bisecting the site, and adjacent residences limits the area of allowable grading and hinders the development of a modern affordable housing product. This variance allows for development of this property while maintaining the existing drainageway and meeting setback requirements as well as avoiding the existing adjacent residences. The requested grading variances are not dissimilar from the City of Reno grading standards on the adjacent land surrounding the Project Site, which would allow the project as proposed without an additional variance process.

(d) Use Authorized. The variance will not authorize a use or activity which is not otherwise expressly authorized by the regulation governing the parcel of property.

No unauthorized uses are proposed on this property. The site is currently an undeveloped infill area with a Master Plan designation of Suburban Residential and corresponding zoning designation of Medium Density Suburban (MDS) 3 dwelling units per acre. The proposed use is single family residential at less than 3 dwelling units per acre, which meets the policies of the Master Plan and Zoning designations.

(e) Effect on a Military Installation. The variance will not have a detrimental effect on the location, purpose and mission of the military installation.

Not applicable. This project is not in proximity to a military installation.

Section 3

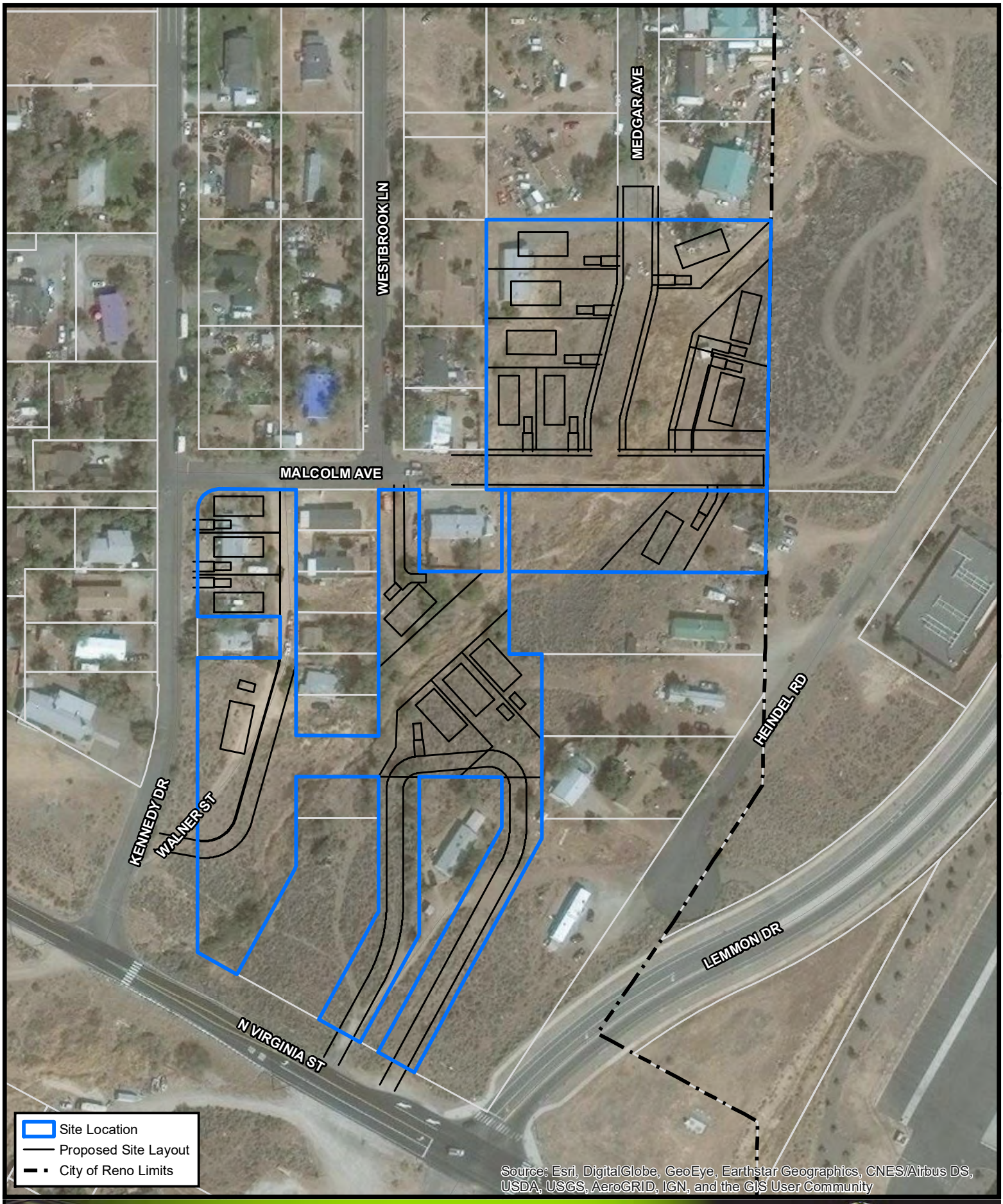
Vicinity Map

Grandview Terrace TSM and Variance

September 2020

0 ½ 1 Miles

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Aerial

Grandview Terrace TSM and Variance

September 2020

0 75 150
FEET

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066

Site Location

PORTION S1/2 SECTION 9 & N1/2 NW 1/4 SEC. 16, T20N-R19E

263

082-263-26
1.786

082-263-51
32,617 sq.ft.

PAR.1 P.M. 4207
082-263-54
13,535 sf

PAR.2 P.M. 4207
082-263-55
14,536sf

PAR.3 P.M. 4207
082-263-56
15,490sf

082-263-42
14,400 sq.ft.

082-263-02
.287

082-263-52
17,499 sq.ft.

082-263-50
.208

082-263-17
.20

082-263-22
.156

082-263-45
.342

082-263-08
.174

082-263-46
.600

082-263-09
.240

082-263-43
.252

082-263-10
.222

082-263-15
2144 sf

082-263-39
.427

DRIVE

MALCOLM AVENUE

KENNEDY

N 1/4 COR. SEC .16

082-262-14
.115

082-262-13
.115

082-262-12
.115

082-262-11
.115

082-262-10
.115

082-262-09
.115

082-262-15
.115

082-262-16
.230

082-262-19
.721

082-262-20
.721

262

082-262-21
3.544 ac.

082-262-01
.602

082-262-02
.457

082-262-08
.115

082-262-22
26352 sf

082-262-23
18817 sf

082-262-24
47449 sf

Washoe County
Reno

S. HIGHWAY 395 (OLD)

HEINDEL ROAD

Washoe County
Reno City Limits

Assessor's Map Number

082-26

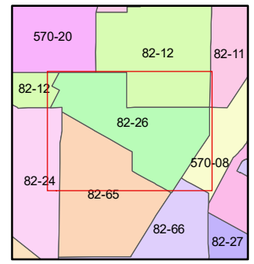
STATE OF NEVADA

WASHOE COUNTY
ASSESSOR'S OFFICE
Joshua G. Wilson, Assessor

1001 East Ninth Street
Building D
Reno, Nevada 89512
(775) 328-2231

Feet
0 12.525 50 75 100

1 inch = 100 feet



created by: CFB 09/15/2009

last updated:

area previously shown on map(s)

NOTE: This map was prepared for the use of the Washoe County Assessor for assessment and illustrative purposes only. It does not represent a survey of the premises. No liability is assumed as to the sufficiency or accuracy of the data delineated hereon.

J.E. SWEATT TRACT (UNOFFICIAL)

PORTION OF SW ¼ SEC. 9
T20N - R19E

Site Location

City of Reno
Washoe County

CORETTA WAY

KENNEDY

WESTBROOK

MEDGAR AVE.

LANE

DR.

MALCOLM AVE.

261

262

263

A

B

C

G

082-26

6	570-261-01	.572 ac.	278.34	89.5
5	570-261-02	.572 ac.	278.34	89.5
4	570-261-03	.572 ac.	278.34	89.5
3	570-261-04	.572 ac.	278.34	89.5
2			278.34	89.5
1	570-261-05	1.144 ac.	278.34	89.5

PAR. 12-A R.S. 5715	570-262-13	23500 sf	100	235
12	570-262-01	.298 ac.	100	130
11			100	130
9	570-262-02	.298 ac.	100	130
10			100	130
PAR. 9-A R.S. 5715	570-262-12	15500 sf	100	155
8	570-262-03	.298 ac.	100	130
7			100	130
5	570-262-09	.298 ac.	100	130
6	570-262-04	.298 ac.	100	130
4	570-262-08	.298 ac.	100	130
3	570-262-05	.298 ac.	100	130
1	570-262-07	.344 ac.	100	150
2	570-262-06	.344 ac.	100	150

6	570-263-08	.29 ac.	100	115
7	570-263-09	.478 ac.	160	130
8			160	130
5	570-263-07	.298 ac.	100	130
9	570-263-10	.478 ac.	160	130
4	570-263-06	.298 ac.	100	130
10	570-263-11	.478 ac.	160	130
3	570-263-05	.07 ac.	100	30
	570-263-04	.230 ac.	100	100
	570-263-12	.478 ac.	160	130
2	570-263-03	.298 ac.	100	130
	570-263-02	.173 ac.	100	75
1	570-263-01	.173 ac.	100	75
	570-263-13	2.59 ac.	347.08	330.05
			341.3	

1			146.18	100
2	570-263-17	29011 sf		
3	570-263-16	14985 sf	142.68	100
4	570-263-15	14985 sf	140.93	
5	570-263-14	16683 sf	139.18	120
			137.08	120.02

Assessor's Map Number

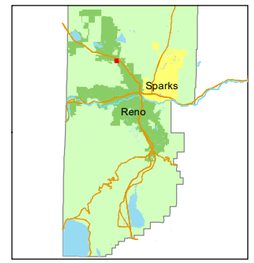
570-26

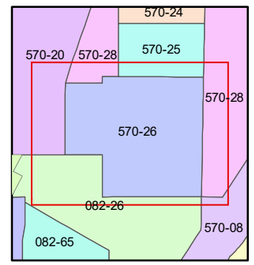
STATE OF NEVADA
WASHOE COUNTY
ASSESSOR'S OFFICE
Michael E. Clark, Assessor

1001 East Ninth Street
Building D
Reno, Nevada 89512
(775) 328-2231

Feet
0 25 50 75 100

1 inch = 100 feet





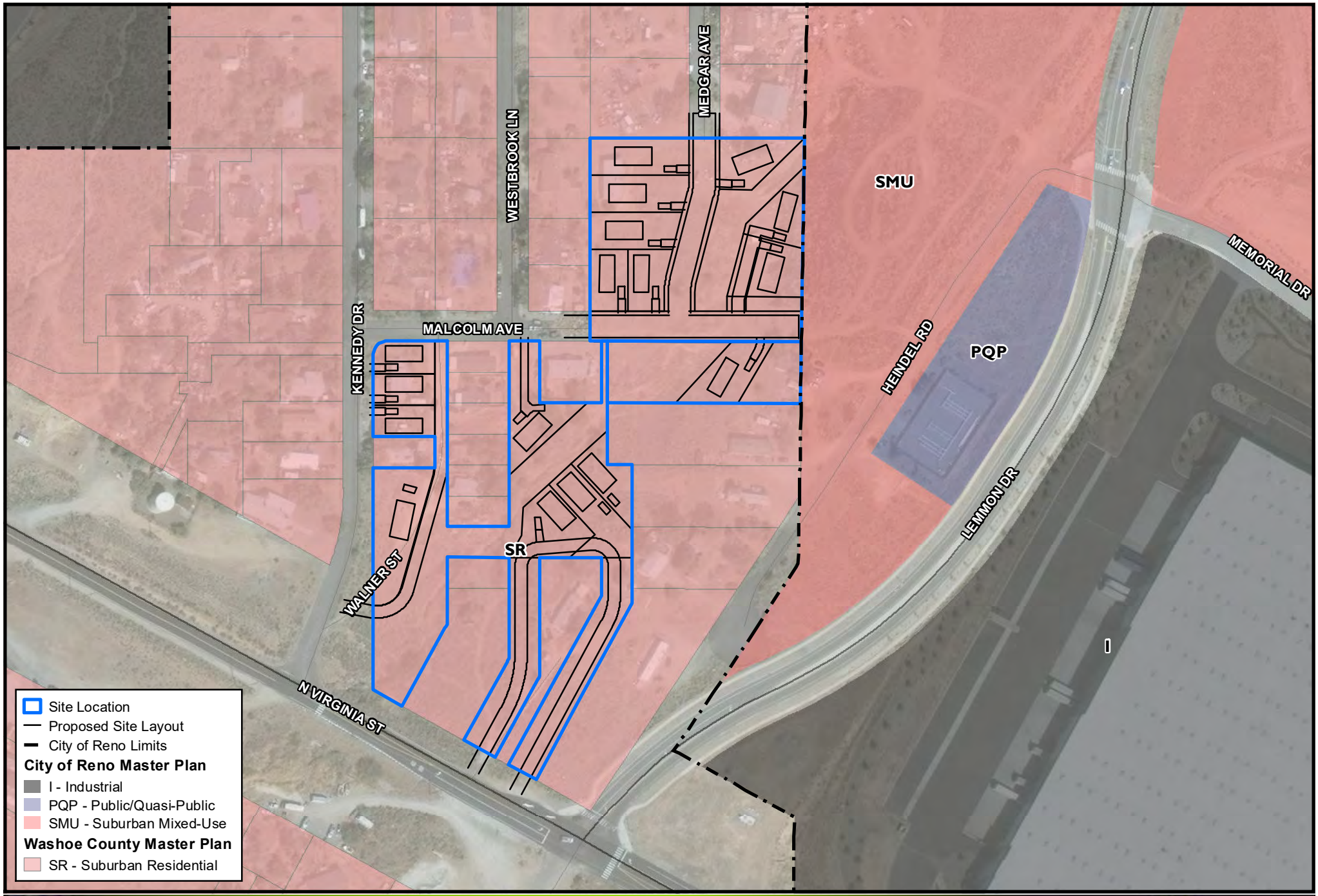
created by: CFB 03/10/2011

last updated: EMG 3/25/16

area previously shown on map(s)

082-12

NOTE: This map was prepared for the use of the Washoe County Assessor for assessment and illustrative purposes only. It does not represent a survey of the premises. No liability is assumed as to the sufficiency or accuracy of the data delineated hereon.

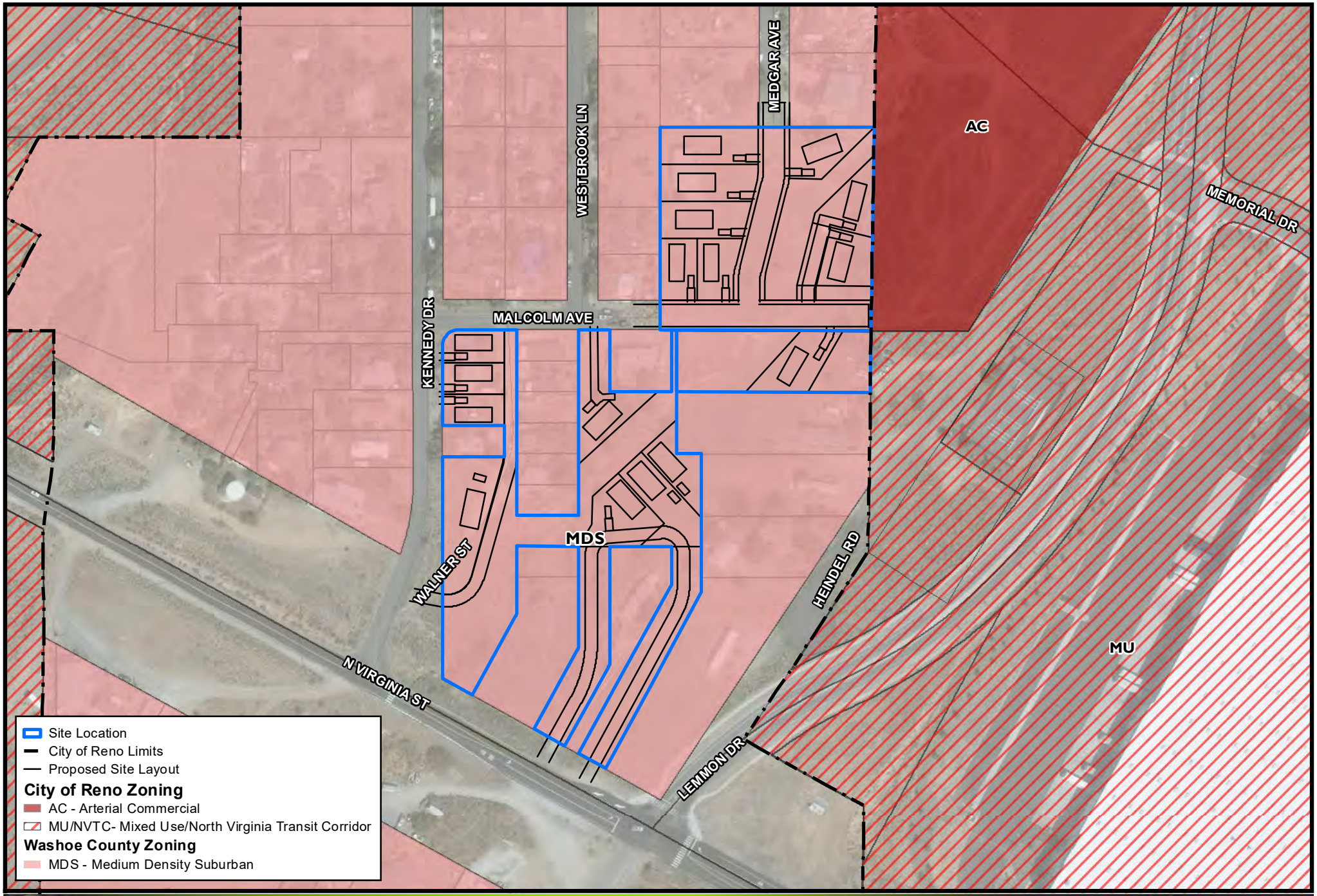


Master Plan

Grandview Terrace TSM and Variance

September 2020

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Zoning

Grandview Terrace TSM and Variance

September 2020

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066

SLOPE MAP
GRANDVIEW TERRACE
RENO,NV
September 2020

NORTH

0 50 100
FEET

Slope (%)
- 0-15
- 15.1-20
- 20.1-25
- 25.1-30
- 30+

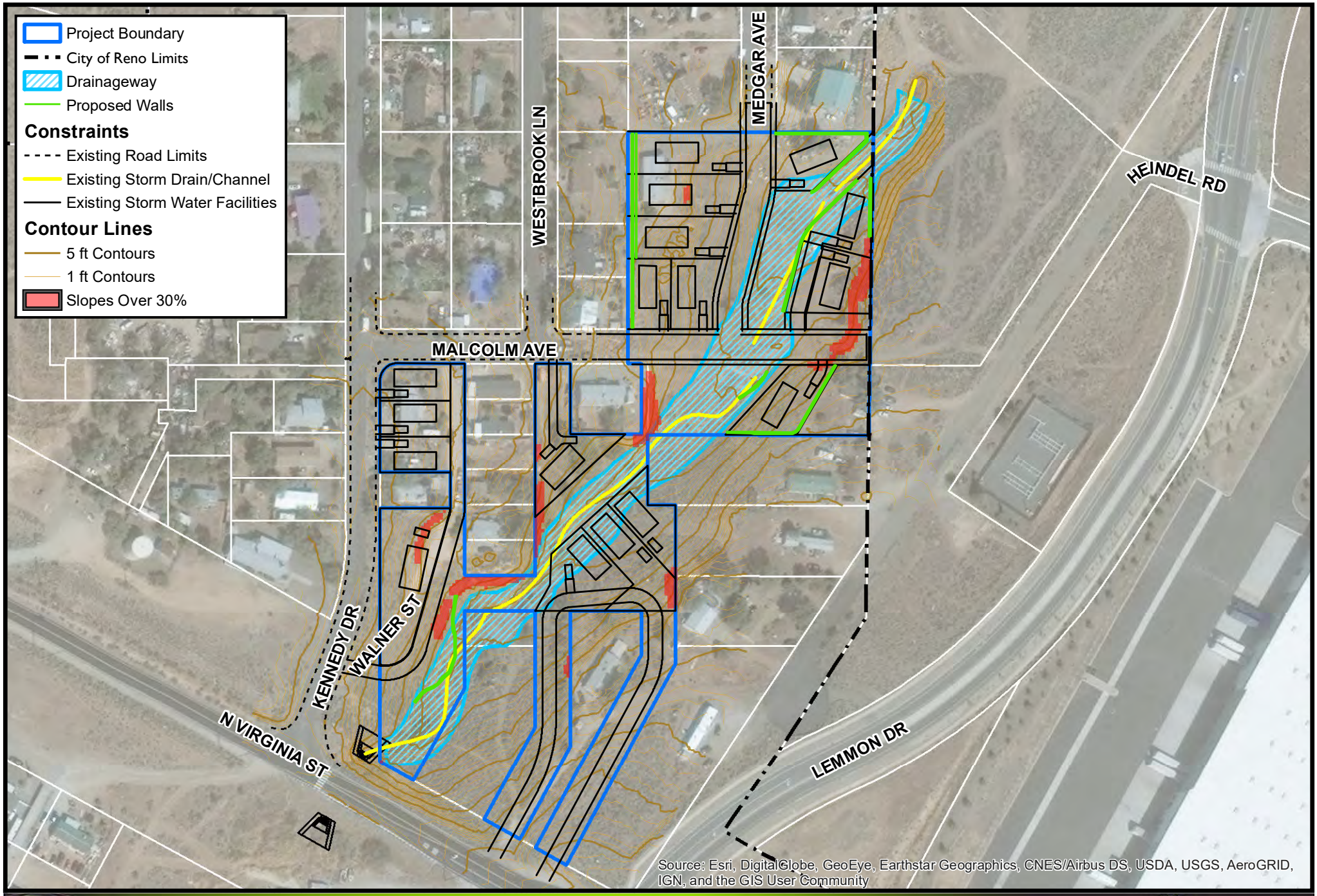
Slope (%)	Area (ac.)	% of Total
0-15	4.4	64.5
15.1-20	1.2	17.4
20.1-25	0.7	10.0
25.1-30	0.3	4.2
30+	0.3	3.9
TOTAL	6.9	100

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PRELIMINARY

WOOD RODGERS

J:\Jobs\3797_Hero_Land_Holdings\Malcom_Heindel_Medgar\GIS\Tasks\slope_boundary_20191030_V1.mxd 10/30/2019 1:11:28 PM sbarrow



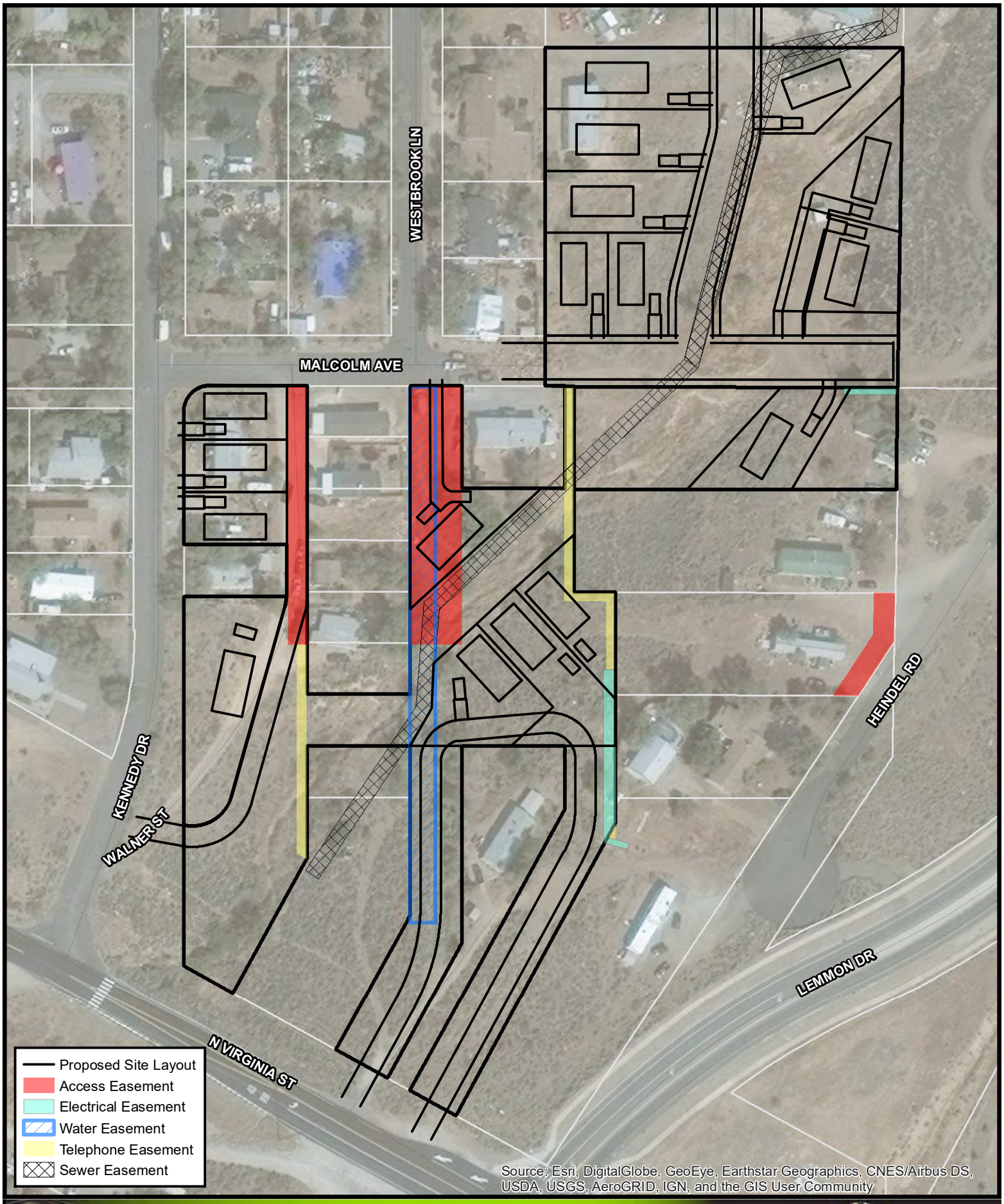
Development Constraints and Opportunities

Grandview Terrace TSM and Variance

September 2020

0 87½ 175
Feet

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Existing Easements Map

Grandview Terrace TSM and Variance

September 2020

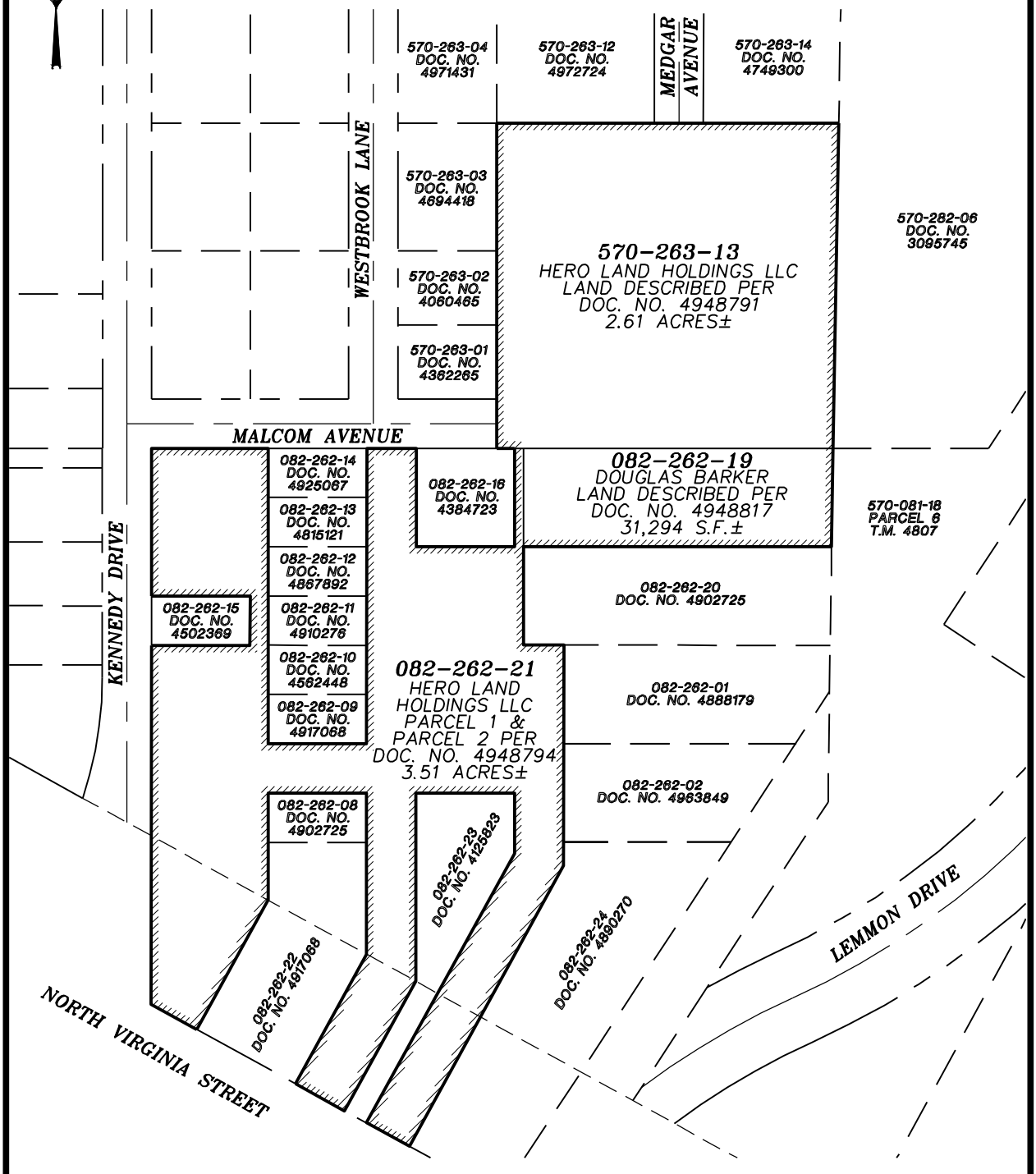
0 60 120
Feet

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066

BOUNDARY MAP EXHIBIT

SITUATE WITHIN THE SW 1/4 OF SECTION 9
& THE NW 1/4 OF SECTION 16
TOWNSHIP 20 NORTH, RANGE 19 EAST, M.D.M.
WASHOE COUNTY NEVADA

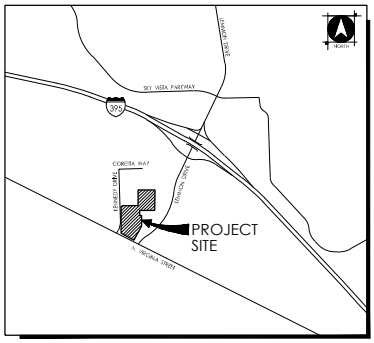
1" = 160'



JOB NO. 3797005
SHEET 1 OF 1

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Blvd
Reno, NV 89502
Tel 775.823.4068
Fax 775.823.4066

GRANDVIEW TERRACE
TENTATIVE SUBDIVISION MAP
TITLE SHEET



VICINITY MAP
NOT TO SCALE

OWNER:

HERO LAND HOLDINGS, LLC
2242 HARVARD STREET, SUITE 200
SACRAMENTO, CA 95815

DOUGLAS T. BARKER
979 MELBA DRIVE
RENO, NV 89503

APPLICANT/DEVELOPER:

DOUGLAS T. BARKER
979 MELBA DRIVE
RENO, NV 89503

BASIS OF BEARINGS

NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994, HIGH ACCURACY REFERENCE NETWORK (NAD 83/94 - HARN), AS DETERMINED USING REAL TIME KINEMATIC (RTK) GPS OBSERVATIONS WITH CORRECTIONS TRANSMITTED BY THE NEVADA GPS NETWORK. THE BEARING BETWEEN GPS REFERENCE STATION "SSBZ" - SS25M10000 AND "RSTEAD" - .....

DIMENSIONS SHOWN ARE GROUND DISTANCES. GRID TO GROUND COMBINED FACTOR = 1.00019793

BASIS OF ELEVATION

THE BASIS OF ELEVATION IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AS TAKEN FROM CITY OF RENO BENCHMARK 2630, WITH A PUBLISHED ELEVATION OF 5194.87 FT. BENCHMARK 2630 IS DESCRIBED AS BEING 1 1/2" DIA. STL CAP - T/C - SW COR -N.VIRGINIA S T & LANCASTER DR. - 13' W\y OF EC ON LANCASTER.

SITE INFORMATION:

RESIDENTIAL LOTS = 18
TOTAL SITE AREA = 298,391 S.F.
RIGHT OF WAY AREA = 31,349 S.F.
LOT AREA = 152,479 S.F.
COMMON AREA = 114,563 S.F.

PROJECT DENSITY:
GROSS DENSITY = 2.63 DU/AC.
NET DENSITY = 5.14 DU/AC.

LOT SUMMARY:
MINIMUM LOT SIZE = 6,122 S.F.
MAXIMUM LOT SIZE = 15,242 S.F.
AVERAGE LOT SIZE = 8,471 S.F.
MINIMUM ALLOWABLE LOT SIZE = 5000 S.F.

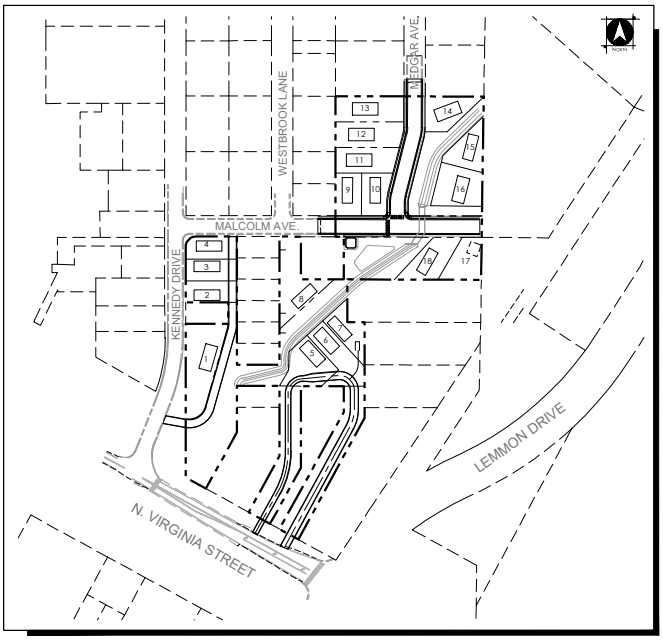
ENGINEERS STATEMENT:

I, C. EVAN NIKIRK , DO HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND WAS COMPLETED ON THE 14th DAY OF SEPTEMBER, 2020.

C. EVAN NIKIRK, P.E. #11466

SHEET INDEX

SHT No.	DWG ID	DRAWING DESCRIPTION
1	T-1	TITLE SHEET
2	DS-1	EXISTING CONDITIONS / DEMOLITION PLAN
3	LS-1	PRELIMINARY LOT AND BLOCK PLAN
4	G-1	PRELIMINARY GRADING PLAN
5	G-2	PRELIMINARY GRADING PLAN
6	G-3	PRELIMINARY GRADING PLAN
7	U-1	PRELIMINARY UTILITY PLAN
8	CS-1	PRELIMINARY CROSS SECTIONS



SITE PLAN
NOT TO SCALE

GRANDVIEW TERRACE
TITLE SHEET

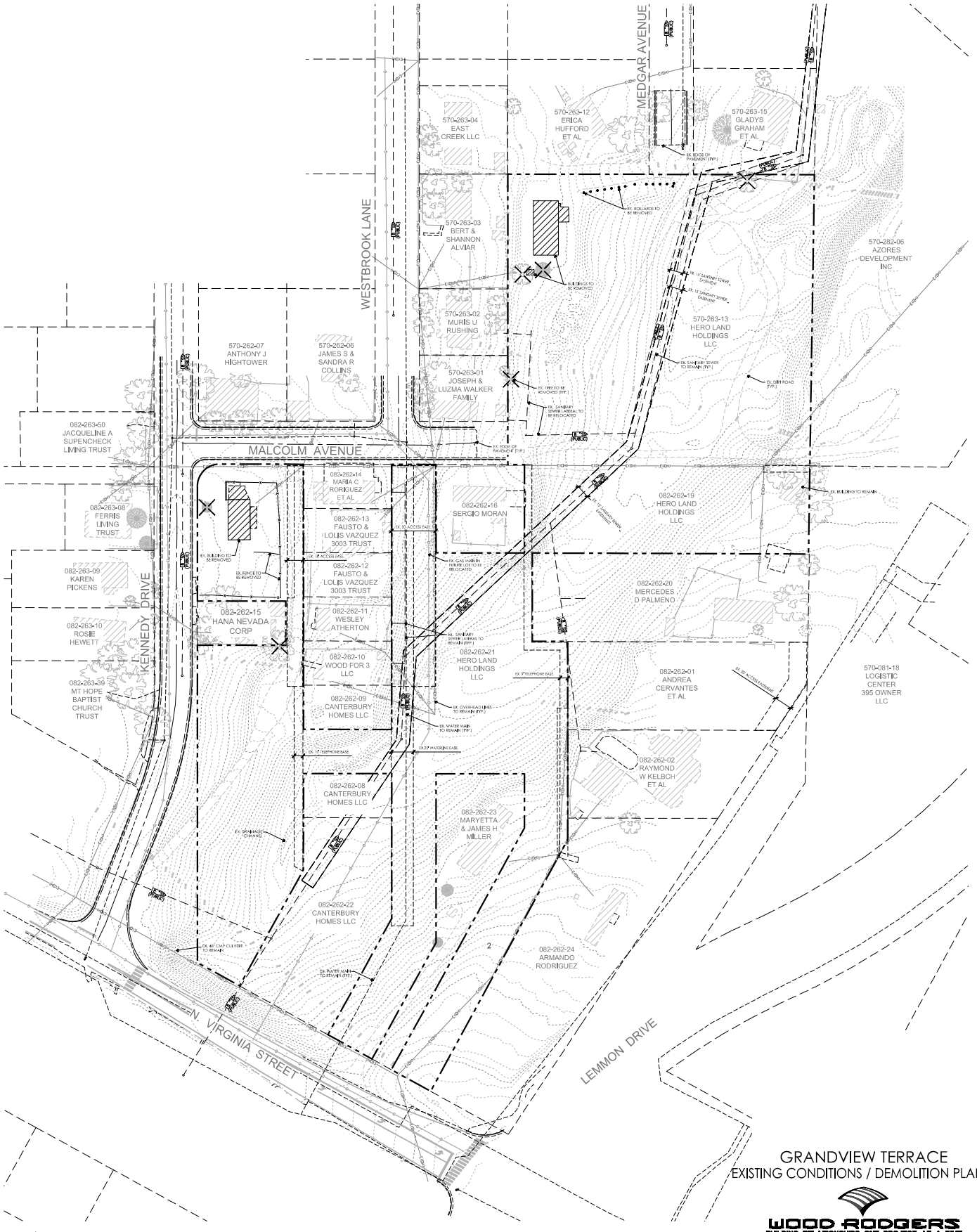
WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

3797005 JUNE, 2020

GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

EXISTING CONDITIONS / DEMOLITION PLAN



NORTH

0 40 80 160

GRANDVIEW TERRACE
EXISTING CONDITIONS / DEMOLITION PLAN

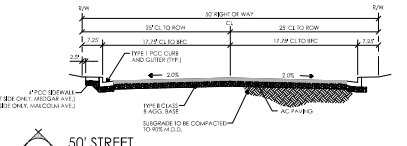
WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Reno, NV 89502
Tel 775.823.4068 Fax 775.823.4066

3797005 JUNE, 2020

GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY LOT AND BLOCK PLAN



A 50' STREET

50' STREET SECTION
NOT TO SCALE

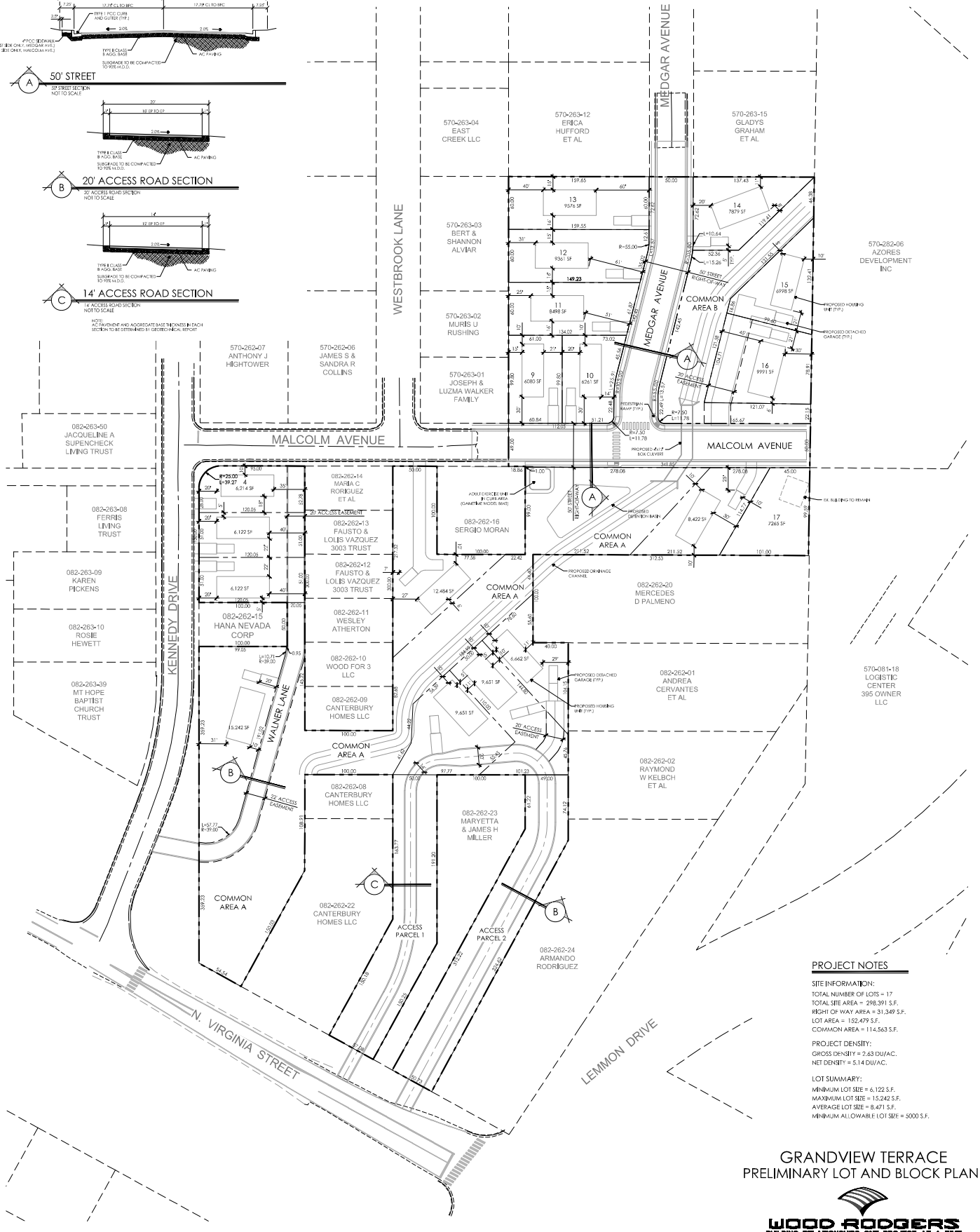
B 20' ACCESS ROAD SECTION

20' ACCESS ROAD SECTION
NOT TO SCALE

C 14' ACCESS ROAD SECTION

14' ACCESS ROAD SECTION
NOT TO SCALE

NOTE:
AC PAVEMENT AND AGGREGATE BASE THICKNESS IN EACH SECTION TO BE DETERMINED BY GEOTECHNICAL REPORT



PROJECT NOTES

SITE INFORMATION:

TOTAL NUMBER OF LOTS = 17
TOTAL SITE AREA = 298,391 S.F.
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AVERAGE LOT SIZE = 8,471 S.F.
MINIMUM ALLOWABLE LOT SIZE = 5000 S.F.

NORTH
0
80
40
160

GRANDVIEW TERRACE
PRELIMINARY LOT AND BLOCK PLAN

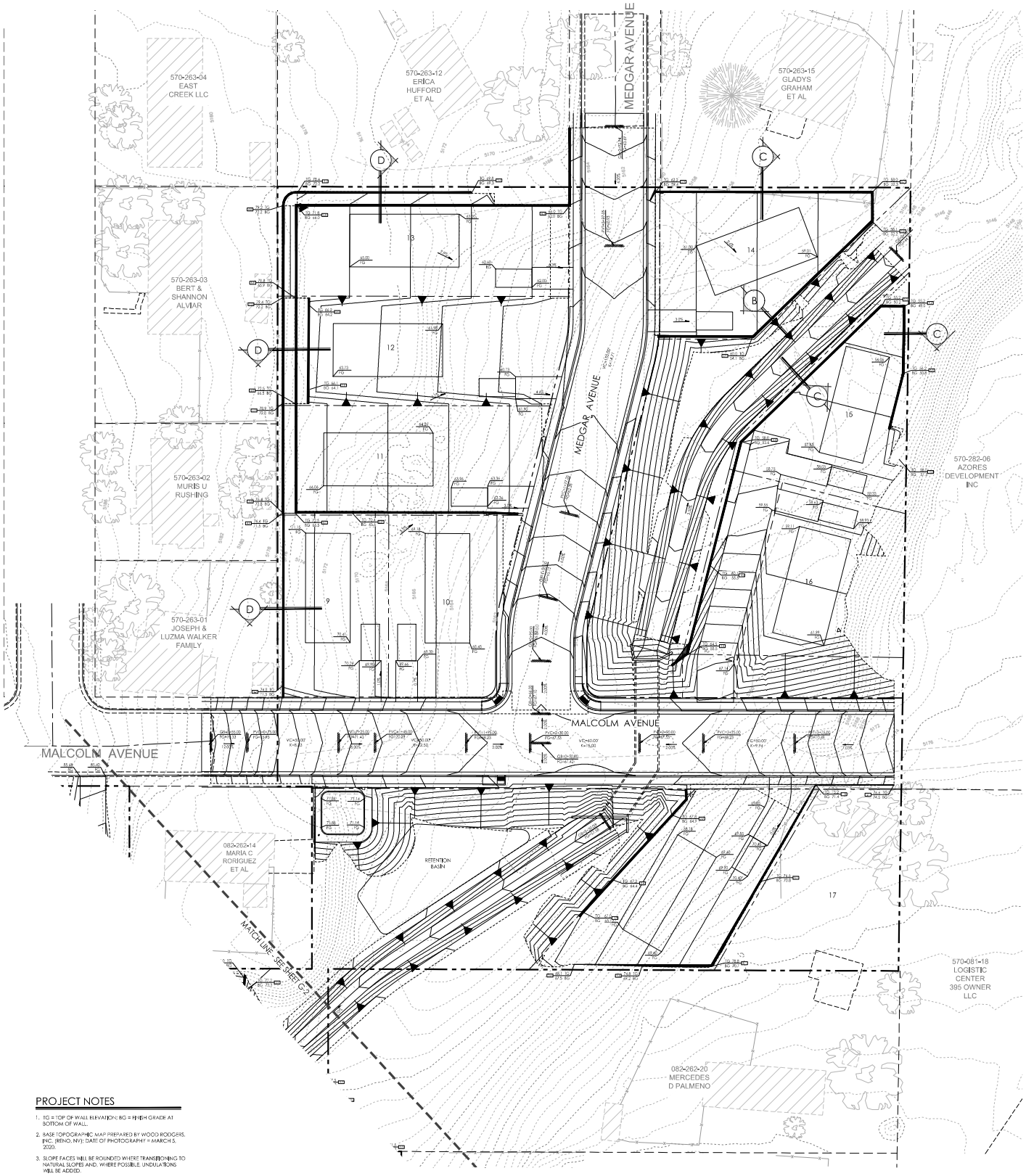
WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel 775.823.4068
Fax 775.823.4066

3797005 JUNE, 2020

GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY GRADING PLAN



PROJECT NOTES

1. TG = TOP OF WALL ELEVATION; BG = FINISH GRADE AT BOTTOM OF WALL.
2. BASE TOPOGRAPHIC MAP PREPARED BY WOOD RODGERS, INC. (RENO, NV); DATE OF PHOTOGRAPHY = MARCH 5, 2020.
3. SLOPE FACES WILL BE ROUNDED WHERE TRANSITIONING TO NATURAL SLOPES AND, WHERE POSSIBLE, UNDULATIONS WILL BE ADDED.

NORTH

0 20 40 80

GRANDVIEW TERRACE
PRELIMINARY GRADING PLAN

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

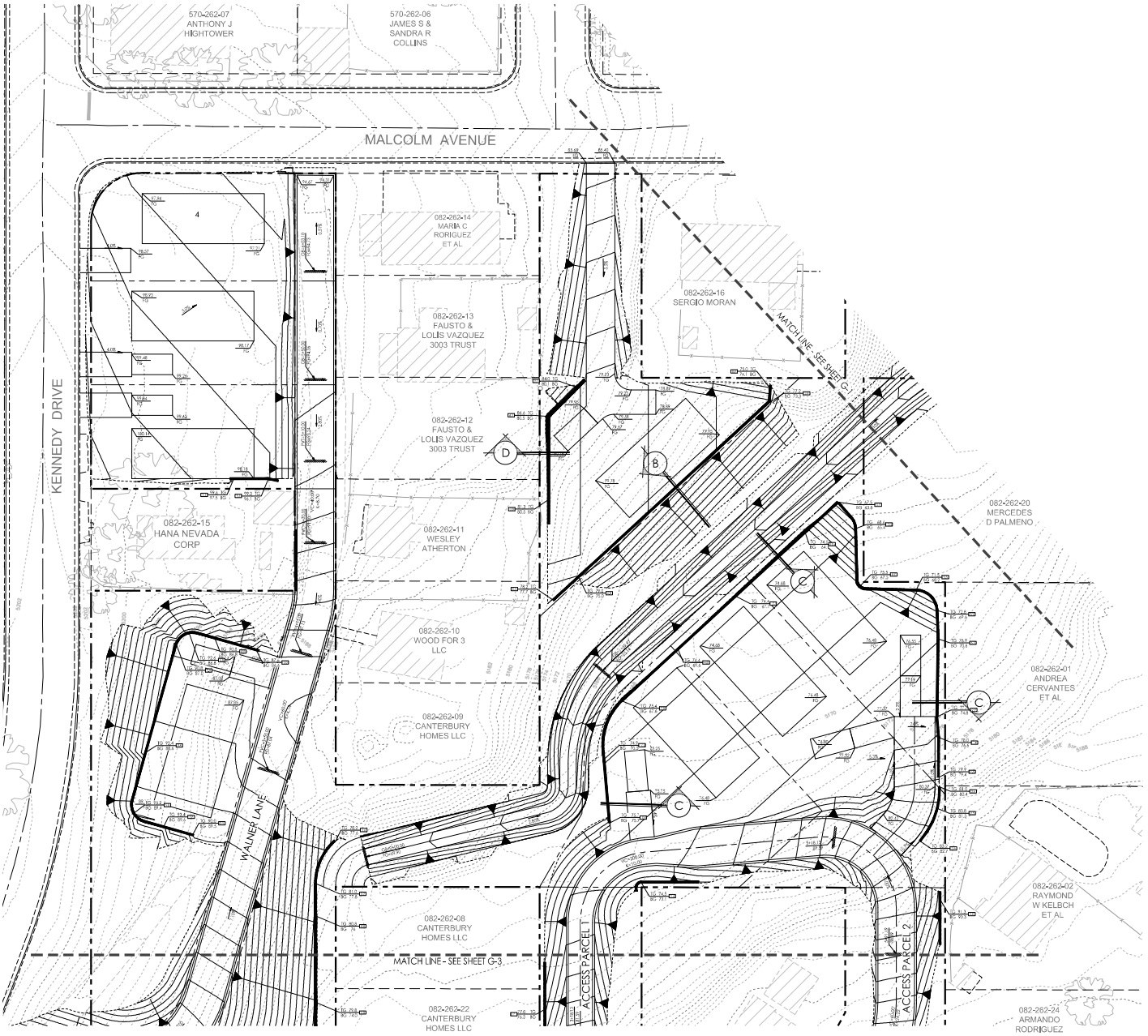
3797005 JUNE, 2020

SHEET G-1 OF 8

GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY GRADING PLAN



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NORTH

0 20 40 80

GRANDVIEW TERRACE
PRELIMINARY GRADING PLAN

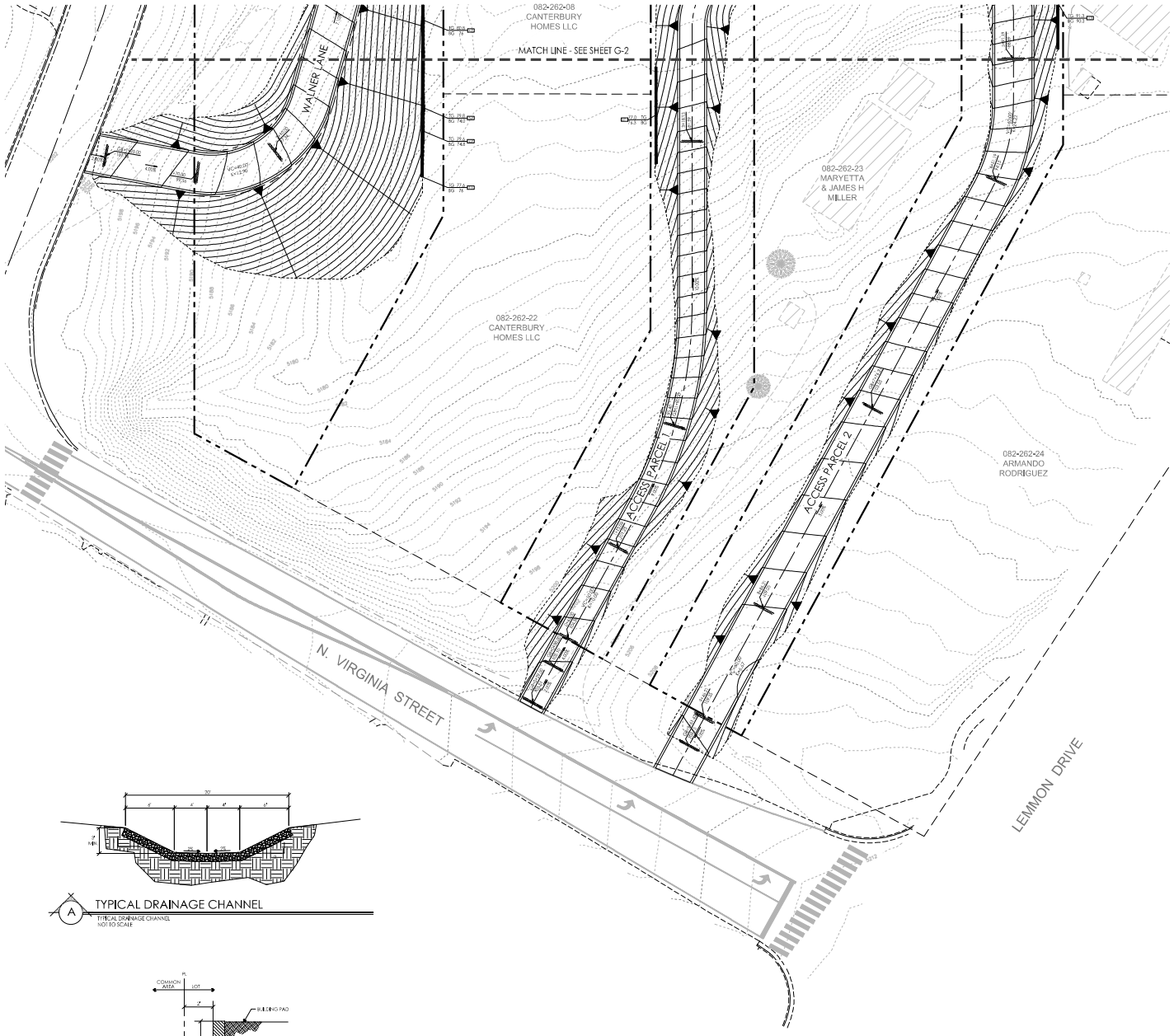
WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

3797005 JUNE, 2020

GRANDVIEW TERRACE

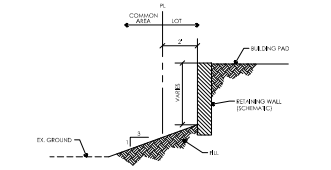
TENTATIVE SUBDIVISION MAP

PRELIMINARY GRADING PLAN



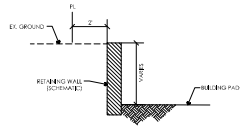
A TYPICAL DRAINAGE CHANNEL

TYPICAL DRAINAGE CHANNEL
NOT TO SCALE

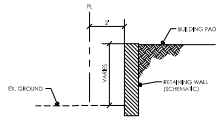


B TYPICAL WALL AND FILL COMBINATION

NOT TO SCALE

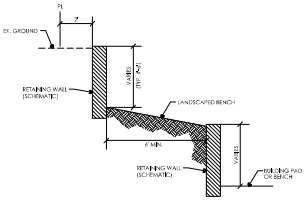


WALL IN CUT



C TYPICAL RETAINING WALL IN FILL

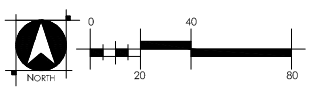
NOT TO SCALE



TERRACE LOCATIONS

D TYPICAL RETAINING WALLS IN CUT

NOT TO SCALE



PROJECT NOTES

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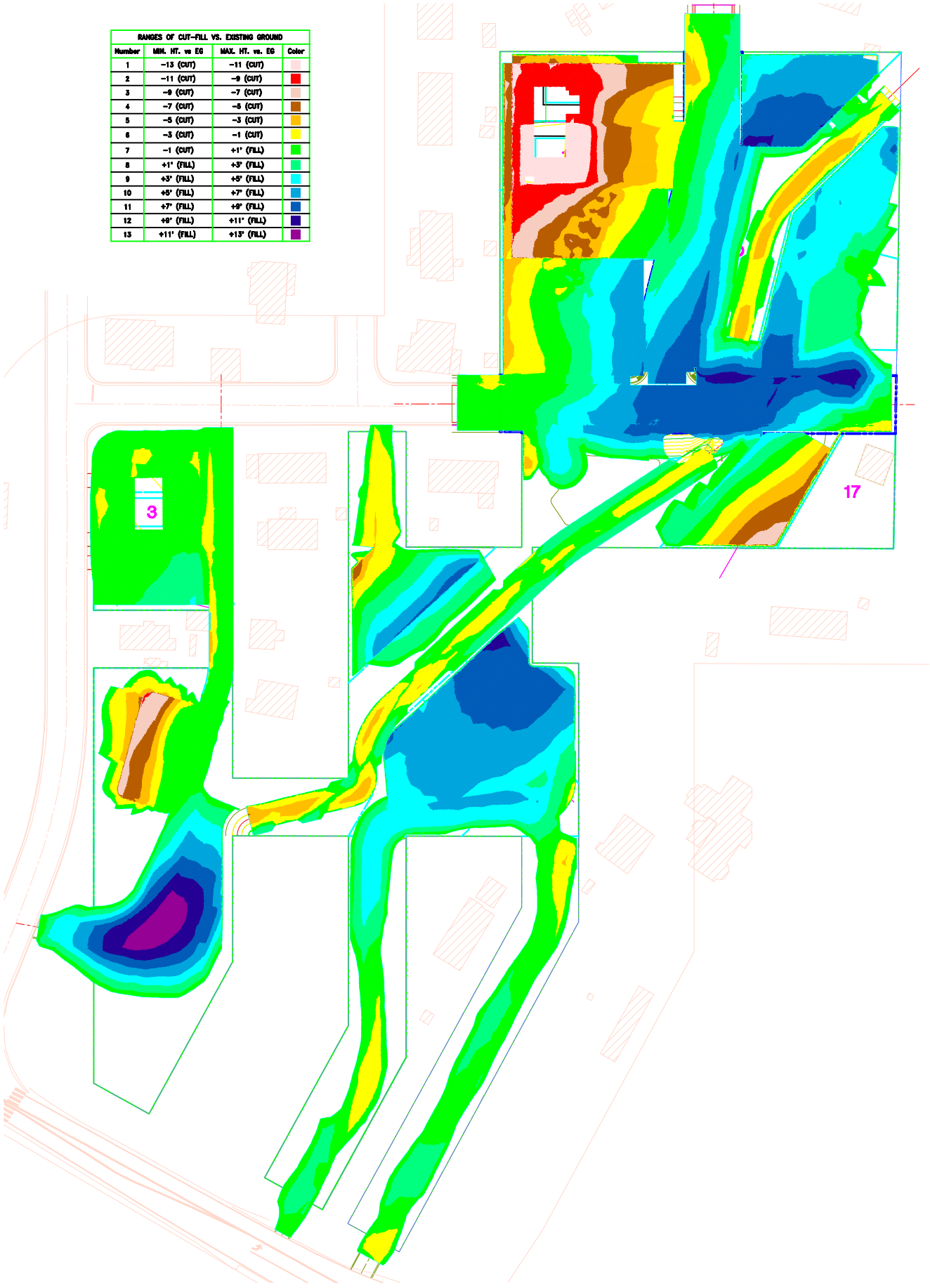
3. SLOPE FACES WILL BE ROUNDED WHERE TRANSITIONING TO NATURAL SLOPES AND, WHERE POSSIBLE, UNDULATIONS WILL BE ADDED.

GRANDVIEW TERRACE
PRELIMINARY GRADING PLAN

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

3797005 JUNE, 2020

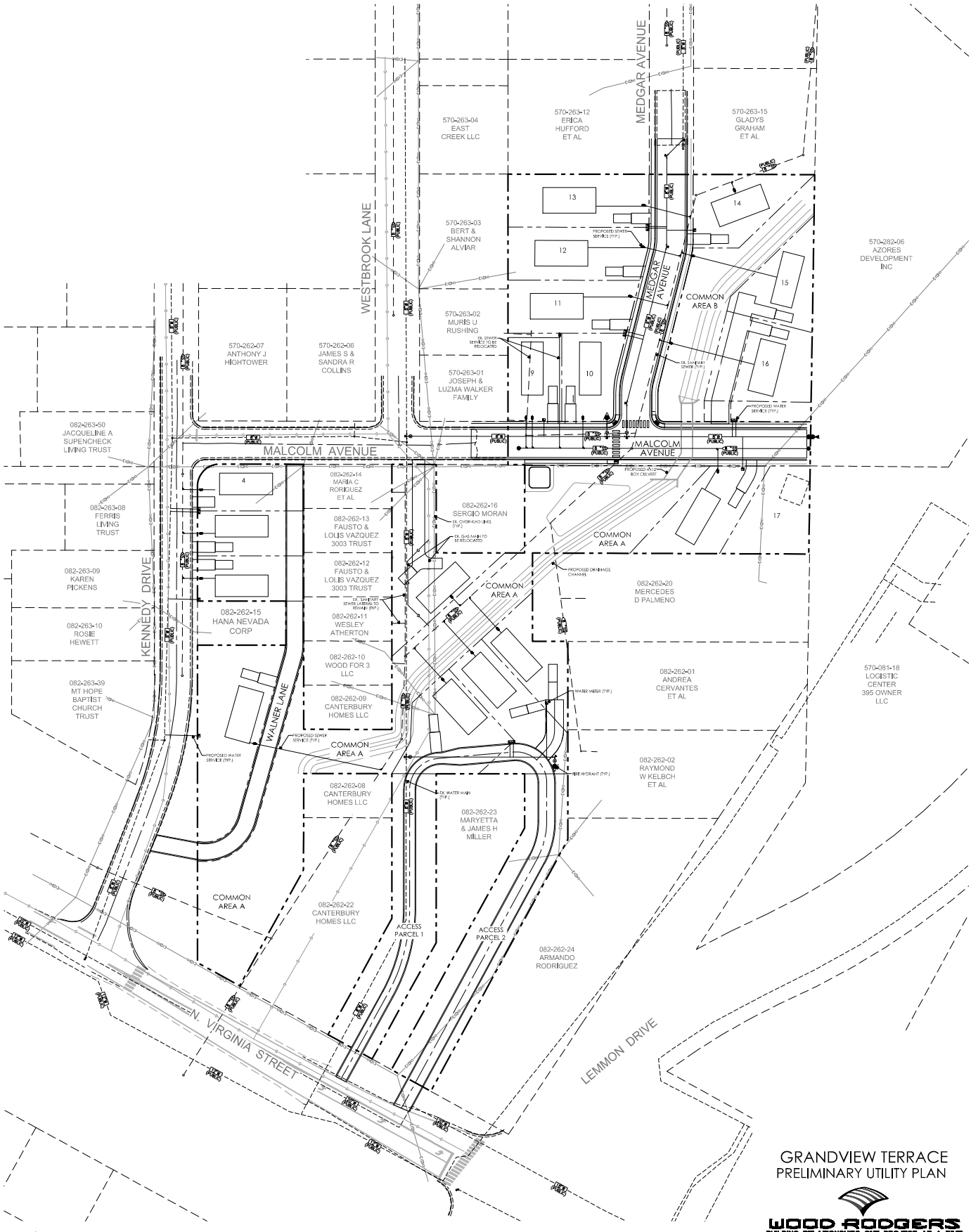
RANGES OF CUT-FILL VS. EXISTING GROUND			
Number	MIN. HT. vs EG	MAX. HT. vs. EG	Color
1	-13' (CUT)	-11' (CUT)	
2	-11' (CUT)	-9' (CUT)	
3	-9' (CUT)	-7' (CUT)	
4	-7' (CUT)	-5' (CUT)	
5	-5' (CUT)	-3' (CUT)	
6	-3' (CUT)	-1' (CUT)	
7	-1' (CUT)	+1' (FILL)	
8	+1' (FILL)	+3' (FILL)	
9	+3' (FILL)	+5' (FILL)	
10	+5' (FILL)	+7' (FILL)	
11	+7' (FILL)	+9' (FILL)	
12	+9' (FILL)	+11' (FILL)	
13	+11' (FILL)	+13' (FILL)	



GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY UTILITY PLAN



GRANDVIEW TERRACE
PRELIMINARY UTILITY PLAN

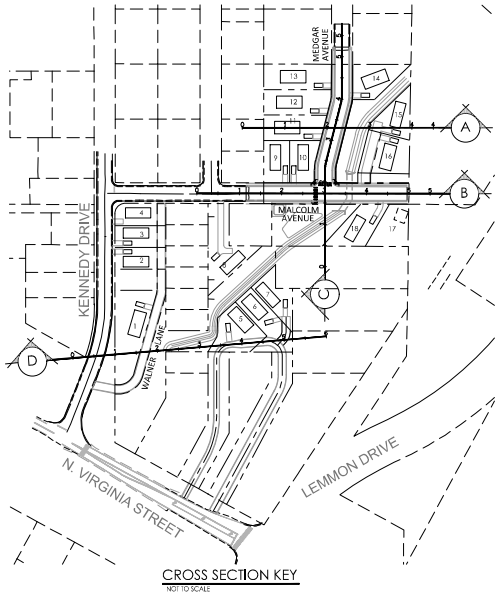
WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

3797005 JUNE, 2020

GRANDVIEW TERRACE

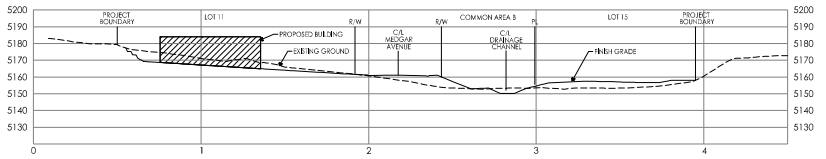
TENTATIVE SUBDIVISION MAP

PRELIMINARY CROSS SECTIONS

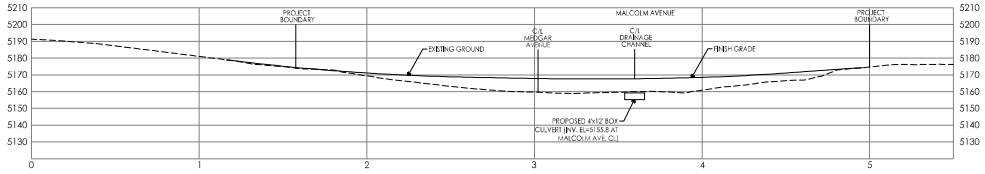


CROSS SECTION KEY

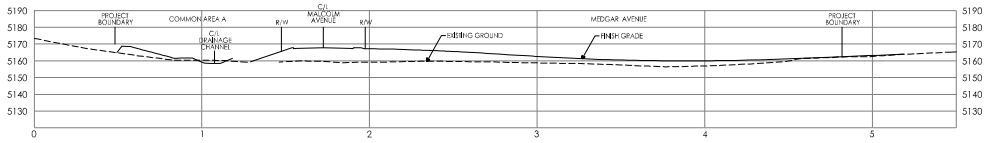
NOT TO SCALE



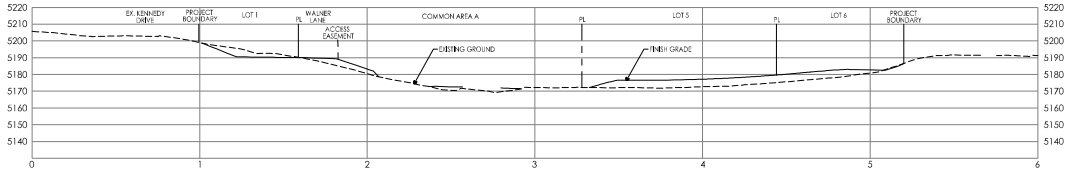
A SCALE: 1"=30' HORIZ. AND VERT.



B SCALE: 1"=30' HORIZ. AND VERT.



C SCALE: 1"=30' HORIZ. AND VERT.



D SCALE: 1"=30' HORIZ. AND VERT.

NORTH

0 30 60 120

GRANDVIEW TERRACE

PRELIMINARY CROSS SECTIONS

WOOD RODGERS

BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

1361 Corporate Boulevard Reno, NV 89502

Tel 775.823.4068 Fax 775.823.4066

3797005 JUNE, 2020

Section 4

WOOD RODGERS

June 15, 2020
Project No. 3797005

Mr. Doug Barker
Hero Land Holdings
979 Melba Drive
Reno, Nevada 89503

RE: Geotechnical Due Diligence
Grandview Terrace
APN's 570-263-13, 082-262-19 & 21
Washoe County, Nevada

REF: USDA Natural Resources Conservation Service
United States Department of Agriculture

2018 International Building Code (IBC)

Dear Mr. Barker,

We are pleased to present our due diligence review letter for the referenced project located in Reno, Washoe County, Nevada. The purpose of our due diligence review is to provide a summary of geotechnical considerations that could potentially impact the development of the property and has been based on review of readily available published documents and our knowledge of the area.

PROJECT DESCRIPTION

The project consists of developing 19 single family manufactured housing residences with associated parking and drive areas. The structures will consist of pre-fabricated construction utilizing standard spread foundations. Foundation loads are anticipated to be light. Cuts will approach 12-feet and fills are typically under 10-feet based on preliminary grading plans. Two existing structures on the site will be demolished.

All parking and drive improvements within right-of-way areas will be evaluated in accordance with Washoe County design standards. Underground utilities will be provided by a variety of public and private companies.

FIGURE 1 - PROJECT DEVELOPMENT AREA

SITE DESCRIPTION

The overall site, located in Washoe County, Nevada, encompasses an area of approximately 6.9 acres and has a central latitude and longitude of 39.6068°N and -119.8559°E, respectively (Washoe County Regional Mapping System). As shown in Figure 1, the site is located north of the North Virginia Street and Lemmon Drive intersection. Two residential structures are currently present on the site which appear to contain minor amounts of cuts and fills on the building pads. Bordering the property is North Virginia Street to the south and residential development to the north, east, and west. Furthermore, a large natural drainage channel transects the property, entering from the southwest and exiting the northeastern part of the project area.

Vegetation appears to be moderately dense, consisting of grasses, brush, and mature trees in the bottom of the drainage. The site is generally sloped down to the drainage channel with slopes ranging from relatively level to over 20-percent.

GEOLOGIC AND GENERAL SOIL AND GROUNDWATER CONDITIONS

Based on the United States Geologic Survey (USGS), Preliminary revised geologic maps of the Reno urban area, Nevada, the site is mapped in a geologic setting of older alluvial fan deposits of early to middle Pleistocene age (Qfo). Figure 2 presents the geologic map of the project site. Natural Resource Conservation Services' (NRCS) Soil Survey Maps describes the site soil as consisting of a surficial silty sand (SM) layer overlying high plasticity clay (CL) and clayey sand (SC) to about four feet in depth. NRCS indicates low plasticity silty, clayey sand (SC-SM) at depths of approximately four to five feet below the ground surface. Bedrock may be encountered at relatively shallow depths on the southern portion of the site.

Nevada Division of Water Resources (NDWR) nearby well logs indicate the static water level is approximately 150-feet below the existing ground surface in the area.

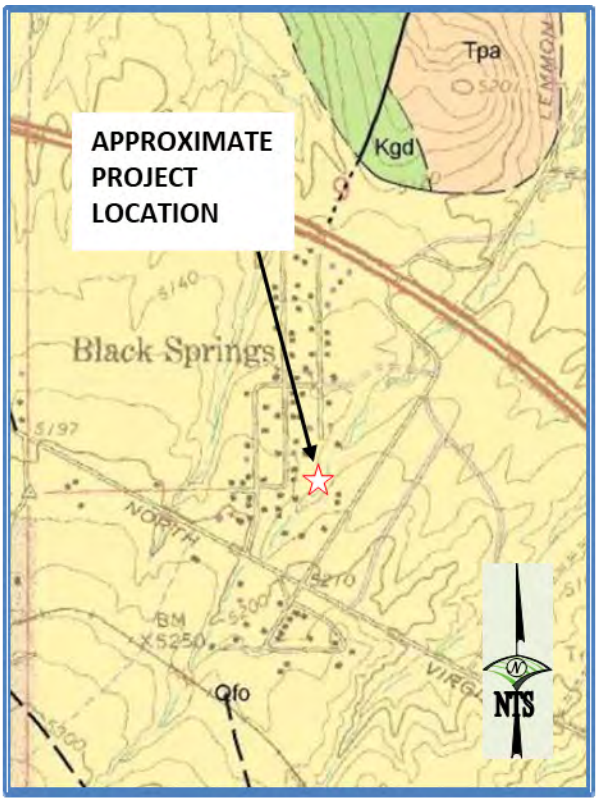


FIGURE 2 - GEOLOGIC MAP

SEISMIC HAZARDS

The Truckee Meadows lies within the western extreme of the Basin and Range physiographic province sandwiched between the Virginia Range and the Pah Rah Range to the east and the Carson Range to the west. The Basin and Range province is characterized by a series of valleys bounded by north/south

trending mountain ranges, byproducts of the seismically active zones of the Wasatch Front in Utah and the Sierra Nevada Mountains along the California/Nevada border. Faulting and seismic activity are integral to the formation of this series of alternating valleys and mountain ranges. As a consequence, the presence of faults, active and inactive, is common in western Nevada.

Surface Rupture

The criteria for evaluating earthquake faults has been formulated by a professional committee for the State of Nevada Earthquake Safety Council. The guidelines present that faults with evidence of movement within the past 10,000 years (Holocene time) are considered Holocene Active. Faults with evidence of displacement within the last 130,000 years are considered Late Quaternary Active and faults with movement within the last 1.6 million years are considered Quaternary Active. The USGS U.S. Quaternary Faults Map was accessed to review the proximity of any active faults as previously characterized. An Undifferentiated Quaternary aged fault (< 1.6 million years) that is part of the Peavine Peak fault zone is mapped through the property but does not transect any of the proposed lots. Furthermore, this fault is sufficiently inactive that no additional investigation or consideration will likely be recommended; surface rupture is considered unlikely.

Liquefaction

Liquefaction is a loss of soil shear strength that can occur during a seismic event as excessive pore water pressure between the soil grains is induced by cyclic shear stresses. This phenomenon is limited to poorly consolidated (Standard Penetration Test less than 30, overburden stress corrected shear wave velocity less than 700 fps) clean to silty sand/sandy silt lying below the ground water table (typically less than 50 feet deep).

A 50-foot liquefaction boring utilizing mud rotary drilling techniques may be considered during the design level investigation in order to more definitively assess the liquefaction potential. An alternative method to analyzing the liquefaction potential is the determination of the shear wave velocity of soils in approximately the top 100 feet via geophysical testing.

Slope Instability

The site soils and surrounding flat lying topography are such that the potential for slope instability at the site due to gravitational or seismic activity is considered low.

PRELIMINARY SOIL PROFILE TYPE AMPLIFICATION FACTORS

In accordance with ASCE 7-16 and the Northern Nevada Amendments of the 2018 IBC, Site Class D (default) has been assigned to the project. The correct Site Classification will be determined during the design level geotechnical investigation. Preliminary seismic design values for this due diligence study were determined based on a representative latitude and longitude of 39.6068°N and -119.8559°E, respectively. Per ASCE 7-16, the site's modified Peak Ground Acceleration to be used for engineering

analyses is equal to 0.763g. Risk category II has been assigned to the project based on our office study. The ASCE 7 Hazards Report is attached to this letter.

SITE PREPARATION AND PRELIMINARY GRADING CONSIDERATIONS

All vegetation and topsoil should be cleared and grubbed from structural areas. Clearing and grubbing depths are anticipated to generally range from two to six inches. Localized deeper removal may be required in areas of large brush and trees or where large root balls are encountered. Vegetation and organic debris should be disposed of offsite or placed in designated non-structural areas with the owner's permission.

Due to parts of the project area being previously developed, any undocumented fill material encountered will require removal and replacement with structural fill. The drainage transecting the property will be addressed by the project's Civil Engineer.

Debris and remnants from the structures and pavements to be demolished should be removed from the site. Underground service tanks (UST's) could be encountered during site grading. If any UST's or associated contaminated soils are encountered, they will require removal and replacement with engineered fill per NDEP requirements. Any existing utilities will require proper removal or abandonment in place in accordance with Washoe County standards.

Depending on the proposed grading plan and the thickness of the native clay soil layer, overexcavation will likely be necessary beneath improvements. Typical separation thicknesses for the anticipated site soils may be up to two or three feet below foundations and one to one and a half foot below site work and pavements which doesn't include the base course section. Overexcavation recommendations typically extend at 1H:1V. Overexcavation depths may be terminated in structural fill areas once the required separation has been achieved or in cut areas where the clay soils have been penetrated.

The site grading plan design will likely endeavor to optimize the cut to fill ratio to the extent possible. Importation of structural fill should be planned for where separation layers are anticipated to be necessary between improvements and clay soils. Structural fill is defined as any material placed below structural elements and includes foundations, concrete slabs-on-grade, pavements, or any structure that derives support from the underlying soil. Off hauling of expansive soils may be required during grading if they cannot be reused in non-structural areas or deep fills.

Cut zones and trenching could be difficult if bedrock is encountered at relatively shallow depths. The design level geotechnical report will address depth to bedrock and any anticipated excavation difficulties for cut zones and utility trenching based on the field investigation.

Any fill placed on a slope steeper than 5H: 1V should be keyed and benched into the original ground surface.

Due to the deep level of groundwater in the project area, no mitigations for saturated subgrade soils or for wet trench conditions are likely to be necessary.

FOUNDATION ALTERNATIVES

Suitable foundation systems will hinge on the findings of the design level geotechnical report. Standard spread foundations should perform well if competent material is encountered or if structural fill separation layers are incorporated beneath the foundation.

STRUCTURAL PAVEMENT CONSIDERATIONS

Consistent with the discussion of potential foundation alternatives, on-site structural pavement section considerations are also dependent upon the quality of the supporting soils. Typically, if granular soils are present, Washoe County's minimum structural pavement section is suitable for the planned improvements. Where surface clays are prevalent, pavement sections may require overexcavation and replacement with a structural fill separation layer to achieve suitable structural support. Pavement structural section alternatives should be addressed in the design level geotechnical report.

SUMMARY

Although the site presents some geotechnical constraints that bear closer scrutiny, the site does not present any adverse conditions that cannot be reasonably mitigated. We appreciate the opportunity to provide this due diligence summary letter. We would like to highlight that this document has been prepared based on published data and our experience in the area. Varying conditions, and conditions not yet identified, may come to light or may be encountered during development of a design-level geotechnical report. Please contact our office if you have any related questions.

Sincerely,
WOOD RODGERS, INCORPORATED

06/15/2020

Justin M. McDougal, PE
Associate
PE Number: 24474
Expires: 12/31/2021

Gary C. Luce
Sr. Geotechnical Engineer

Enclosures:
ASCE 7 Hazards Report

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	5162.18 ft (NAVD 88)
Risk Category:	II	**Latitude:**	39.6068
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-119.8559

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.5	S_{D1} :	N/A
S_1 :	0.514	T_L :	6
F_a :	1.2	PGA :	0.636
F_v :	N/A	PGA_M :	0.763
S_{MS} :	1.8	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.2	C_v :	1.4

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Thu Jun 11 2020

Date Source: USGS Seismic Design Maps

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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PRELIMINARY DRAINAGE REPORT

FOR THE

GRANDVIEW TERRACE SUBDIVISION

Prepared for:

Hero Land Holdings, LLC
Douglas T. Barker
979 Melba Drive
Reno, NV 89503

June 15, 2020

Prepared by:

Wood Rodgers Inc.
1361 Corporate Boulevard
Reno, Nevada 89502
(775) 823-4068
Evan Nikirk, PE

06.15.2020

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

PRELIMINARY DRAINAGE REPORT

FOR THE

GRANDVIEW TERRACE SUBDIVISION

Prepared for:

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WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

Table of Contents

1 INTRODUCTION

This report serves as the preliminary drainage study in support of the Grandview Terrace Tentative Subdivision Map. The purpose of this report is to provide the analysis necessary to evaluate the development of the proposed project site in accordance with Truckee Meadows Regional Drainage Manual (TMRDM) and Washoe County development standards.

1.1 PROJECT LOCATION

According to the Public Land Survey System, the site is situated within Section 16, Township 20 North, Range 19 East, Mount Diablo Meridian (T20N, R19E, MDM), in Washoe County, Nevada. The parcels comprising the development are designated Assessor Parcel Numbers (APNs) 082-262-21, 082-262-19, and 570-263-13. This project is bordered by private single-family residences to the north, existing Hendel Road and Lemmon Drive to the east, existing North Virginia Street to the south, and existing Kennedy Drive to the west. A vicinity map is included in Appendix A.

1.2 PROJECT DESCRIPTION

The proposed ±6.85-acre Grandview Terrace development is designed as a single-family residential subdivision. The project will consist of construction of 17 manufactured homes with driveways and associated infrastructure; the 18th lot has an existing residence that will remain in place. This report is in support of the Tentative Subdivision Map application and provides a preliminary analysis of the on-site drainage system.

The Grandview Terrace project will develop parcels on either side of a dry wash that traverses the project area from southwest to northeast. Existing terrain on either side of the project site slopes towards a poorly-defined natural drainage channel at between approximately 5 and 30 percent in the proposed development area. The flowline of the existing channel has a slope of approximately 2 percent. Native vegetation includes sagebrush, rabbitbrush, grasses, wild rose, and sparse trees, with sagebrush the predominant vegetation on the steep slopes and grasses and wild rose more prevalent near the flowline of the drainage channel. The site is currently accessed from the northwest by way of Malcolm Avenue or Kennedy Drive, or from the north via Medgar Avenue, or from the east by way of Hendel Road. The site is located entirely within FEMA FIRM Panel No. 32031C3026G. A FEMA Flood Zone Exhibit is included in Appendix A.

A preliminary desktop geotechnical due diligence was performed (Wood Rodgers, 2020) to summarize soil, bedrock, and ground water conditions expected at the site and to evaluate design issues related to site development. The investigation was based on available public data from the United States Geologic Survey (USGS), the Natural Resources Conservation Service (NRCS), and the Nevada Division of Water Resources. Records indicate that site soils consist mainly of silty sands (SM), high plasticity clay (CH), and clayey sands (SC), and bedrock may be encountered at relatively shallow depths at the southern portion of the site. Nearby well records indicate that the static water level is approximately 150 feet below ground surface.

The existing drainage channel that transects the development conveys runoff from Peavine Mountain, as well as several private parcels surrounding the proposed project site. Before entering the project site, the drainage channel is routed through pipe culverts under embankments extending east-west across the wash at the Union Pacific Railroad crossing and at North Virginia Street. After leaving the site, the channel enters a pipe culvert that conveys runoff to the US Highway 395 and Lemmon Drive overpass. The drainage channel eventually discharges to Lemmon Lake.

1.3 REGULATORY PERSPECTIVE

The project site is located within Washoe County jurisdiction. The drainage utilities are to be publicly owned and maintained by Washoe County.

2 PREVIOUS STUDIES

Soils conditions of the Grandview Terrace site were investigated in the due diligence letter *Geotechnical Due Diligence* by Wood Rodgers Inc., dated June 15, 2020.

The existence of any other previous drainage studies is not known at this time.

3 METHODS

The hydrologic basin draining to the existing drainage channel bisecting the project is approximately 2.6 square miles. As the area being analyzed is larger than 100 acres, the TMRDM requires the Natural Resources Conservation Service (SCS) unit hydrograph method be used to attain peak flows for the drainage basins. The SCS method requires a curve number (CN), accumulated rainfall depth, and lag time for each basin. The equations for the SCS method are:

$$Q = (P - 0.2S)^2/(P + 0.8S)$$

$$S = \left(\frac{1000}{CN}\right) - 10$$

Where:

Q = Accumulated excess (inches)
P = Accumulated rainfall depth (inches)
S = Currently available soil moisture storage deficit (inches)
CN = Curve number (unitless)
A = Area of the basin (acres)

4 HYDROLOGIC ANALYSIS

The hydrologic analysis consists of on-site peak runoff flow computations for the existing and proposed conditions. The 5-year and 100-year storm events were modeled per the TMRDM using the SCS Unit Hydrograph method. Peak flows were determined using HEC-HMS software, version 4.2.1. Basin areas, times of concentration, and Curve Numbers (CN) were input into the HEC-HMS program to obtain peak runoff flows. Existing storage capacity of flows detained behind the

culvert crossings of the Union Pacific Railroad and North Virginia Street embankments were also modeled using HEC-HMS software. Elevation-Area curves were developed and were input into the program along with the existing outlet structures.

4.1 TIME OF CONCENTRATION / LAG TIME

The time of concentration (t_c) is defined as the time required for water to flow from the hydraulically most distant part of the drainage area to the point of consideration. Usually, the point of consideration is the discharge point of the basin or sub-basin. Time of concentration is used to determine the corresponding rainfall intensity for calculating the peak runoff rate of a given storm event for the basin or sub-basin. For basins less than one square mile in total area and slope less than 10 percent, the following equations shall be used in determining time of concentration.

$$t_c = t_i + t_t$$

Where:

t_c = time of concentration (minutes)
t_i = initial, overland flow time (minutes)
t_t = travel time in ditch, channel, gutter, pipe etc. (minutes)

$$t_i = \frac{1.8(1.1 - R)L_o^{1/2}}{S^{1/3}}$$

Where:

t_i = initial overland flow time (minutes)
L_o = length of overland flow (feet, 500 feet max.)
S = average overland basin slope (percent)
R = flow runoff coefficient = 0.0132CN-0.39

$$t_t = \frac{L}{V * 60}$$

Where:

t_t = travel time
L = length of water course
V = average water velocity

URBANIZED BASIN CHECK AND tc MINIMUM

The final time of concentration shall be the lesser of tc calculated above and the following subject to a minimum of 5 minutes for paved areas and 10 minutes for landscaped areas.

$$t_c = \frac{L}{180} + 10$$

Where L = watershed length (feet)

LAG TIME

Lag time (TLAG) for SCS calculations is defined as:

$$TLAG = t_c * 0.6$$

Tables detailing the t_c and TLAG values for the analyzed basins for existing, and proposed, conditions are included in Appendix B, and C, respectively.

FOR BASINS LESS THAN ONE SQUARE MILE IN TOTAL AREA AND SLOPE LESS THAN 10 PERCENT

Lag time (TLAG) for SCS calculations is defined as:

$$TLAG = 22.1K_n(L * \frac{L_c}{S^{0.5}})^{0.33}$$

Where:

K_n = Roughness Factor

L = Length of longest water course (miles)

L_c = Length along longest watercourse measured upstream to basin centroid (miles)

S = Representative slope along watercourse (feet/mile)

4.2 DESIGN RAINFALL DEPTHS

Precipitation depth estimates were taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 1, Version 5, which provides rainfall information for a given latitude and longitude. As the existing drainage basin is so large, precipitation estimates were taken at the approximate centroid of the basin. It was determined that the approximate centroid latitude and longitude are approximately 39.584 West and 119.887 North, respectively, and depths were obtained for the 5-year and 100-year storm events.

For the 100-year, 10-day storm analysis, precipitation estimates were taken at the approximate centroid of basin A-2, as that is more representative of the project area. It was determined that the centroid latitude and longitude are approximately 39.607 West and 119.855 North, respectively, and depths were obtained for the 100-year, 10-day storm event. Precipitation estimates are included in Appendix A of this report.

4.3 CURVE NUMBER

The Runoff Curve Number (CN) for each basin is determined by overlaying land use information about the basin with soil data available for the basin. Soil types are rated from A to D with correspondingly higher curve number values. The overall CN for a basin is a weighted average for each area based on the land uses and soil curve numbers. Tables from NRCS for Runoff Curve Numbers For Urban Areas and Runoff Curve Numbers For Arid And Semiarid Rangelands are included in Appendix A of this report. A table summarizing the weighted average CN for each basin of the existing and proposed site conditions is included in Appendix A of this report. An exhibit displaying the NRCS soil designations within the hydrologic basin areas is included in Appendix A.

4.4 HYDRAULIC ANALYSIS

Flow extents for the historic 100-year storm conditions through the existing drainage channel were modelled with HEC-RAS software, version 5.0.3. Peak storm flows, channel cross-sections, Manning's roughness coefficients, and reach lengths were input into the program to determine elevations of flow. The results are depicted in the exhibit, "100-Year Storm Flow Boundaries" included in Appendix B. Under proposed conditions, the 100-year storm flow will be contained within channel improvements developed during detailed designed.

5 HISTORIC DRAINAGE SYSTEM

Historically the site drains toward the central drainage channel at slopes between 5 and 30 percent. This poorly-defined natural channel has an approximate slope of 2 percent. Existing site conditions have been analyzed as two basins, one large basin upstream from the North Virginia Street culvert crossing south of the project (A-1), and one below the culvert crossing that includes the proposed development area (A-2). For context, refer to the two exhibits entitled, "Hydrologic Basins" in Appendix A. The HEC model was analyzed with the weighted CN numbers, basin areas, and lag times calculated for the existing basin 100-year conditions. Ponds were added to the HEC model to simulate the temporary storage of runoff backed up behind the existing embankments and culvert crossings under the railroad and North Virginia Street. A junction was added to the model at the bottom of the proposed project, labeled "Out". Results of the HEC-HMS model are summarized in Appendix B.

6 PROPOSED DRAINAGE SYSTEM

The proposed drainage system will primarily consist of sheet flow away from residences toward the improved central drainage channel. Lots adjoining the new street extentions of Malcolm Avenue and Medgar Avenue will drain to the street gutter fronting each lot; those concentrated flows will be collected by catch basins and discharged into the central drainage channel near the street intersection. A reinforced concrete box (RCB) culvert will be constructed to convey channel flows under the proposed extension of Malcolm Avenue. Individual drainage elements are to be sized with the technical drainage report accompanying final design of the project.

6.1 RESULTS OF HYDROLOGIC ANALYSIS

The proposed hydrologic basins were analyzed using HEC-HMS software. Summaries of the analysis are included in Appendix C.

6.2 PROPOSED STORM DRAIN SYSTEM

The proposed storm drain system will be analyzed with the technical drainage report accompanying the final Civil Improvement Plans. At this time, there is very little storm drain infrastructure proposed with the Grandview Terrace project. Most of the proposed lots either front to an existing street or would naturally sheet flow to the existing drainage channel, eliminating the need for further infrastructure to route storm flows.

6.3 WATER QUALITY CONTROLS

Water quality controls specific to each phase are to be determined with design of that respective phase. Expected water quality controls include fiber rolls surrounding drainage inlets, riprap protection for drainage ditches, and any additional best management practices presented in the site Erosion Control Plan of the final Civil Improvement Plans.

6.4 DETENTION / RETENTION REQUIREMENTS

The analysis performed with this report indicates the 100-year storm event peak discharge through the site will increase by 0.3cfs with development of the project, from 432.4 cfs to 432.7 cfs. This increase is negligible (0.07%) and is within the assumption tolerance of this analysis. This is because the off-site flows conveyed through the project are from a much larger basin, and the peak flows resulting from the project area will be routed through the system long before the off-site peak flows enter the project area.

The project is within a closed hydrologic basin, with the runoff eventually discharging to Lemmon Lake. Per the TMRDM, retention is required so there is no net increase in run-off volume from the 100-year, 10-day storm event in the proposed condition when compared to the pre-development condition.

The proposed basins were analyzed using the SCS method to ensure the volume of run-off for the 100-year, 10-day storm does not exceed pre-development volumes and satisfy the retention requirement. NOAA Atlas 14 lists the 100-year, 10 day rainfall at 10.2 inches for the project area. The SCS Unit Hydrograph method was used to determine runoff from the entire project. Weighted curve numbers were calculated for the project as a whole, and were adjusted for a 10-day storm return per the USDA NRCS Technical Release 60 “Earth Dams and Reservoirs” table 2-3.

Accumulated excess was calculated for pre-development and post-development conditions to determine the change in flow rate (ΔQ). The ΔQ was then multiplied by the total basin area (20.52ac) to determine the retention volume necessary. Table 1 summarizes the calculation variables:

Table 1: Retention Volume Calculations – Grandview Terrace

	Overall CN	10-Day CN	Rainfall (in)	Runoff (in)
Pre-Development	71.9	54	10.2	4.24
Post-Development	76.1	60	10.2	5.06
			ΔQ=	**0.82 in**
			A=	**20.52 ac**
			V=	**1.40 AC-FT**

As summarized in Table 1, the proposed retention basins will need to decrease the overall discharge volume from the site by 1.40 acre-feet to mitigate volumetric increases resulting from development.

7 SPECIAL FLOOD HAZARDS

The entire site lies within FEMA flood hazard area "unshaded X", which indicates that the project is outside the 0.2% probability per year flood zone. As the project area is outside the 0.2% annual probability of flooding, there are no special flood hazard considerations proposed with this project other than reduction of runoff volume in the 100-year, 10-day storm event.

7.1 IMPACTS OF PROPOSED DEVELOPMENT ON FLOOD HAZARD AREA

Retention for the Grandview Terrace project will be designed to mitigate any volume increases in the 100-year, 10-day storm flows to Lemmon Lake. As such the project is not anticipated to further impact flood hazard areas.

7.2 FEMA AND LOCAL CODE COMPLIANCE

The Grandview Terrace project will be compliant with all federal and local code requirements.

8 CONCLUSIONS

The proposed Grandview Terrace project has been designed to collect and convey storm flows generated on-site and to perpetuate off-site generated flows that drain through the project. Increases in runoff between pre- and post-development site conditions will be retained on-site. Storm water quality measures will be installed during construction to reduce probability of sediment being carried off-site by storm runoff. No negative impacts are anticipated from the development of the Grandview Terrace project.

9 REFERENCES

Truckee Meadows Regional Drainage Manual, April 30, 2009.

Geotechnical Due Diligence, unpublished letter report by Wood Rodgers Inc., June 15, 2020.

HEC-HMS Hydraulic Modeling System, Version 4.2.1, U.S. Army Corps of Engineers

HEC-RAS Hydraulic Modeling System, Version 5.0.3, U.S. Army Corps of Engineers

APPENDIX A

GENERAL FIGURES

Vicinity Map

Grandview Terrace Tentative Map

May 2020

0 ½ 1 Miles

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066

\\woodrodgers.loc\ProductionData\Jobs-Reno\Jobs\3797_Hero_Land_Holdings\Grandview_Terrace_OA\GIS\Tasks\VicinityMap_20200428.mxd 5/4/2020 8:24:23 AM sredman

National Flood Hazard Layer FIRMette

FEMA

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/11/2020 at 1:37:30 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, USA*
Latitude: 39.5842°, Longitude: -119.8872°
Elevation: 6086.68 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.117** (0.100-0.134)	**0.146** (0.124-0.170)	**0.193** (0.165-0.226)	**0.237** (0.202-0.279)	**0.312** (0.259-0.371)	**0.381** (0.307-0.459)	**0.464** (0.362-0.567)	**0.566** (0.424-0.706)	**0.735** (0.518-0.946)	**0.895** (0.600-1.18)
10-min	**0.178** (0.151-0.204)	**0.222** (0.189-0.258)	**0.294** (0.251-0.344)	**0.362** (0.307-0.425)	**0.475** (0.394-0.565)	**0.580** (0.468-0.698)	**0.706** (0.551-0.863)	**0.862** (0.646-1.08)	**1.12** (0.788-1.44)	**1.36** (0.914-1.80)
15-min	**0.221** (0.188-0.253)	**0.275** (0.235-0.320)	**0.364** (0.311-0.427)	**0.448** (0.381-0.527)	**0.588** (0.489-0.700)	**0.719** (0.579-0.865)	**0.876** (0.683-1.07)	**1.07** (0.800-1.33)	**1.39** (0.976-1.79)	**1.69** (1.13-2.23)
30-min	**0.297** (0.253-0.341)	**0.370** (0.316-0.431)	**0.491** (0.419-0.574)	**0.604** (0.513-0.710)	**0.793** (0.658-0.942)	**0.968** (0.781-1.17)	**1.18** (0.920-1.44)	**1.44** (1.08-1.79)	**1.87** (1.32-2.40)	**2.28** (1.53-3.00)
60-min	**0.368** (0.313-0.422)	**0.459** (0.391-0.534)	**0.607** (0.518-0.711)	**0.747** (0.635-0.878)	**0.981** (0.814-1.17)	**1.20** (0.966-1.44)	**1.46** (1.14-1.78)	**1.78** (1.33-2.22)	**2.31** (1.63-2.98)	**2.82** (1.89-3.71)
2-hr	**0.488** (0.434-0.557)	**0.605** (0.540-0.693)	**0.769** (0.678-0.882)	**0.911** (0.795-1.05)	**1.13** (0.959-1.31)	**1.32** (1.10-1.55)	**1.55** (1.26-1.84)	**1.84** (1.45-2.24)	**2.38** (1.79-3.01)	**2.89** (2.10-3.75)
3-hr	**0.603** (0.543-0.677)	**0.748** (0.679-0.843)	**0.926** (0.834-1.04)	**1.07** (0.956-1.21)	**1.28** (1.12-1.45)	**1.46** (1.26-1.67)	**1.67** (1.42-1.95)	**1.97** (1.64-2.33)	**2.49** (2.01-3.03)	**2.99** (2.35-3.78)
6-hr	**0.913** (0.827-1.02)	**1.14** (1.03-1.27)	**1.39** (1.25-1.55)	**1.58** (1.42-1.77)	**1.83** (1.62-2.06)	**2.02** (1.77-2.28)	**2.20** (1.90-2.52)	**2.43** (2.07-2.81)	**2.85** (2.38-3.35)	**3.29** (2.72-3.92)
12-hr	**1.30** (1.18-1.45)	**1.63** (1.47-1.82)	**2.03** (1.82-2.27)	**2.35** (2.10-2.63)	**2.77** (2.44-3.13)	**3.10** (2.70-3.51)	**3.42** (2.94-3.93)	**3.75** (3.17-4.35)	**4.17** (3.44-4.95)	**4.52** (3.66-5.44)
24-hr	**1.77** (1.59-1.99)	**2.22** (2.00-2.50)	**2.82** (2.53-3.17)	**3.31** (2.96-3.72)	**4.00** (3.54-4.50)	**4.55** (4.00-5.12)	**5.13** (4.47-5.80)	**5.73** (4.94-6.53)	**6.58** (5.58-7.55)	**7.25** (6.06-8.40)
2-day	**2.24** (1.99-2.56)	**2.83** (2.51-3.23)	**3.67** (3.24-4.19)	**4.37** (3.84-4.98)	**5.36** (4.66-6.13)	**6.17** (5.33-7.08)	**7.03** (6.00-8.13)	**7.96** (6.71-9.29)	**9.29** (7.67-11.0)	**10.4** (8.41-12.4)
3-day	**2.50** (2.21-2.87)	**3.19** (2.81-3.65)	**4.18** (3.68-4.79)	**5.01** (4.39-5.74)	**6.21** (5.39-7.12)	**7.20** (6.19-8.28)	**8.26** (7.02-9.56)	**9.41** (7.89-11.0)	**11.1** (9.08-13.1)	**12.4** (10.0-14.9)
4-day	**2.77** (2.44-3.18)	**3.54** (3.12-4.06)	**4.70** (4.13-5.39)	**5.66** (4.95-6.50)	**7.06** (6.12-8.12)	**8.22** (7.06-9.48)	**9.49** (8.04-11.0)	**10.9** (9.07-12.6)	**12.9** (10.5-15.2)	**14.5** (11.6-17.3)
7-day	**3.34** (2.89-3.89)	**4.30** (3.72-5.01)	**5.77** (4.99-6.74)	**6.98** (6.02-8.15)	**8.71** (7.44-10.2)	**10.1** (8.57-11.9)	**11.7** (9.78-13.8)	**13.3** (11.0-15.8)	**15.7** (12.7-18.9)	**17.7** (14.1-21.4)
10-day	**3.84** (3.34-4.46)	**4.97** (4.32-5.76)	**6.68** (5.79-7.75)	**8.05** (6.96-9.34)	**9.98** (8.55-11.6)	**11.5** (9.81-13.5)	**13.2** (11.1-15.5)	**14.9** (12.4-17.6)	**17.4** (14.2-20.8)	**19.4** (15.7-23.4)
20-day	**5.08** (4.44-5.86)	**6.55** (5.73-7.57)	**8.73** (7.62-10.1)	**10.4** (9.08-12.1)	**12.8** (11.0-14.8)	**14.6** (12.5-17.0)	**16.6** (14.1-19.3)	**18.6** (15.6-21.8)	**21.4** (17.6-25.4)	**23.6** (19.2-28.3)
30-day	**6.15** (5.38-7.13)	**7.94** (6.95-9.21)	**10.6** (9.24-12.3)	**12.6** (11.0-14.6)	**15.5** (13.4-17.9)	**17.7** (15.2-20.6)	**20.0** (17.0-23.4)	**22.4** (18.9-26.3)	**25.7** (21.4-30.4)	**28.3** (23.2-33.8)
45-day	**7.49** (6.56-8.51)	**9.69** (8.49-11.0)	**12.9** (11.3-14.6)	**15.3** (13.3-17.4)	**18.6** (16.1-21.2)	**21.1** (18.2-24.2)	**23.7** (20.3-27.2)	**26.4** (22.4-30.5)	**30.0** (25.1-35.0)	**32.9** (27.1-38.6)
60-day	**8.63** (7.51-9.84)	**11.2** (9.77-12.8)	**14.9** (13.0-17.0)	**17.6** (15.3-20.1)	**21.1** (18.2-24.1)	**23.7** (20.3-27.2)	**26.3** (22.4-30.2)	**28.9** (24.4-33.3)	**32.3** (27.1-37.6)	**34.9** (29.0-40.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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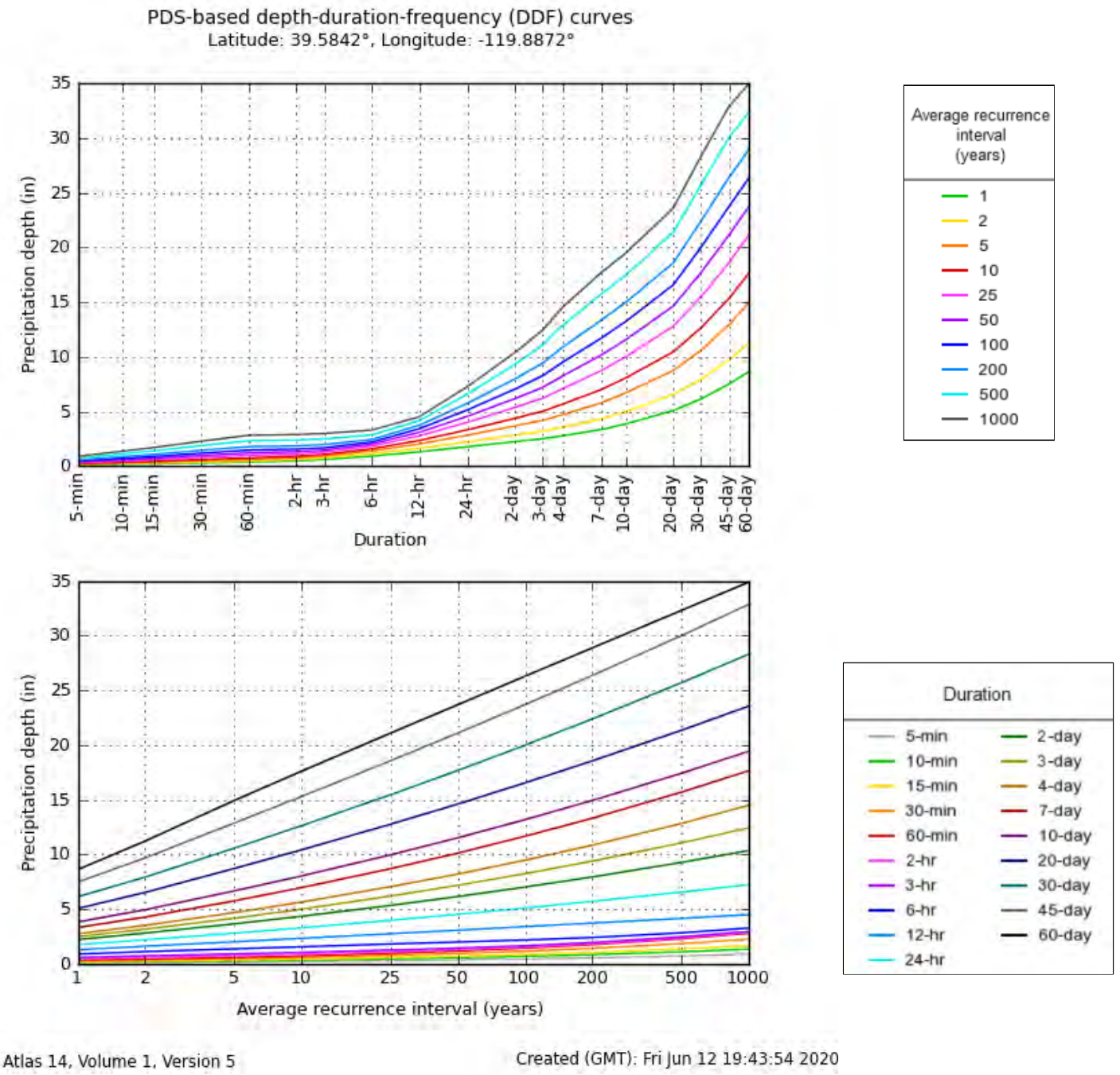
PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Fri Jun 12 19:43:54 2020

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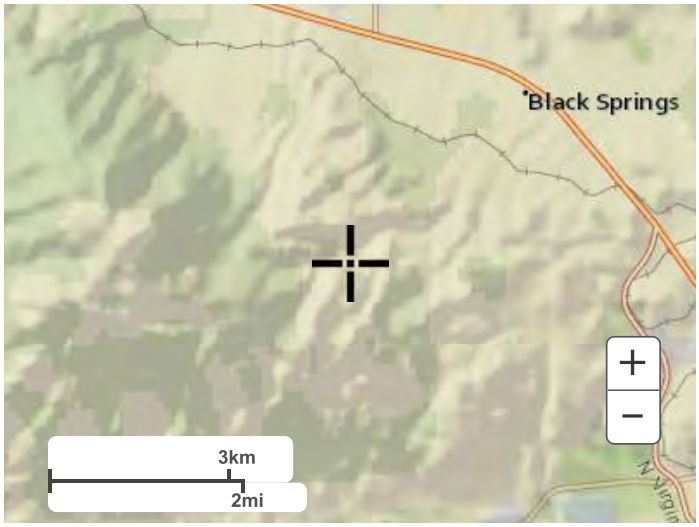
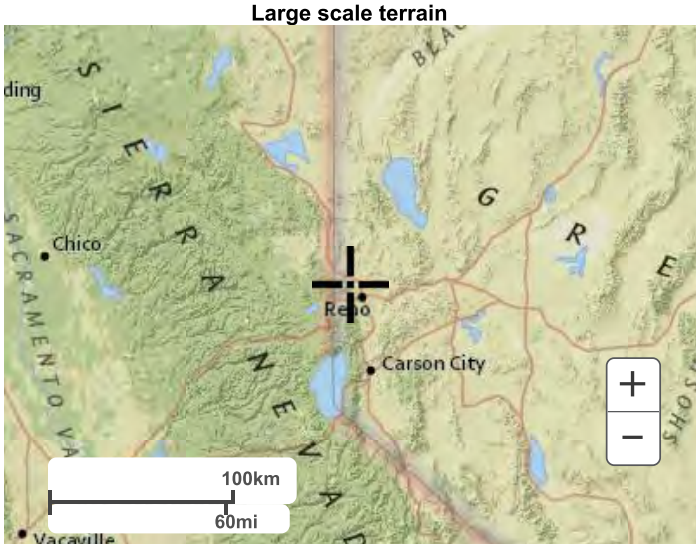
Maps & aerials

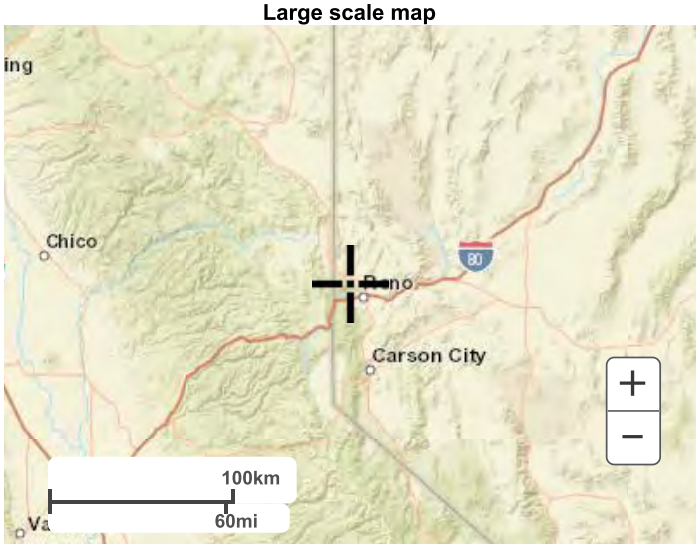
Small scale terrain



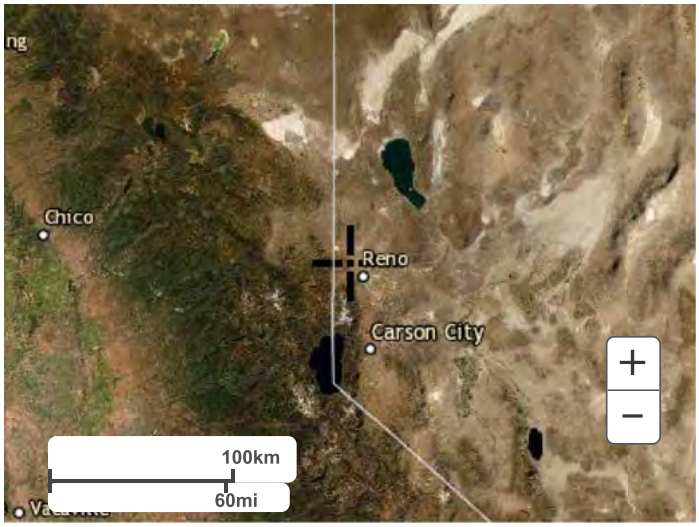
Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, USA*
Latitude: 39.6069°, Longitude: -119.8555°
Elevation: 5162.65 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.106** (0.089-0.122)	**0.132** (0.111-0.153)	**0.175** (0.149-0.206)	**0.217** (0.184-0.257)	**0.288** (0.239-0.346)	**0.354** (0.286-0.432)	**0.434** (0.340-0.538)	**0.532** (0.401-0.674)	**0.693** (0.494-0.908)	**0.844** (0.576-1.13)
10-min	**0.161** (0.136-0.185)	**0.200** (0.169-0.233)	**0.267** (0.227-0.314)	**0.330** (0.280-0.391)	**0.438** (0.363-0.527)	**0.539** (0.435-0.658)	**0.661** (0.517-0.819)	**0.810** (0.610-1.03)	**1.06** (0.752-1.38)	**1.29** (0.876-1.72)
15-min	**0.200** (0.168-0.230)	**0.249** (0.210-0.289)	**0.331** (0.281-0.390)	**0.410** (0.347-0.485)	**0.543** (0.451-0.653)	**0.668** (0.539-0.816)	**0.819** (0.641-1.02)	**1.00** (0.756-1.27)	**1.31** (0.932-1.71)	**1.59** (1.09-2.14)
30-min	**0.269** (0.227-0.309)	**0.335** (0.282-0.390)	**0.445** (0.379-0.525)	**0.552** (0.468-0.654)	**0.732** (0.607-0.880)	**0.900** (0.726-1.10)	**1.10** (0.864-1.37)	**1.35** (1.02-1.71)	**1.76** (1.25-2.31)	**2.15** (1.46-2.88)
60-min	**0.333** (0.281-0.383)	**0.414** (0.350-0.482)	**0.551** (0.469-0.649)	**0.683** (0.579-0.809)	**0.906** (0.751-1.09)	**1.11** (0.899-1.36)	**1.37** (1.07-1.69)	**1.67** (1.26-2.12)	**2.18** (1.55-2.86)	**2.66** (1.81-3.56)
2-hr	**0.443** (0.393-0.507)	**0.550** (0.490-0.631)	**0.702** (0.618-0.808)	**0.837** (0.727-0.963)	**1.05** (0.886-1.21)	**1.23** (1.02-1.45)	**1.45** (1.17-1.73)	**1.74** (1.36-2.14)	**2.27** (1.70-2.89)	**2.76** (2.00-3.60)
3-hr	**0.542** (0.486-0.611)	**0.673** (0.609-0.762)	**0.838** (0.752-0.947)	**0.974** (0.866-1.10)	**1.17** (1.02-1.33)	**1.34** (1.15-1.54)	**1.55** (1.31-1.80)	**1.84** (1.52-2.17)	**2.35** (1.88-2.91)	**2.83** (2.21-3.63)
6-hr	**0.800** (0.723-0.893)	**0.998** (0.901-1.12)	**1.23** (1.10-1.37)	**1.40** (1.25-1.57)	**1.63** (1.44-1.84)	**1.80** (1.57-2.04)	**1.97** (1.70-2.26)	**2.19** (1.86-2.54)	**2.61** (2.18-3.07)	**3.05** (2.50-3.66)
12-hr	**1.11** (1.00-1.24)	**1.39** (1.25-1.55)	**1.74** (1.56-1.94)	**2.02** (1.80-2.25)	**2.38** (2.10-2.68)	**2.66** (2.32-3.02)	**2.95** (2.53-3.38)	**3.23** (2.73-3.75)	**3.61** (2.98-4.27)	**3.93** (3.18-4.72)
24-hr	**1.49** (1.34-1.67)	**1.86** (1.68-2.09)	**2.37** (2.13-2.65)	**2.78** (2.49-3.11)	**3.35** (2.98-3.76)	**3.81** (3.36-4.28)	**4.29** (3.75-4.85)	**4.79** (4.14-5.45)	**5.49** (4.67-6.30)	**6.05** (5.06-7.01)
2-day	**1.84** (1.64-2.10)	**2.33** (2.07-2.65)	**3.01** (2.66-3.42)	**3.57** (3.14-4.05)	**4.36** (3.81-4.97)	**5.01** (4.33-5.73)	**5.69** (4.87-6.57)	**6.43** (5.43-7.48)	**7.47** (6.18-8.81)	**8.31** (6.76-9.95)
3-day	**2.03** (1.80-2.32)	**2.58** (2.29-2.94)	**3.38** (2.98-3.85)	**4.03** (3.55-4.60)	**4.98** (4.34-5.69)	**5.75** (4.96-6.59)	**6.58** (5.61-7.60)	**7.48** (6.28-8.70)	**8.76** (7.20-10.3)	**9.82** (7.92-11.7)
4-day	**2.23** (1.97-2.54)	**2.84** (2.51-3.24)	**3.74** (3.30-4.27)	**4.50** (3.95-5.14)	**5.59** (4.87-6.40)	**6.49** (5.59-7.45)	**7.47** (6.35-8.63)	**8.53** (7.14-9.91)	**10.1** (8.22-11.9)	**11.3** (9.09-13.5)
7-day	**2.66** (2.32-3.08)	**3.41** (2.97-3.95)	**4.55** (3.95-5.28)	**5.48** (4.75-6.36)	**6.82** (5.85-7.93)	**7.91** (6.72-9.23)	**9.08** (7.64-10.7)	**10.3** (8.58-12.2)	**12.1** (9.87-14.6)	**13.6** (10.9-16.5)
10-day	**3.03** (2.64-3.49)	**3.90** (3.41-4.50)	**5.22** (4.54-6.03)	**6.27** (5.45-7.25)	**7.75** (6.67-8.98)	**8.94** (7.63-10.4)	**10.2** (8.63-11.9)	**11.5** (9.62-13.6)	**13.4** (11.0-16.0)	**14.9** (12.0-17.9)
20-day	**3.94** (3.46-4.53)	**5.07** (4.45-5.85)	**6.75** (5.92-7.76)	**8.06** (7.04-9.27)	**9.84** (8.54-11.3)	**11.2** (9.68-13.0)	**12.7** (10.8-14.8)	**14.2** (12.0-16.7)	**16.3** (13.5-19.4)	**17.9** (14.7-21.5)
30-day	**4.72** (4.14-5.45)	**6.09** (5.35-7.03)	**8.10** (7.09-9.33)	**9.65** (8.42-11.1)	**11.8** (10.2-13.6)	**13.4** (11.6-15.5)	**15.1** (12.9-17.6)	**16.9** (14.3-19.8)	**19.3** (16.1-22.9)	**21.3** (17.5-25.4)
45-day	**5.73** (5.03-6.49)	**7.39** (6.50-8.37)	**9.80** (8.60-11.1)	**11.6** (10.2-13.2)	**14.0** (12.2-15.9)	**15.9** (13.7-18.1)	**17.8** (15.3-20.4)	**19.7** (16.8-22.7)	**22.3** (18.8-26.0)	**24.4** (20.2-28.5)
60-day	**6.59** (5.75-7.49)	**8.55** (7.47-9.71)	**11.3** (9.88-12.9)	**13.3** (11.6-15.1)	**15.9** (13.8-18.1)	**17.8** (15.4-20.4)	**19.7** (16.9-22.6)	**21.6** (18.4-24.9)	**24.1** (20.3-27.9)	**25.9** (21.6-30.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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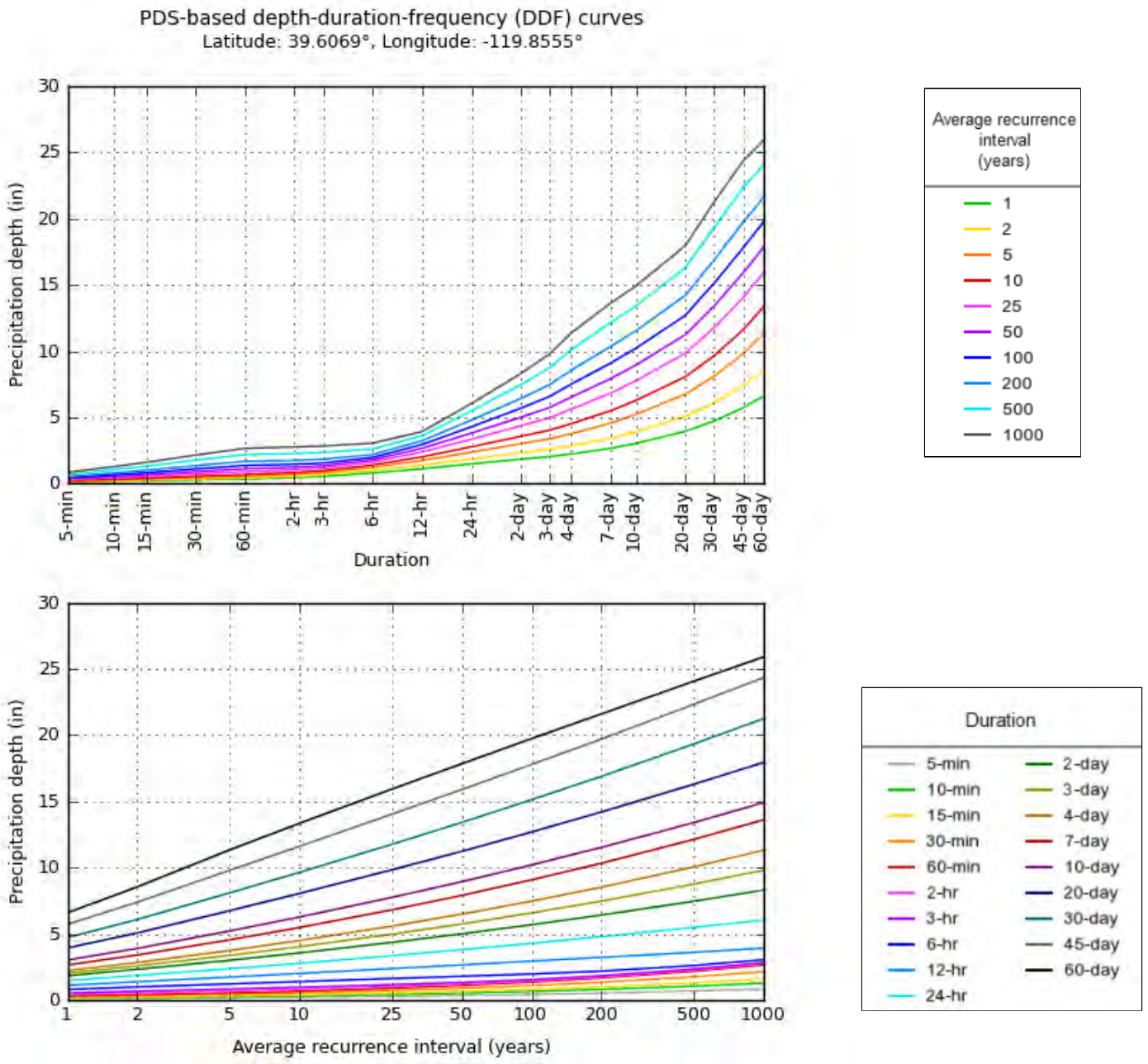
PF graphical



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Created (GMT): Sat Jun 13 01:39:12 2020

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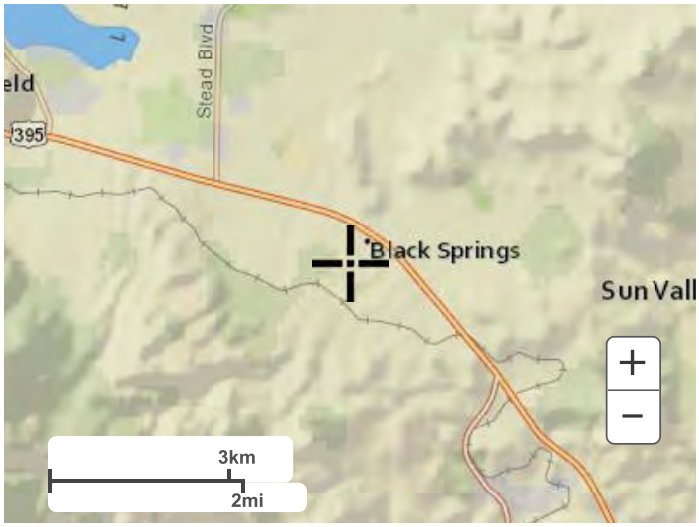
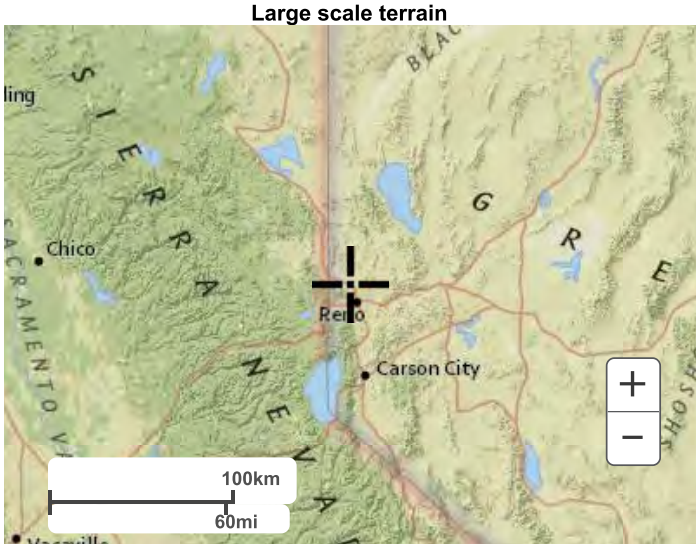
Maps & aerials

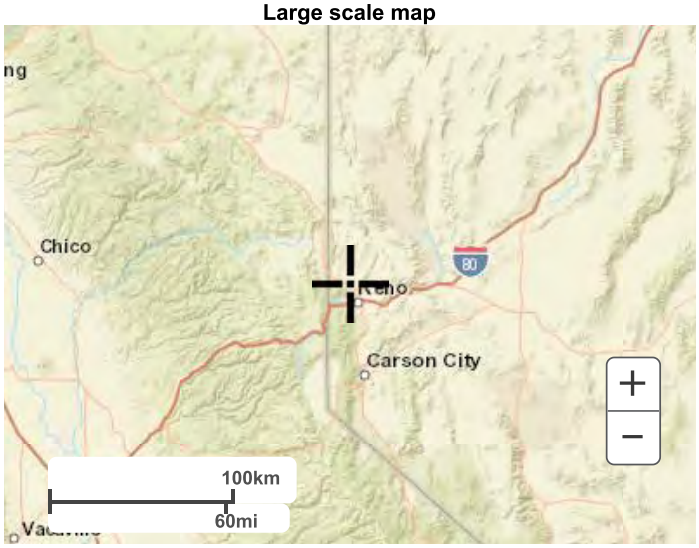
Small scale terrain



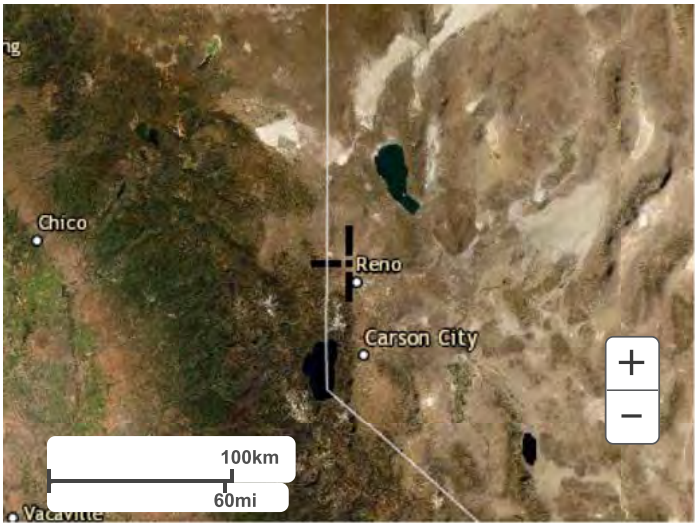
Large scale terrain



Large scale map



Large scale aerial



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HYDROLOGIC BASINS
GRANDVIEW TERRACE
WASHOE COUNTY, NV
JUNE 2020

NOTES

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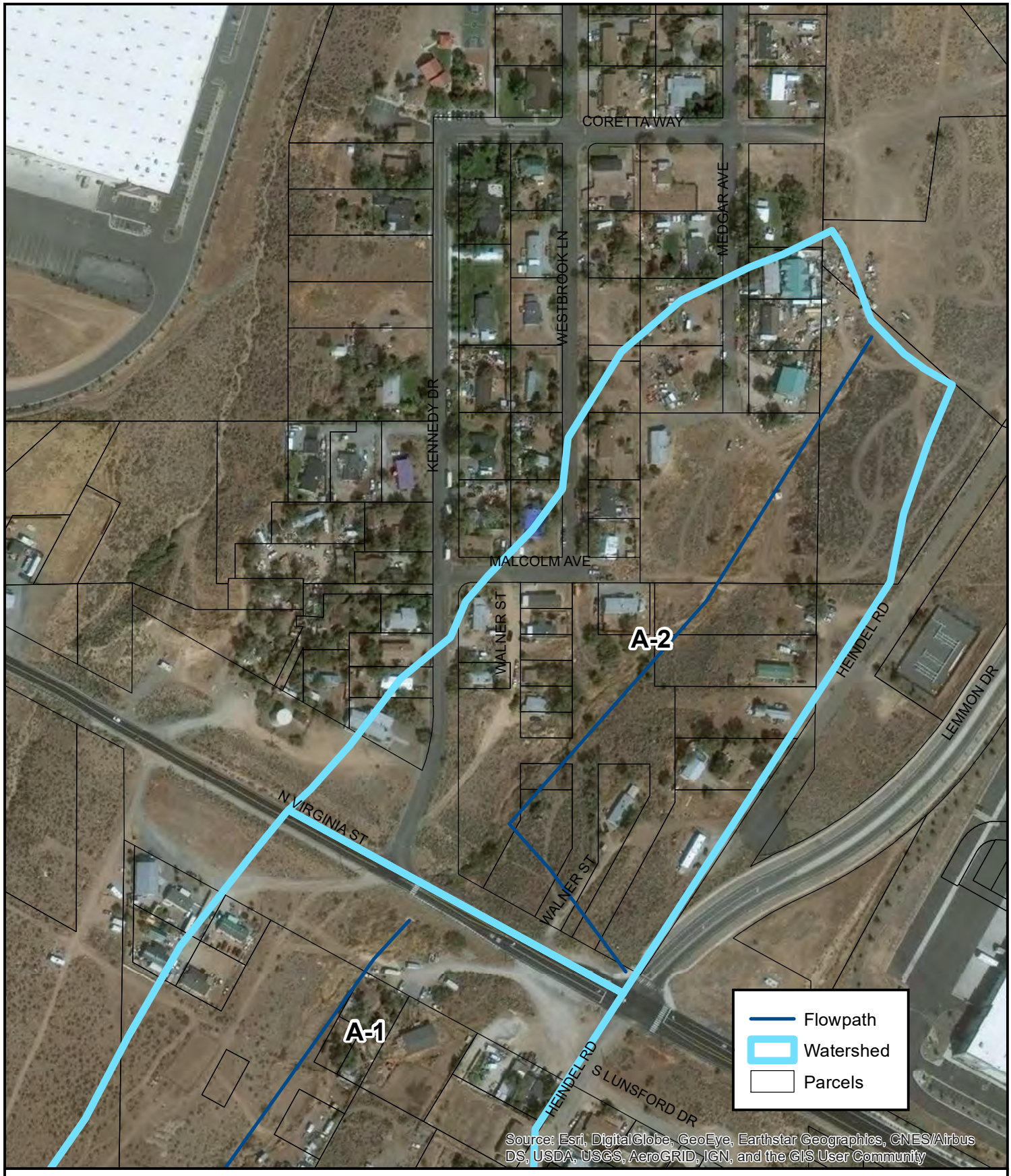
FIGURE 2



HYDROLOGIC BASINS
GRANDVIEW TERRACE
WASHOE COUNTY, NV
JUNE 2020
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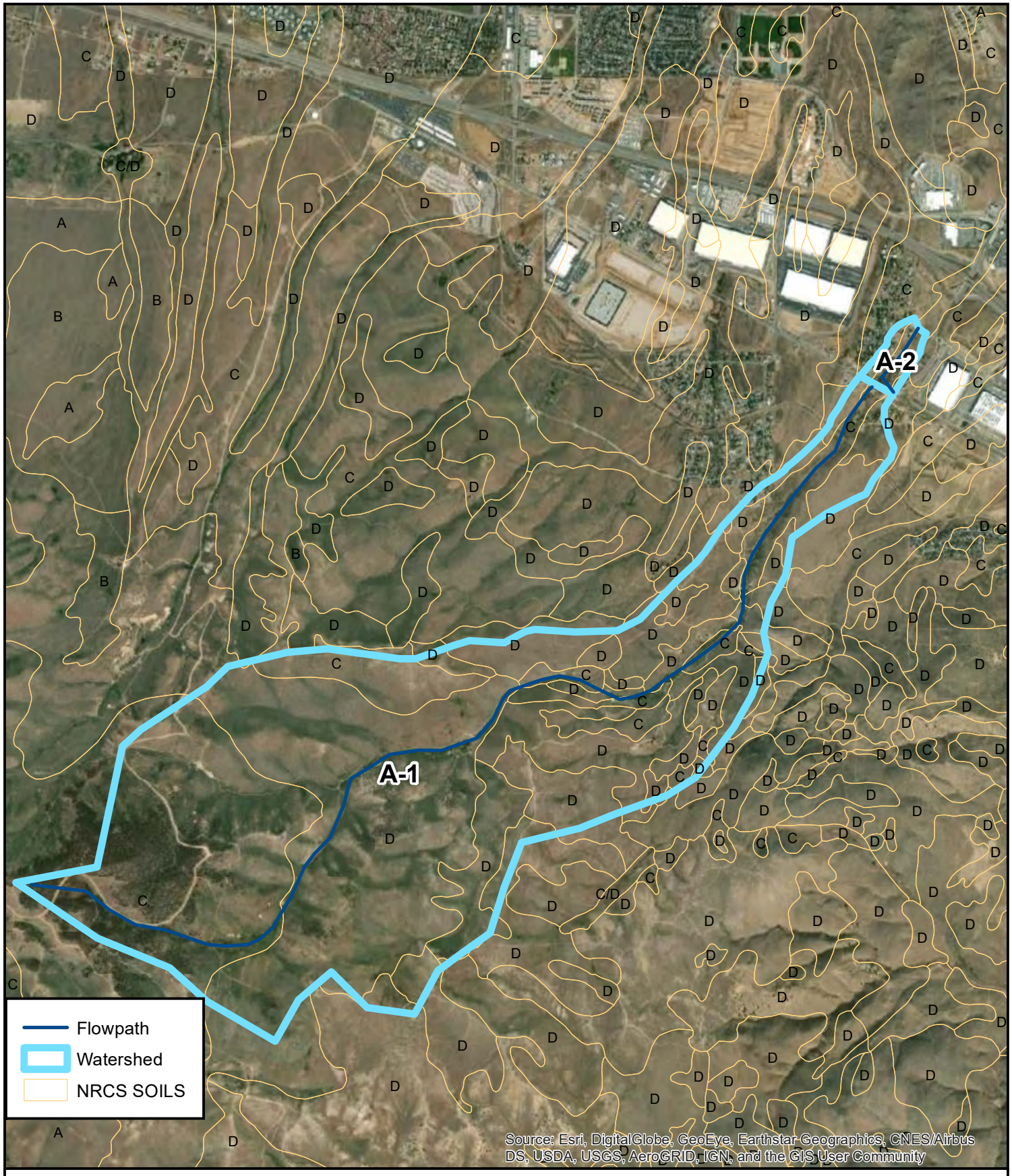
FIGURE 3



NRCS SOIL GROUPS

GRANDVIEW TERRACE
WASHOE COUNTY, NV
JUNE 2020

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FIGURE 4

Time of Concentration
Hydrologic Basins
Grandview Terrace

TIME OF CONCENTRATION													
Drainage Basin	Drainage Area (AC)	Initial Flow Time, T_i				Travel Time, T_t				Total (T_i+T_t)	Urbanized Basins Check	Final	
		Overland Flow				Channelized Flow							
		L_i (ft)	S (ft/ft)	R	T_i (min)	L_s(ft)	S (ft/ft)	V(ft/s)	T_{t1} (min)	T_c (min)	T_c*(min)	T_c (min)	TLAG (min)
A-2	20.52	364	0.096	0.56	8.8	1176	0.028	3.0	6.5	15.3	18.6	**15.3**	9.20

Basins Over 1 mi2 or slope > 10% analyzed using TLAG = 22.1*Kn(L*Lc/S^0.5)^0.33

	Drainage Area (AC)	Kn	L	Lc	S (ft/mi)	TLAG(hours)	TLAG(min)
A-1	1655.86	0.09	4.26	2.85	475.2	1.64	98.38

RUNOFF CURVE NUMBERS FOR URBAN AREAS[1]

Cover Type and Hydrologic Condition	Aver. % Impervious Area[2]	Runoff Curve Numbers Soil Comp A	Soil Comp B	Soil Comp C	Soil Comp D
Fully developed urban area (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50 to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious only, no vegetation)[5]		77	86	91	94
Idle lands (CNs are determined using cover types similar to those Table 702 - 3 of 4)					

[1]Average runoff condition, and $I_a = 0.2S$

[2]The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CNs for other combinations of conditions may be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986).

[3]CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

[4]Composite CNs for natural desert landscaping should be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986) based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CNs are assumed equivalent to desert shrub in poor hydrologic condition.

[5]Composite CNs to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986) based on the degree of development (impervious area percentage) and the CNs for the newly graded pervious areas.

RUNOFF CURVE NUMBERS FOR ARID AND SEMIARID RANGELANDS[1]

Cover Description	Hydrologic Condition[2]	Runoff Curve Numbers Soil Comp A[3]	Soil Comp B	Soil Comp C	Soil Comp D
Herbaceous – mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen – mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper – pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub – major plants include saltbrush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

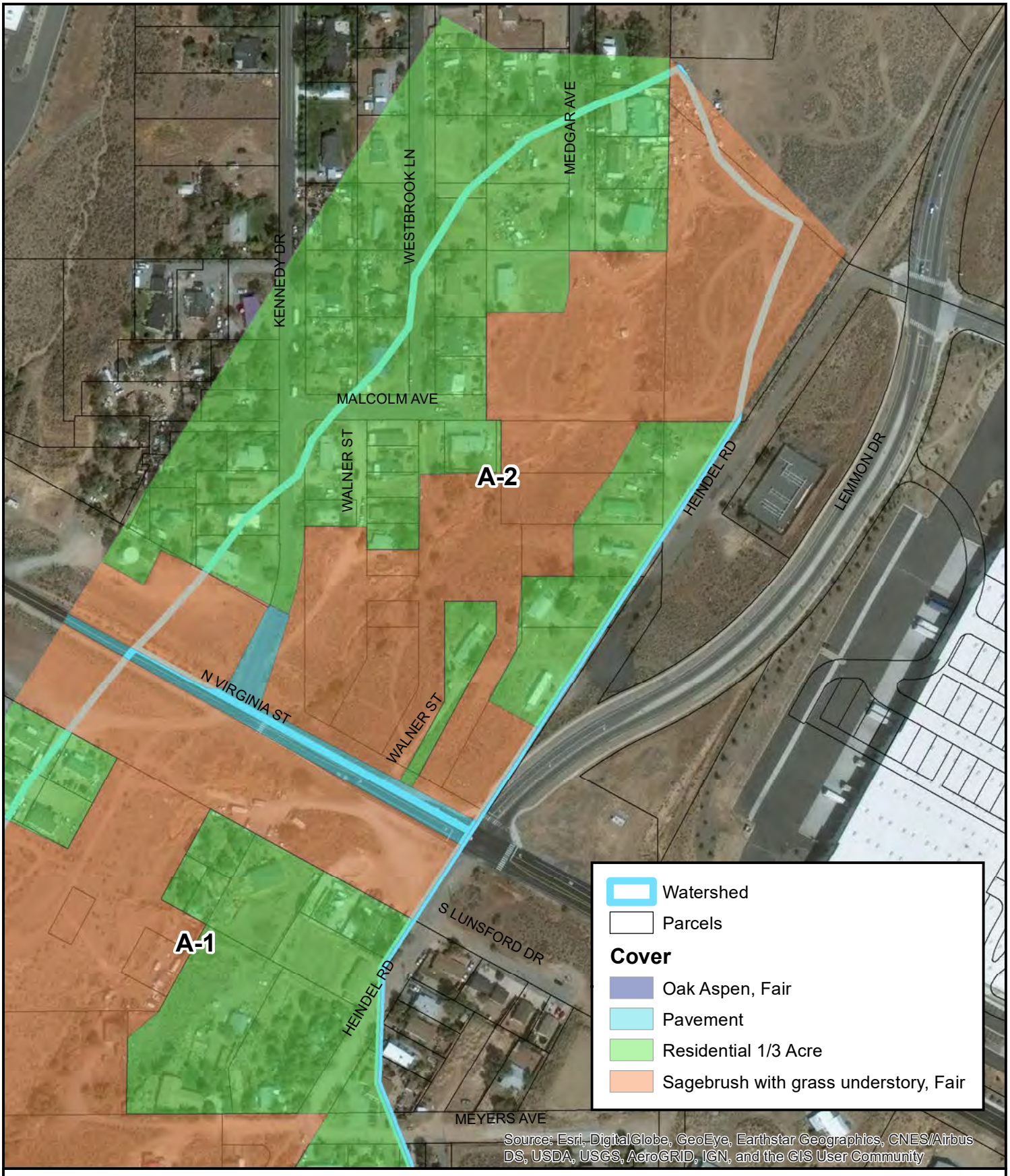
[1]Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use Table 702 - 3 of 4.

[2]*Poor*: < 30% ground cover (litter, grass, and brush overstory)
Fair: 30 to 70% ground cover
Good: > 70% ground cover

[3]Curve numbers for group A have been developed only for desert shrub.

APPENDIX B

EXISTING CONDITIONS



EXISTING LAND USE
GRANDVIEW TERRACE
WASHOE COUNTY, NV
JUNE 2020
NOTES

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FIGURE 5

Existing Weighted Curve Numbers
Grandview Terrace

Watershed A-1			
Land Use	**Soil**	**Area**	**Curve Number**
Sagebrush with grass understory, Fair	C	408.04	63
Sagebrush with grass understory, Fair	D	1051.99	70
Residential 1/3 Acre	C	3.17	81
Residential 1/3 Acre	D	7.25	86
Pavement	C	0.40	98
Pavement	D	0.07	98
Oak Aspen, Fair	C	167.44	57
Oak Aspen, Fair	D	17.50	63
Total Area		**1655.86**	
Final Curve Number			**66.99**

Watershed A-2			
Land Use	**Soil**	**Area**	**Curve Number**
Residential 1/3 Acre	C	8.33	81
Residential 1/3 Acre	D	0.53	86
Sagebrush with grass understory, Fair	C	10.67	63
Sagebrush with grass understory, Fair	D	0.50	70
Pavement	C	0.44	98
Pavement	D	0.05	98
Total Area		**20.52421**	
Final Curve Number			**71.90**

Project: HeroHoldings Simulation Run: EX 5year 24hour

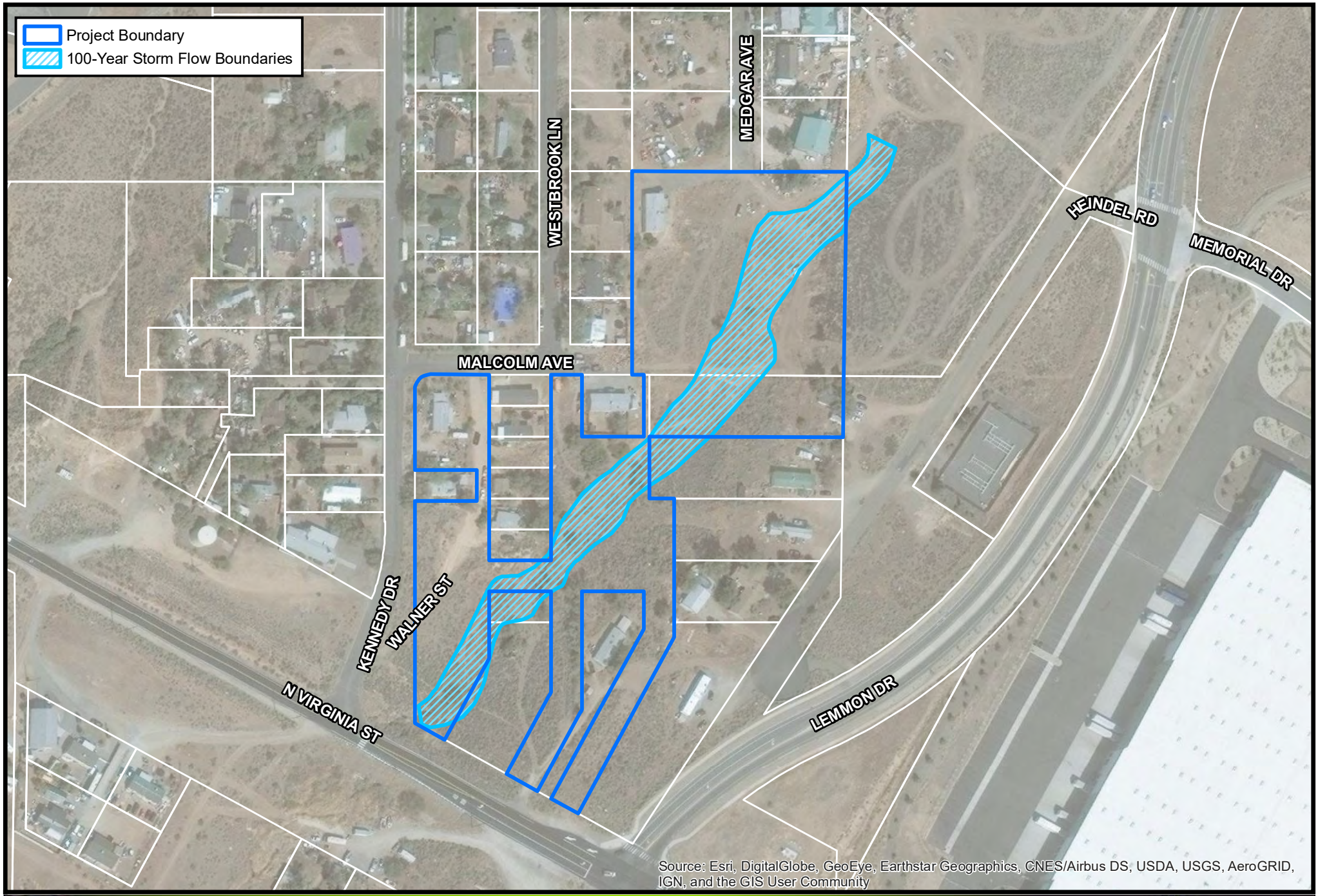
Start of Run: 01Jan2019, 00:00 Basin Model: Existing
End of Run: 02Jan2019, 00:00 Meteorologic Model: 5year
Compute Time: 12Jun2020, 14:08:27 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A-1	2.5873000	86.9	01Jan2019, 14:16	0.44
A-2	0.0320691	7.6	01Jan2019, 12:11	0.69
Crossing-1	2.5873000	86.7	01Jan2019, 14:21	0.43
Crossing-2	2.5873000	86.6	01Jan2019, 14:26	0.43
Out	2.6193691	87.9	01Jan2019, 14:26	0.44

Project: HeroHoldings Simulation Run: PROP 5year 24hour

Start of Run: 01Jan2019, 00:00 Basin Model: Proposed
End of Run: 02Jan2019, 00:00 Meteorologic Model: 5year
Compute Time: 12Jun2020, 14:08:00 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A-1	2.5873000	86.9	01Jan2019, 14:16	0.44
A-2	0.0320691	10.5	01Jan2019, 12:11	0.90
Crossing-1	2.5873000	86.7	01Jan2019, 14:21	0.43
Crossing-2	2.5873000	86.6	01Jan2019, 14:26	0.43
Out	2.6193691	88.2	01Jan2019, 14:26	0.44



100-Year Storm Flow Boundaries

Grandview Terrace Tentative Map

June 2020

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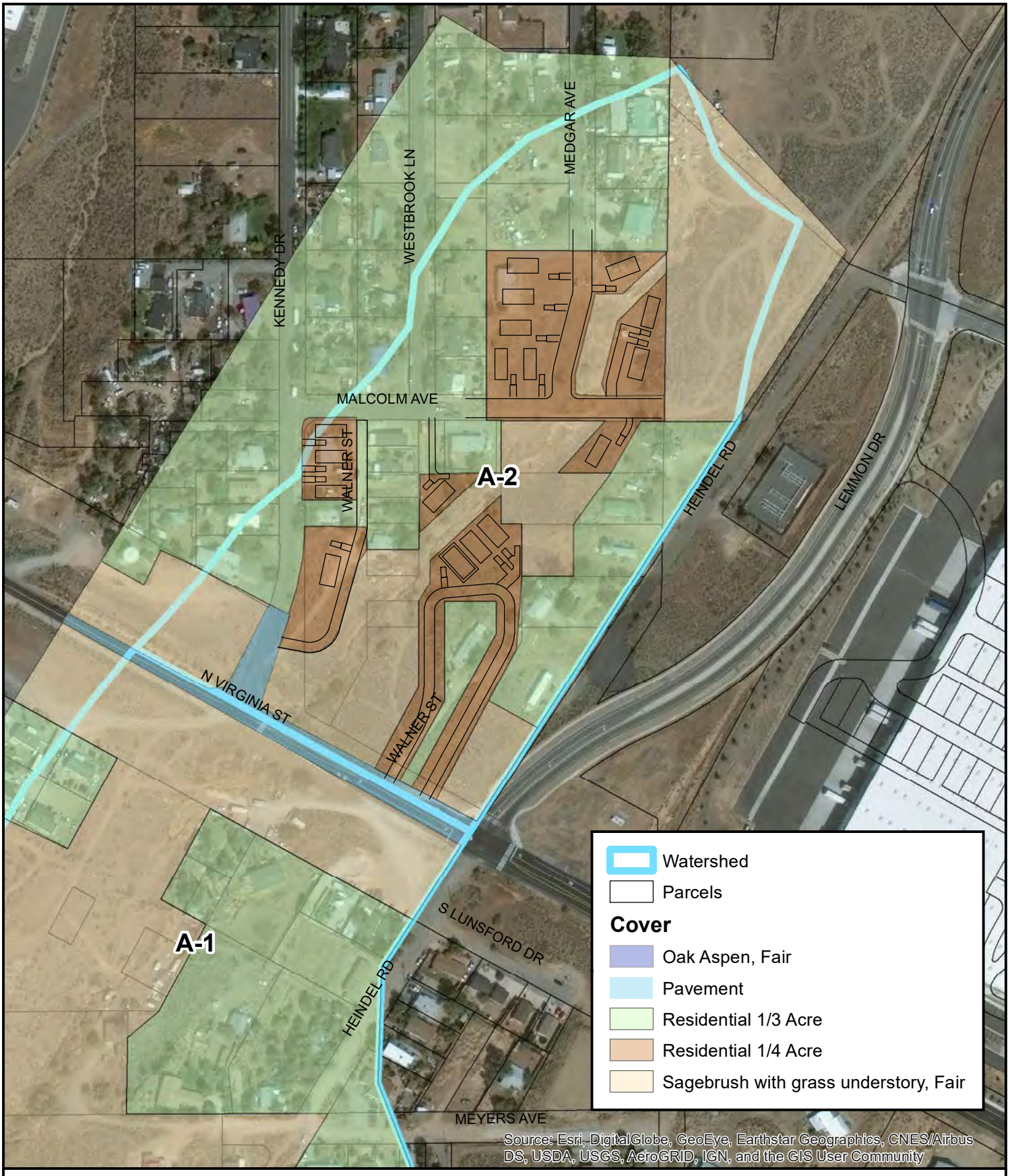
APPENDIX C

PROPOSED CONDITIONS



PROPOSED LAND USE
GRANDVIEW TERRACE
WASHOE COUNTY, NV
JUNE 2020
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FIGURE 6

Proposed Weighted Curve Numbers
Grandview Terrace

Watershed A-1			
Land Use	**Soil**	**Area**	**Curve Number**
Sagebrush with grass understory, Fair	C	408.04	63
Sagebrush with grass understory, Fair	D	1051.99	70
Residential 1/3 Acre	C	3.17	81
Residential 1/3 Acre	D	7.25	86
Pavement	C	0.40	98
Pavement	D	0.07	98
Oak Aspen, Fair	C	167.44	57
Oak Aspen, Fair	D	17.50	63
Total Area		**1655.86**	
Final Curve Number			**66.99**

Watershed A-2			
Land Use	**Soil**	**Area**	**Curve Number**
Residential 1/3 Acre	C	7.56	81
Residential 1/3 Acre	D	0.53	86
Sagebrush with grass understory, Fair	C	6.43	63
Sagebrush with grass understory, Fair	D	0.49	70
Pavement	C	0.44	98
Pavement	D	0.05	98
Residential 1/4 Acre	C	5.02	83
Residential 1/4 Acre	D	0.02	87
Total Area		**20.52421**	
Final Curve Number			**76.13**

Project: HeroHoldings Simulation Run: EX 100year 24hour

Start of Run: 01Jan2019, 00:00 Basin Model: Existing
End of Run: 02Jan2019, 00:00 Meteorologic Model: 100year
Compute Time: 12Jun2020, 14:10:04 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A-1	2.5873000	485.1	01Jan2019, 13:44	1.69
A-2	0.0320691	37.2	01Jan2019, 12:11	2.27
Crossing-1	2.5873000	476.3	01Jan2019, 13:55	1.67
Crossing-2	2.5873000	429.9	01Jan2019, 14:17	1.61
Out	2.6193691	432.4	01Jan2019, 14:17	1.62

Project: HeroHoldings Simulation Run: PROP 100year 24hour

Start of Run: 01Jan2019, 00:00 Basin Model: Proposed
End of Run: 02Jan2019, 00:00 Meteorologic Model: 100year
Compute Time: 12Jun2020, 14:05:32 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A-1	2.5873000	485.1	01Jan2019, 13:44	1.69
A-2	0.0320691	43.5	01Jan2019, 12:11	2.63
Crossing-1	2.5873000	476.3	01Jan2019, 13:55	1.67
Crossing-2	2.5873000	429.9	01Jan2019, 14:17	1.61
Out	2.6193691	432.7	01Jan2019, 14:17	1.62

PRELIMINARY SANITARY SEWER STUDY

for the

GRANDVIEW TERRACE SUBDIVISION
RENO, NEVADA

Prepared for:

Hero Land Holdings, LLC
979 Melba Dr.
Reno, NV 89502

June 15, 2020

Prepared by:

Wood Rodgers, Inc.
1361 Corporate Boulevard
Reno, NV 89502

Evan Nikirk, P.E.
Associate

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

PRELIMINARY SANITARY SEWER STUDY

for the

GRANDVIEW TERRACE SUBDIVISION
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Prepared for:

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WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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APPENDIX

INTRODUCTION

This report serves as the preliminary sanitary sewer study for the proposed Grandview Terrace subdivision in north Reno. The purpose of this report is to describe the sanitary sewer improvements proposed to serve the project and to estimate the sewage flows expected to be generated from the development. This report will also analyze the impacts of the development on downstream facilities in accordance with local development standards and sound design and engineering practices.

PROJECT LOCATION

The proposed project site (APNs 082-262-19, 082-262-21, 570-263-13) is approximately 6.85± acres in size and located south of U.S. Highway 395 at the intersection of Lemmon Drive and North Virginia Street. A vicinity map showing the site in the context of local development is included in the appendix at the end of this report. According to the Public Land Survey System, the site is in the north portion of Section 16 in T20N, R19E, MDM, Washoe County, Nevada.

The project is bounded by Kennedy drive to the east, Coretta way to the north, Heindel Road to the west and North Virginia Street to the south. The site is largely undeveloped, except for two residences that exist on either parcel. An exhibit showing the site layout and adjacent properties is included in the appendix of this report for reference.

Site development will involve the extension of two streets and two paved access roads or alleys, construction of an improved drainage channel, grading of house pads and installation of 17 single-family pre-fabricated homes with detached garages and driveways. One lot will be occupied by an existing residence. Prior to development the site will be subdivided into 18 single-family lots, 2 access parcels, and 2 common areas.

EXISTING CONDITION

The subject parcels are largely undeveloped hilly terrain covered with native shrubs and grasses, with each parcel having one existing single-family house; two of the residences will be removed prior to site development and one will remain. There is currently a poorly-defined natural channel that spans the length of the development, which provide a drainage path for the surrounding properties and upstream watershed.

The public sanitary sewer mains in the project vicinity are 8-inch-diameter pipe, with one that runs directly through the middle of the site and another that exists within Kennedy Drive. Both sewer mains belong to Washoe County and flow from south to north where they eventually meet at a common manhole to cross below US395. Sewer then flows west to east adjacent to a private commercial property where it ties into a main within Lemmon Drive and flows south to the Truckee Meadows Water Reclamation Facility (TMWRF). Although sewer collection is provided by Washoe County, sewerage has recently been rerouted to TMWRF.

Both on-site sewer mains will be utilized for sewer service, and will serve all 18 parcels withing the proposed project.

PROPOSED CONDITION

Each proposed parcel will have a single 4-inch lateral extending from the house to the sewer main. A new sewer main will be constructed 200 linear feet (LF) east and 128 LF west of the existing manhole located within the street right-of-way for the proposed Malcolm Avenue extension. The extension of Medgar Avenue will overlay the existing sewer main alignment north of Malcolm Avenue. A total of 3 new lots will be served by the existing Kennedy Drive main, 11 lots will be served by the existing on-site main, and 3 new and 3 existing lots will be served by the new sewer main in the Malcolm Avenue extension. The 3 existing lots are currently connected to the existing central main and will be reconnected to the new system. Refer to the exhibit, Preliminary Sanitary Sewer Layout, enclosed in the appendix to this report for an overview of the existing and proposed system.

All 4-inch sewer laterals will be maintained by the respective property owners up to the cleanout at each property line and all public mains will be maintained by Washoe County.

HYDRAULIC ANALYSIS

The peak daily flow was calculated using the sewage contribution for Single Family Residential as specified by *City of Reno Public Works Design Manual*. The peak flow was calculated using 350 gallons per capita per day (gpcd) for 8-inch-diameter mains and a single-family residence occupancy rate of 3.0 capita/dwelling unit. The peak flow for the project site is estimated at 18,900 gallons/day (18 units x 350 gpcd x 3.0 capita/dwelling unit).

It is estimated the existing 8-inch-diameter sewer main that bisects the site has an approximate peak flow rate of 60,000 gpd from surrounding residential developments. With the proposed development adding 18,900 gpd, the total flow in the main will be 78,900 gpd. An 8-inch-diameter sewer main at half capacity (0.5D) on a minimum 0.4% slope can convey 227,000 gpd, which is more than sufficient capacity for the proposed project and contributing sewershed. A full analysis of upstream and downstream tributary areas will be evaluated at the time of final design.

The sanitary sewer system improvements for the proposed project, including sewer laterals, will be designed to meet the requirements and criteria specified in the *City of Reno Public Works Design Handbook*.

This preliminary report estimates the proposed sewerage contribution from the project in relation to local sewer system requirements. There will not be any non-domestic waste introduced into the sanitary sewer system from this project. Further hydraulic analysis will be performed with the final design phase of the proposed project.

CONCLUSION

The proposed preliminary sanitary sewer system discussed in this report will ultimately be designed to adequately serve the proposed 18-lot Grandview Terrace subdivision with no adverse effects to the downstream infrastructure anticipated. All 4-inch sewer laterals will be maintained by the respective property owners up to the cleanout at each property line and all public mains will be maintained by Washoe County.

REFERENCES

City of Reno Public Works Design Manual, January 2009.

APPENDIX

VICINITY MAP

PRELIMINARY SANITARY SEWER LAYOUT

Vicinity Map

Grandview Terrace Tentative Map

May 2020

0 ½ 1 Miles

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Fax: 775.823.4066

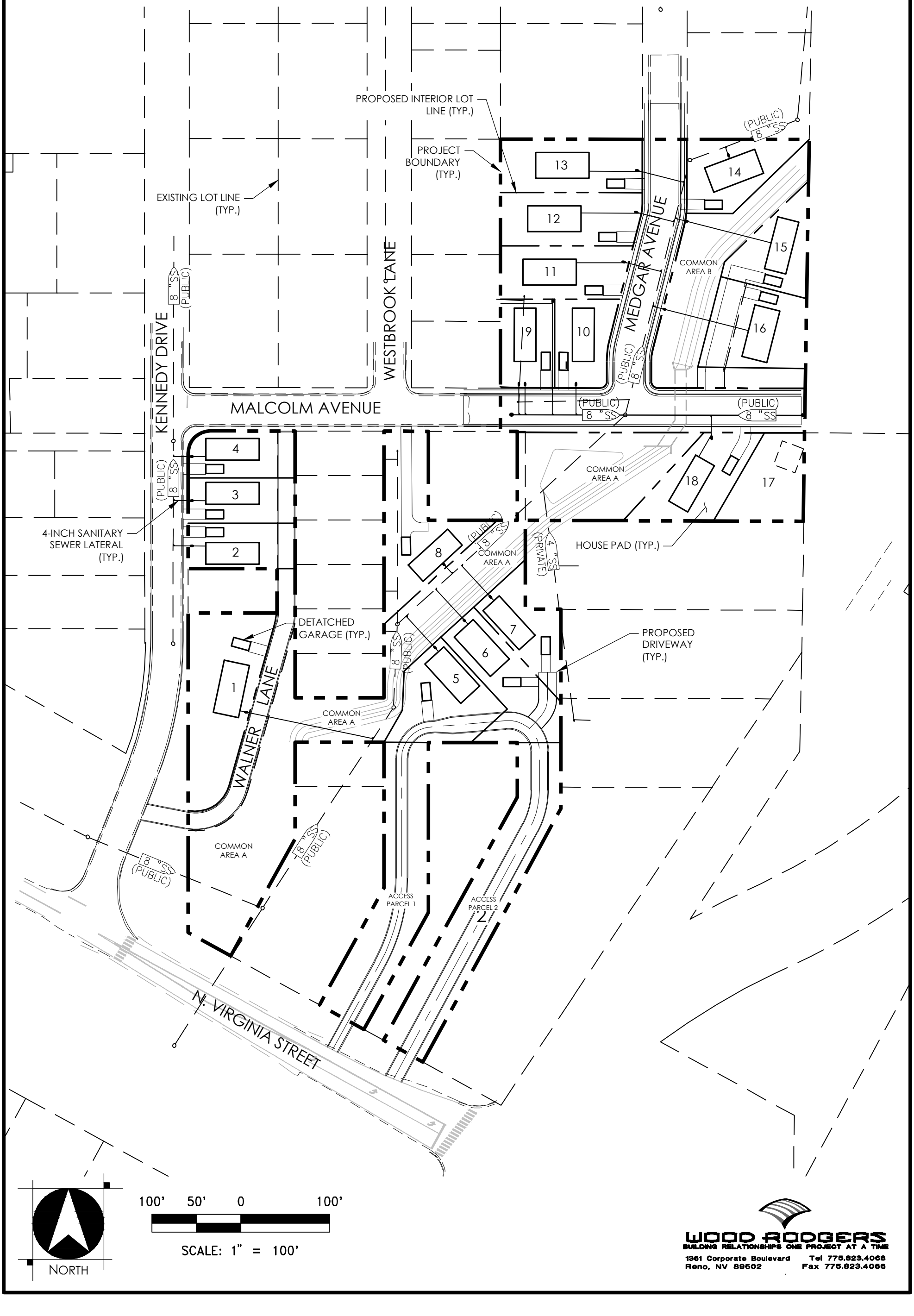
\\woodrodgers.loc\ProductionData\Jobs-Reno\Jobs\3797_Hero_Land_Holdings\Grandview_Terrace_OA\GIS\Tasks\VicinityMap_20200428.mxd 5/4/2020 8:24:23 AM sredman

PRELIMINARY SANITARY SEWER LAYOUT

GRANDVIEW TERRACE

RENO, NEVADA

JUNE, 2020



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Map Pocket

GRANDVIEW TERRACE
TENTATIVE SUBDIVISION MAP
TITLE SHEET

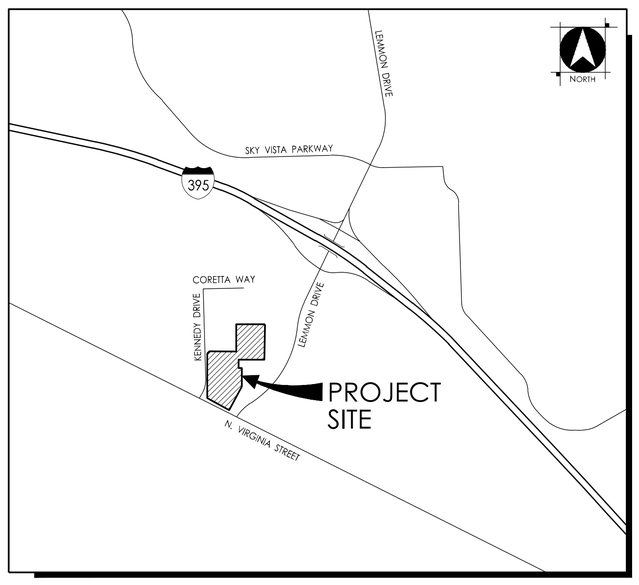
OWNER:

HERO LAND HOLDINGS, LLC
2242 HARVARD STREET, SUITE 200
SACRAMENTO, CA 95815

DOUGLAS T. BARKER
979 MELBA DRIVE
RENO, NV 89503

APPLICANT/DEVELOPER:

DOUGLAS T. BARKER
979 MELBA DRIVE
RENO, NV 89503



VICINITY MAP
NOT TO SCALE

BASIS OF BEARINGS

NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994, HIGH ACCURACY REFERENCE NETWORK (NAD 83/94 - HARN), AS DETERMINED USING REAL TIME KINEMATIC (RTK) GPS OBSERVATIONS WITH CORRECTIONS TRANSMITTED BY THE NEVADA GPS NETWORK. THE BEARING BETWEEN GPS REFERENCE STATION "SSB2" - S52SM10000 AND "RSTEAD" - N22SM01037 IS TAKEN AS NORTH 86°59'47" WEST. ALL DIMENSIONS SHOWN ARE GROUND DISTANCES. GRID TO GROUND COMBINED FACTOR = 1.00019793

BASIS OF ELEVATION

THE BASIS OF ELEVATION IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AS TAKEN FROM CITY OF RENO BENCHMARK 2630, WITH A PUBLISHED ELEVATION OF 5194.87 FT. BENCHMARK 2630 IS DESCRIBED AS BEING 1 1/2" DIA STL CAP - T/C - SW COR -N.VIRGINIA S T & LANCASTER DR. - 13' WI/y OF EC ON LANCASTER.

SITE INFORMATION:

RESIDENTIAL LOTS = 18
TOTAL SITE AREA = 298,391 S.F.
RIGHT OF WAY AREA = 31,349 S.F.
LOT AREA = 152,479 S.F.
COMMON AREA = 114,563 S.F.

PROJECT DENSITY:
GROSS DENSITY = 2.63 DU/AC.
NET DENSITY = 5.14 DU/AC.

LOT SUMMARY:
MINIMUM LOT SIZE = 6,122 S.F.
MAXIMUM LOT SIZE = 15,242 S.F.
AVERAGE LOT SIZE = 8,471 S.F.
MINIMUM ALLOWABLE LOT SIZE = 5000 S.F.

ENGINEERS STATEMENT:

I, C. EVAN NIKIRK , DO HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND WAS COMPLETED ON THE 14th DAY OF SEPTEMBER, 2020.

C. EVAN NIKIRK, P.E. #11466

SHEET INDEX

SITE PLAN
NOT TO SCALE

GRANDVIEW TERRACE
TITLE SHEET

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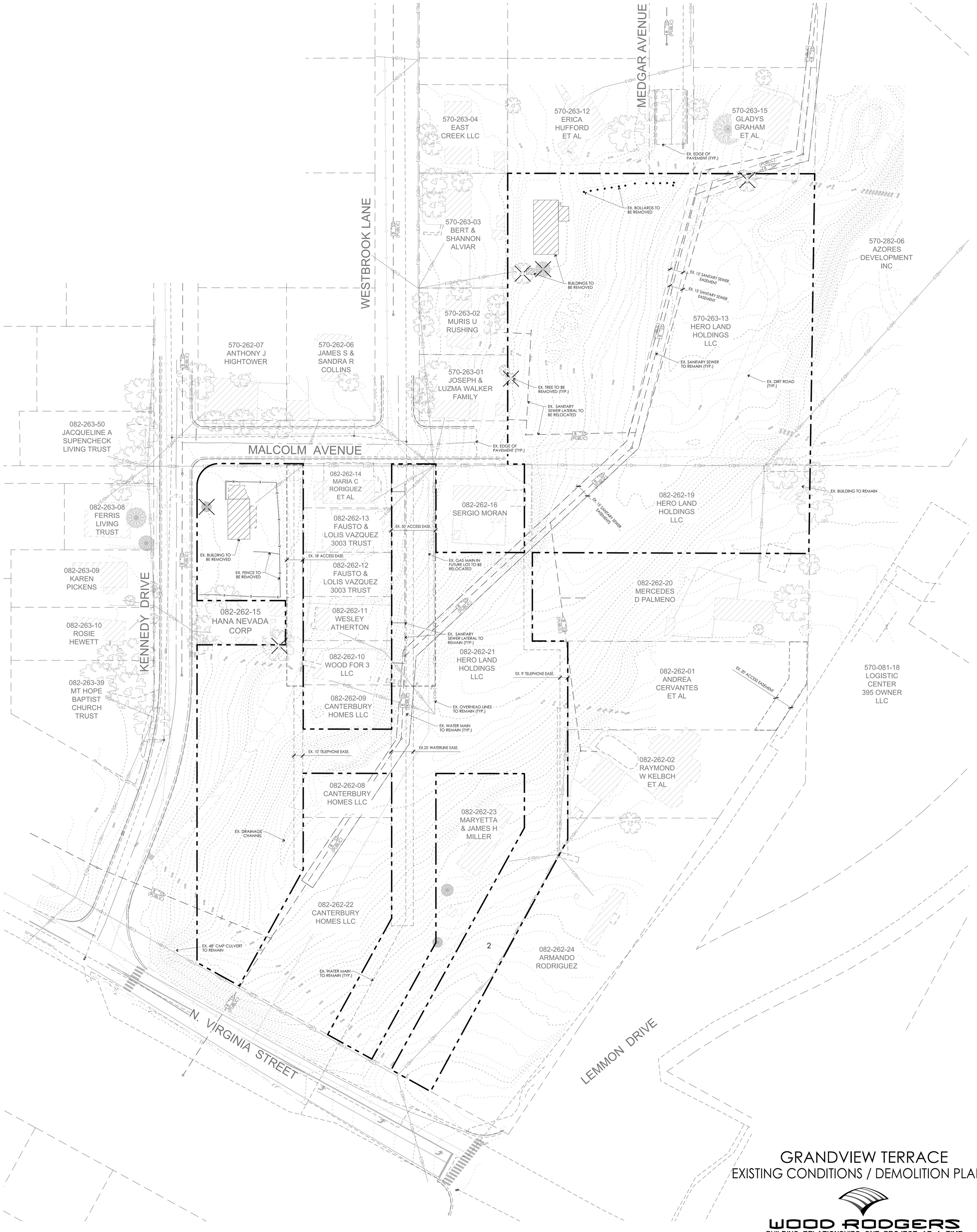
3797005 JUNE, 2020

SHEET T-1 OF 8

GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

EXISTING CONDITIONS / DEMOLITION PLAN



GRANDVIEW TERRACE

EXISTING CONDITIONS / DEMOLITION PLAN

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SHEET DE-1 OF 8

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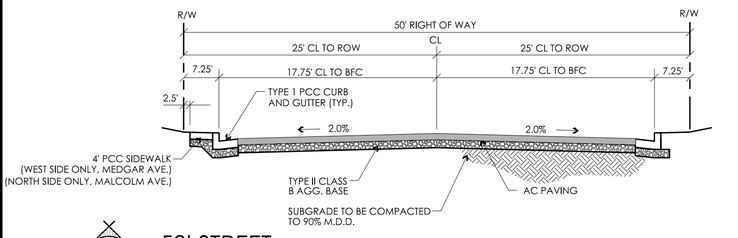
GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY LOT AND BLOCK PLAN



A 50' STREET

50' STREET SECTION
NOT TO SCALE

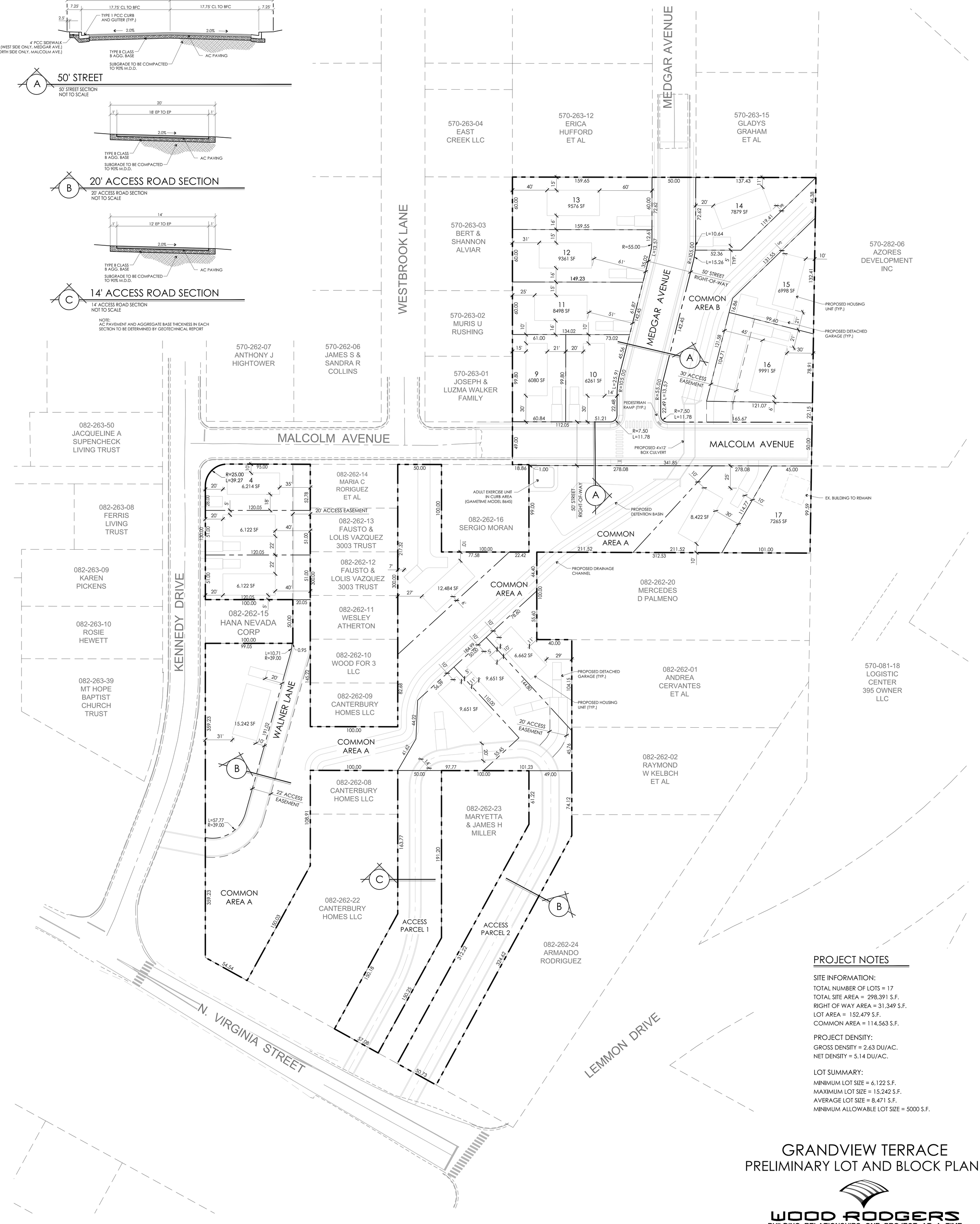
B 20' ACCESS ROAD SECTION

20' ACCESS ROAD SECTION
NOT TO SCALE

C 14' ACCESS ROAD SECTION

14' ACCESS ROAD SECTION
NOT TO SCALE

NOTE:
AC PAVEMENT AND AGGREGATE BASE THICKNESS IN EACH SECTION TO BE DETERMINED BY GEOTECHNICAL REPORT



PROJECT NOTES

SITE INFORMATION:

TOTAL NUMBER OF LOTS = 17
TOTAL SITE AREA = 298,391 S.F.
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AVERAGE LOT SIZE = 8,471 S.F.
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NORTH
0
80
40
160

GRANDVIEW TERRACE

PRELIMINARY LOT AND BLOCK PLAN

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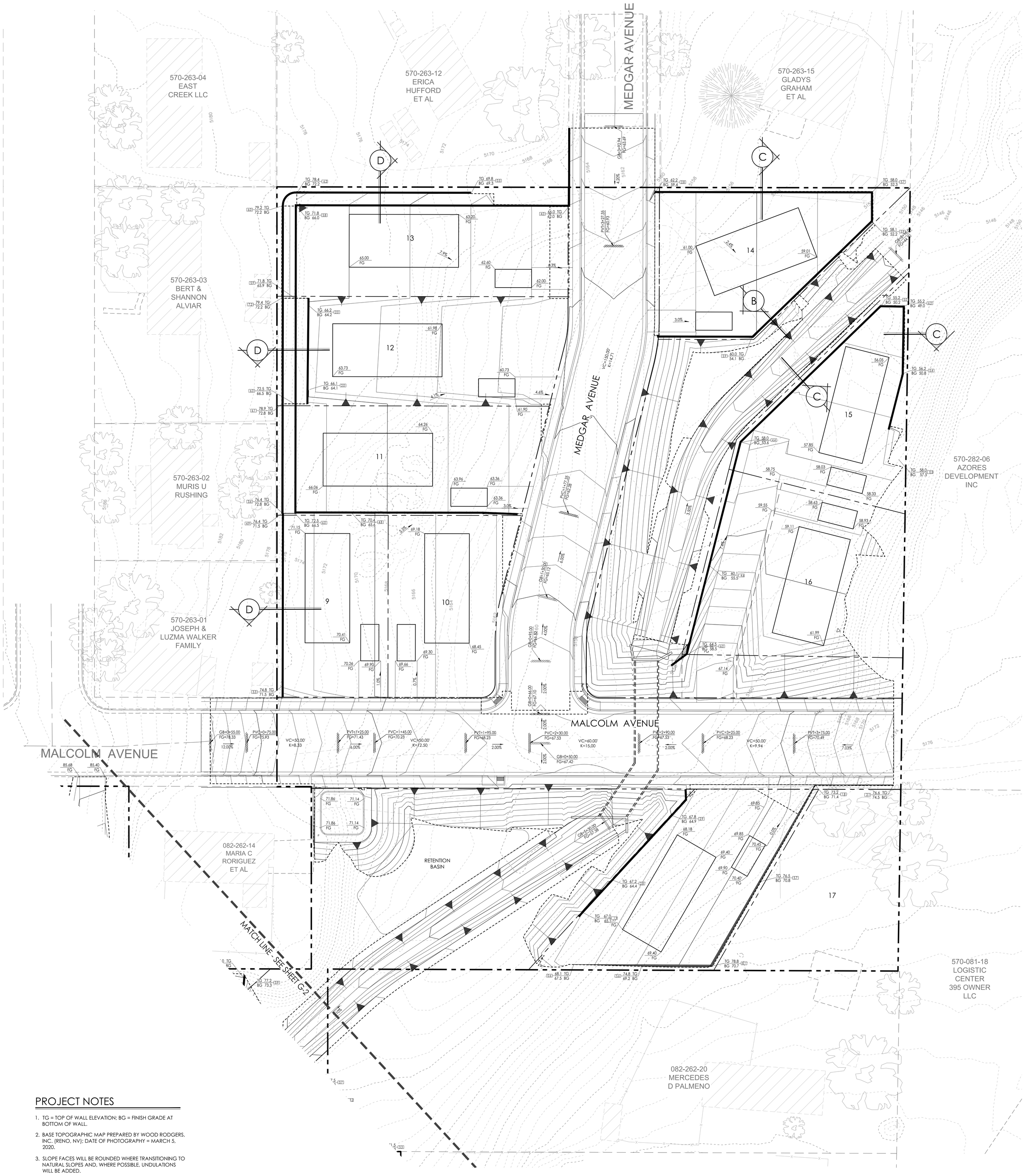
GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY GRADING PLAN



PROJECT NOTES

1. TG = TOP OF WALL ELEVATION; BG = FINISH GRADE AT BOTTOM OF WALL.
2. BASE TOPOGRAPHIC MAP PREPARED BY WOOD RODGERS, INC. (RENO, NV); DATE OF PHOTOGRAPHY = MARCH 5, 2020.
3. SLOPE FACES WILL BE ROUNDED WHERE TRANSITIONING TO NATURAL SLOPES AND, WHERE POSSIBLE, UNDULATIONS WILL BE ADDED.

NORTH

0 40 20 80

GRANDVIEW TERRACE

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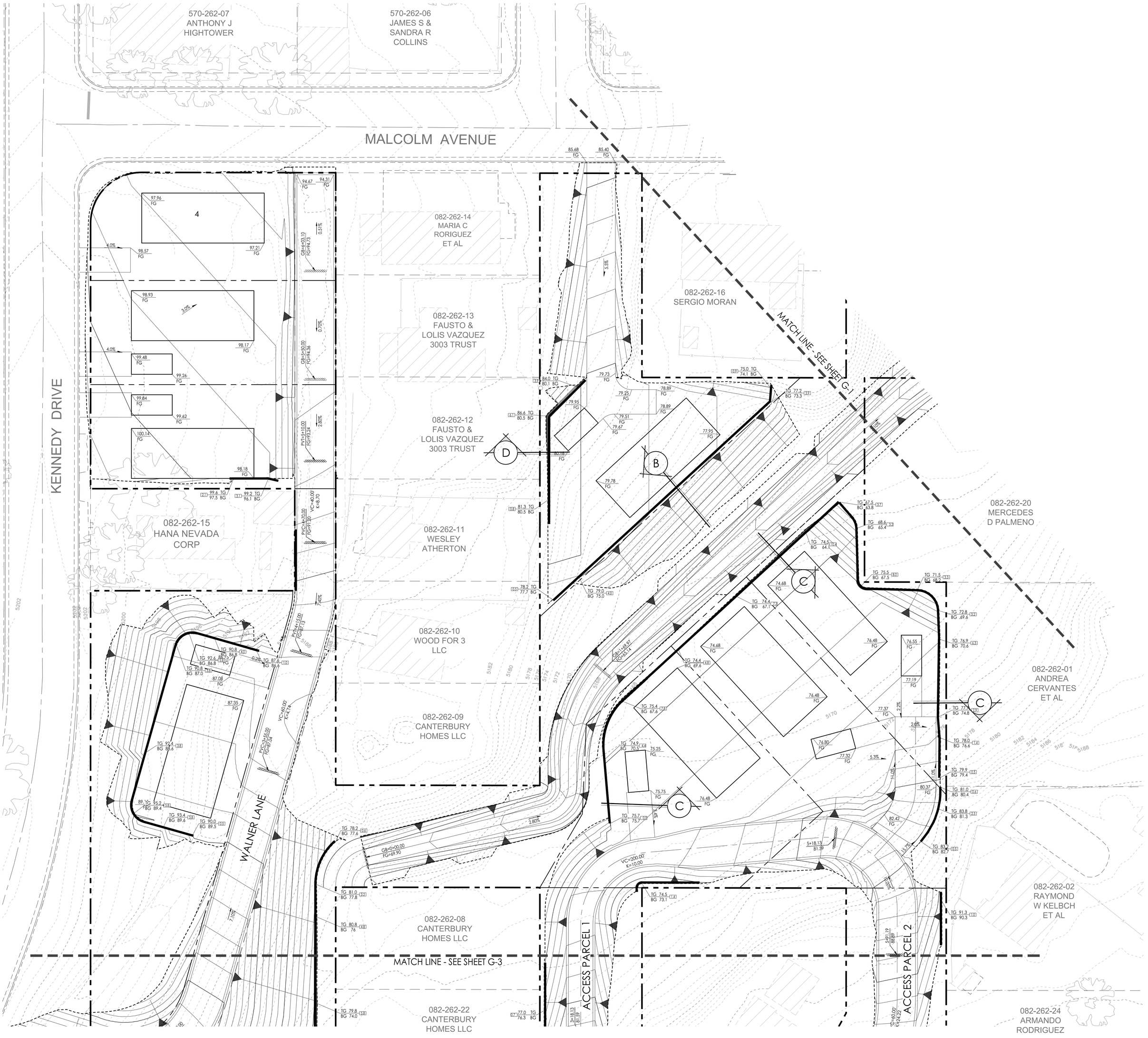
SHEET G-1 OF 8

GRANDVIEW TERRACE
TENTATIVE SUBDIVISION MAP
PRELIMINARY GRADING PLAN



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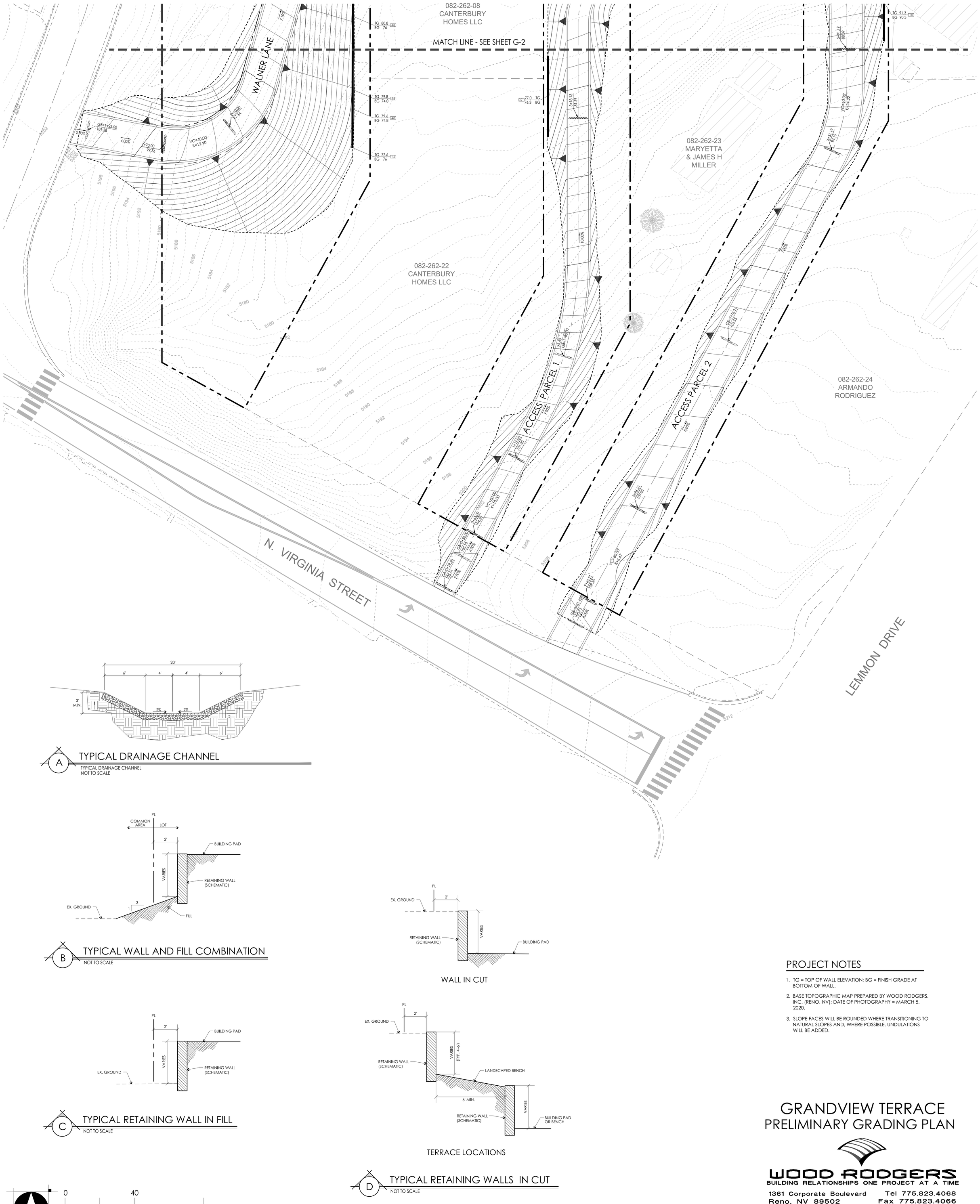


A TYPICAL DRAINAGE CHANNEL

TYPICAL DRAINAGE CHANNEL
NOT TO SCALE

B TYPICAL WALL AND FILL COMBINATION

NOT TO SCALE

WALL IN CUT

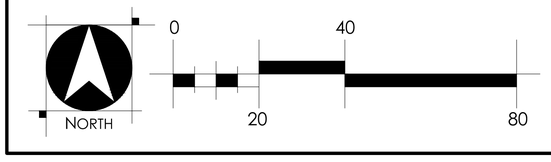
TERRACE LOCATIONS

C TYPICAL RETAINING WALL IN FILL

NOT TO SCALE

D TYPICAL RETAINING WALLS IN CUT

NOT TO SCALE



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SHEET G-3 OF 8

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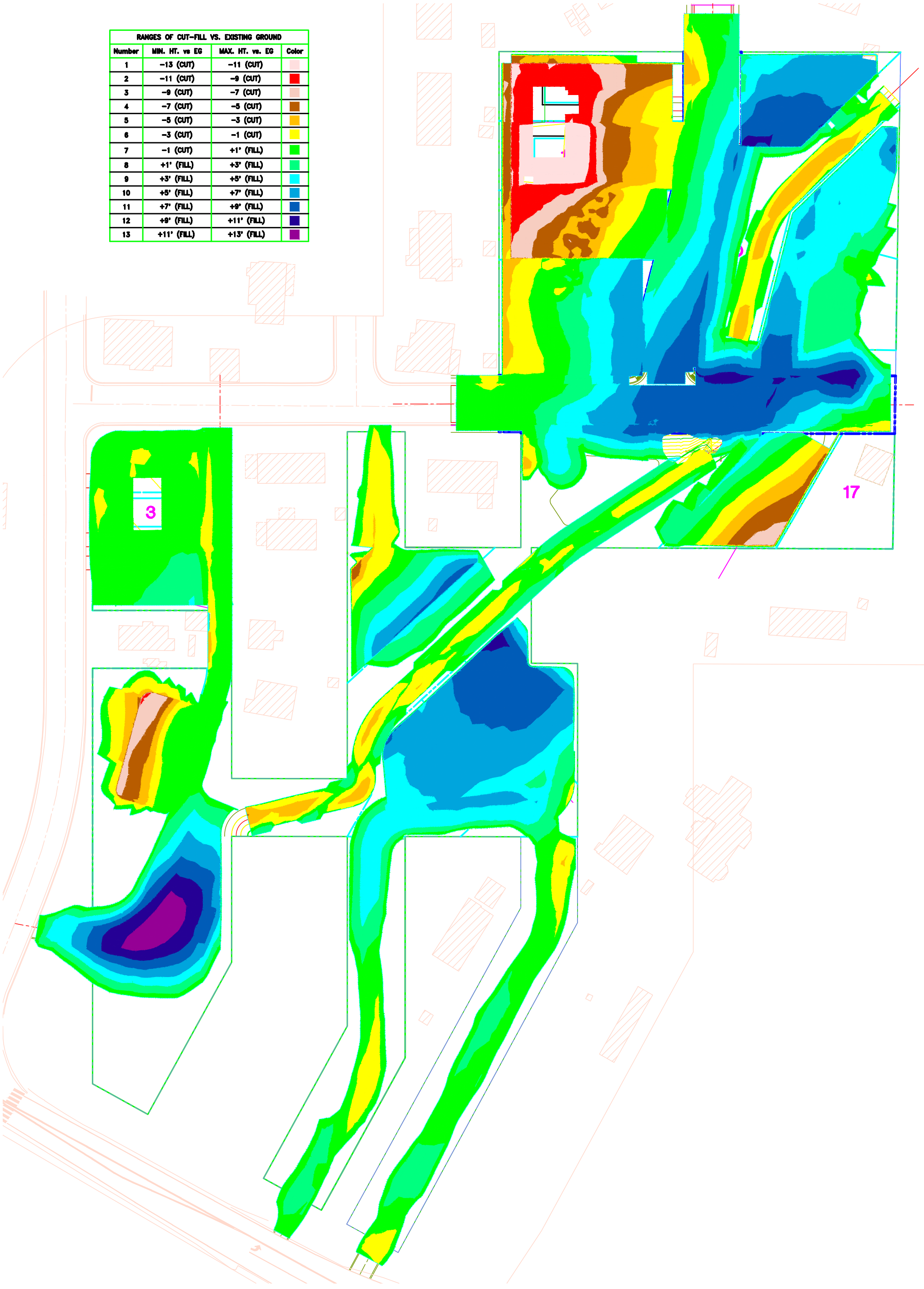
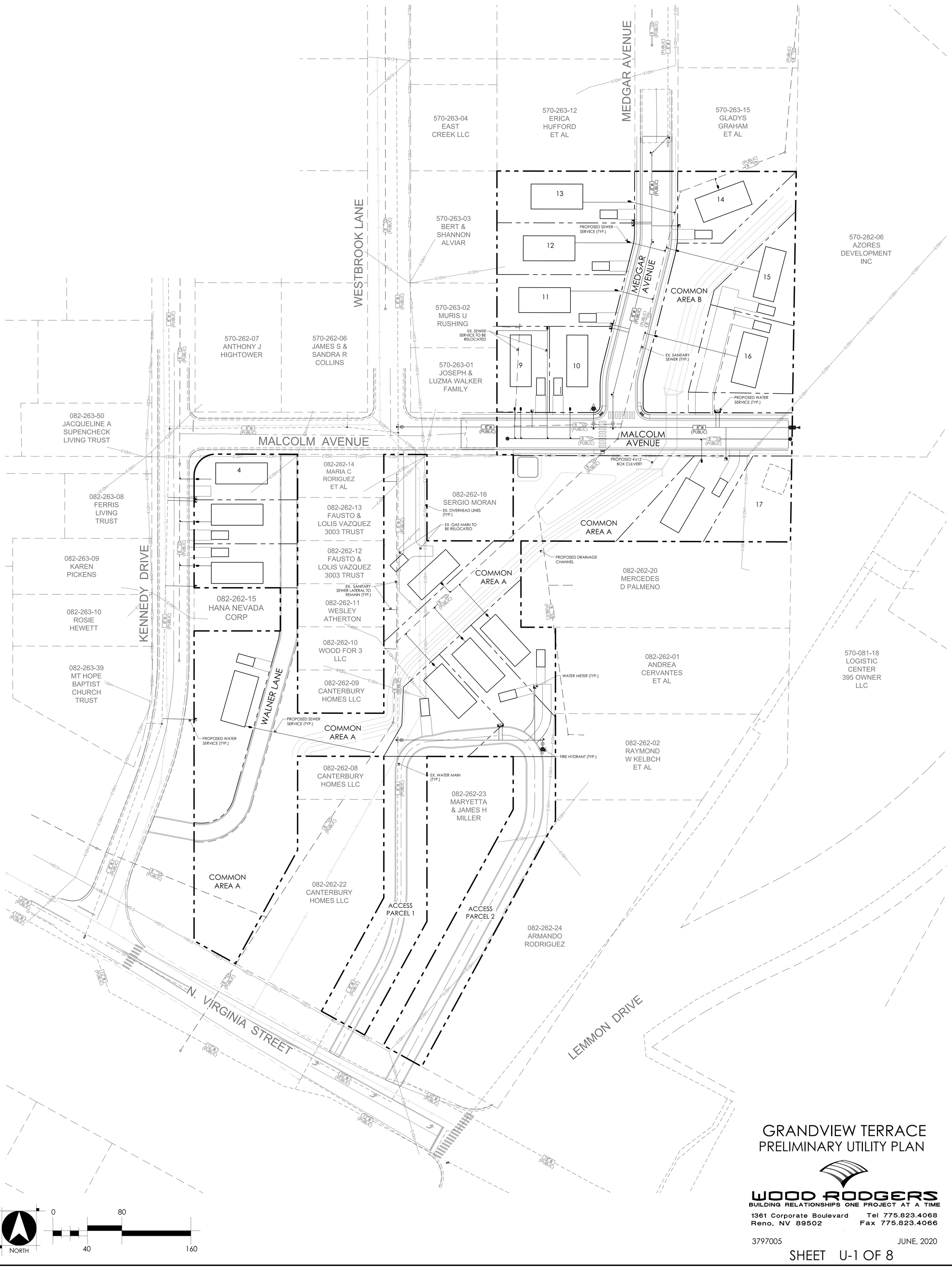
RANGES OF CUT-FILL VS. EXISTING GROUND			
Number	MIN. HT. vs EG	MAX. HT. vs. EG	Color
1	-13' (CUT)	-11' (CUT)	
2	-11' (CUT)	-9' (CUT)	
3	-9' (CUT)	-7' (CUT)	
4	-7' (CUT)	-5' (CUT)	
5	-5' (CUT)	-3' (CUT)	
6	-3' (CUT)	-1' (CUT)	
7	-1' (CUT)	+1' (FILL)	
8	+1' (FILL)	+3' (FILL)	
9	+3' (FILL)	+5' (FILL)	
10	+5' (FILL)	+7' (FILL)	
11	+7' (FILL)	+9' (FILL)	
12	+9' (FILL)	+11' (FILL)	
13	+11' (FILL)	+13' (FILL)	



GRANDVIEW TERRACE

TENTATIVE SUBDIVISION MAP

PRELIMINARY UTILITY PLAN



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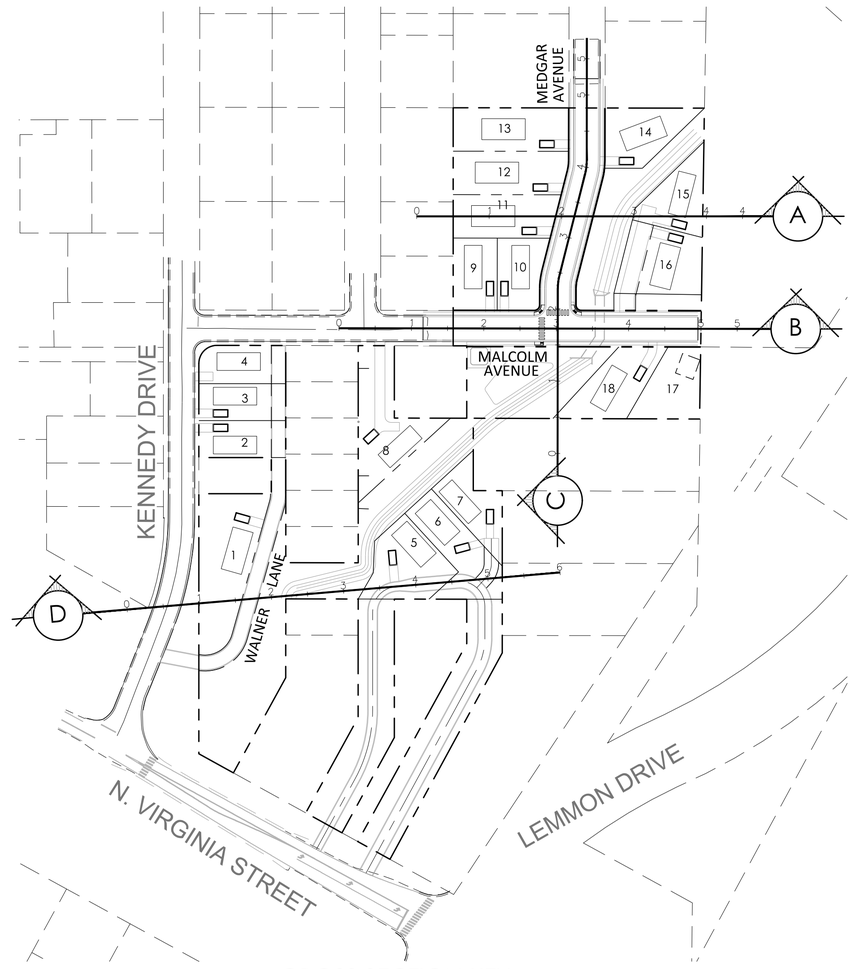
SHEET U-1 OF 8

GRANDVIEW TERRACE

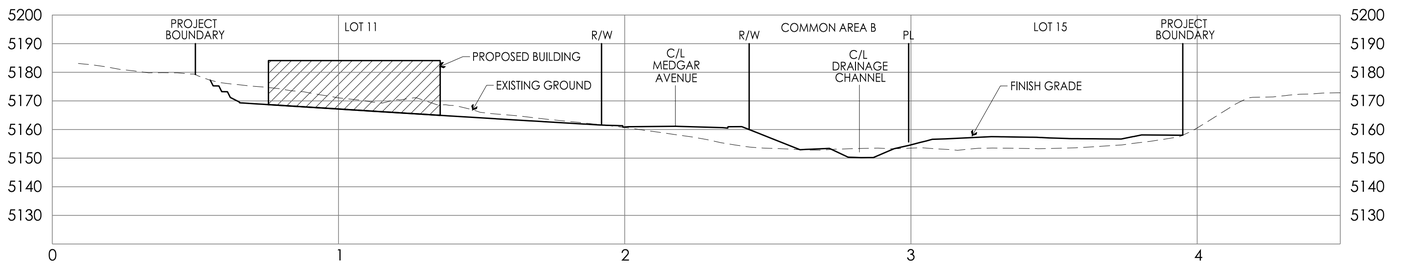
TENTATIVE SUBDIVISION MAP

PRELIMINARY CROSS SECTIONS

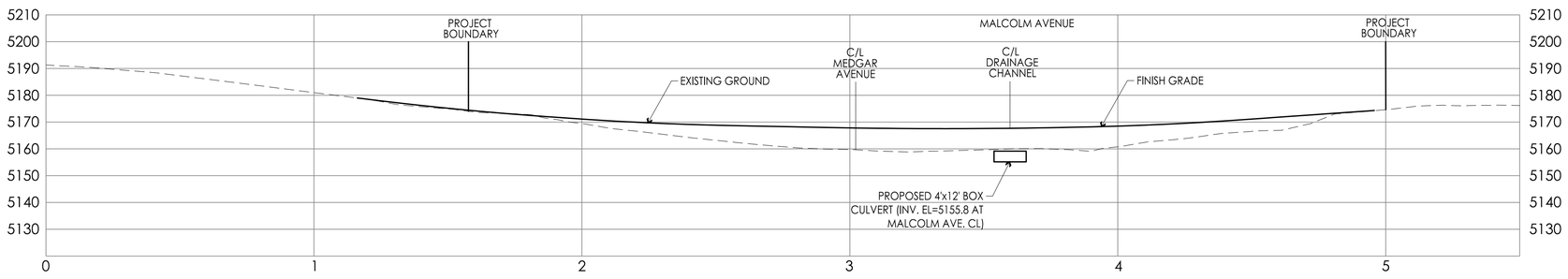


CROSS SECTION KEY

NOT TO SCALE



A SCALE: 1"=30' HORIZ. AND VERT.



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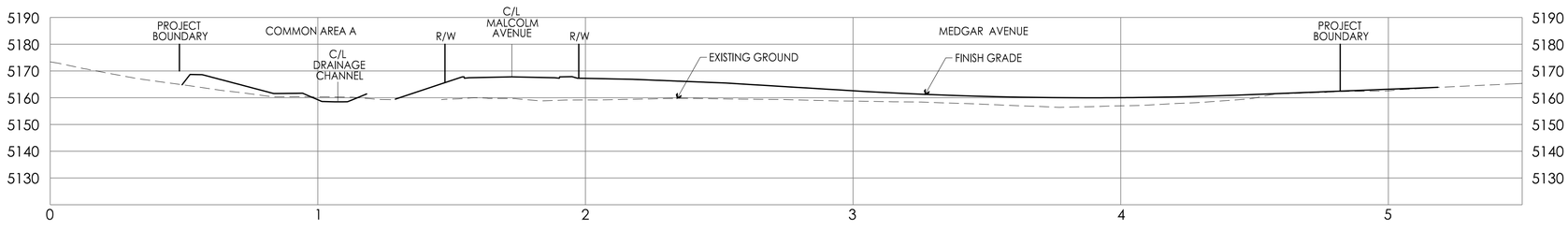
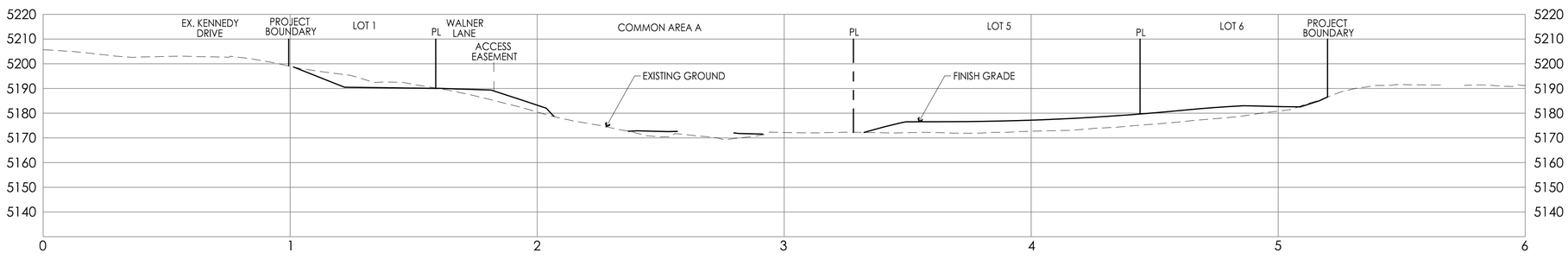
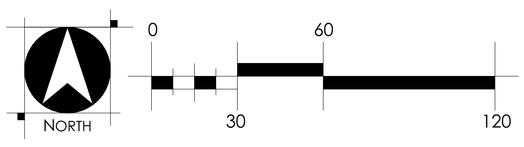


C SCALE: 1"=30' HORIZ. AND VERT.



D SCALE: 1"=30' HORIZ. AND VERT.



GRANDVIEW TERRACE

PRELIMINARY CROSS SECTIONS

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