DS #: 5281

APN: 125-06-701-001

PROJECT: Sunstone Parcel D

SUBMITTAL: 2nd

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**				**DATE:** **July 23, 2020**
TO: **Land Development Services** Department of Building & Safety				**FROM:** Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Sunstone Parcel D				Kimley-Horn
Cross Streets:	Skye Canyon Park Drive and Log Cabin Way/O'Hare Road			Lennar
File Number:	F:\Depot\DSMemos\DS5281B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-701-001			CCRFCD
Zoning Action:	TMP-78151			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/13/2020	6/4/2020	See Comments Below	$400.00	3848812: $400
2nd Submittal	7/6/2020	7/23/2020		$400.00	3908721: $400
			TOTAL FEES (LDDRS):	**$800.00**	**----**

REMARKS:

***** <u>The Conditional Approval of this Drainage Study is to allow the engineer/developer to submit the Improvement Plans to City Land Development Only</u>**

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. **This drainage study is acceptable in concept**; however, City of Las Vegas will not formally accept the study until the Clark County Regional Flood Control District (CCRFCD) has issued a letter of concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.

   <u>Please note that effective April 6, 2020, only electronic submittals to the CCRFCD will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.</u>

2. The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.
3. The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.
4. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

5. Landscape areas are not allowed to drain over the sidewalk. Provide sidewalk underdrain(s) to convey the runoff from the proposed paseo swale to the street(s). Revise all pertinent details accordingly.
6. Secure a notarized letter of permission from the property owner allowing the offsite grading within the future paseo. This letter is required prior to final acceptance of the drainage study.
7. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
JKS

T/R/S: T19S/R60E/6
AREA G-06

Addendum to the Technical Drainage Study for

SUNSTONE PARCEL D

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

Kimley»Horn

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Sunstone Parcel D Date: July 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Skye Canyon Park Drive

East/West: Log Cabin Way & O'Hare Road

b) Section: 6 Township: 19S Range: 60E

c) APN : 125-06-701-001

Name of Owner: Lennar - Robert Flaxa

Telephone No.: 702.821.4651 Fax No.: E-Mail Address: robert.flaxa@lennar.com

Address: 9275 W Russell Rd, Suite 400 Las Vegas NV 89119

Contact Person-Name: Rachael R. Dennis, P.E. **Telephone No.:** 702.734.5666

* **E-Mail Address:** rachael.dennis@kimley-horn.com **Fax No.:**

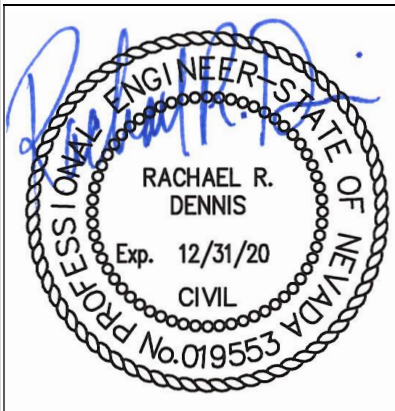
Firm: KIMLEY-HORN

Address: 6671 Las Vegas Boulevard South, Suite 320 Las Vegas, NV 89119

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☒	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit	GRADING PERMIT	

1. Total Owned Land Area: At Site: +/- 238.14 acres Being Developed/Disturbed: +/- 28.7 acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site: n/a
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: 1. UP to TDS Sunstone Phase 1 Infrastructure, 2. Skye Canyon Master Drainage Study Update #5
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: 1. Existing 48" RCP Lateral in Log Cabin Way 2. Minor surface flows to O'Hare Road.
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: June 4, 2020
TO: **Land Development Services** Department of Building & Safety				FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Sunstone Parcel D				Kimley-Horn
Cross Streets:	Skye Canyon Park Drive and Log Cabin Way/O'Hare Road			Lennar
File Number:	F:\Depot\DSMemos\DS5281A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-701-001			CCRFCD
Zoning Action:				
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/13/2020	6/4/2020	See Comments Below	$400.00	3848812: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.
2. Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.
3. The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

   When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

4. The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.
5. The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.
6. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.
7. Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.
8. Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.
9. As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.
10. It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.
11. This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).
12. Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.
13. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."
14. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.
15. Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Lob Cabin Way.
16. Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.
17. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).
18. Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.
19. The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de-sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.
20. Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.

21. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
22. Call out detail 7/C7.2 on the Grading Plans.
23. Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.
24. It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.
25. Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.
26. Revise the lateral profile callouts on Sheets C4.03 and C4.07.
27. Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.
28. Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.
29. Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.
30. Revise the Drainage Certification block to reference City of Las Vegas.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
JKS

T/R/S: T19S/R60E/6
AREA G-06

Kimley»Horn

July 1, 2020

Mr. Albert Sung, P.E.
City of Las Vegas Flood Control
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Addendum to the Technical Drainage Study for Sunstone Parcel D***

Dear Mr. Sung,

This letter certifies that all items provided on the *Addendum to the Technical Drainage Study for Sunstone Parcel D* electronic submittal matches the paper version bound into the study.

With Kimley-Horn, you should expect more and will experience better. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or concerns.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.T

Kimley»Horn

Addendum to the Technical Drainage Study for *SUNSTONE PARCEL D*

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

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July 2020
KH Project #092935006

Kimley»Horn

July 2, 2020

Ms. Jennifer Shinn, P.E.
City of Las Vegas
Department of Public Works
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Technical Drainage Study for Sunstone Parcel D (DS5281)***

Ms. Shinn,

This letter is being submitted in response to the subject Drainage Study Comment Letter dated June 4, 2020. These comments have been reviewed and are addressed herein.

Comment 1: **Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.**

Response: Zoning and Planning Conditions (**TMP-78151**) for the proposed site have been included in **Appendix A**.

Comment 2: **Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.**

Response: CLV Department of Planning Approval received on May 27, 2020 for the proposed onsite grade difference of 2 feet above or below existing grades has been included in **Appendix A**.

Comment 3: **The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.**

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

When it's applicable, structural calculations of facilities must be approved by the City prior to the Clark County Regional Flood Control District for their review and concurrence.

Response: Noted. We request that the structural calculations and plans be a condition of the TDS approval.

Comment 4: **The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.**

Response: Noted.

Comment 5: **The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.**

Response: Noted.

Comment 6: **This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.**

Response: Noted.

Comment 7: **Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.**

Response: The finish floor elevation for Lot 10 has been updated to match the grading plan on the **Finish Floor Check** included in **Appendix B**.

Comment 8: **Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.**

Response: The drop inlet identifiers have been added to the drop inlet summary table on **Figures ULT-1** and **FAC-1** for clarity. Note that the design remains unchanged from the previous submittal. Copies of **Figures ULT-1** and **FAC-1** has been included in **Appendix A**.

Comment 9: **As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.**

Response: Solid grouted walls have been provided to a minimum of twice the depth of flow above the adjacent flow line elevation for lots that do not meet the minimum FFE requirements. Callouts for the solid grouted walls have been added to the grading plans and **Details H** and **J** on Sheet **C7.1** in **Appendix D**.

Comment 10: **It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.**

Response: For Lots 71-85 along the future paseo, solid grouted walls have been provided to a minimum of twice the depth of flow highest adjacent finished grade have been added to maintain flood protection. Refer to **Detail E** on Sheet **C7.1** in **Appendix D**.

Comment 11: **This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).**

Response: Interim swales have been added in the future paseo area between Parcels D and F to direct flows north and south into Log Cabin Way and O'Hare Road, respectively. The proposed interim swale grading is consistent with the referenced Ultimate Condition analysis from the *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95)* (hereinafter referred to as *Master Study)*. The *Master Study* analyzed the future developed condition paseos as part of Subbasins **ELOG1** (35 cfs) and **EOHR1** (29 cfs). Flows for the proposed interim channels were prorated

from the *Master Study*. Referenced *Master Study* **Exhibit E – Ultimate Condition Onsite Hydrologic Map** in **Appendix C** depicts the subbasins and drainage patterns used in the ultimate condition hydrologic analysis for the future paseo. Referenced hydrologic calculations from the *Master Study* have been included in **Appendix C**. Prorate calculations for the future paseo subbasins have been included on **Figure ULT-1**. Hydraulic calculations for the proposed interim swales have been included in **Appendix B**. **Figure ULT-1** in **Appendix A** shows the locations of the cross sections and summary tables corresponding to the calculations. The revised grading plans have been included in **Appendix D**.

Comment 12: **Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.**

Response: Acknowledged. Permission to grade is being coordinated. We request the permission to grade be a condition of the TDS approval.

Comment 13: **Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA,"**

Response: The following note has been provided on the grading plans in **Appendix D**: "**All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."**

Comment 14: **All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.**

Response: Noted. All public drainage easements and common lots have been labeled on the grading plans. All drainage easements have been labeled as **"Public Drainage Easements to be Privately Maintained By the HOA**". Refer to the improvement plans in **Appendix D**.

Comment 15: **Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Log Cabin Way.**

Response: A 29-foot wide Public Drainage Easement has been added to the grading plans where the storm drain crosses Common Lot N. Refer to the improvement plans in **Appendix D**.

Comment 16: **Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.**

Response: Noted. Construction notes and callouts for all manholes and drop inlets referencing standard drawings and details have been added to the grading plans in **Appendix D**.

Comment 17: **Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).**

Response: Construction Notes 3 and Note 4 calling out USDCCA Drawing No. 421 have been added to the grading plans in **Appendix D**.

Comment 18: **Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.**

Response: A connection detail (Detail **5/C7.2)** for the proposed storm drain connection to the existing drop inlet in Log Cabin Way has been added to the grading plans in **Appendix D**.

Comment 19: **The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de- sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.**

Response: The proposed cul-de-sacs have been revised to reflect a 1% minimum slope. Refer to the improvement plans in **Appendix D**.

Comment 20: **Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.**

Response: Grading has been revised to reflect a swale in Common Element P and the driveway inadvertently shown at this location has also been removed. Refer to the improvement plans in **Appendix D**.

Comment 21: **The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.**

Response: Noted. A quantity estimate of all the drainage improvements has been added to the grading plans on Sheet **C2.0**. Refer to the improvement plans in **Appendix D**.

Comment 22: **Call out detail 7/C7.2 on the Grading Plans.**

Response: A pipe penetration Detail **5/C7.2** has been added to the grading plans in **Appendix D**.

Comment 23: **Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.**

Response: Most of the onsite storm drain has been revised to provide adequate utility clearances; however, the utilities have not been shown on the plans since they are not complete. It is acknowledged, that as the utility design **progresses, a drainage study update may be necessary if there is any significant storm drain** revision. Standard Form 6 models for the revised mainline and laterals have been included in **Appendix B**. All existing and proposed flood control facilities have been shown on the **Figure FAC-1** and the plans included in **Appendix D**. Note that although the storm drain lengths, slopes and manhole angles have been revised, the design intent is consistent with the previous submittal.

Additionally, the slopes for street **Cross Sections** and **Drop Inlets D-1** and **D-3B** were updated to match the revised plans. The resulting street flow and drop inlet collection data based on the flows generated during ultimate conditions has been presented in **tables on Figure ULT-1** in **Appendix A.** Hydraulic calculations have been included in **Appendix B**. Note that although the slopes for **D-1** and **D-3B** have been revised, the design intent is consistent with the previous submittal.

Comment 24: **It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.**

Response: Unnecessary construction note callouts have been removed from the profile view. Refer to the improvement plans in **Appendix D**.

Comment 25: **Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.**

Response: **LAT 4** has been updated to reflect the correct flow rates. Refer to the improvement plans in **Appendix D**.

Comment 26: **Revise the lateral profile callouts on Sheets C4.03 and C4.07.**

Response: Lateral callouts have been revised on **Sheets C4.03** and **C4.07.** Refer to the improvement plans in **Appendix D**.

Comment 27: **Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.**

Response: The flow rate has been updated on **Sheet C4.11.** Refer to the improvement plans in **Appendix D**.

Comment 28: **Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.**

Response: The Flood Zone Note has been corrected to Panel Number 1735. Refer to the improvement plans in **Appendix D.**

Comment 29: **Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.**

Response: CLV drawing numbers for the existing storm drain facilities in the perimeter streets have been added where approved.

Comment 30: **Revise the Drainage Certification block to reference City of Las Vegas.**

Response: Drainage Certification block has been revised to reference the City of Las Vegas. Refer to the Improvement Plans in **Appendix D**.

We anticipate that the above responses address your concerns/comments. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or need any additional information.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.

Kimley»Horn

LIST OF APPENDICES

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
  - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Appendix C – Reference Materials

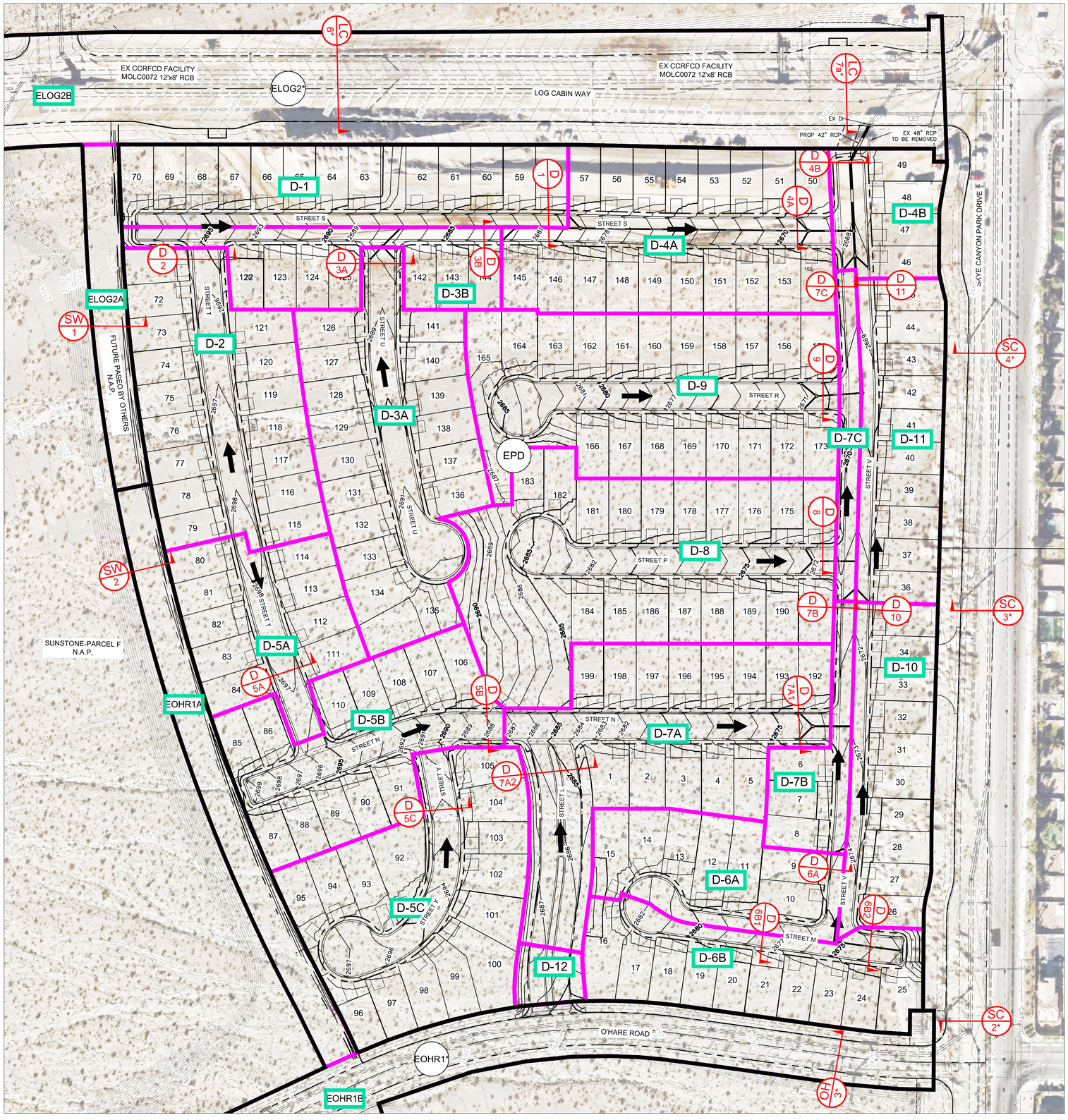
- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95);* December 2018.

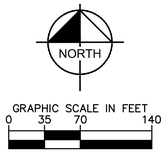
Appendix D – Improvement Plans

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.





LEGEND

- SITE — BASIN ID
- XXX — PRORATED BASIN BOUNDARY ID
- BASIN BOUNDARY
- PRORATED BASIN BOUNDARY
- FLOW ARROW
- X / XX — SECTION ID

ULTIMATE CONDITION PRORATED FLOW SUMMARY

Ultimate Onsites			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
EPD*	65	28.7	2.26
ELOG2*	35	12.1	2.89
EOHR1*	29	10.1	2.87
Ultimate Onsite Prorated Basins			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
D-1	4	1.6	2.26
D-2	4.5	2.0	2.26
D-3A	5	2.3	2.26
D-3B	2	1.0	2.26
D-4A	5	2.2	2.26
D-4B	1.5	0.6	2.26
D-5A	2.5	1.2	2.26
D-5B	4	1.7	2.26
D-5C	5	2.2	2.26
D-6A	2	1.1	2.26
D-6B	3	1.4	2.26
D-7A	6	2.5	2.26
D-7B	1	0.5	2.26
D-7C	1	0.3	2.26
D-8	7	3.0	2.26
D-9	6	2.6	2.26
D-10	3	1.2	2.26
D-11	2.5	1.2	2.26
D-12	<1	0.1	2.26
TOTAL	**65**	**28.7**	**NA**
ELOG2A	2	0.6	2.89
ELOG2B	33	11.5	2.89
TOTAL	**35**	**12.1**	**NA**
EOHR1A	3	1.0	2.87
EOHR1B	26	9.1	2.87
TOTAL	**29**	**10.1**	**NA**

*Referenced from the Master Study

STREET HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
D-1	3.25	4.0	0.29	3.70	1.07
D-2	1.66	4.5	0.27	2.50	0.68
D-3A	1.75	5.0	0.28	2.62	0.73
D-3B	3.25	7.5	0.35	4.29	1.50
D-4A	3.25	9.0	0.30	3.76	1.13
D-4B	0.70	6.0	0.33	1.93	0.64
D-5A	1.61	2.5	0.27	1.53	0.41
D-5B	3.25	11.5	0.32	4.03	1.29
D-5C	1.69	5.0	0.28	2.59	0.73
D-6A	0.70	2.0	0.30	0.30	0.09
D-6B1	2.50	3.0	0.28	3.14	0.88
D-6B2	2.50	3.0	0.23	2.70	0.62
D-7A1	3.25	17.5	0.36	4.45	1.60
D-7A2	0.50	2.0	0.30	1.33	0.40
D-7B	0.70	4.0	0.36	2.06	0.74
D-7C	0.70	2.5	0.32	1.84	0.59
D-8	3.25	7.0	0.28	3.60	1.01
D-9	3.25	6.0	0.27	3.47	0.94
D-10	0.70	3.0	0.33	1.93	0.64
D-11	0.70	3.5	0.35	1.99	0.70

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

REFERENCED HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	Q_{10} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
LC6*	3.83	13	0.37	4.57	1.69	5	0.29	3.74	1.08
LC7a*	3.83	5.5	0.35	4.40	1.54	2	0.27	3.59	0.97
OH3*	3.76	36	0.49	5.73	2.81		-		
SC2*	0.46	14.5	0.61	2.37	1.45		-		
SC3*	0.22	3	0.44	1.24	0.55	1	0.33	3.89	1.28
SC4*	0.65	2	0.34	1.73	0.59	1	0.28	1.52	0.43

CHANNEL HYDRAULIC SECTIONS

SWALE SECTION	TRIBUTARY BASINS	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	TYPE	SIDE SLOPES		Red'd d_{50}
SW-1	ELOG2A	1.00	2.0	0.53	2.37	1.26	V-Ditch	3:1	3:1	N/A
SW-2	EOHR1A	1.00	3.0	0.62	2.62	1.62	V-Ditch	3:1	3:1	N/A

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2018 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BLVD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702.589.3500
WWW.KIMLEY-HORN.COM

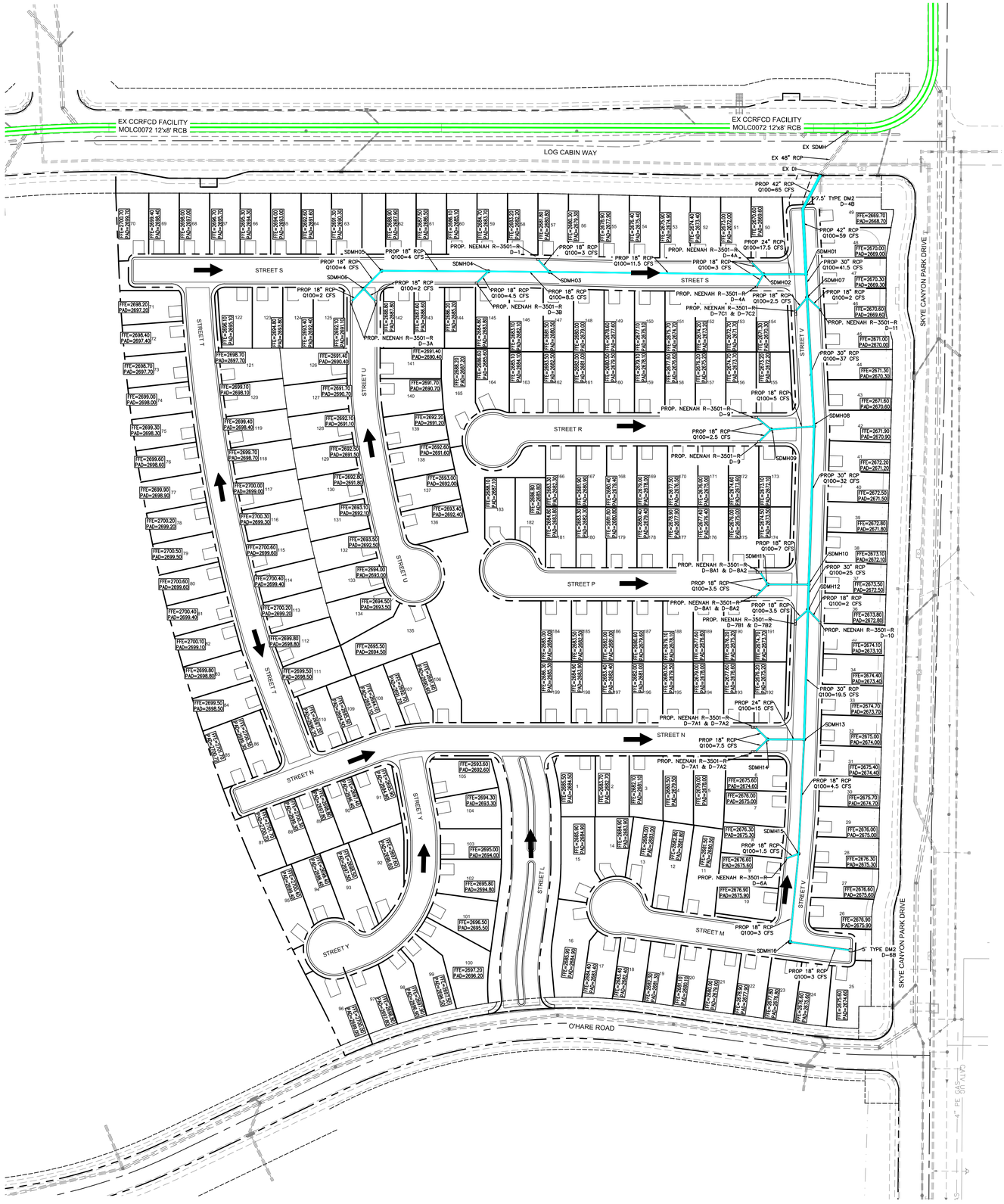
KHA PROJECT 092935006
DATE 3/17/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

ULTIMATE CONDITION BASIN MAP

SUNSTONE - PARCEL D

PREPARED FOR
LENNAR HOMES

ULT-1



NORTH

LEGEND

- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING CCRFCD FACILITY
- FLOW ARROW

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BLVD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

KHA PROJECT 092935006
DATE 5/5/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

FACILITY MAP

SUNSTONE PARCEL D
PREPARED FOR
LENNAR HOMES
CITY OF LAS VEGAS NEVADA

FAC-1

Plotted By:Donovan, Autumlyn Sheet Set:Kha Layout:FAC-1 July 01, 2020 10:47:37am K:\LAV_Civil\092935006-Lennar Sunstone\Reports\DRAINAGE\Parcel D\02_ADD\Figures\CAD\ADD_Facility_Map.dwg

City of Las Vegas

AGENDA MEMO - PLANNING

PLANNING COMMISSION MEETING DATE: MARCH 10, 2020
DEPARTMENT: PLANNING
ITEM DESCRIPTION: APPLICANT: GREYSTONE NEVADA, LLC - OWNER: EASTLAND, LLC

** STAFF RECOMMENDATION(S) **

CASE NUMBER	*RECOMMENDATION*	*REQUIRED FOR APPROVAL*
TMP-78151	Staff recommends APPROVAL, subject to conditions:	

** NOTIFICATION **

NEIGHBORHOOD ASSOCIATIONS NOTIFIED N/A

NOTICES MAILED N/A

PROTESTS 0

APPROVALS 0

SS

**** CONDITIONS ****

TMP-78151 CONDITIONS

Planning

1. Approval of the Tentative Map shall be for no more than four (4) years. If a Final Map is not recorded on all or a portion of the area embraced by the Tentative Map within four (4) years of the approval of the Tentative Map, this action is void.

2. All development shall conform to the Sunstone Development Agreement and related exhibits as amended, including the Sunstone Design Guidelines and Sunstone Parks Agreement.

3. Street names must be provided in accordance with the City's Street Naming Regulations.

4. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.

5. In conjunction with creation, declaration and recordation of the subject common-interest community, and prior to recordation of the Covenants, Codes and Restrictions ("CC&R"), or conveyance of any unit within the community, the Developer is required to record a Declaration of Private Maintenance Requirements ("DPMR") as a covenant on all associated properties, and on behalf of all current and future property owners. The DPMR is to include a listing of all privately owned and/or maintained infrastructure improvements, along with assignment of maintenance responsibility for each to the common interest community or the respective individual property owners, and is to provide a brief description of the required level of maintenance for privately maintained components. The DPMR must be reviewed and approved by the City of Las Vegas Department of Field Operations prior to recordation, and must include a statement that all properties within the community are subject to assessment for all associated costs should private maintenance obligations not be met, and the City of Las Vegas be required to provide for said maintenance. Also, the CC&R are to include a statement of obligation of compliance with the DPMR. Following recordation, the Developer is to submit copies of the recorded DPMR and CC&R documents to the City of Las Vegas Department of Field Operations.

6. All development is subject to the conditions of City Departments and State Subdivision Statutes.

Public Works

7. Private streets must be granted and labeled on the Final Map for this site as Public Utility Easements (P.U.E.), Public Sewer Easements, and Public Drainage Easements with private surface maintenance by the Homeowner's Association.

8. In accordance with Condition #10 of TMP-76718 and Section 3.04 of the Sunstone Development Agreement, if not already constructed or guaranteed by the master developer, a minimum two lanes of asphalt pavement on village streets providing the main access to this site and a working sanitary sewer connection shall be provided prior to a final inspection of any dwelling units within this Tentative Map. Complete construction of Village streets shall conform to Section 3.04 of the Sunstone Development Agreement. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.

9. Common Element "N" shall be a minimum 40-foot wide Public Sewer, Public Drainage, and Public Utility Easement to Be Privately Maintained. The boundary between Lot 52 and Common Element "N" may need to move east to accommodate the proposed easement. No trees or landscaping over three feet tall shall be allowed within the public sewer easement.

10. Construct paved access to any proposed manholes not located within the private streets.

11. Prior to the recordation of a Final Map for this site, submit a pedestrian circulation plan to identify nearby pedestrian attractors and recommend measures to accommodate pedestrians, such as but not limited to pedestrian access, crosswalk, pedestrian activated flashers and temporary sidewalks.

12. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building, grading permits or the recordation of a Final Map, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

13. The approval of all Public Works related improvements shown on this Tentative Map is in concept only. Specific design and construction details relating to size, type and/or alignment of improvements, including but not limited to street, sewer and drainage improvements, shall be resolved prior to approval of the construction plans by the City. No deviations from adopted City Standards shall be allowed unless specific written approval for such is received from the City Engineer prior to the recordation of a Final Map or the approval of subdivision related construction plans, whichever may occur first. Approval of this Tentative Map does not constitute approval of any deviations. If such approval cannot be obtained, a revised Tentative Map must be submitted showing elimination of such deviations. Roadway locations and parcel entries are schematic and final studies and engineering improvements designs. Geometric design of Parcel entry points must be approved through the development review of each parcel.

14. Site development to comply with all applicable conditions of approval for the Sunstone master Tentative Map (TMP-76718) and any other site related actions.

** STAFF REPORT **

PROJECT DESCRIPTION

The applicant requests review of a Tentative Map for a 199-lot private gated single family residential subdivision on 30.74 acres of undeveloped land at the southeast corner of Log Cabin Way and N Skye Canyon Park Dr.

ISSUES

- The boundary between Lot 52 and Common Element "N" may need to move east to accommodate a 40-foot public sewer easement required by Public Works condition.
- The Tentative Map was reviewed and approved by the Master Developer of Sunstone on December 23, 2019 prior to submittal to the City for review.

ANALYSIS

The proposed subdivision is part of a 630-acre master planned development (Sunstone) generally located east of U.S. 95 and south of Moccasin Road. The Sunstone community is zoned T-D (Traditional Development), a district which was established to permit and encourage the development of comprehensively planned mixed-use communities with a minimum of 80 contiguous acres of land under one ownership or control that can generally exist as a self-contained community.

Development of the site is subject to the terms of an approved Development Agreement between the Master Developer and the City of Las Vegas, which includes the Sunstone Design Guidelines. The Development Agreement indicates that the proposed subdivision is part of Phase 2 of development. The developer has requested that Sunstone R-SL (Residential Small Lot) standards be used for this subdivision, which conforms to the L (Residential Low) Sunstone land use category designated for this parcel by the Development Agreement. The minimum lot size under the Sunstone R-SL standards is 2,800 square feet and the minimum lot width is 35 feet; this subdivision proposes lots with an average size of 4,343 square feet and 45 feet in width. Two-story units are planned with sizes ranging between 2,400 to 2,800 square feet. The density of this subdivision is 6.47 dwelling units per acre, which is below the maximum 15 dwelling units per acre required by the Sunstone Master Land Use Plan for L (Residential Low) designated parcels.

Access to the site is from Ohare Road, which was designed and recorded through a Parent Final Map (FMP-77750) on February 10, 2020. Interior streets, trails, open spaces and drainage corridors are private and will be maintained by a Homeowners' Association. Private streets are 49 feet wide with sidewalks on both sides as required by the Sunstone Development Agreement. A 50-foot paseo separates this parcel from another residential parcel to the west (Parcel F). A trail will be installed within the paseo and maintained by the Master Developer. Perimeter landscaping will be provided through the Master Developer along Ohare Road, N Skye Canyon Park Dr and Log Cabin Way and will conform to Sunstone Design Guidelines.

As this site is part of a master plan with specific offsite improvement standards and trail pathways, it is not subject to Title 19.04 street section and connectivity requirements. Stub street terminations are permitted by the Sunstone Development Agreement. The Tentative Map indicates a Connectivity Ratio of 1.18 and includes multiple bicycle and pedestrian connections. The site slopes down from west to east approximately 3% and from south to north less than 1%. Per Section 6.B.3 of the Sunstone Design Guidelines, the maximum retaining wall height is six feet. The submitted cross sections show tiered retaining walls of 3.5 feet and 5.5 feet along the west property line. No retaining walls over six feet in height are shown. Sunstone Design Guidelines allow up to 12 feet of exposure.

The Clark County School District (CCSD) has commented on the impact future development might have on the three levels of schools in the area. CCSD projects that approximately 86 additional primary and secondary school students will be generated by the proposed development on this site. According to CCSD, Bilbray and Scherkenback Elementary Schools and Ralph Cadwallader Middle School are slightly below capacity for the 2019-20 school year. Arbor View High School is 129% over program capacity. No new schools are planned in the area.

FINDINGS (TMP-78151)

The Tentative Map generally conforms to the terms of the Sunstone Development Agreement. The map also conforms to Nevada Revised Statutes as applicable for tentative maps. Staff recommends approval, subject to conditions.

BACKGROUND INFORMATION

Related Relevant City Actions by Planning, Fire, Bldg., etc.	
06/19/19	The City Council approved the First Amendment and Restatement of the Sunstone Development Agreement (thereby dissolving the Eastland Development Agreement) on approximately 628 acres at the southwest corner of Moccasin Road and N Skye Canyon Park Dr (DIR-76290). The Planning Commission and staff recommended approval.
	The City Council approved the First Amendment and Restatement of the Sunstone Parks Agreement (DIR-76291). The Planning Commission and staff recommended approval.
07/23/19	The Planning Commission approved a Parent Tentative Map (TMP-76718) for a 22-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr. Staff recommended approval.
02/10/20	A Parent Final Map (FMP-77750) for a 20-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr was recorded.

Most Recent Change of Ownership	
11/07/13	A deed was recorded for a change in ownership.

Related Building Permits/Business Licenses
There are no related building permits or business licenses associated with the subject site.

Pre-Application Meeting	
12/23/19	Department of Planning staff met with the applicant to discuss submittal requirements for a Tentative Map application. The applicant was advised that a map could be submitted but would not be placed on an agenda until the parent final map for Sunstone recorded.

Neighborhood Meeting
A neighborhood meeting was not required, nor was one held.

Field Check	
01/30/20	The site is undeveloped with native desert vegetation. A staging area for a paving project is located at the corner of Log Cabin Way and N Skye Canyon Park Dr.

Details of Application Request	
Site Area	
Gross Acres	30.74

Surrounding Property	***Existing Land Use Per Title 19.12***	***Planned or Special Land Use Designation***	***Existing Zoning District***
Subject Property	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
North	Undeveloped	L (Residential Low) - Sunstone P (Park and Trail) - Sunstone	T-D (Traditional Development)
South	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
East	Single Family, Detached	PCD (Planned Community Development)	R-PD6 (Residential Planned Development – 6 Units per Acre)
West	Undeveloped	P (Park and Trail) - Sunstone	T-D (Traditional Development)

Master and Neighborhood Plan Areas	***Compliance***
Sunstone Development Agreement	Y
Special Area and Overlay Districts	***Compliance***
T-D (Traditional Development) District	Y
Other Plans or Special Requirements	***Compliance***
Trails (by others)	N/A
Las Vegas Redevelopment Plan Area	N/A
Interlocal Agreement	N/A
Project of Significant Impact (Development Impact Notification Assessment)	N/A
Project of Regional Significance	N/A

DEVELOPMENT STANDARDS

Pursuant to the Sunstone Design Guidelines for the R-SL (Residential Small Lot) density category, the following standards apply:

Standard	*Required/Allowed*	*Provided*	*Compliance*
Housing Type	Single Family Residential	Single Family Residential	Y
Min. Lot Size	2,800 SF	4,038 SF	Y
Min. Lot Width	35 Feet	45 Feet	Y
Min. Setbacks			
• Front (single story living element or porch)*	14 Feet	14 Feet	Y
• Front (to garage door)	18 Feet	18 Feet	Y
• Front (2nd story elements)	20 Feet	20 Feet	Y
• Side	5 Feet	5 Feet	Y
• Corner Side	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	Y
• Rear	10 Feet to single story living element 15 Feet to 2nd story living element**	10 Feet to single story living element 15 Feet to 2nd story living element	Y
Max. Lot Coverage	60 %	60 %	Y
Max. Building Height	3 stories/35 Feet	1 story/35 Feet	Y

*May be reduced to 10 feet for single family living or porch elements for 30% of building width.
**May be reduced by 5 feet for 50% of building width.

Street Name	***Functional Classification of Street(s)***	***Governing Document***	***Actual Street Width (Feet)***	***Compliance with Street Section***
N Skye Canyon Park Dr	Primary Arterial	Planned Streets and Highways Map	43-70	N*
	Arterial with Trail	Sunstone DA		
Ohare Rd	Minor Collector with Bike Lanes	Sunstone DA	0	N*
Log Cabin Way	Arterial	Sunstone DA	0	N*

*Public perimeter streets will be improved according to the requirements of the Sunstone Development Agreement.

19.04.040 Connectivity		
Transportation Network Element	***# Links***	***# Nodes***
Internal Street	20	
Intersection – Internal		10
Cul-de-sac Terminus		5
Intersection – External Street or Stub Terminus		4
Intersection – Stub Terminus w/ Temporary Turn Around Easements		0
Non-Vehicular Path - Unrestricted	2.5	
Total	22.5	19
	Required	***Provided***
Connectivity Ratio (Links / Nodes):	**N/A**	**1.18**

Pursuant to Title 19.08 and 19.12, the following parking standards apply:

Parking Requirement							
Use	***Gross Floor Area or Number of Units***	***Required***			***Provided***		***Compliance***
		Parking Ratio	*Parking*		*Parking*		
			Regular	Handi-capped	Regular	Handi-capped	
Single Family, Detached	199 units	2 spaces per unit w/in enclosed garage	398				
TOTAL SPACES REQUIRED			398		398		Y
Regular and Handicap Spaces Required			398	0	398	0	Y

SS

Kimley»Horn

May 21, 2020

Department of Planning
City of Las Vegas
333 N Rancho Dr
Las Vegas, Nevada 89106

RE: ***Justification Letter for TMP-78141/PRJ-78003, Sunstone – Parcel D (Parcel 13 of Sunstone Final Map – FMP-77750) cut and fill more than two feet***

To Whom it May Concern:

We hereby submit the attached grading plans for review by the CLV Planning Department of Sunstone – Parcel F (Parcel 12 of Sunstone Final Map – FMP-77750), a single-family residential subdivision located within the 630+/- acre Sunstone master planned community at the SWC of the intersection of N. Skye Canyon Park Dr. and Log Cabin Way.

Due to the existing topography of the site, generally having an existing slope of 4% to 5% from west to east, the site will have areas of cut and fill of greater than two feet onsite. In addition, the 30+/- acre site's current natural topography contains ridges and valleys traversing through the site with height/depth greater than four feet requiring adequate cut or fill accordingly. The site is currently being designed to blend with the Sunstone infrastructure roadways, maintain drainage per the approved master technical drainage study, attain balanced earthworks, and reduce earthwork movement onsite to the greatest extent practicable.

On behalf of the owner, EASTLAND LLC, we'd like to respectfully request approval for the cut and fill heights exceeding two feet as shown in the grading plans included with this review. Thank you for your consideration, we look forward to working with the Planning Department for a favorable recommendation for this project. Please contact me at (702) 862-3632 or Mikal.Kintner@kimley-horn.com should you have any questions or concerns.

Sincerely,

Mikal Kintner

Mikal Kintner
cc: Lennar Homes

PLANS APPROVED
PLANNING
Dept of Planning
City of Las Vegas, Nevada
2 FOOT GRADE DIFFERENCE ONLY
LHM MAY 21 2020

Conforms to the minimum requirement of LVMC Title 19 applicable Master Plan Development standards and/or Conditions of Approval. Make No Change Without Approval. Plan is Not a Permit to Violate Any Ordinance.

FMP.

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
    - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Worksheet for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	4.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.29 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.1 ft²
Wetted Perimeter	10.37 ft
Hydraulic Radius	0.10 ft
Top Width	10.28 ft
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Critical Slope	0.73 %
Velocity	3.70 ft/s
Velocity Head	0.21 ft
Specific Energy	0.51 ft
Froude Number	2.012
Flow Type	Supercritical

Worksheet for D-1 (Half Street)

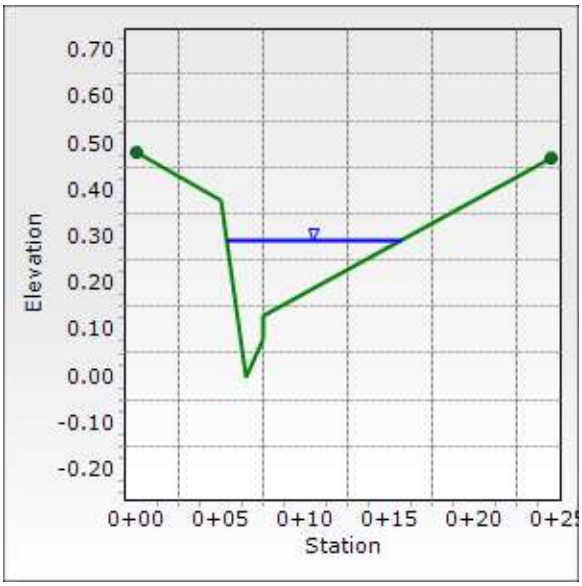
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Channel Slope	3.25 %
Critical Slope	0.73 %

Cross Section for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.29 ft
Discharge	4.00 cfs



Worksheet for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	7.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.35 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.7 ft²
Wetted Perimeter	13.42 ft
Hydraulic Radius	0.13 ft
Top Width	13.33 ft
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Critical Slope	0.70 %
Velocity	4.29 ft/s
Velocity Head	0.29 ft
Specific Energy	0.64 ft
Froude Number	2.089
Flow Type	Supercritical

Worksheet for D-3B (Half Street)

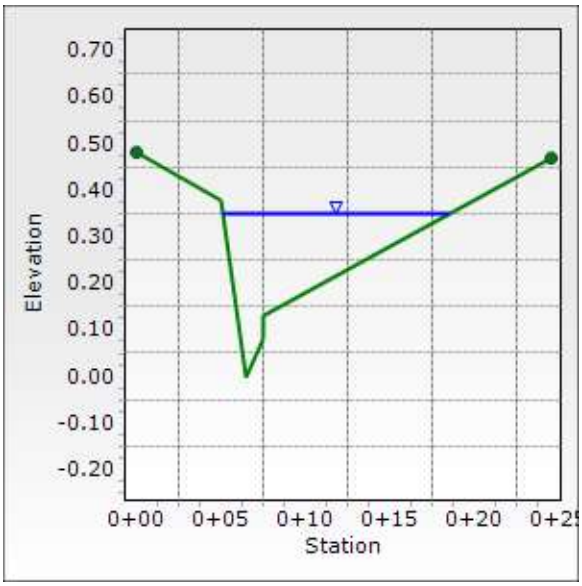
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Channel Slope	3.25 %
Critical Slope	0.70 %

Cross Section for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.35 ft
Discharge	7.50 cfs



Worksheet for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	0.53 ft
Flow Area	0.8 ft²
Wetted Perimeter	3.35 ft
Hydraulic Radius	0.25 ft
Top Width	3.18 ft
Critical Depth	0.49 ft
Critical Slope	1.56 %
Velocity	2.37 ft/s
Velocity Head	0.09 ft
Specific Energy	0.62 ft
Froude Number	0.811
Flow Type	Subcritical

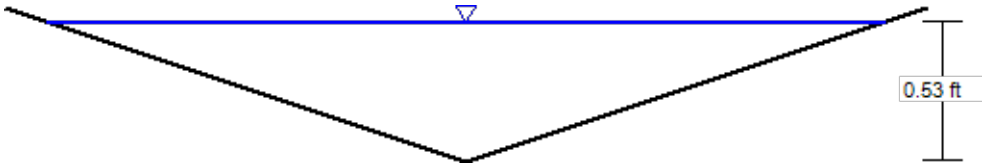
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

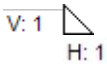
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.53 ft
Critical Depth	0.49 ft
Channel Slope	1.00 %
Critical Slope	1.56 %

Cross Section for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.53 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs





Worksheet for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs

Results	
Normal Depth	0.62 ft
Flow Area	1.1 ft²
Wetted Perimeter	3.91 ft
Hydraulic Radius	0.29 ft
Top Width	3.71 ft
Critical Depth	0.57 ft
Critical Slope	1.48 %
Velocity	2.62 ft/s
Velocity Head	0.11 ft
Specific Energy	0.72 ft
Froude Number	0.832
Flow Type	Subcritical

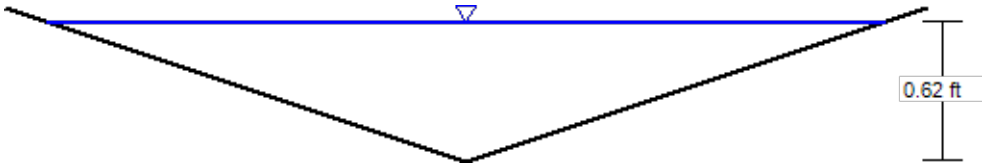
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

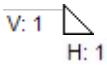
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.62 ft
Critical Depth	0.57 ft
Channel Slope	1.00 %
Critical Slope	1.48 %

Cross Section for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.62 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs





Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED MAINLINE - Connect to 42" RCP in Log Cabin Way to Street V to Street N

DATE: 06/30/20 FILE: SF6.xls

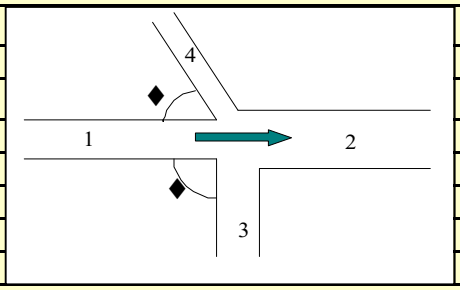
Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		42			54.11																					Outlet K_o=	1.0									62.16	61.45		
1000.00	1053.57	R	42	1	54.11	57.23	53.6	5.83%	9.62	0.0049	65.0	6.76	0.71	0.0042	0.0042	0.22																		0.00	62.38	61.67			FULL	U/S
1053.57	1058.57	T	42	1	57.23	57.40	5.0	3.29%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0038		0.02	30	0.22	0.16	45	0.50	0.42											0.59			62.97	62.39	FULL	U/S
1058.57	1150.00	R	42	1	57.40	58.04	91.4	0.70%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0034	0.31																		0.00	63.29	62.70			FULL	U/S
1150.00	1155.00	T	30	1	58.04	59.08	5.0	20.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0068		0.03	0	0.02	0.01	90	0.25	0.31											0.35			63.64	62.53	FULL	U/S
1155.00	1184.29	R	30	1	59.08	59.28	29.3	0.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0102	0.30																		0.00	63.94	62.83			FULL	U/S
1184.29	1189.29	T	30	1	59.28	59.32	5.0	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0092		0.05	0	0.02	0.02													0.43	0.50			64.44	63.55	FULL	U/S
1189.29	1375.21	R	30	1	59.32	60.62	185.9	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0081	1.51																		0.00	65.95	65.06			FULL	U/S
1375.21	1380.21	T	30	1	60.62	60.66	5.0	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0071		0.04	3	0.02	0.02	90	0.25	0.72											0.77			66.72	66.06	FULL	U/S
1380.21	1608.96	R	30	1	60.66	62.25	228.8	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0061	1.39																		0.00	68.10	67.44			FULL	U/S
1608.96	1613.96	T	30	1	62.25	62.29	5.0	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0049		0.02	0	0.02	0.01	90	0.25	0.56											0.60			68.70	68.30	FULL	U/S
1613.96	1646.18	R	30	1	62.29	62.51	32.2	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0037	0.12																		0.00	68.82	68.42			FULL	U/S
1646.18	1651.18	T	30	1	62.51	62.57	5.0	1.10%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0030		0.01	0	0.02	0.01													0.30	0.32			69.14	68.90	FULL	U/S
1651.18	1838.06	R	30	1	62.57	63.87	186.9	0.70%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0023	0.42																		0.00	69.56	69.32			FULL	U/S
1838.06	1843.06	T	24	1	63.87	64.41	5.0	10.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0033		0.02	90	1.33	0.33														0.34			69.91	69.55	FULL	U/S
1843.06	1892.02	R	24	1	64.41	64.75	49.0	0.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0044	0.21																		0.00	70.12	69.77			FULL	U/S
1892.02	1897.02	T	18	1	64.75	65.32	5.0	11.29%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0047		0.02	45	0.46	0.16	45	0.50	0.21											0.40			70.52	70.24	FULL	U/S
1897.02	1917.48	R	18	1	65.32	65.70	20.5	1.89%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.10																		0.00	70.63	70.35			FULL	U/S
1917.48	1922.48	T	18	1	65.70	66.08	5.0	7.44%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	0	0.02	0.01	45	0.50	0.22											0.24			70.87	70.74	FULL	U/S
1922.48	1923.98	R	18	1	66.08	66.27	1.5	13.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	70.87	70.75			FULL	U/S
1923.98	1923.98	R	18	1	66.27	66.27	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			70.98	70.98	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	37
Flow in Pipe 2 (cfs)	42
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	44
Angle of Pipe 4*	42



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77
Head Loss at Junction (ft)	**0.43**

Equation Used:

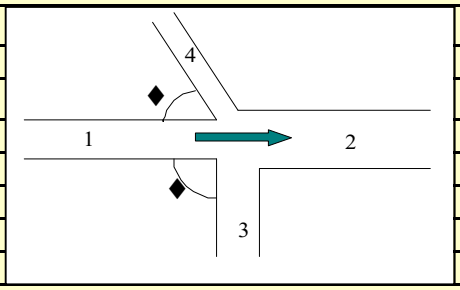
Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	19
Flow in Pipe 2 (cfs)	25
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	4
Angle of Pipe 3	44
Angle of Pipe 4*	46



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**0.30**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Mainline - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	54.11	57.61	62.16	61.45	64.03	EXDI	OK	NO
1053.57	57.23	60.73	62.38	61.67	66.82	DI02	OK	NO
1058.57	57.40	60.90	62.97	62.39	66.82	DI02	OK	NO
1150.00	58.04	61.54	63.29	62.70	68.12	SDMH01	OK	NO
1155.00	59.08	61.58	63.64	62.53	68.12	SDMH01	OK	NO
1184.29	59.28	61.78	63.94	62.83	68.36	SDMH07	OK	NO
1189.29	59.32	61.82	64.44	63.55	68.36	SDMH07	OK	NO
1375.21	60.62	63.12	65.95	65.06	69.66	SDMH08	OK	NO
1380.21	60.66	63.16	66.72	66.06	69.66	SDMH08	OK	NO
1608.96	62.25	64.75	68.10	67.44	71.33	SDMH10	OK	NO
1613.96	62.29	64.79	68.70	68.30	71.33	SDMH10	OK	NO
1646.18	62.51	65.01	68.82	68.42	71.59	SDMH12	OK	NO
1651.18	62.57	65.07	69.14	68.90	71.59	SDMH12	OK	NO
1838.06	63.87	66.37	69.56	69.32	72.93	SDMH13	OK	NO
1843.06	64.41	66.41	69.91	69.55	72.93	SDMH13	OK	NO
1892.02	64.75	66.75	70.12	69.77	73.54	SDMH14	OK	NO
1897.02	65.32	66.82	70.52	70.24	73.54	SDMH14	OK	NO
1917.48	65.70	67.20	70.63	70.35	73.45	DI23	OK	NO
1922.48	66.08	67.58	70.87	70.74	73.45	DI23	OK	NO
1923.98	66.27	67.77	70.87	70.75	73.55	DI24	OK	NO
1923.98	66.27	67.77	70.98	70.98	73.55	DI24	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH 01 (Street S Mainline)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

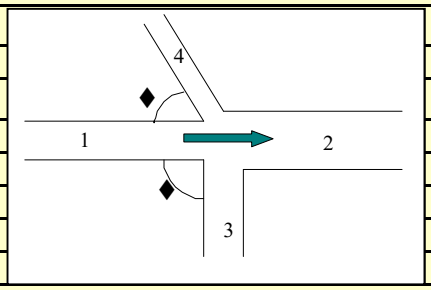
CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S										H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		24			59.27																					Outlet K_o=	1.0									63.18	62.70		
1000.00	1060.50	R	24	1	59.27	59.69	60.5	0.70%	3.14	0.0049	17.5	5.57	0.48	0.0060	0.0060	0.36																		0.00	63.54	63.06			FULL	U/S
1060.50	1065.50	T	18	1	59.69	60.30	5.0	12.06%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0090		0.04	0	0.02	0.01													1.60	1.66			65.20	64.54	FULL	U/S
1065.50	1376.74	R	18	1	60.30	70.98	311.2	3.43%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0119	3.72																		0.00	73.14	72.48			PART	D/S
1376.74	1381.74	T	18	1	70.98	71.15	5.0	3.22%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0092		0.05	0	0.02	0.01	47	0.50	0.48											0.54			73.68	73.32	FULL	U/S
1381.74	1466.74	R	18	1	71.15	73.70	85.0	3.01%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0065	0.55																		0.00	75.56	75.20			PART	D/S
1466.74	1471.74	T	18	1	73.70	73.86	5.0	3.01%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0040		0.02	0	0.02	0.01	45	0.50	0.32											0.35			75.91	75.83	FULL	U/S
1471.74	1624.74	R	18	1	73.86	78.45	153.0	3.00%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.22																		0.00	80.02	79.95			PART	D/S
1624.74	1629.74	T	18	1	78.45	78.54	5.0	1.85%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014		0.01	45	0.46	0.04														0.04			80.12	80.04	FULL	D/S
1629.74	1661.74	R	18	1	78.54	78.76	32.0	0.70%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.05																		0.00	80.34	80.26			FULL	D/S
1661.74	1666.74	T	18	1	78.76	78.81	5.0	0.86%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0009		0.00	88	1.33	0.11	0	0.85	0.06											0.17			80.52	80.50	FULL	U/S
1666.74	1690.62	R	18	1	78.81	79.05	23.9	1.02%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	80.57	80.55			FULL	D/S
1690.62	1690.62	R	18	1	79.05	79.05	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.59	80.59	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	18.0
Diameter of Pipe 2 (in)	18.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	12
Flow in Pipe 2 (cfs)	18
Flow in Pipe 3 (cfs)	3
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	45
Angle of Pipe 4*	45

*Optional



Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	1.77
Area of Pipe 2 (ft^2)	1.77
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**1.60**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

SDMH 01 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	59.27	61.27	63.18	62.70	68.12	SDMH01	OK	NO
1060.50	59.69	61.69	63.54	63.06	68.99	SDMH02	OK	NO
1065.50	60.30	61.80	65.20	64.54	68.99	SDMH02	OK	NO
1376.74	70.98	72.48	73.14	72.48	79.28	SDMH03	OK	NO
1381.74	71.15	72.65	73.68	73.32	79.28	SDMH03	OK	NO
1466.74	73.70	75.20	75.56	75.20	82.19	SDMH04	OK	NO
1471.74	73.86	75.36	75.91	75.83	82.19	SDMH04	OK	NO
1624.74	78.45	79.95	80.02	79.95	87.14	SDMH05	OK	NO
1629.74	78.54	80.04	80.12	80.04	87.14	SDMH05	OK	NO
1661.74	78.76	80.26	80.34	80.26	87.61	SDMH06	OK	NO
1666.74	78.81	80.31	80.52	80.50	87.61	SDMH06	OK	NO
1690.62	79.05	80.55	80.57	80.55	86.86	DI08	OK	NO
1690.62	79.05	80.55	80.59	80.59	86.86	DI08	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0											64.58	64.54		
1000.00	1025.89	R	18	1	60.21	60.47	25.9	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.61	64.56			FULL	U/S
1025.89	1025.89	R	18	1	60.47	60.47	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.65	64.65	FULL	U/S

SDMH 02 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.99	SDMH02	OK	NO
1025.89	60.47	61.97	64.61	64.56	68.87	DI03	OK	NO
1025.89	60.47	61.97	64.65	64.65	68.87	DI03	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 South

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0									64.58	64.54		
1000.00	1021.46	R	18	1	60.21	60.53	21.5	1.50%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.60	64.56			FULL	U/S
1021.46	1021.46	R	18	1	60.53	60.53	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.64	64.64	FULL	U/S

SDMH 02 South - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.32	SDMH02	OK	NO
1021.46	60.53	62.03	64.60	64.56	68.62	DI04	OK	NO
1021.46	60.53	62.03	64.64	64.64	68.62		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH03

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			71.07																					Outlet K_o=	1.0									73.36	73.32		
1000.00	1025.18	R	18	1	71.07	71.69	25.2	2.46%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																			0.00	73.39	73.34			FULL	U/S
1025.18	1025.18	R	18	1	71.69	71.69	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			73.43	73.43	FULL	U/S

SDMH 03 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	71.07	72.57	73.36	73.32	79.28	SDMH03	OK	NO
1025.18	71.69	73.19	73.39	73.34	79.38	DI05	OK	NO
1025.18	71.69	73.19	73.43	73.43	79.38	DI05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH04

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			73.78																					Outlet K_o=	1.0										75.93	75.83		
1000.00	1024.63	R	18	1	73.78	74.82	24.6	4.22%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.05																		0.00	76.42	76.32			PART	D/S
1024.63	1024.63	R	18	1	74.82	74.82	0.0		1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.00					45	0.50	0.05	Ki=	0.4	0.04								0.09			76.51	76.51	FULL	U/S

SDMH 04 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	73.78	75.28	75.93	75.83	82.19	SDMH04		OK	NO
1024.63	74.82	76.32	76.42	76.32	81.93	DI06		OK	NO
1024.63	74.82	76.32	76.51	76.51	81.93	DI06		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH06 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			78.78																					Outlet K_o=	1.0											80.52	80.50		
1000.00	1026.38	R	18	1	78.78	79.41	26.4	2.39%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																			0.00	80.93	80.91			PART	D/S
1026.38	1026.38	R	18	1	79.41	79.41	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.95	80.95	FULL	U/S

SDMH 06 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	78.78	80.28	80.52	80.50	87.61	SDMH06	OK	NO
1026.38	79.41	80.91	80.93	80.91	87.72	DI07	OK	NO
1026.38	79.41	80.91	80.95	80.95	87.72	DI07	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.30																					Outlet K_o=	1.0											63.57	63.55		
1000.00	1026.56	R	18	1	60.30	60.96	26.6	2.49%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	63.58	63.56			FULL	U/S
1026.56	1026.56	R	18	1	60.96	60.96	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			63.60	63.60	FULL	U/S

SDMH 07 East - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.57	63.55	68.36	SDMH07	OK	NO
1026.56	60.96	62.46	63.58	63.56	67.77	DI09	OK	NO
1026.56	60.96	62.46	63.60	63.60	67.77	DI09	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			60.30																					Outlet K_o=	1.0										63.58	63.55		
1000.00	1024.39	R	18	1	60.30	60.79	24.4	2.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	63.59	63.56			FULL	U/S
1024.39	1029.39	T	18	1	60.79	61.39	5.0	11.90%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0004		0.00	42	0.32	0.01	45	0.50	0.02											0.04			63.63	63.61	FULL	U/S
1029.39	1030.89	R	18	1	61.39	61.40	1.5	1.00%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00																	0.00	63.63	63.61			FULL	U/S
1030.89	1030.89	R	18	1	61.40	61.40	0.0		1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00					45	0.50	0.01	Ki=	0.4	0.01							0.01			63.64	63.64	FULL	U/S

SDMH 07 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.58	63.55	68.36	SDMH07	OK	NO
1024.39	60.79	62.29	63.59	63.56	67.65	DI10	OK	NO
1029.39	61.39	62.89	63.63	63.61	67.65	DI10	OK	NO
1030.89	61.40	62.90	63.63	63.61	67.68	DI11	OK	NO
1030.89	61.40	62.90	63.64	63.64	67.68	DI11	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH08 (Street R)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)=	0.013	Inlet Structure Type or K_i=	D	Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			61.64																					Outlet K_o=	1.0									66.18	66.06		
1000.00	1061.30	R	18	1	61.64	62.07	61.3	0.70%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.14																		0.00	66.32	66.20			FULL	U/S
1061.30	1066.30	T	18	1	62.07	62.32	5.0	5.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0014		0.01	45	0.46	0.06	45	0.50	0.11											0.17			66.50	66.46	FULL	U/S
1066.30	1089.25	R	18	1	62.32	64.45	23.0	9.31%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	66.51	66.48			FULL	U/S
1089.25	1089.25	R	18	1	64.45	64.45	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 08 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	61.64	63.14	66.18	66.06	69.66	SDMH08	OK	NO
1061.30	62.07	63.57	66.32	66.20	70.59	SDMH09	OK	NO
1066.30	62.32	63.82	66.50	66.46	70.59	SDMH09	OK	NO
1089.25	64.45	65.95	66.51	66.48	70.33	DI13	OK	NO
1089.25	64.45	65.95	66.54	66.54	70.33	DI13	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH09 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			62.08																					Outlet K_o=	1.0									66.49	66.46		
1000.00	1028.34	R	18	1	62.08	62.47	28.3	1.35%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.02																		0.00	66.51	66.48			FULL	U/S
1028.34	1028.34	R	18	1	62.47	62.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 09 North- Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	62.08	63.58	66.49	66.46	70.59	SDMH09	OK	NO
1028.34	62.47	63.97	66.51	66.48	70.46	DI12	OK	NO
1028.34	62.47	63.97	66.54	66.54	70.46	DI12	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH10

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.27																					Outlet K_o=	1.0								68.54	68.30		
1000.00	1058.50	R	18	1	63.27	63.68	58.5	0.70%	1.77	0.0049	7.0	3.96	0.24	0.0044	0.0044	0.26																		0.00	68.80	68.56			FULL	U/S
1058.50	1063.50	T	18	1	63.68	63.72	5.0	0.78%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0028		0.01	0	0.02	0.00	45	0.50	0.21												0.23			69.03	68.97	FULL	U/S
1063.50	1083.50	R	18	1	63.72	63.89	20.0	0.84%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.06	69.00			FULL	U/S
1083.50	1088.50	T	18	1	63.89	64.46	5.0	11.32%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	47	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1088.50	1090.00	R	18	1	64.46	64.47	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1090.00	1090.00	R	18	1	64.47	64.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 10 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.27	64.77	68.54	68.30	71.33	SDMH10	OK	NO
1058.50	63.68	65.18	68.80	68.56	72.15	SDMH11	OK	NO
1063.50	63.72	65.22	69.03	68.97	72.15	SDMH11	OK	NO
1083.50	63.89	65.39	69.06	69.00	71.89	DI16	OK	NO
1088.50	64.46	65.96	69.13	69.10	71.89	DI16	OK	NO
1090.00	64.47	65.97	69.13	69.10	72.02	DI7	OK	NO
1090.00	64.47	65.97	69.16	69.16	72.02	DI7	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH11 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.70																					Outlet K_o=	1.0												
1000.00	1018.50	R	18	1	63.70	65.32	18.5	8.77%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.05	68.99			FULL	U/S
1018.50	1023.50	T	18	1	65.32	65.57	5.0	4.84%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	51	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1023.50	1025.00	R	18	1	65.57	65.58	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1025.00	1025.00	R	18	1	65.58	65.58	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 11 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.70	65.20	69.03	68.97	72.15	SDMH11	OK	NO
1018.50	65.32	66.82	69.05	68.99	71.68	DI14	OK	NO
1023.50	65.57	67.07	69.13	69.10	71.68	DI14	OK	NO
1025.00	65.58	67.08	69.13	69.10	71.80	DI15	OK	NO
1025.00	65.58	67.08	69.16	69.16	71.80	DI15	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			63.55																					Outlet K_o=	1.0									68.92	68.90		
1000.00	1026.16	R	18	1	63.55	64.20	26.2	2.48%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	68.93	68.91			FULL	U/S
1026.16	1026.16	R	18	1	64.20	64.20	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			68.95	68.95	FULL	U/S

SDMH 12 East - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	63.55	65.05	68.92	68.90	71.59	SDMH12	Connect to Mainline	OK	NO
1026.16	64.20	65.70	68.93	68.91	71.00	DI18	Eastern DI	OK	NO
1026.16	64.20	65.70	68.95	68.95	71.00	DI18	Eastern DI	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.55																					Outlet K_o=	1.0									68.96	68.90		
1000.00	1022.68	R	18	1	63.55	64.02	22.7	2.07%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.03																		0.00	68.99	68.93			FULL	U/S
1022.68	1027.68	T	18	1	64.02	64.62	5.0	11.93%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0007		0.00	46	0.46	0.03	45	0.50	0.05												0.08			69.07	69.05	FULL	U/S
1027.68	1029.18	R	18	1	64.62	64.63	1.5	1.00%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00																		0.00	69.07	69.05			FULL	U/S
1029.18	1029.18	R	18	1	64.63	64.63	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01									0.02			69.09	69.09	FULL	U/S

SDMH 12 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.55	65.05	68.96	68.90	71.59	SDMH12	OK	NO
1022.68	64.02	65.52	68.99	68.93	70.87	DI19	OK	NO
1027.68	64.62	66.12	69.07	69.05	70.87	DI19	OK	NO
1029.18	64.63	66.13	69.07	69.05	70.89	DI20	OK	NO
1029.18	64.63	66.13	69.09	69.09	70.89	DI20	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH13

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			64.89																															69.65	69.55		
																												Outlet K_o=		1.0										
1000.00	1166.50	R	18	1	64.89	66.05	166.5	0.70%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.30																		0.00	69.96	69.85			FULL	U/S
1166.50	1171.50	T	18	1	66.05	66.09	5.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0013		0.01	5	0.05	0.00	66	0.33	0.09											0.09			70.05	70.01	FULL	U/S
1171.50	1297.50	R	18	1	66.09	66.97	126.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.10																		0.00	70.15	70.11			FULL	U/S
1297.50	1302.50	T	18	1	66.97	67.02	5.0	0.85%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008		0.00	90	1.33	0.06														0.06			70.22	70.17	FULL	U/S
1302.50	1390.00	R	18	1	67.02	67.89	87.5	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.07																		0.00	70.29	70.24			FULL	U/S
1390.00	1390.00	R	18	1	67.89	67.89	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02									0.04			70.33	70.33	FULL	U/S

SDMH 13 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	64.89	66.39	69.65	69.55	72.93	SDMH13	C4.12	OK	NO
1166.50	66.05	67.55	69.96	69.85	74.12	SDMH15	C4.12	OK	NO
1171.50	66.09	67.59	70.05	70.01	74.12	SDMH15	C4.12	OK	NO
1297.50	66.97	68.47	70.15	70.11	75.21	SDMH16	C4.12	OK	NO
1302.50	67.02	68.52	70.22	70.17	75.21	SDMH16	C4.05	OK	NO
1390.00	67.89	69.39	70.29	70.24	72.56	DI27	C4.05	OK	NO
1390.00	67.89	69.39	70.33	70.33	72.56	DI27	C4.05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH14 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			65.27																					Outlet K_o=	1.0									70.52	70.24		
1000.00	1022.50	R	18	1	65.27	67.22	22.5	8.66%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.11																		0.00	70.63	70.35			FULL	U/S
1022.50	1027.50	T	18	1	67.22	67.46	5.0	4.74%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	52	0.46	0.13	45	0.50	0.22											0.36			71.00	70.87	FULL	U/S
1027.50	1029.00	R	18	1	67.46	67.47	1.5	1.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	71.00	70.88			FULL	U/S
1029.00	1029.00	R	18	1	67.47	67.47	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			71.11	71.11	FULL	U/S

SDMH 14 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	65.27	66.77	70.52	70.24	73.54	SDMH14	OK	NO
1022.50	67.22	68.72	70.63	70.35	73.37	DI21	OK	NO
1027.50	67.46	68.96	71.00	70.87	73.37	DI21	OK	NO
1029.00	67.47	68.97	71.00	70.88	73.49	DI22	OK	NO
1029.00	67.47	68.97	71.11	71.11	73.49	DI22	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH15 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			66.07																					Outlet K_o=	1.0									70.02	70.01		
1000.00	1020.16	R	18	1	66.07	66.52	20.2	2.23%	1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00																		0.00	70.03	70.01			FULL	U/S
1020.16	1020.16	R	18	1	66.52	66.52	0.0		1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00					45	0.50	0.01	Ki=	0.4	0.00								0.01			70.04	70.04	FULL	U/S

SDMH 15 West - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	66.07	67.57	70.02	70.01	74.12	SDMH15	C5.1	OK	NO
1020.16	66.52	68.02	70.03	70.01	73.33	DI26	C5.1	OK	NO
1020.16	66.52	68.02	70.04	70.04	73.33	DI26	C5.1	OK	NO

Worksheet for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

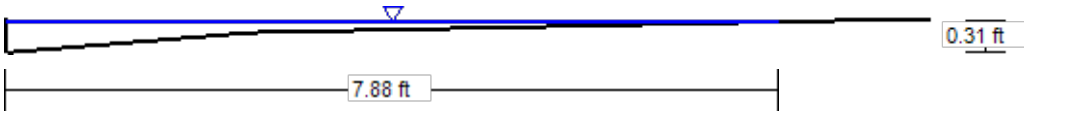
Options	
Grate Flow Option	Exclude None

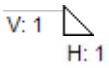
Results	
Efficiency	75.91 %
Intercepted Flow	3.04 cfs
Bypass Flow	0.96 cfs
Spread	7.88 ft
Depth	0.31 ft
Flow Area	0.8 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	4.95 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.038
Grate Flow Ratio	0.750
Active Grate Length	1.13 ft

Cross Section for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	75.91 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

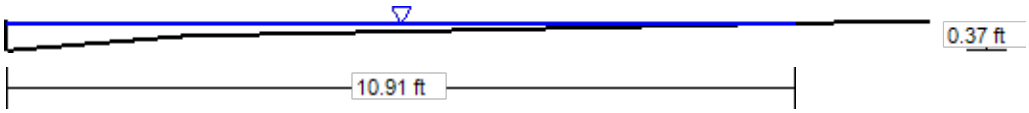
Options	
Grate Flow Option	Exclude None

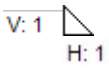
Results	
Efficiency	60.95 %
Intercepted Flow	4.57 cfs
Bypass Flow	2.93 cfs
Spread	10.91 ft
Depth	0.37 ft
Flow Area	1.4 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.44 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.032
Grate Flow Ratio	0.597
Active Grate Length	1.13 ft

Cross Section for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	60.95 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

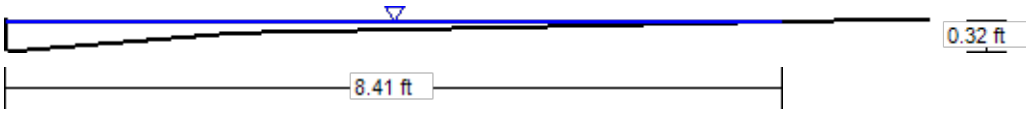


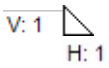


Cross Section for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	73.03 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	73.03 %
Intercepted Flow	3.29 cfs
Bypass Flow	1.21 cfs
Spread	8.41 ft
Depth	0.32 ft
Flow Area	0.9 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.03 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.037
Grate Flow Ratio	0.720
Active Grate Length	1.13 ft

Sunstone Parcel D - Technical Drainage Study								
LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
1	85.50	85.70	84.74	0.60	0.30	-0.42	D-7A2	Street L, 1 course solid grout
1	85.50	83.51	81.72	0.76	0.36	1.65	D-7A1	Street N
2	83.70	81.72	80.09	0.76	0.36	1.64	D-7A1	Street N
3	82.10	80.09	78.47	0.76	0.36	1.67	D-7A1	Street N
4	80.50	78.47	77.00	0.76	0.36	1.69	D-7A1	Street N
5	79.00	77.00	75.44	0.76	0.36	1.66	D-7A1	Street N
6	75.60	75.44	73.37	0.76	0.36	-0.18	D-7B	Street N, 1 course solid grout
6	75.60	73.49	73.13	0.76	0.36	1.77	D-7B	Street V
7	76.00	73.76	73.49	0.76	0.36	1.90	D-7B	Street V
8	76.30	74.09	73.76	0.76	0.36	1.87	D-7B	Street V
9	76.60	74.53	74.09	0.76	0.30	1.85	D-6A	Street V
10	76.90	75.35	74.53	0.76	0.30	1.33	D-6A	Street V
10	76.90	78.05	76.19	0.76	0.30	-1.37	D-6A	Street M, 3 course solid grout
11	81.50	79.27	78.05	0.76	0.30	2.01	D-6A	Street M
12	82.80	80.45	79.27	0.76	0.30	2.13	D-6A	Street M
13	84.00	81.96	80.45	0.76	0.30	1.82	D-6A	Street M
14	84.90	82.79	81.96	0.76	0.30	1.89	D-6A	Street M
15	85.90	83.26	82.79	0.76	0.30	2.42	D-6A	Street M
15	85.90	86.22	85.70	0.60	0.30	-0.54	D-7A2	Street L, 1 course solid grout
16	85.90	83.26	82.22	0.76	0.28	2.46	D-6B	Street M
16	85.90	86.64	86.22	0.60	0.30	-0.96	D-7A2	Street L, 2 course solid grout
16	85.90	83.64	80.21	0.98	0.49	1.66	OH3*	O'Hare Road
17	84.40	82.22	81.41	0.76	0.28	2.00	D-6B	Street M
17	84.40	82.00	80.21	0.98	0.49	1.80	OH3*	O'Hare Road
18	83.40	81.41	80.25	0.76	0.28	1.81	D-6B	Street M
18	83.40	80.21	76.45	0.98	0.49	2.59	OH3*	O'Hare Road
19	82.30	80.25	79.13	0.76	0.28	1.87	D-6B	Street M
19	82.30	80.21	76.45	0.98	0.49	1.49	OH3*	O'Hare Road
20	81.10	79.13	78.00	0.76	0.28	1.79	D-6B	Street M
20	81.10	76.45	73.96	0.98	0.49	4.05	OH3*	O'Hare Road
21	80.00	78.00	76.88	0.76	0.28	1.82	D-6B	Street M
21	80.00	76.45	73.96	0.98	0.49	2.95	OH3*	O'Hare Road
22	78.90	76.88	75.75	0.76	0.28	1.84	D-6B	Street M
22	78.90	73.96	72.76	0.98	0.49	4.34	OH3*	O'Hare Road
23	77.80	75.75	74.63	0.76	0.28	1.87	D-6B	Street M
23	77.80	72.76	70.09	0.98	0.49	4.44	OH3*	O'Hare Road
24	76.60	74.63	73.63	0.76	0.28	1.79	D-6B	Street M
24	76.60	72.76	70.09	0.98	0.49	3.24	OH3*	O'Hare Road
25	75.60	73.63	72.94	0.76	0.28	1.79	D-6B	Street M
25	75.60	70.09	69.24	0.98	0.49	4.91	OH3*	O'Hare Road
26	76.90	74.21	72.96	0.76	0.28	2.51	D-6B	Street M
26	76.90	74.69	74.46	0.76	0.33	1.93	D-10	Street V
27	76.60	74.46	74.15	0.76	0.33	1.86	D-10	Street V
28	76.30	74.15	73.83	0.76	0.33	1.87	D-10	Street V
29	76.00	73.83	73.53	0.76	0.33	1.89	D-10	Street V
30	75.70	73.53	73.21	0.76	0.33	1.89	D-10	Street V
31	75.40	73.21	72.90	0.76	0.33	1.91	D-10	Street V
32	75.00	72.90	72.58	0.76	0.33	1.82	D-10	Street V
33	74.70	72.58	72.26	0.76	0.33	1.84	D-10	Street V
34	74.40	72.26	71.95	0.76	0.33	1.86	D-10	Street V
35	74.10	71.95	71.63	0.76	0.33	1.87	D-10	Street V
36	73.80	71.63	71.32	0.76	0.35	1.85	D-11	Street V
37	73.50	71.32	71.00	0.76	0.35	1.86	D-11	Street V
38	73.10	71.00	70.69	0.76	0.35	1.78	D-11	Street V
39	72.80	70.69	70.37	0.76	0.35	1.79	D-11	Street V
40	72.50	70.37	70.06	0.76	0.35	1.81	D-11	Street V
41	72.20	70.06	69.74	0.76	0.35	1.82	D-11	Street V
42	71.90	69.74	69.44	0.76	0.35	1.84	D-11	Street V
43	71.60	69.44	69.13	0.76	0.35	1.84	D-11	Street V
44	71.30	69.13	68.81	0.76	0.35	1.85	D-11	Street V
45	71.00	68.81	68.50	0.76	0.35	1.87	D-11	Street V
46	70.60	68.50	68.18	0.76	0.33	1.82	D-4B	Street V
47	70.30	68.18	67.87	0.76	0.33	1.84	D-4B	Street V
48	70.00	67.87	67.55	0.76	0.33	1.85	D-4B	Street V

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
49	69.70	67.55	67.41	0.76	0.33	1.87	D-4B	Street V
49	69.70	64.41	64.13	0.70	0.35	4.97	LC7a*	Log Cabin Way
50	70.60	67.74	67.41	0.76	0.33	2.58	D-4B	Street V
50	70.60	69.50	68.35	0.76	0.30	0.88	D-4A	Street S
50	70.60	66.03	64.41	0.70	0.35	4.25	LC7a*	Log Cabin Way
51	73.00	68.25	66.03	0.70	0.35	4.43	LC7a*	Log Cabin Way
51	73.00	70.97	69.50	0.76	0.30	1.81	D-4A	Street S
52	74.40	68.25	66.03	0.70	0.35	5.83	LC7a*	Log Cabin Way
52	74.40	72.43	70.97	0.76	0.30	1.75	D-4A	Street S
53	75.90	73.08	69.21	0.70	0.35	2.50	LC7a*	Log Cabin Way
53	75.90	73.89	72.43	0.76	0.30	1.79	D-4A	Street S
54	76.40	73.08	69.21	0.70	0.35	3.00	LC7a*	Log Cabin Way
54	76.40	75.37	73.89	0.76	0.30	0.81	D-4A	Street S
55	78.90	76.92	73.08	0.70	0.35	1.66	LC7a*	Log Cabin Way
55	78.90	76.84	75.37	0.76	0.30	1.84	D-4A	Street S
56	80.30	76.92	73.08	0.70	0.35	3.06	LC7a*	Log Cabin Way
56	80.30	78.30	76.84	0.76	0.30	1.78	D-4A	Street S
57	81.80	76.92	73.08	0.70	0.35	4.56	LC7a*	Log Cabin Way
57	81.80	79.76	78.30	0.76	0.30	1.82	D-4A	Street S
58	83.20	80.79	76.92	0.70	0.35	2.09	LC7a*	Log Cabin Way
58	83.20	81.21	79.76	0.76	0.30	1.77	D-1	Street S
59	84.70	80.79	76.92	0.70	0.35	3.59	LC7a*	Log Cabin Way
59	84.70	82.67	81.21	0.76	0.30	1.81	D-1	Street S
60	86.10	84.62	80.79	0.70	0.35	1.16	LC7a*	Log Cabin Way
60	86.10	84.13	82.67	0.76	0.30	1.75	D-1	Street S
61	87.50	84.62	80.79	0.70	0.35	2.56	LC7a*	Log Cabin Way
61	87.50	85.52	84.13	0.76	0.30	1.76	D-1	Street S
62	88.90	86.00	84.62	0.70	0.35	2.58	LC7a*	Log Cabin Way
62	88.90	86.87	85.52	0.76	0.30	1.81	D-1	1 course solid grout along common element
63	91.30	89.00	87.00	0.74	0.37	1.94	LC6*	Log Cabin Way
63	91.30	89.27	87.92	0.76	0.30	1.81	D-1	Street S
64	92.60	91.00	88.45	0.74	0.37	1.24	LC6*	Log Cabin Way
64	92.60	90.62	89.27	0.76	0.30	1.76	D-1	Street S
65	94.00	92.28	90.00	1.00	0.37	1.36	LC6*	Log Cabin Way
65	94.00	91.97	90.62	0.76	0.30	1.81	D-1	Street S
66	95.30	94.50	92.28	0.74	0.37	0.44	LC6*	Log Cabin Way,
66	95.30	93.32	91.97	0.76	0.30	1.76	D-1	Street S
67	96.70	96.00	94.12	0.74	0.37	0.34	LC6*	Log Cabin Way
67	96.70	94.67	93.32	0.76	0.30	1.81	D-1	Street S
68	98.00	97.00	95.40	0.74	0.37	0.64	LC6*	Log Cabin Way
68	98.00	96.02	94.67	0.76	0.30	1.76	D-1	Street S
69	99.40	98.13	97.00	0.74	0.37	0.91	LC6*	Log Cabin Way
69	99.40	97.37	96.02	0.76	0.30	1.81	D-1	Street S
70	100.70	98.60	98.13	0.74	0.37	1.74	LC6*	Log Cabin Way
70	100.70	98.38	97.37	0.76	0.30	2.10	D-1	Street S
70	100.70	100.00	99.50	1.06	0.53	0.02	SW-1	Paseo, 3 course solid grout
71	98.20	98.09	96.37	0.76	0.35	-0.21	D-3B	Street S, 1 course solid grout
71	98.20	95.97	95.79	0.76	0.27	2.07	D-2	Street T
71	98.20	101.43	101.09	1.06	0.53	-3.91	SW-1	Paseo, 3 course solid grout
72	98.40	96.23	95.97	0.76	0.27	2.01	D-2	Street T
72	98.40	102.00	101.43	1.06	0.53	-4.28	SW-1	Paseo, 3 course solid grout
73	98.70	96.56	96.23	0.76	0.27	1.98	D-2	Street T
73	98.70	102.35	102.00	1.06	0.53	-4.33	SW-1	Paseo, 3 course solid grout
74	99.00	96.83	96.56	0.76	0.27	2.01	D-2	Street T
74	99.00	103.00	102.35	1.06	0.53	-4.68	SW-1	Paseo, 3 course solid grout
75	99.30	97.13	96.56	0.76	0.27	2.01	D-2	Street T
75	99.30	103.00	103.00	1.06	0.53	-4.38	SW-1	Paseo, 3 course solid grout
76	99.60	97.45	97.13	0.76	0.27	1.99	D-2	Street T
76	99.60	103.95	103.00	1.06	0.53	-5.03	SW-1	Paseo, 3 course solid grout
77	99.90	97.72	97.45	0.76	0.27	2.02	D-2	Street T
77	99.90	104.26	103.95	1.06	0.53	-5.04	SW-1	Paseo, 3 course solid grout
78	100.20	98.02	97.72	0.76	0.27	2.02	D-2	Street T
78	100.20	104.26	104.00	1.24	0.62	-4.92	SW-2	Paseo, 3 course solid grout
79	100.50	98.22	98.02	0.76	0.27	2.12	D-2	Street T
79	100.50	104.00	103.41	1.24	0.62	-4.36	SW-2	Paseo, 3 course solid grout

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
80	100.60	98.22	98.16	0.76	0.27	2.22	D-5A	Street T
80	100.60	103.41	103.00	1.24	0.62	-3.67	SW-2	Paseo, 3 course solid grout
81	100.40	98.16	97.89	0.76	0.27	2.08	D-5A	Street T
81	100.40	103.00	102.52	1.24	0.62	-3.46	SW-2	Paseo, 3 course solid grout
82	100.10	97.89	97.60	0.76	0.27	2.05	D-5A	Street T
82	100.10	102.52	102.00	1.24	0.62	-3.28	SW-2	Paseo, 3 course solid grout
83	99.80	97.60	97.31	0.76	0.27	2.04	D-5A	Street T
83	99.80	102.00	101.50	1.24	0.62	-3.06	SW-2	Paseo, 3 course solid grout
84	99.50	97.31	97.01	0.76	0.27	2.03	D-5A	Street T
84	99.50	101.50	100.95	1.24	0.62	-2.86	SW-2	Paseo, 3 course solid grout
85	101.70	99.61	98.33	0.76	0.32	1.83	D-5B	Street N
85	101.70	100.95	100.00	1.24	0.62	-0.11	SW-2	Paseo, 3 course solid grout
86	100.30	98.33	97.19	0.76	0.32	1.71	D-5B	Street N
86	100.30	97.01	96.55	0.76	0.27	3.13	D-5A	Street T
87	101.70	99.61	98.27	0.76	0.32	1.83	D-5B	Street N
87	101.70	99.48	100.00	1.24	0.62	1.36	SW-2	Paseo, 3 course solid grout
88	100.30	98.27	96.80	0.76	0.32	1.77	D-5B	Street N
89	98.80	96.80	95.34	0.76	0.32	1.74	D-5B	Street N
90	97.40	95.34	93.88	0.76	0.32	1.80	D-5B	Street N
91	95.90	93.88	92.24	0.76	0.32	1.76	D-5B	Street N
91	95.90	92.16	91.45	0.76	0.28	3.56	D-5C	Street Y
92	97.60	95.39	92.16	0.76	0.28	2.03	D-5C	Street Y
93	98.50	96.56	95.39	0.76	0.28	1.76	D-5C	Street Y
94	99.40	97.31	96.56	0.76	0.28	1.91	D-5C	Street Y
95	100.40	98.09	97.31	0.76	0.28	2.13	D-5C	Street Y
95	100.40	100.00	97.25	1.24	0.62	-0.46	SW-2	Paseo, 3 course solid grout
96	100.00	98.09	96.86	0.76	0.28	1.73	D-5C	Street Y
96	100.00	94.18	87.14	0.98	0.49	5.22	OH3*	O'Hare Road
96	100.00	96.77	95.00	1.24	0.62	2.37	SW-2	Paseo, 3 course solid grout
97	98.80	96.86	96.00	0.76	0.28	1.76	D-5C	Street Y
97	98.80	94.18	87.14	0.98	0.49	4.02	OH3*	O'Hare Road
98	97.90	96.00	95.38	0.76	0.28	1.72	D-5C	Street Y
98	97.90	94.18	87.14	0.98	0.49	3.12	OH3*	O'Hare Road
99	97.50	95.38	94.92	0.76	0.28	1.94	D-5C	Street Y
99	97.50	94.18	87.14	0.98	0.49	2.72	OH3*	O'Hare Road
100	97.20	94.92	94.49	0.76	0.28	2.10	D-5C	Street Y
100	97.20	87.72	86.56	0.76	0.30	9.26	D-7A2	Street L
100	97.20	94.18	87.14	0.98	0.49	2.42	OH3*	O'Hare Road
101	96.50	94.49	93.94	0.76	0.28	1.83	D-5C	Street Y
101	96.50	87.72	87.44	0.76	0.30	8.56	D-7A2	Street L
102	95.80	93.94	93.20	0.76	0.28	1.68	D-5C	Street Y
102	95.80	87.44	87.10	0.76	0.30	8.14	D-7A2	Street L
103	95.00	93.20	92.48	0.76	0.28	1.62	D-5C	Street Y
103	95.00	87.10	86.87	0.76	0.30	7.68	D-7A2	Street L
104	94.30	92.48	91.76	0.76	0.28	1.64	D-5C	Street Y
104	94.30	86.87	86.54	0.76	0.30	7.21	D-7A2	Street L
105	93.60	91.76	90.22	0.76	0.28	1.66	D-5C	Street Y
105	93.60	89.21	86.81	0.76	0.32	4.13	D-5B	Street N
105	93.60	86.48	86.37	0.76	0.30	6.90	D-7A2	Street L
106	91.60	89.50	88.15	0.76	0.32	1.84	D-5B	Street N
107	92.70	90.71	89.50	0.76	0.32	1.73	D-5B	Street N
108	94.10	92.05	90.71	0.76	0.32	1.79	D-5B	Street N
109	95.50	93.48	92.05	0.76	0.32	1.76	D-5B	Street N
110	97.20	94.62	93.48	0.76	0.32	2.32	D-5B	Street N
110	97.20	97.01	95.50	0.76	0.27	0.03	D-5A	Street T
111	99.50	97.32	97.01	0.76	0.27	2.02	D-5A	Street T
112	99.80	97.68	97.32	0.76	0.27	1.96	D-5A	Street T
113	100.20	97.98	97.68	0.76	0.27	2.06	D-5A	Street T
114	100.40	98.22	97.98	0.76	0.27	2.02	D-5A	Street T
115	100.60	98.22	98.17	0.76	0.27	2.22	D-2	Street T
116	100.30	98.17	97.87	0.76	0.27	1.97	D-2	Street T
117	100.00	97.87	97.55	0.76	0.27	1.97	D-2	Street T
118	99.70	97.55	97.24	0.76	0.27	1.99	D-2	Street T
119	99.40	97.24	96.92	0.76	0.27	2.00	D-2	Street T
120	99.10	96.92	96.60	0.76	0.27	2.02	D-2	Street T

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
121	98.70	96.60	96.22	0.76	0.27	1.94	D-2	Street T
122	96.10	96.22	94.86	0.76	0.27	-0.28	D-2	Street T, 1 course solid grout
122	96.10	94.00	92.78	0.76	0.35	1.78	D-3B	Street S
123	94.80	92.78	91.43	0.76	0.35	1.70	D-3B	Street S
124	93.40	91.43	90.08	0.76	0.35	1.65	D-3B	Street S
125	92.10	90.08	89.03	0.76	0.35	1.70	D-3B	Street S
125	92.10	88.93	88.44	0.76	0.28	2.99	D-3A	Street U
126	91.40	89.28	88.93	0.76	0.28	1.94	D-3A	Street U
127	91.70	89.62	89.28	0.76	0.28	1.90	D-3A	Street U
128	92.10	89.97	89.62	0.76	0.28	1.95	D-3A	Street U
129	92.50	90.32	89.97	0.76	0.28	2.00	D-3A	Street U
130	92.80	90.68	90.32	0.76	0.28	1.94	D-3A	Street U
131	93.10	91.03	90.68	0.76	0.28	1.89	D-3A	Street U
132	93.50	91.53	91.03	0.76	0.28	1.79	D-3A	Street U
133	94.00	91.97	91.53	0.76	0.28	1.85	D-3A	Street U
134	94.50	92.26	91.97	0.76	0.28	2.06	D-3A	Street U
135	95.50	92.61	92.26	0.76	0.28	2.71	D-3A	Street U
136	93.40	91.48	90.93	0.76	0.28	1.74	D-3A	Street U
137	93.00	90.93	90.55	0.76	0.28	1.89	D-3A	Street U
138	92.60	90.55	90.17	0.76	0.28	1.87	D-3A	Street U
139	92.20	90.17	89.77	0.76	0.28	1.85	D-3A	Street U
140	91.70	89.77	89.29	0.76	0.28	1.75	D-3A	Street U
141	91.40	89.29	88.93	0.76	0.28	1.93	D-3A	Street U
142	88.80	88.93	87.48	0.76	0.28	-0.31	D-3A	Street U, 1 course solid grout
142	88.80	86.66	85.61	0.76	0.35	1.82	D-3B	Street S
143	87.60	85.61	84.23	0.76	0.35	1.67	D-3B	Street S
144	86.20	84.23	82.74	0.76	0.35	1.65	D-3B	Street S
145	84.80	82.74	81.11	0.76	0.30	1.84	D-4A	Street S
146	83.10	81.11	79.47	0.76	0.30	1.77	D-4A	Street S
147	81.50	79.47	78.00	0.76	0.30	1.81	D-4A	Street S
148	80.00	78.00	76.54	0.76	0.30	1.78	D-4A	Street S
149	78.60	76.54	75.09	0.76	0.30	1.84	D-4A	Street S
150	77.10	75.09	73.64	0.76	0.30	1.79	D-4A	Street S
151	75.70	73.64	72.17	0.76	0.30	1.84	D-4A	Street S
152	74.20	72.17	70.71	0.76	0.30	1.81	D-4A	Street S
153	72.70	70.71	69.25	0.76	0.30	1.77	D-4A	Street S
154	71.30	69.25	68.44	0.76	0.30	1.83	D-4A	Street S
154	71.30	68.82	68.29	0.76	0.32	2.22	D-7C	Street V
155	73.20	69.34	68.82	0.76	0.32	3.60	D-7C	Street V
155	73.20	71.21	69.96	0.76	0.27	1.83	D-9	Street R
156	74.70	72.68	71.21	0.76	0.27	1.86	D-9	Street R
157	76.20	74.14	72.68	0.76	0.27	1.90	D-9	Street R
158	77.60	75.60	74.14	0.76	0.27	1.84	D-9	Street R
159	79.10	77.06	75.60	0.76	0.27	1.88	D-9	Street R
160	80.50	78.53	77.06	0.76	0.27	1.81	D-9	Street R
161	82.00	79.09	78.53	0.76	0.27	2.75	D-9	Street R
162	83.50	81.45	79.09	0.76	0.27	1.89	D-9	Street R
163	85.10	83.08	81.45	0.76	0.27	1.86	D-9	Street R
164	86.60	84.45	83.08	0.76	0.27	1.99	D-9	Street R
165	88.20	86.18	84.45	0.76	0.27	1.86	D-9	Street R
166	83.30	81.32	79.86	0.76	0.27	1.82	D-9	Street R
167	81.90	79.86	78.40	0.76	0.27	1.88	D-9	Street R
168	80.40	78.40	76.94	0.76	0.27	1.84	D-9	Street R
169	79.00	76.94	75.47	0.76	0.27	1.90	D-9	Street R
170	77.50	75.47	74.01	0.76	0.27	1.87	D-9	Street R
171	76.00	74.01	72.55	0.76	0.27	1.83	D-9	Street R
172	74.60	72.55	71.09	0.76	0.27	1.89	D-9	Street R
173	73.10	71.09	70.12	0.76	0.27	1.85	D-9	Street R
173	73.10	70.44	70.12	0.76	0.32	2.40	D-7C	Street V
174	74.50	70.97	70.44	0.76	0.32	3.27	D-7C	Street V
174	74.50	72.49	71.14	0.76	0.28	1.83	D-8	Street P
175	76.00	73.95	72.49	0.76	0.28	1.87	D-8	Street P
176	77.40	75.42	73.95	0.76	0.28	1.80	D-8	Street P
177	78.90	76.88	75.42	0.76	0.28	1.84	D-8	Street P
178	80.40	78.34	76.88	0.76	0.28	1.88	D-8	Street P

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
179	81.80	79.81	78.34	0.76	0.28	1.81	D-8	Street P
180	83.30	81.27	79.81	0.76	0.28	1.85	D-8	Street P
181	84.80	82.79	81.27	0.76	0.28	1.83	D-8	Street P
182	86.80	84.82	82.79	0.76	0.28	1.80	D-8	Street P
183	88.10	85.93	84.82	0.76	0.28	1.99	D-8	1 course solid grout along common element
184	85.00	82.95	81.49	0.76	0.28	1.87	D-8	1 course solid grout along common element
185	83.50	81.49	80.03	0.76	0.28	1.83	D-8	Street P
186	82.00	80.03	78.56	0.76	0.28	1.79	D-8	Street P
187	80.60	78.56	77.10	0.76	0.28	1.86	D-8	Street P
188	79.10	77.10	75.64	0.76	0.28	1.82	D-8	Street P
189	77.60	75.64	74.17	0.76	0.28	1.78	D-8	Street P
190	76.20	74.17	72.71	0.76	0.28	1.85	D-8	Street P
191	74.70	72.71	71.71	0.76	0.28	1.81	D-8	Street P
191	74.70	72.05	71.52	0.76	0.33	2.37	D-10	Street V
192	76.20	72.57	72.05	0.76	0.33	3.35	D-10	Street V
192	76.20	74.18	73.13	0.76	0.36	1.68	D-7A1	Street N
193	77.60	75.56	74.18	0.76	0.36	1.70	D-7A1	Street N
194	79.00	77.02	75.56	0.76	0.36	1.64	D-7A1	Street N
195	80.50	78.48	77.02	0.76	0.36	1.68	D-7A1	Street N
196	82.00	79.95	78.48	0.76	0.36	1.71	D-7A1	Street N
197	83.40	81.41	79.95	0.76	0.36	1.65	D-7A1	Street N
198	84.90	82.87	81.41	0.76	0.36	1.69	D-7A1	Street N
199	86.30	84.33	82.87	0.76	0.36	1.63	D-7A1	1 course solid grout along common element

Lots adjacent to Skye Canyon Park Drive are significantly elevated above the adjacent TC's

Appendix C – Reference Materials

- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95); December 2018*

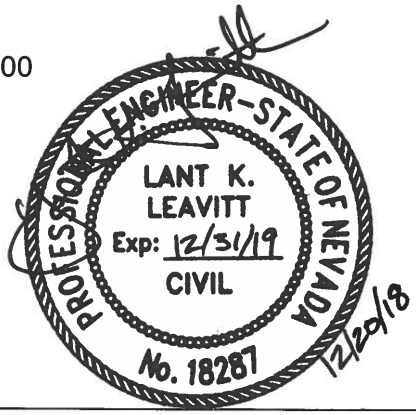
MASTER DRAINAGE STUDY
UPDATE #5
(for Development East of US-95)

Skye Canyon
City of Las Vegas, Nevada

Job No.: EST1801.000
Date: December 2018

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Eastland Co., LLC
2490 Paseo Verde Pkwy, Suite 120
Henderson, NV 89074
Phone: 702-736-9100 ▪ Fax: 702-736-9200



Lant Leavitt, P.E.
NV Professional Engineer No. 18287

Assisted By: Cameron Bencini, P.E.
Jonathan Rocha, E.I.

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: January 28, 2019
TO: **Land Development Services** Department of Public Works				FROM: Oh Sang Kwon, P.E. Flood Control Section Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Master Drainage Study – SUNSTONE (Formally Update #5 to Skye Canyon Master)				Slater Hanifan Group
Cross Streets:	Fort Apache Road & Moccasin Road			Eastland Co., LLC
File Number:	F:\Depot\DSMemos\DS5081A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-501-001			CCRFCD
Zoning Action:	Eastland Development Agreement			CCPW
FEMA Flood Zone	YES	NO **X**		NDOT
Proposed Storm Drain	YES **X**	NO		NV Energy

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	12/26/2018	1/28/2019	Conditionally Approved	$400.00	502000: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS: **1st Submittal: Master Study for Development split off from Skye Canyon. SUNSTONE is the Development east of US-95 that was previously incorporated into the Skye Canyon Master Study.**

The Skye Canyon East (SUNSTONE) / Skye Canyon Master Plan MPU Facilities are being incorporated into the 2018 CCRFCD Master Plan. A separate MPA is not required at this time. Further changes to the MPU Facilities within SUNSTONE Master Drainage Study shall require an MPA that must be submitted to *City of Las Vegas* and *CCRFCD* for approval and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject Overall Master Study.

This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy. Permits for development within Designated Builder Parcels shall not be issued if the associated Master Plan facilities are not under construction.

The Master Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Department of Public Works concurrence.
X	is conditionally approved subject to Nevada Department of Transportation concurrence.
	is conditionally approved subject to BLM concurrence/approval.

The Master Drainage Study for SUNSTONE (Update #5 to Skye Canyon Master Drainage Study) provides additional information that addresses the design parameters used as the basis for the Development east of US-95. **This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy**. The ultimate condition infrastructure drainage facilities that are assumed to be in place include:

- The Moccasin Master Plan Regional Facility – Upper Las Vegas Wash to west of US-95. This includes the Interim Collection Facility west of US-95.
- Skye Canyon Detention Basin #2.
- Skye Canyon Phase 3A regional Facility – Skye Canyon Park Dr. to Iron Mountain Rd.
- The US-95 Local Facility – Brent Lane to Kyle Canyon Interchange. This connects into the existing MPU Facility along US-95.

The construction of these Ultimate Facilities will make US 95 a 100-yr cutoff through the reach south of the Moccasin Master Plan Regional Facility crossing, thereby meeting the full intent of the CCRFCD Master Plan.

Changes and timing of the corresponding infrastructure improvements that protect the SUNSTONE Development shall require Updating the Master Drainage Study Phasing.

1. The overall concept presented in the Master Drainage Study for SUNSTONE appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the National Monument. This shall also include the extension of Local Facilities along the northern boundary (Moccasin Alignment) Between Brightstone Trail and Sun Park Drive (Skye Village Road to Fort Apache). Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed local facilities needed for each phase of development.

2. The Local Facility extension along the Moccasin alignment shall include 100-year local collection between EC19 to EC21 and shall be shown on Exhibit J of this Master Study. The Master Drainage Study for Skye Canyon – Update #4, Supplemental; Identified the 150 cfs increase to the proposed Moccasin Road MPU Facility from Skye Canyon Park Drive to the Upper Las Vegas Wash (due to removal of an upstream diversion across Moccasin Road to the north). This Local Facility extension shall be addressed with the Specific Technical Drainage Studies for development that specifically address the impacts of development and storm discharge along the Moccasin corridor prior to the City removing the requirement of BLM and National Park Service concurrence

3. The implementation of the CCRFCD Master Plan facilities along US-95, south of Kyle Canyon Interchange, has been completed by NDOT. With the ultimate condition infrastructure drainage facilities noted above the development west of US-95 will no longer have flows crossing US-95 as per the CCRFCD Master Plan and also noted within the NDOT concurrence for the Skye Canyon Master Drainage Study dated March 8, 2018. The required Technical Drainage Study necessary for the US-95 Local Facility shall address the removal of the culverts allowing flows to cross to the east side of US-95.

4. The ***Master Land Use Plan*** has been submitted as a part of the (SUNSTONE) Eastland DA, any changes to the flows shown in this Master Drainage Study due to the Master Land Use Plan shall require a complete update to the Master Drainage Study.

5. High velocity flows within the future MPU facilities is a critical concern of the City and Regional Flood. Where velocities exceed 25 fps the City is considering 6,000 psi concrete with 2-inches of sacrificial concrete on the invert. Where velocities exceed 35 fps, additional design mitigation shall be reviewed on a case by case basis. The engineer shall review the velocity impacts and recommend a course of action for City approval with each technical drainage study for the corresponding facilities.

6. CCRFCD concurrence has previously been provided for Skye Canyon Master Drainage Study Update #4. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from CCRFCD after Conditional Approval by the City of Las Vegas.

7. CCPW concurrence was provided covering Skye Canyon Master Drainage Study Update #4. New County concurrence is not required for the SUNSTONE Master Drainage Study.

8. NDOT concurrence was provided covering Skye Canyon Master Drainage Study Update #4. NDOT concurrence for Skye Canyon Master Drainage Study Update #4 supports the proposed MPU facilities and the elimination of the flows crossing US-95 per the Master Plan and shown on Exhibit J. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from NDOT after Conditional Approval by the City of Las Vegas.

9. Please note that the Traffic Study must be approved prior to final approval of the Master Drainage Study. If the street layout does not match the Master Drainage Study, an update to the Master Drainage Study must be submitted to address the changes.

10. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (ie. Changes in pods, infrastructure, flows etc.) will require an update to the Master Drainage Study and this update must be approved by the *City of Las Vegas Flood Control Section* prior to final approval of technical drainage study.

11. Please note that the proposed 100-year flood protection facilities identified on Exhibit J must be constructed by the Master Developer as a part of the master planned infrastructure. Technical drainage studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.

12. Technical drainage studies are required for each of the Pod's. The technical drainage studies for the Pod's may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted Pod drainage studies.

13. Building permits for the homes within the individual Pod's will not be issued until construction of the street and flood control infrastructure around the Pod is substantially complete or interim protection is provided per the approved technical drainage study.

14. Please note that all proposed interim facilities must be maintained by the master developer.

15. Provide a legal description of the proposed drainage facilities located outside of dedicated public right-of-way prior to recordation of the parent final map.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved master drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section.* Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
Osk/pbj

T/R/S: T19S/R60E/6 & 7
AREA G-6 & 7

REGIONAL FLOOD CONTROL DISTRICT

Steven C. Parrish, P.E.
General Manager/Chief Engineer

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City of Boulder City

March 6, 2019

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

DISTRICT CONCURRENCE: SUNSTONE (FORMALLY UPDATE# 5 SKYE CANYON MASTER)
(DS5081A) (RFCD No. 19-11214)

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated December 26, 2018 for above-mentioned project as submitted by SLATER HANIFAN GROUP. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated January 28, 2019.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works with the following conditions:

> Per District's Uniform Regulations for the Control of Drainage, Section VIII.D.13, the Lead Entity shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by SLATER HANIFAN GROUP may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 685-0000 • FAX: (702) 685-0001
Website: http://www.regionalflood.org

REGIONAL FLOOD CONTROL DISTRICT

STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY:
Ching C. Wang, P.E.
Senior Civil Engineer

CCW:dd

c: Lant K. Leavitt, P.E, Slater Hanifan Group

P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\L-19-11214as_built doc

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
1263 S. Stewart Street
Carson City, Nevada 89712

BRIAN SANDOVAL
Governor

RUDY MALFABON, P.E., *Director*

February 20, 2019

In Reply, Refer to:

Lant K. Leavitt, P.E.
5740 S. Arville St, Suite 216
Las Vegas, NV 89118

TECHNICAL DRAINAGE STUDY
Sunstone Master Drainage Study, Update #5
Clark County

Dear Mr. Leavitt:

The Nevada Department of Transportation (NDOT) Hydraulics Section has received and reviewed the following document(s) for the above-referenced project.

Document:	**Dated:**
Transmittal Letter from Lant K. Leavitt, P.E., SHG	Feb. 4, 2019
Executive Summary for Master Drainage Study Update #5 for Skye Canyon Development East of US 95 - Sunstone	Feb. 1, 2019
Master Drainage Study Update #5 for Skye Canyon Development (for Development East of US 95) Skye Canyon	Dec. 20, 2018
Drainage Information Form tamped by Lant K. Leavitt, P.E., SHG	Feb. 1, 2019

The drainage design information presented in the reviewed document(s):

X	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project.
	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project. The following comments should be addressed with the permit application:
	must be supplemented or modified to satisfy the following comment(s) before preliminary Hydraulic Section approval can be granted:

All submittals regarding this project must be forwarded through (or copied to) the local NDOT District permitting office. All pertinent drainage design documents (including those previously submitted for preliminary review) must be submitted to the local NDOT District permitting office with the Right-Of-Way Occupancy Permit Application. All plans and reports must be signed and stamped by a Nevada registered civil engineer.

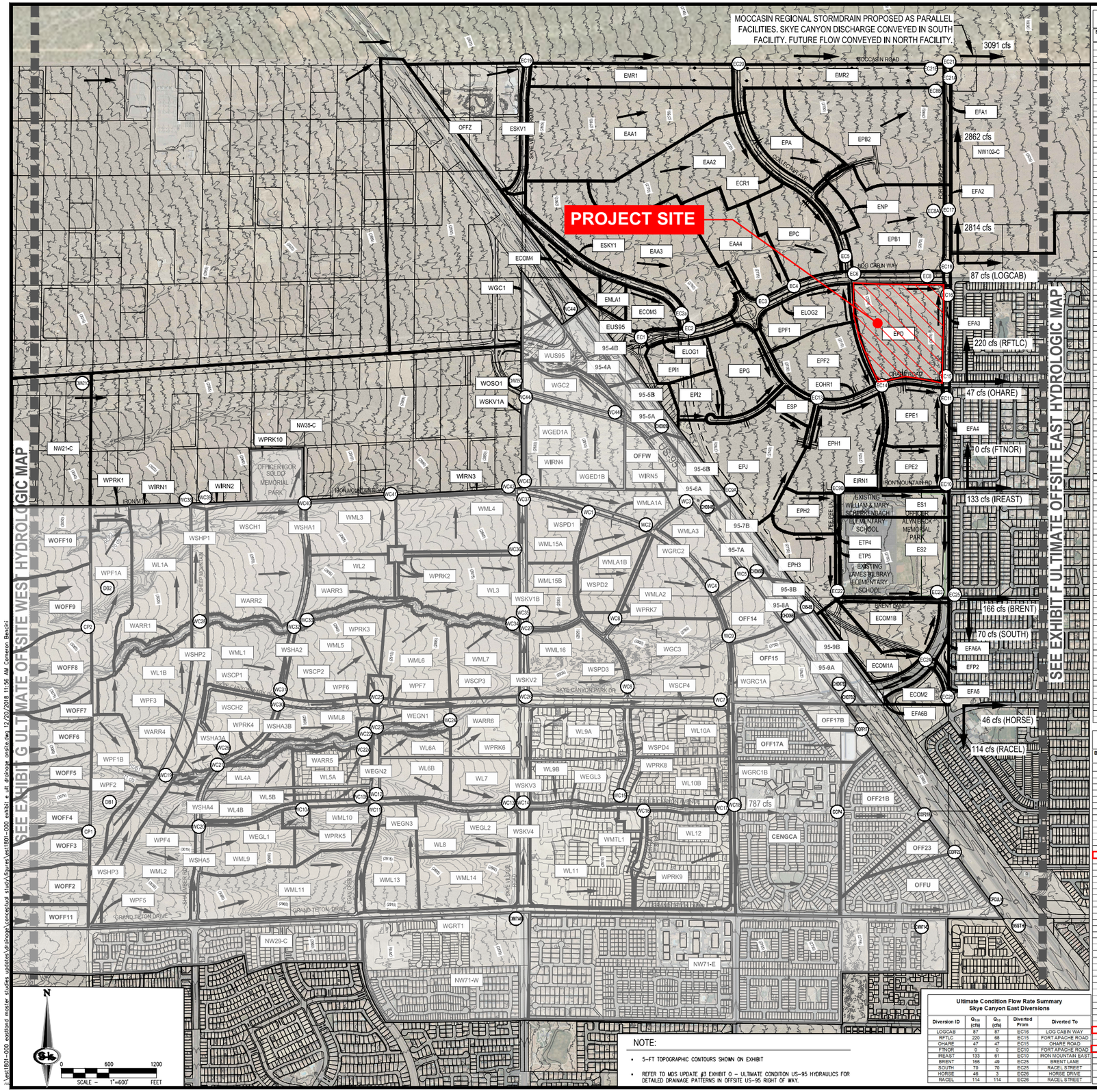
No liability is assumed by the Department in performing this review. Verification and acceptance of all background information, design data and conclusions is the responsibility of the consulting engineer.

Please call me at (775) 888-7621 should you have any questions.

Sincerely,

Brian A. Matthews, P.E.
Professional Engineering Specialist

c: Mary Martini, P.E., District 1 Engineer
Michael Yates, District 1 Assistant Engineer, Permit Coordinator
Charles Molisee, District 1 Permit Coordinator
Charles Pratt, HQ Permit Coordinator
Mario Gomez, District 1 Assistant Engineer



NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- REFER TO MDS UPDATE #3 EXHIBIT O – ULTIMATE CONDITION US-95 HYDRAULICS FOR DETAILED DRAINAGE PATTERNS IN OFFSITE US-95 RIGHT OF WAY.

Ultimate Condition Flow Rate Summary Skye Canyon East Diversions

Diversion ID	Q_{100} (cfs)	Q_{10} (cfs)	Diverted From	Diverted To
LOGCAB	87	87	EC16	LOG CABIN WAY
RFTLC	220	68	EC15	FORT APACHE ROAD
OHARE	47	47	EC15	OHARE ROAD
FTNOR	0	0	EC10	FORT APACHE ROAD
IREAST	133	61	EC10	IRON MOUNTAIN EAST
BRENT	166	49	EC25	BRENT LANE
SOUTH	70	70	EC25	RACEL STREET
HORSE	46	3	EC26	HORSE DRIVE
RACEL	114	114	EC26	RACEL STREET

Ultimate Condition Flow Rate Summary Skye Canyon West Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
WARR1	3.6	9	4
WARR2	2.8	7	3
WARR3	7.1	17	7
WARR4	1.3	3	1
WARR5	8.0	18	8
WARR6	2.4	6	2
WGC1	8.3	24	11
WGC2	8.3	23	10
WGC3	30.4	95	47
WGED1A	28.4	77	35
WGED1B	11.5	33	16
WL10A	17.1	46	21
WL10B	18.3	49	22
WL11	36.7	99	46
WL12	31.4	84	38
WL1A	29.8	81	38
WL1B	28.0	79	36
WL2	15.7	45	21
WL3	24.9	69	32
WL4A	8.0	23	10
WL4B	8.9	27	12
WL5A	10.9	32	15
WL5B	3.8	12	5
WL6A	6.2	19	9
WL6B	10.6	30	14
WL7	11.5	34	16
WL8	17.4	48	22
WL9A	18.2	49	22
WL9B	14.4	39	18
WML1	18.0	52	24
WML10	11.6	38	19
WML11	16.0	48	23
WML12	15.1	44	20
WML13	16.4	49	25
WML14	19.2	59	29
WML15A	12.3	40	20
WML15B	11.2	34	17
WML16	22.2	64	32
WML2	27.4	78	38
WML3	17.3	56	28
WML4	25.1	77	38
WML5	27.3	82	41
WML6	20.5	64	32
WML7	18.6	59	30
WML8	10.3	34	17
WML9	16.4	55	28
WMLA1A	6.5	20	10
WMLA1B	12.0	37	18
WMLA2	30.4	88	44
WMLA3	11.6	35	17
WPF1A	20.2	59	29
WPF1B	18.9	63	31
WPF2	3.1	10	5
WPF3	4.6	17	8
WPF4	5.7	19	9
WPF5	0.4	1	0
WPF6	1.0	4	2
WPF7	4.5	14	7
WPRK1	2.4	6	2
WPRK10	10.0	19	8
WPRK2	3.2	7	2
WPRK3	1.8	4	2
WPRK4	1.0	3	1
WPRK5	2.0	5	2
WPRK6	13.2	28	10
WPRK7	3.0	6	2
WPRK8	1.7	4	1
WPRK9	0.5	1	0
WSCH1	39.4	106	48
WSCH2	11.6	37	16
WEST ROADWAY BASINS			
WEGL1	3.4	12	6
WEGL2	3.3	12	7
WEGL3	4.8	16	9
WEGN1	0.5	2	1
WEGN2	2.1	7	1
WEGN3	3.3	10	6
WGRC1A	1.3	4	2
WGRC1B	3.2	10	5
WGRC2	2.7	9	5
WGRT1	11.7	30	16
WIRN1	0.6	2	1
WIRN2	2.2	7	4
WIRN3	1.3	5	3
WIRN4	2.7	9	5
WIRN5	0.7	3	2
WMTL1	1.3	5	2
WOSO1	2.2	8	4
WSCP1	1.5	6	3
WSCP2	3.0	11	6
WSCP3	3.5	13	7
WSCP4	7.8	25	14
WSHA1	2.3	6	2
WSHA2	1.5	5	2
WSHA3A	0.7	3	1
WSHA3B	1.6	6	3
WSHA4	1.4	6	3
WSHA5	2.4	8	5
WSHP1	6.4	19	9
WSHP2	9.3	27	13
WSHP3	10.4	31	15
WSKV1A	1.4	5	3
WSKV1B	3.5	11	6
WSKV2	2.0	19	8
WSKV3	4.2	14	7
WSKV4	4.5	15	8
WSPD1	0.7	3	1
WSPD2	2.1	3	2
WSPD3	0.9	3	2
WSPD4	2.3	8	4
WUS95	8.5	28	16

Ultimate Condition Flow Rate Summary Skye Canyon East Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
EAA1	55.0	114	49
EAA2	35.4	82	36
EAA3	51.2	102	45
EAA4	21.0	45	20
ECOM1A	9.9	30	15
ECOM1B	13.7	42	21
ECOM3	6.4	17	7
ECOM4	5.5	15	7
EMLA1	3.2	10	4
ENP	3.5	0	0
EPA	17.1	40	18
EPB1	31.6	50	16
EPB2	46.4	67	22
EPC	20.2	48	21
EPD	28.9	65	28
EPE1	12.5	29	13
EPE2	9.1	22	10
EPF1	13.5	32	14
EPF2	19.1	57	26
EPG	15.9	36	16
EPH1	23.9	56	25
EPH2	8.9	27	13
EPH3	15.4	44	22
EPI1	8.6	23	10
EPI2	7.4	20	9
EPJ	31.7	55	19
ES1	10.4	20	8
ES2	32.1	85	41
ESP	3.5	0	0
OFFZ	30.8	39	10
EAST ROADWAY BASINS			
EBRT1	1.8	6	3
ECR1	7.8	22	12
EFA1	2.7	8	4
EFA2	2.4	7	4
EFA3	2.5	7	4
EFA4	2.8	8	5
EFA5	0.9	3	2
EFA6A	2.5	9	5
EFA6B	5.7	18	10
EIRN1	1.9	6	3
ELOG1	4.3	15	8
ELOG2	12.1	35	19
EMR1	17.4	22	7
EMR2	19.2	26	8
EOHR1	10.1	29	16
ESKV1	3.9	11	6
ESKY1	8.2	23	13
ETP4	0.8	3	2
ETP5	0.9	3	2
EUS95	9.4	34	19

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	139
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	129
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon East Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
EC1 Q = WC44B + RETC02 + EU595 + 95-4A + 95-4B	4.96	2054	886
EC2 Q = EC1 + EC2a + ELOG1 + EPI	5.20	2330	1001
EC2A Q = WCAVAC + EC2A1 + EC2A4 + EBLK1 + EBLK1 + EBLK1	0.22	286	121
EC3 Q = EC2 + EBA3	5.28	2420	1038
EC4 Q = EC3 + EBA4	5.31	2460	1055
EC5 Q = EPC + EBA2 + ECR1	0.10	152	69
EC6 Q = EC4 + EC5	5.43	2622	1127
EC8 Q = EC6 + ELOG2	5.45	2654	1145
EC8A Q = EMP + EPE1	0.05	50	16
EC8B Q = EPA + EPE2	0.10	108	39
EC9A Q = 95-5A + 95-5B + 95-6A + 95-6B	0.03	57	27
EC9B Q = EC8A + EPH2 + ETP4	0.05	87	42
EC10 Q = EC8B + ERN1 + ES1	0.08	133	61
EC11 Q = EC10 + EPH4 + EPE1	0.10	37	18
EC13 Q = ESP + EPG + EPC + EPJ + ESP + ECHR1	0.11	136	58
EC14 Q = EC13 + EPF2 + EPH1	0.17	232	99
EC15 Q = EC11 + EC14	0.28	267	115
EC16 Q = EC14+EPA3 + EPD	0.33	287	148
EC17 Q = EC8 + EC8A	5.84	2862	1200
EC18 Q = EC8 + EC16	5.78	2814	1184
EC19 Q = OFFZ + EBKV1	0.05	50	16
EC20 Q = EC19 + EAA1 + EMR1	0.17	187	71
EC21A Q = EC17 + EFA1 + EOBB	5.94	2955	1232
EC21B Q = EC21 + EMR2	0.20	212	79
EC21 Q = EC21A + EC21B	6.14	3091	1276
EC22 Q = OBC4B + ETP5	0.05	94	48
EC23 Q = EC22 + EC2 + EBRT1	0.10	186	93
EC24 Q = 95-9B + EC2B1A + EFA6B	0.04	68	35
EC25 Q = EC23 + EC2B1B + EFA5A	0.13	236	119
EC26 Q = SOUTH + EC24 + EC2A2 + EFP2	0.18	160	117

Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WC1 Q = WML15A + WXPD1	0.02	43	21
WC2 Q = WC1 + WRN4 + WMLA1A	0.03	73	37
WC3 Q = WC2 + WGED1B + WRN5	0.05	109	54
WC4 Q = WRK7 + WMLA1B + WMLA2 + WGRC2	0.08	135	67
WC5 Q = WC4 + WML3	0.09	170	83
WC6 Q = WML16 + WXPD3	0.04	68	33
WC7 Q = WC6 + WL9A + WL10A + WSCP4	0.10	186	89
WC8 Q = WML15B + WXPD2	0.02	37	19
WC9 Q = WC7 + WGC3 + WGRC1A + WC8	0.17	322	155
WC10A Q = WML8 + WPR6	0.03	60	30
WC10B Q = WC10A + WL4B + WEGL1	0.05	99	48
WC11 Q = WML10 + WEGN3	0.07	127	61
WC12 Q = WC10B + WC11	0.11	226	109
WC13 Q = WC12 + WL6B + WL7 + WML13 + WEGL2	0.17	332	170
WC14 Q = WC13 + WML14 + WL8 + WSKV3 + WSKV4	0.24	485	236
WC15 Q = WL9B + WXPD4	0.03	46	21
WC16 Q = WL11 + WPR6B + WPR6D + WMTL1	0.06	106	48
WC17 Q = WC14 + WC15 + WC16 + WGEL3 + WL10B	0.37	695	331
WC18 Q = WC17 + WL12 + WGRC1B	0.42	787	372
WC19 Q = RDB3 + WSHP3 + WPF2	0.90	94	70
WC20 Q = WPF5 + WML2 + WSHA5	0.05	86	42
WC21 Q = WC19 + WC20 + WMR6 + WPF4 + WSHA4	0.96	201	121
WC22A Q = WL4A + WL5A + WL5B	0.05	67	43
WC22 Q = WC21 + WC22A + WPRK4 + WMR5	1.01	282	169
WC23 Q = WC22 + WL6 + WPR + WEGN1 + WEGN2	1.03	322	189
WC24 Q = WC23 + WMR6 + WPF7 + WL6A	1.05	359	194
WC25 Q = WC23 + WPR3	0.01	16	8
WC26 Q = WC24 + WC25 + WPR6 WSCP5	1.09	412	217
WC27 Q = WC26 + WML7 + WSKV2	1.12	487	253
WC28 Q = WL10 + WMR5 + WSHP2	0.06	113	53
WC29 Q = WPF4 + WSHA3A	0.01	19	10
WC30 Q = WC29 + WSCH2 + WSHA3B	0.04	62	29
WC31 Q = WC30 + WSCP1	0.04	68	33
WC32 Q = WC31 + WML1 + WSHA2	0.07	124	58
WC33 Q = WC28 + WC32 + WMR2	0.14	244	113
WC34 Q = WC33 + WMR5 + WML5 + WML6	0.23	404	191
WC35 Q = WC27 + WC34	1.34	876	436
WC36 Q = WL2 + WPR2	0.03	51	23
WC37 Q = WC35 + WC36 + WSKV1B + WL3	1.41	1000	492
WC38 Q = RDB2 + WPR1 + WMR1 + WL1A	0.62	139	84
WC39 Q = WC38 + WSHP1	0.63	157	93
WC40 Q = WC39 + WSHA1	0.07	112	50
WC41 Q = WC38 + WC39 + WPR2 + WC40 + WML3	0.72	321	170
WC42 Q = WC41 + WPR3 + WML4	0.77	398	209
WC43 Q = WL3T + WC42	2.18	1325	648
WC43A Q = WC43 + WSKV1A	2.19	1330	650
CNW2SC Q = RDNW01 + NW50-C + WPRK10	2.71	1201	347
CNW71F Q = RDNW01 + NW71-E	0.24	610	106
CNW71W Q = RNW29C + NW71-W	0.24	354	167
CP1FT Q = OFF17B + OFF17A	0.04	66	31
CP2FB Q = CON + OFF21B	0.55	990	469
CP2FZ Q = RDP23 + OFF23	0.01	19	9
CP4FZ Q = RDF41 + OFF4-2	0.72	871	245
CP5FS1 Q = RDF4T4 + OFF5-1	1.02	1182	352
DB1 Q = CP1 + WOFF4 + WOFF5 + WOFF6 + WFF1B	0.88	793	313
RDB1 (FROM DB1)	0.88	71	57
DB2 Q = CP2 + WOFF9 + WOFF10 + WPF1A	0.57	667	254
RDB2 (FROM DB2)	0.57	70	53
EAST CONCENTRATION POINTS			
EC2F Q = EC21 + NW102-C	6.34	3308	1338
EC2B Q = EC21 + NW130-W	6.52	3369	1346
US95 CONCENTRATION POINTS			
CHDD6B Q = EXDD2B + WC3 + OFFW	0.08	130	64
CHDD6B Q = CHDD6B + WC5	0.17	301	147
CHDD6B Q = CHDD6B + WC6 + OFF14	0.36	648	315
CHDD7B Q = CHDD6B + 95-9A	0.37	669	325
CHDD7B2 Q = CHDD7B + OFF15	0.40	731	357
95-9B Q = 95-7A + 95-7B + 95-8A + 95-8B	0.02	47	24
OFCULV Q = CHDTRIB + CCP1FT + CCP2FB + CCP2FZ3 + OFFU	1.05	1836	877
95STN Q = CPCULV + CBWT1E	1.54	2285	1070

LEGEND

- BASIN BOUNDARY (UNCHANGED BASIN)
- BASIN BOUNDARY
- MATCHLINE SEE EXHIBIT FOR MAP EXTENSION
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- ID — FLOW DIRECTION
- ID — FLOW SPLIT

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.	APP. DATE

EASTLAND COMPANY, LLC

SKYE CANYON - MASTER DRAINAGE STUDY UPDATE

ULTIMATE CONDITION ONSITE HYDROLOGIC MAP

DATE: DEC. 2018
DRAFTER: CWB
DESIGNER: CWB
CHECKED: LL
PROJECT NO.
EST1801-000

EXHIBIT E
SHEET 1 OF 1

J:\est\1801-000 eastland master studies updates\drainage\conceptual study\figures\est1801-000 exhibit e ult drainage onsite.dwg 12/20/2018 11:56 AM Cameron Benzel

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: Skye Canyon MDS UP5 - Eastland
Description:
By: CWB
Date: 12/17/2018

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EAA1	D	90.10	0.799	55.00	0.0859	105	1.00	5.55	3598	2.3	3.05	4.62	13.91	19.45	3703	30.572	0.195
EAA2	D	90.10	0.799	35.40	0.0553	105	1.00	5.55	2452	2.6	3.26	4.94	9.13	14.68	2557	24.206	0.147
EAA3	D	90.10	0.799	51.20	0.0800	105	1.00	5.55	3578	1.9	2.76	4.18	15.28	20.82	3683	30.461	0.208
EAA4	D	90.10	0.799	21.00	0.0328	358	3.07	7.05	1655	0.9	1.93	2.92	10.92	17.97	2013	21.183	0.180
EBRT1	D	98.00	0.904	1.80	0.0028	20	1.00	1.58	1361	3.1	3.55	5.38	5.01	6.60	1381	17.672	0.066
ECOM1A	D	95.00	0.864	9.90	0.0155	50	1.00	3.00	1317	2.1	2.95	4.47	5.88	8.88	1367	17.594	0.089
ECOM1B	D	95.00	0.864	13.70	0.0214	50	1.00	3.00	1286	2.2	2.98	4.52	5.69	8.70	1336	17.422	0.087
ECOM2	D	95.00	0.864	4.70	0.0073	50	1.00	3.00	575	2.4	3.15	4.77	2.91	5.91	625	13.472	0.059
ECOM3	D	90.10	0.799	6.40	0.0100	50	1.00	3.83	747	1.3	2.34	3.54	4.73	8.55	797	14.428	0.086
ECOM4	D	90.10	0.799	5.50	0.0086	50	1.00	3.83	874	2.3	3.06	4.63	4.07	7.90	924	15.133	0.079
ECR1	D	97.40	0.896	7.80	0.0122	33	2.00	1.68	2468	1.3	2.27	3.43	13.22	14.90	2501	23.894	0.149
EFA1	D	98.00	0.904	2.70	0.0042	37	2.00	1.71	1491	0.5	1.43	2.16	13.47	15.17	1528	18.489	0.152
EFA2	D	98.00	0.904	2.40	0.0038	51	2.00	2.00	981	0.5	1.43	2.16	9.54	11.54	1032	15.733	0.115
EFA3	D	98.00	0.904	2.50	0.0039	32	2.00	1.59	1116	0.5	1.43	2.16	10.58	12.17	1148	16.378	0.122
EFA4	D	98.00	0.904	2.80	0.0044	79	2.00	2.49	1220	0.5	1.43	2.16	11.38	13.87	1299	17.217	0.139
EFA5	D	98.00	0.904	0.90	0.0014	40	2.00	1.77	266	4.5	4.29	6.50	1.03	2.81	306	11.700	0.050
EFA6A	D	98.00	0.904	2.50	0.0039	83	2.00	2.56	671	1.8	2.70	4.09	3.78	6.34	754	14.189	0.063
EFA6B	D	98.00	0.904	5.70	0.0089	27	2.00	1.46	1852	2.3	3.04	4.61	7.63	9.08	1879	20.439	0.091
EFP2	D	95.00	0.864	1.00	0.0016	50	1.00	3.00	110	12.7	7.21	10.92	0.25	3.26	160	10.889	0.050
EIRN1	D	92.20	0.827	1.90	0.0030	14	2.00	1.46	1317	3.0	3.52	5.34	4.92	6.38	1331	17.394	0.064
ELOG1	D	98.00	0.904	4.30	0.0067	51	2.00	2.00	934	1.8	2.73	4.13	4.81	6.81	985	15.472	0.068
ELOG2	D	97.90	0.902	12.10	0.0189	45	2.00	1.89	2847	2.9	3.41	5.17	10.02	11.91	2892	26.067	0.119
EMLA1	D	90.10	0.799	3.20	0.0050	50	1.00	3.83	344	4.9	4.49	6.80	1.28	5.10	394	12.189	0.051
EMR1	D	79.90	0.665	17.40	0.0272	191	1.00	10.83	2364	3.0	3.48	5.26	8.30	19.13	2555	24.194	0.191
EMR2	D	81.70	0.688	19.20	0.0300	304	1.00	12.92	2237	2.5	3.19	4.84	8.59	21.51	2541	24.117	0.215
ENP	D	55.30	0.340	3.50	0.0055	79	1.00	12.16	620	1.3	2.29	3.48	4.21	16.37	699	13.883	0.139
EOHR1	D	97.50	0.897	10.10	0.0158	21	2.00	1.33	2845	2.3	3.05	4.62	11.19	12.52	2866	25.922	0.125
EPA	D	90.10	0.799	17.10	0.0267	107	1.00	5.60	1441	1.6	2.56	3.87	7.31	12.91	1548	18.600	0.129
EPB1	D	82.20	0.695	31.60	0.0494	110	1.00	7.65	1930	1.8	2.72	4.12	8.86	16.50	2040	21.333	0.165
EPB2	D	82.20	0.695	46.40	0.0725	100	1.00	7.29	2604	1.7	2.63	3.98	11.99	19.28	2704	25.022	0.193
EPC	D	90.10	0.799	20.20	0.0316	95	1.00	5.28	1389	1.7	2.66	4.02	6.82	12.09	1484	18.244	0.121
EPD	D	90.10	0.799	28.90	0.0452	152	1.00	6.67	1237	0.7	1.73	2.61	9.53	16.20	1389	17.717	0.162
EPE1	D	90.10	0.799	12.50	0.0195	133	1.00	6.24	1126	1.2	2.17	3.28	7.03	13.27	1259	16.994	0.133

Skye Canyon Update #5

EST1801-000 GIS Curve Number.xlsx

BASIN ID	Soil Survey	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
EAA1	LV	18	314	90.05	55.00	55.00	100.0%	100.0%	90.05	90.05	**90.1**
EAA2	LV	18	314	90.05	35.40	35.40	100.0%	100.0%	90.05	90.05	**90.1**
EAA3	LV	18	314	90.05	51.20	51.20	100.0%	100.0%	90.05	90.05	**90.1**
EAA4	LV	18	314	90.05	21.00	21.00	100.0%	100.0%	90.05	90.05	**90.1**
EBRT1	LV	4	400	98	1.80	1.80	100.0%	100.0%	98.00	98.00	**98.0**
ECOM1A	LV	10	400	95	9.90	9.90	100.0%	100.0%	95.00	95.00	**95.0**
ECOM1B	LV	10	400	95	13.70	13.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM2	LV	10	400	95	4.70	4.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM3	LV	10	314	90.05	6.40	6.40	100.0%	100.0%	90.05	90.05	**90.1**
ECOM4	LV	10	314	90.05	5.50	5.50	100.0%	100.0%	90.05	90.05	**90.1**
ECR1	LV	4	314	98	5.60	7.80	71.8%	71.8%	70.36	70.36	
ECR1	LV	9	314	96	0.60	7.80	7.7%	79.5%	7.38	77.74	
ECR1	LV	9	314	96	1.60	7.80	20.5%	100.0%	19.69	97.44	**97.4**
EFA1	LV	4	314	98	2.70	2.70	100.0%	100.0%	98.00	98.00	**98.0**
EFA2	LV	4	314	98	2.40	2.40	100.0%	100.0%	98.00	98.00	**98.0**
EFA3	LV	4	314	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA4	LV	4	314	98	2.80	2.80	100.0%	100.0%	98.00	98.00	**98.0**
EFA5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EFA6A	LV	4	400	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA6B	LV	4	400	98	5.70	5.70	100.0%	100.0%	98.00	98.00	**98.0**
EIRN1	LV	4	314	98	1.20	1.90	63.2%	63.2%	61.89	61.89	
EIRN1	LV	9	314	96	0.60	1.90	31.6%	94.7%	30.32	92.21	**92.2**
ELOG1	LV	4	314	98	4.30	4.30	100.0%	100.0%	98.00	98.00	**98.0**
ELOG2	LV	4	314	98	11.50	12.10	95.0%	95.0%	93.14	93.14	
ELOG2	LV	9	314	96	0.60	12.10	5.0%	100.0%	4.76	97.90	**97.9**
EMLA1	LV	10	314	90.05	3.20	3.20	100.0%	100.0%	90.05	90.05	**90.1**
EMR1	LV	4	314	98	4.00	17.40	23.0%	23.0%	22.53	22.53	
EMR1	LV	13	314	67.45	10.10	17.40	58.0%	81.0%	39.15	61.68	
EMR1	LV	9	314	96	3.30	17.40	19.0%	100.0%	18.21	79.89	**79.9**
EMR2	LV	13	314	67.45	10.00	19.20	52.1%	52.1%	35.13	35.13	
EMR2	LV	9	314	96	2.60	19.20	13.5%	65.6%	13.00	48.13	
EMR2	LV	9	314	96	0.40	19.20	2.1%	67.7%	2.00	50.13	
EMR2	LV	9	314	96	0.70	19.20	3.6%	71.4%	3.50	53.63	
EMR2	LV	4	314	98	5.50	19.20	28.6%	100.0%	28.07	81.70	**81.7**
ENP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
EOHR1	LV	4	314	98	7.40	10.10	73.3%	73.3%	71.80	71.80	
EOHR1	LV	9	314	96	0.90	10.10	8.9%	82.2%	8.55	80.36	
EOHR1	LV	9	314	96	0.80	10.10	7.9%	90.1%	7.60	87.96	
EOHR1	LV	9	314	96	1.00	10.10	9.9%	100.0%	9.50	97.47	**97.5**
EPA	LV	18	314	90.05	17.10	17.10	100.0%	100.0%	90.05	90.05	**90.1**
EPB1	LV	19	314	82.15	31.60	31.60	100.0%	100.0%	82.15	82.15	**82.2**
EPB2	LV	19	314	82.15	46.40	46.40	100.0%	100.0%	82.15	82.15	**82.2**
EPC	LV	18	314	90.05	20.20	20.20	100.0%	100.0%	90.05	90.05	**90.1**
EPD	LV	18	314	90.05	28.90	28.90	100.0%	100.0%	90.05	90.05	**90.1**
EPE1	LV	18	314	90.05	12.50	12.50	100.0%	100.0%	90.05	90.05	**90.1**
EPE2	LV	18	314	90.05	9.10	9.10	100.0%	100.0%	90.05	90.05	**90.1**
EPF1	LV	18	314	90.05	13.50	13.50	100.0%	100.0%	90.05	90.05	**90.1**
EPF2	LV	18	314	90.05	19.10	19.10	100.0%	100.0%	90.05	90.05	**90.1**
EFP2	LV	10	400	95	1.00	1.00	100.0%	100.0%	95.00	95.00	**95.0**
EPG	LV	18	314	90.05	15.90	15.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH1	LV	18	314	90.05	23.90	23.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH2	LV	18	314	90.05	1.90	8.90	21.3%	21.3%	19.22	19.22	
EPH2	LV	18	400	95	7.00	8.90	78.7%	100.0%	74.72	93.94	**93.9**
EPH3	LV	18	400	95	15.40	15.40	100.0%	100.0%	95.00	95.00	**95.0**
EPI1	LV	10	314	90.05	8.60	8.60	100.0%	100.0%	90.05	90.05	**90.1**
EPI2	LV	10	314	90.05	7.40	7.40	100.0%	100.0%	90.05	90.05	**90.1**
EPJ	LV	16	400	93	4.70	31.70	14.8%	14.8%	13.79	13.79	
EPJ	LV	16	314	83.15	27.00	31.70	85.2%	100.0%	70.82	84.61	**84.6**
ES1	LV	37	314	83.51	8.20	10.40	78.8%	78.8%	65.84	65.84	
ES1	LV	37	400	92.96	2.20	10.40	21.2%	100.0%	19.66	85.51	**85.5**
ES2	LV	37	400	92.96	32.10	32.10	100.0%	100.0%	92.96	92.96	**93.0**
ESKV1	LV	4	314	98	3.90	3.90	100.0%	100.0%	98.00	98.00	**98.0**
ESKY1	LV	4	314	98	8.20	8.20	100.0%	100.0%	98.00	98.00	**98.0**
ESP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
ETP4	LV	4	400	98	0.50	0.80	62.5%	62.5%	61.25	61.25	
ETP4	LV	4	314	98	0.30	0.80	37.5%	100.0%	36.75	98.00	**98.0**
ETP5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EUS95	LV	4	314	98	9.40	9.40	100.0%	100.0%	98.00	98.00	**98.0**
OFFZ	LV	20	314	78.65	30.80	30.80	100.0%	100.0%	78.65	78.65	**78.7**
NW102-C	LV	48	314	93.4175	0.40	128.10	0.3%	0.3%	0.29	0.29	
NW102-C	LV	48	314	93.4175	5.40	128.10	4.2%	4.5%	3.94	4.23	
NW102-C	LV	47	314	86.478	7.70	128.10	6.0%	10.5%	5.20	9.43	
NW102-C	LV	48	314	93.4175	114.60	128.10	89.5%	100.0%	83.57	93.00	**93.0**
NW103-W	LV	47	314	86.478	0.10	99.80	0.1%	0.1%	0.09	0.09	
NW103-W	LV	44	630	88.9	0.10	99.80	0.1%	0.2%	0.09	0.18	
NW103-W	LV	46	630	92.68	0.10	99.80	0.1%	0.3%	0.09	0.27	
NW103-W	LV	47	630	94.08	0.20	99.80	0.2%	0.5%	0.19	0.46	
NW103-W	LV	46	630	92.68	0.20	99.80	0.2%	0.7%	0.19	0.64	
NW103-W	LV	44	630	88.9	0.30	99.80	0.3%	1.0%	0.27	0.91	

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*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   18DEC18  TIME  12:41:55  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE.INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     LENNAR HOMES
    3         ID     SKYE CANYON
    4         ID     MASTER DRAINAGE STUDY - UPDATE #5
    5         ID     ULTIMATE DRAINAGE CONDITION - REVISED EAST AREA
    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR   PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    2.77
   32         PC      0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC  0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC  0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC  0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC  0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC  0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC  0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC  0.998   0.999   1.000
   40         LS      0    98.0
   41         UD  0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

```
                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```



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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    2.77
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```
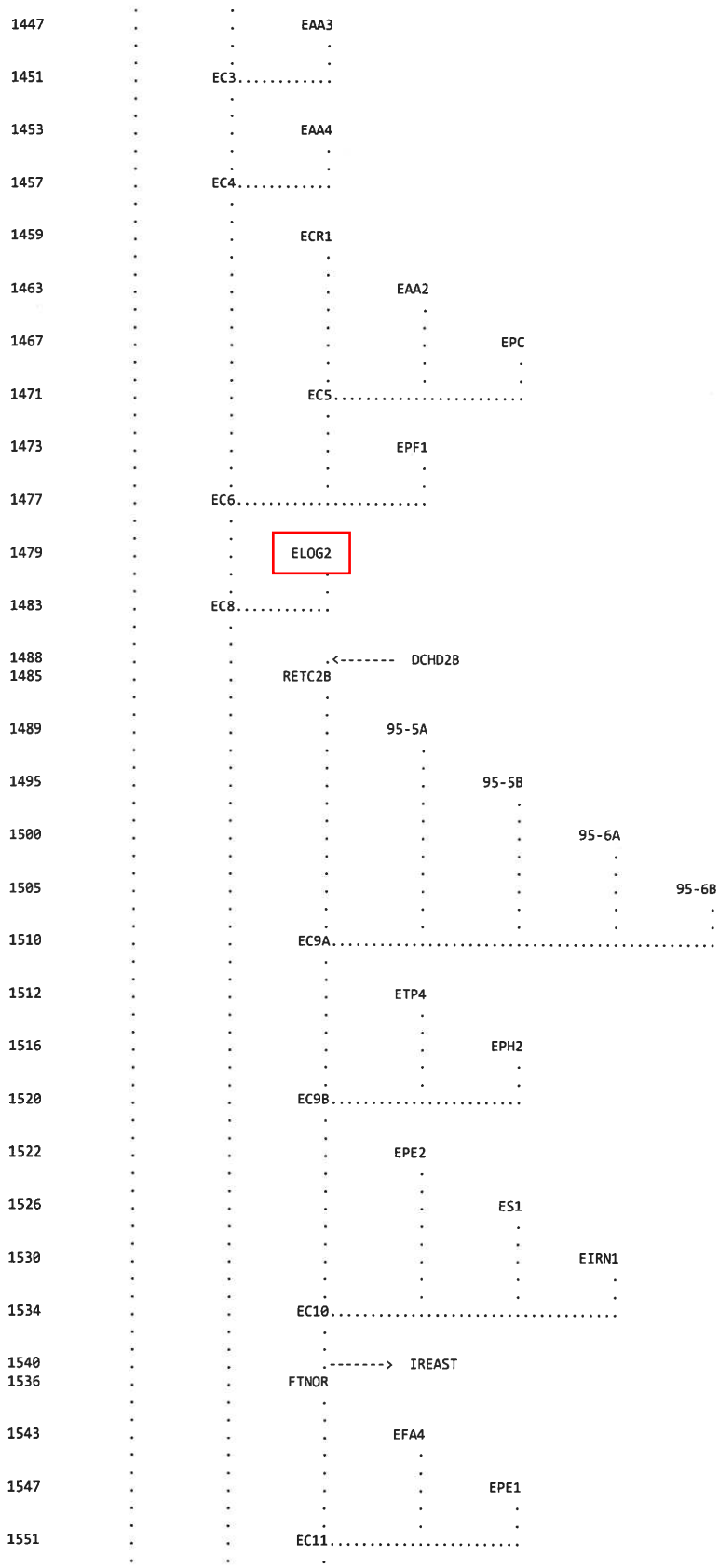

```
             *

1561         KK    EPI2
1562         BA  0.0116
1563         LS       0    90.1
1564         UD   0.081
             *

1565         KK   EOHR1
1566         BA  0.0158
1567         LS       0    97.5
1568         UD   0.125
             *

1569         KK     ESP
1570         BA  0.0055
1571         LS       0    55.3
1572         UD   0.128
             *

1573         KK    EC13
1574         HC       5
             *

1575         KK    EPF2
1576         BA  0.0298
1577         LS       0    90.1
1578         UD   0.050
             *

1579         KK    EPH1
1580         BA  0.0373
1581         LS       0    90.1
1582         UD   0.141
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1583         KK    EC14
1584         HC       3
             *

1585         KK    EC15
1586         HC       2
             *

1587         KK   RFTLC
1588         KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
1589         DT   OHARE
1590         DI       0     115    5000
1591         DQ       0      47      47
             *

1592         KK    EFA3
1593         BA  0.0039
1594         LS       0    98.0
1595         UD   0.122
             *

1596         KK     EPD
1597         BA  0.0452
1598         LS       0    90.1
1599         UD   0.162
             *

1600         KK    EC16
1601         HC       3
             *

1602         KK  R2FTLC
1603         KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
1604         DT  LOGCAB
1605         DI       0      87    5000
1606         DQ       0      87      87
             *

1607         KK    EC18
1608         HC       2
             *

1609         KK     ENP
1610         BA  0.0055
1611         LS       0    45.3
1612         UD   0.139
             *

1613         KK    EPB1
```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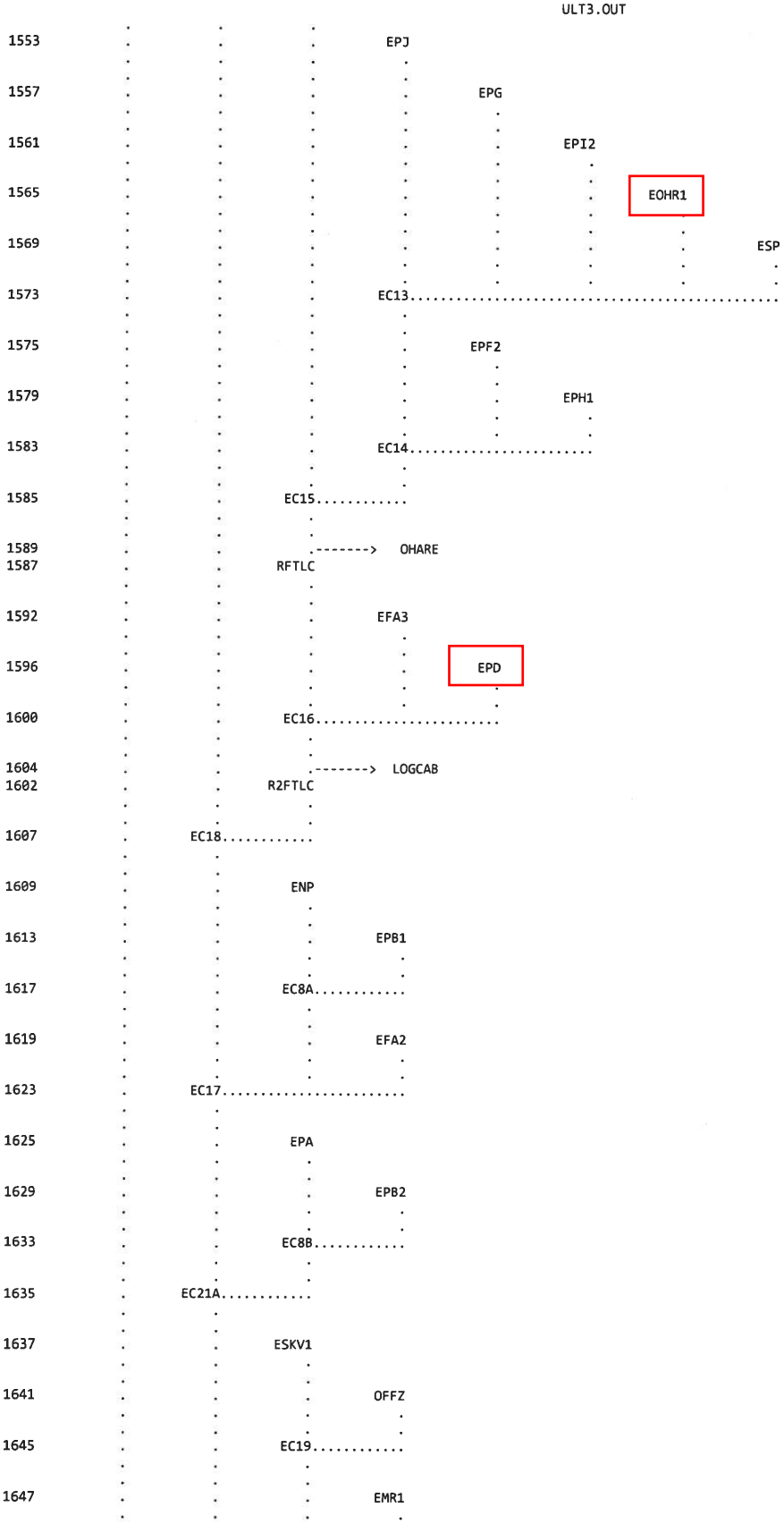
EAA4
1457
EC4
1459
ECR1
1463
EAA2
1467
EPC
1471
EC5
1473
EPF1
1477
EC6
1479
ELOG2
1483
EC8
1488
DCHD2B
1485
RETC2B
1489
95-5A
1495
95-5B
1500
95-6A
1505
95-6B
1510
EC9A
1512
ETP4
1516
EPH2
1520
EC9B
1522
EPE2
1526
ES1
1530
EIRN1
1534
EC10
1540
IREAST
1536
FTNOR
1543
EFA4
1547
EPE1
1551
EC11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1565
EOHR1
1569
ESP
1573
EC13
1575
EPF2
1579
EPH1
1583
EC14
1585
EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

HYDROGRAPH AT										
+	EPF1	.02	1	FLOW	32.	31.	31.	29.	28.	28.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC6	5.43	1	FLOW	2977.	2897.	2858.	2701.	2622.	2579.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	35.	34.	34.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC8	5.45	1	FLOW	3012.	2931.	2892.	2734.	2654.	2611.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	12.	12.	11.	11.	11.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	11.	11.	11.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	19.	18.	18.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	12.	12.	12.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	57.	55.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	27.	26.	26.	25.	24.	24.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	87.	85.	83.	79.	77.	76.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	22.	22.	21.	20.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	20.	20.	19.	18.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	8.	8.	8.	8.	7.	7.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	29.	29.	28.	27.	26.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	37.	36.	36.	34.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	55.	53.	52.	49.	47.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	36.	35.	34.	32.	31.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	20.	19.	19.	18.	17.	17.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	29.	29.	28.	27.	26.	26.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	4.92	4.92	4.92
5 COMBINED AT										
+	EC13	.11	1	FLOW	136.	132.	130.	123.	119.	117.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	57.	56.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	56.	54.	53.	50.	49.	48.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	232.	225.	222.	209.	203.	200.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	267.	259.	256.	241.	234.	230.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	OHARE	.28	1	FLOW	47.	47.	47.	47.	47.	47.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	220.	212.	209.	194.	187.	183.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	65.	63.	62.	59.	57.	56.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	287.	278.	273.	255.	247.	242.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	200.	191.	186.	168.	160.	155.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	3211.	3122.	3078.	2902.	2814.	2766.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	4.92	4.92	4.92	5.00	5.00	5.08
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18DEC18  TIME  12:39:20  *
*                                      *
****************************************
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```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
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    3         ID     SKYE CANYON
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    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3 - 10yr.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR    PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    1.58
   32         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC   0.998   0.999   1.000
   40         LS       0    98.0
   41         UD   0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

```
                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```



```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    1.58
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```

```
                *
     1561       KK    EPI2
     1562       BA  0.0116
     1563       LS       0    90.1
     1564       UD   0.081
                *
     1565       KK   EOHR1
     1566       BA  0.0158
     1567       LS       0    97.5
     1568       UD   0.125
                *
     1569       KK     ESP
     1570       BA  0.0055
     1571       LS       0    55.3
     1572       UD   0.128
                *
     1573       KK    EC13
     1574       HC       5
                *
     1575       KK    EPF2
     1576       BA  0.0298
     1577       LS       0    90.1
     1578       UD   0.050
                *
     1579       KK    EPH1
     1580       BA  0.0373
     1581       LS       0    90.1
     1582       UD   0.141
                *
1                                       HEC-1 INPUT                                          PAGE 44

     LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

     1583       KK    EC14
     1584       HC       3
                *
     1585       KK    EC15
     1586       HC       2
                *
     1587       KK   RFTLC
     1588       KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
     1589       DT   OHARE
     1590       DI       0     115    5000
     1591       DQ       0       0      47
                *
     1592       KK    EFA3
     1593       BA  0.0039
     1594       LS       0    98.0
     1595       UD   0.122
                *
     1596       KK     EPD
     1597       BA  0.0452
     1598       LS       0    90.1
     1599       UD   0.162
                *
     1600       KK    EC16
     1601       HC       3
                *
     1602       KK  R2FTLC
     1603       KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
     1604       DT  LOGCAB
     1605       DI       0      87    5000
     1606       DQ       0      87      87
                *
     1607       KK    EC18
     1608       HC       2
                *
     1609       KK     ENP
     1610       BA  0.0055
     1611       LS       0    55.3
     1612       UD   0.139
                *
     1613       KK    EPB1
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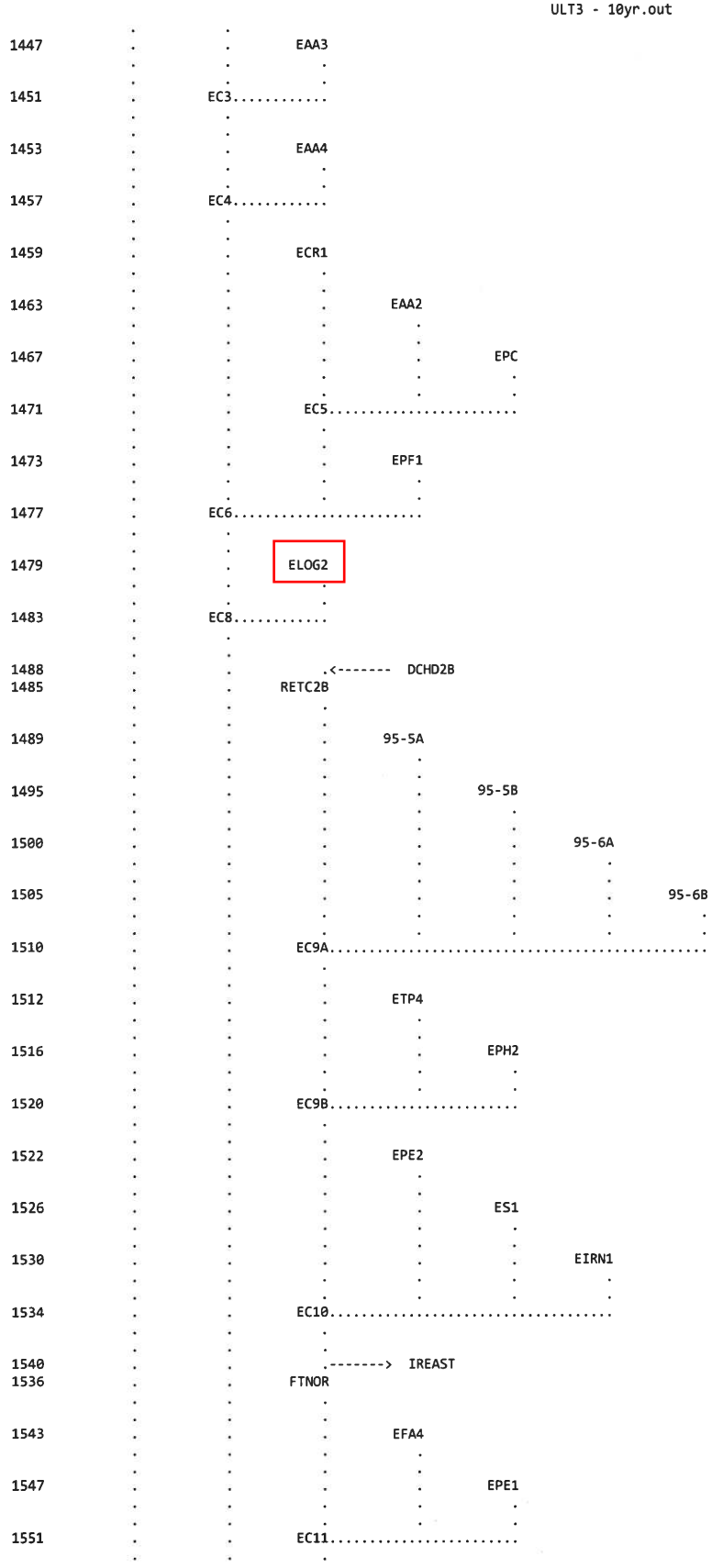
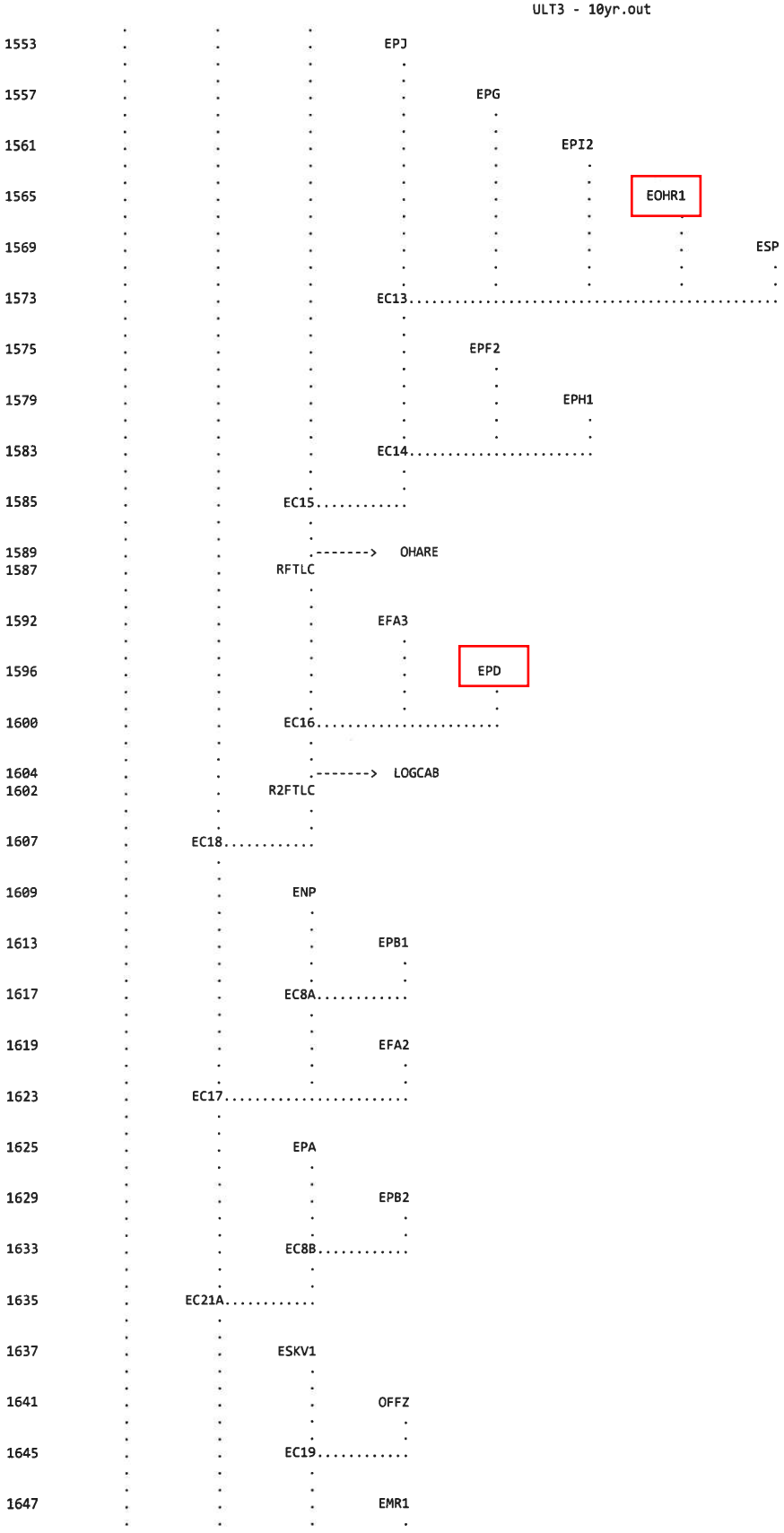

1447 EAA3
1451 EC3
1453 EAA4
1457 EC4
1459 ECR1
1463 EAA2
1467 EPC
1471 EC5
1473 EPF1
1477 EC6
1479 ELOG2
1483 EC8
1488 DCHD2B
1485 RETC2B
1489 95-5A
1495 95-5B
1500 95-6A
1505 95-6B
1510 EC9A
1512 ETP4
1516 EPH2
1520 EC9B
1522 EPE2
1526 ES1
1530 EIRN1
1534 EC10
1540 IREAST
1536 FTNOR
1543 EFA4
1547 EPE1
1551 EC11


1553
EPJ
1557
EPG
1561
EPI2
1565
EOHR1
1569
ESP
1573
EC13
1575
EPF2
1579
EPH1
1583
EC14
1585
EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

+	EPF1	.02	1	FLOW	14.	14.	14.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC6	5.43	1	FLOW	1296.	1258.	1238.	1164.	1127.	1108.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	19.	19.	19.	18.	18.	17.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58
2 COMBINED AT										
+	EC8	5.45	1	FLOW	1315.	1277.	1257.	1182.	1145.	1125.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	5.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	27.	26.	26.	24.	23.	23.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	13.	13.	13.	12.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	42.	41.	40.	38.	37.	36.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	10.	9.	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	8.	7.	7.	7.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	5.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	13.	13.	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	18.	17.	17.	16.	15.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	19.	18.	18.	16.	16.	15.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	16.	15.	15.	14.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	9.	8.	8.	8.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	16.	16.	16.	15.	14.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
5 COMBINED AT										
+	EC13	.11	1	FLOW	58.	56.	55.	52.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	26.	25.	25.	23.	22.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	25.	24.	23.	22.	21.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	99.	96.	94.	88.	84.	83.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	OHARE	.28	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.58	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	28.	28.	27.	25.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	148.	143.	141.	131.	127.	124.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	61.	56.	54.	44.	40.	37.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	1376.	1333.	1311.	1226.	1184.	1163.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC17	5.84	1	FLOW	1396.	1352.	1329.	1243.	1200.	1178.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

Appendix D – Improvement Plans

CIVIL IMPROVEMENT PLANS

FOR

SUNSTONE - PARCEL D

APN: 125-06-710-003

LAS VEGAS, NEVADA

PROJECT CONTACTS

DEVELOPER/OWNER
LENNAR
9275 W RUSSELL RD, SUITE 400
LAS VEGAS, NEVADA 89148

CONTACT: ROBERT FLAXA
(702) 821-4651

MASTER PLAN SURVEYOR
VTN NEVADA
2727 S RAINBOW BLVD
LAS VEGAS, NEVADA 89146

CONTACT: RAYMOND JOHNSON
(720) 873-7550

CIVIL ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD SOUTH, SUITE 320
LAS VEGAS, NEVADA 89119

CONTACT: MIKAL KINTNER
(702) 862-3632

PROJECT INFORMATION

NUMBER OF LOTS: 199
ACREAGE: ±30.74 ACRES (GROSS)

EXISTING ZONING: T-D EXISTING
PROPOSED ZONING: T-D

ENTITLEMENTS: TMP-78151

DRAINAGE STUDY: DS5281A

TRAFFIC STUDY: TIA75571-1

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE 'X' PER FEMA FLOOD INSURANCE MAP NUMBERS 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE¼) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

LEGAL DESCRIPTION

PARCEL 13 OF THE PARENT FINAL MAP OF SUNSTONE (FMP-77750) BOOK 161, PAGE 40 OF PLATS ON FILE WITH CLARK COUNTY NEVADA, RECORDER.

UTILITY NOTE

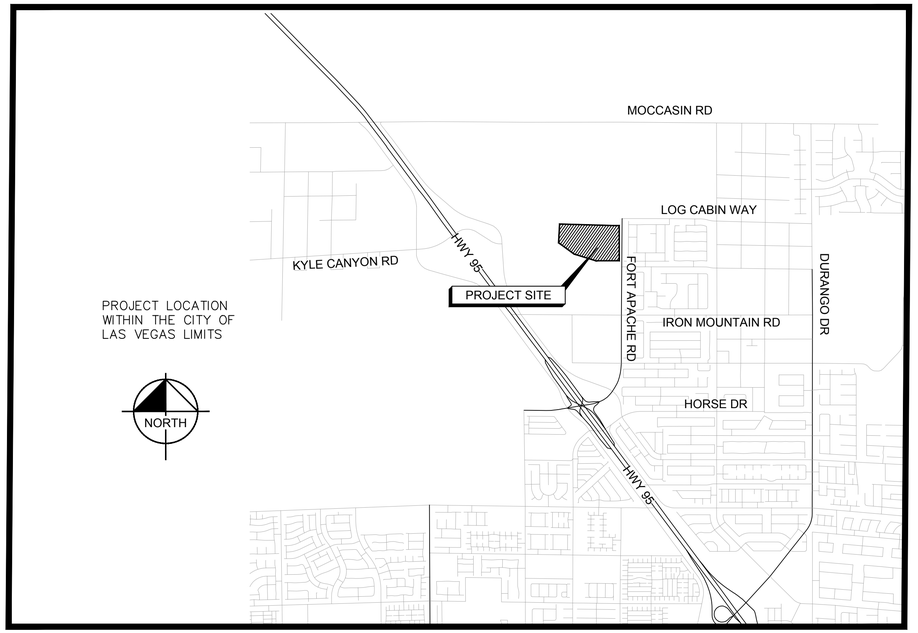
KIMLEY-HORN AND ASSOCIATES TAKES NO RESPONSIBILITY FOR EXISTING UTILITIES SHOWN HEREIN. THE EXISTING UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY-OTHER PARTIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND VERIFY THE LOCATIONS AND INVERTS OF THE EXISTING WITHIN THE VICINITY OF CONSTRUCTION ACTIVITIES. IF A CONFLICT IS FOUND TO EXIST, THE CONTRACTOR SHALL COORDINATE THE PROJECT ENGINEER, PROJECT ARCHITECT, AND THE OWNER IMMEDIATELY.

UTILITY PROVIDERS

WATER	LAS VEGAS VALLEY WATER DISTRICT
SEWER	CITY OF LAS VEGAS
ELECTRIC	NV ENERGY
SOLID WASTE DISPOSAL	REPUBLIC SERVICES
GAS	SOUTHWEST GAS
TELEPHONE	CENTURY LINK
COMMUNICATIONS	COX COMMUNICATIONS

GENERAL NOTES

1. THIS SUBDIVISION IS A PART OF THE SUNSTONE MASTER PLAN.
2. LANDSCAPING ON-SITE WILL BE MAINTAINED BY AN HOA
3. WATER POINT OF CONNECTION WILL COME OFF EXISTING WATER LINES STUBS IN O'HARE AVE & SKYE CANYON PARK DR.
4. SEWER POINT OF CONNECTION WILL COME OFF EXISTING SEWER LINES AT THE SOUTHEAST CORNER OF THE PARCEL
5. ABOVE GROUND UTILITY BOXES SHALL NOT BE PLACED WITHIN TRAIL CORRIDORS
6. ONSITE STREETS, TRAILS, OPEN SPACES, AND DRAINAGE CORRIDORS ARE TO BE PRIVATE AND MAINTAINED BY THE HOA
7. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA



LOCATION MAP
NTS

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER SOUTHWEST GEOTECHNICAL:
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

SHEET INDEX

SEE SHEET 3 FOR SHEET INDEX

APPROVALS

CITY OF LAS VEGAS

"APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY LISTED UNDER "DEVIATIONS FROM STANDARDS" THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATION FROM STANDARDS" IN FAVOR OF THE CITY OF LAS VEGAS IMPROVEMENT STANDARDS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA".

ALLEN PAVELKA, PE #09029
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

CITY OF LAS VEGAS PLANNING DEPARTMENT
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT

CITY OF LAS VEGAS FIRE DEPT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1625 GPM / ONSITE 1625 GPM

NV ENERGY* DATE

* NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK* DATE

* THE AFFIXED CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTIONS OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. DATE

SOUTHWEST GAS CORPORATION DATE

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MIKAL KINTNER EXPIRES 06/30/21 CIVIL No. 23006 — 07/01/2020

KHA PROJECT 092935006		DESIGNED BY	MK
DATE 07/01/2020		DRAWN BY	KJW
SCALE AS SHOWN		CHECKED BY	TLC

COVER SHEET

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

Plotted By:Kintner Mikal Sheet Set:092935006 - Lennar Sunstone Parcel D Layout:1 COVER SHEET July 02, 2020 11:27:52am K:\LAS_Civil\092935006-Lennar Sunstone\CAD\PlanSheets\Parcel D\092935006-Cv-D.dwg
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CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 'UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA', LATEST ISSUE; THE 'UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA', LATEST REVISED EDITION; THE 'SUMMERLIN IMPROVEMENT STANDARDS' FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS 'DEVIATIONS FROM STANDARDS'.
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STD STANDARD DRAWING 218.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY TERRACON CONSULTANTS INC. DATED DECEMBER 14, 2017 PROJECT NO. 64175087, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE A MINIMUM OF TWO (2) HORIZONTAL AND VERTICAL (INVERT) LOCATIONS OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER MAIN AND LATERALS TO THE HORIZONTAL SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
22. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC/ELECTRICAL FIELD OPERATIONS DIVISION AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623.1.0.03 (E) OF THE SPECIFICATIONS.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION. 4. ALL EMPTY CONDUIT SHALL HAVE PULL STRINGS INSTALLED PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE OF EIGHTEEN INCHES (18") TO THE FACE OF STREET LIGHTING POLE ON ALL SIDES WHEN STREETLIGHT IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE. 6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE ELECTRICAL SERVICES SECTION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NEVADA POWER COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREETLIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

NOTE TO CONTRACTOR:

1. CONTRACTOR IS REQUIRED TO NOTIFY THE ARCHITECT, ENGINEER AND OWNER IN WRITING BY RFI OF ANY TYPED, HANDWRITTEN, STAMPED OR LABELLED PLAN CHECK COMMENTS ON THE PERMITTED PLANS WITHIN 7 DAYS OF RECEIPT OF THE PERMITTED PLANS. FAILURE TO PROVIDE WITHIN 7 DAYS INDICATES CONTRACTOR HAS INCLUDED ALL COSTS WITHIN HIS BASE BID TO COMPLY WITH FEDERAL, STATE AND LOCAL CODES AND SHALL PERFORM THE WORK AT NO ADDITIONAL COST.
2. GENERAL CONTRACTOR SHALL INCLUDE CONTACTING, COORDINATING PERMITS, SCHEDULING AND SUPERVISING ALL WORK TO BE PERFORMED BY NVE, SOUTHWEST GAS, CENTURYLINK, COX CABLE OR OTHER UTILITY PURVEYOR WORK PRIOR TO AND DURING CONSTRUCTION INCLUDING BARRICADING PLANS, BARRICADE DESIGNS, PERMITS AND BARRICADE WORK.
3. GENERAL CONTRACTOR SHALL CONTACT AND MEET ONSITE WITH ALL UTILITY PURVEYORS FOR SCHEDULING AND COORDINATION PURPOSES AT LEAST 30 DAYS PRIOR TO INSTALLATION OF UTILITY WORK.
4. GENERAL CONTRACTOR SHALL PROVIDE AND PAY FOR ALL BARRICADING PLANS, APPROVALS AND BARRICADING WITHIN THE RIGHT OF WAY AS WELL AS ANY CHANGES REQUIRED BY THE GOVERNING AUTHORITY IN THE PERFORMANCE OF CONTRACTOR'S WORK.
5. THE OWNER AND/OR HIS CONSULTANTS ARE NOT RESPONSIBLE FOR DELAYS CAUSED BY CONTRACTOR'S FAILURE TO PROVIDE NOTIFICATIONS IN A TIMELY MANNER.
6. PROJECT CONSULTANTS SHALL RESPOND TO RFIS OR OTHER CONTRACTOR QUERIES WITHIN 5 BUSINESS DAYS.

DEVIATION FROM STANDARDS

NONE

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # 137252

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF THE UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES OR SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS OF CONSTRUCTION MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDED THE PLACEMENT OF APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

   ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. NO LEAD COMPLIANCE NOTE: TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE INSTALLED OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO._____####_____ FIRST APPROVED DATE:_____

SWPPP NOTES

1. CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVED ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS AND CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTION MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS FIRE & RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS-APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND FIRE HYDRANT MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 3310 & 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES OR CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC 507.2.1, NFPA 24]
8. PAINTING CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC 507.5.7.1]
10. PRIOR TO FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    RESIDENTIAL-500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED
    COMMERCIAL-300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FEET SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN ISLANDS, FIRE HYDRANTS SHALL BE PROVIDED ON TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC C102.1]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET. [IFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE FOUR (4) OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN TWO (2) FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 8% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FEET 6 INCHES. [IFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FEET FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD, NOT LESS THAN 24 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FEET. [IFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FEET IF THE BUILDING IS SPRINKLERED. [IFC 501.1.1]
25. APPROVED SECONDARY FIRE APPARATUS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FEET. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR E

MASTER LEGEND

- STREET CENTERLINE
- PROPERTY LINE / RIGHT OF WAY
- EASEMENT LINE
- EXISTING PATENT EASEMENT
- EXISTING WALL
- PROPOSED RETAINING OR STEM WALL
- PROPOSED SCREEN WALL
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED CONCRETE BARRIER RAIL
- EXISTING CURB & GUTTER
- PROPOSED CURB & GUTTER
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BOLLARD
- PROPOSED DOOR
- SCARP
- SLOPE
- EXISTING GRADE
- PROPOSED GRADE
- BACKWATER VALVE
- PRESSURE REDUCING VALVE

- EXISTING CONTOUR
- PROPOSED CONTOUR
- CUT FILL TRANSITION
- ADA ACCESS
- SAWCUT LIMITS
- GRADE BREAK
- FLOW LINE
- EXISTING STORM DRAIN
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- PROPOSED SEWER
- PROPOSED SEWER LATERAL
- PROPOSED WATER LINE
- PROPOSED STREET LIGHT / TRAFFIC CONDUIT
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN
- EXISTING HANDICAP PARKING
- PROPOSED HANDICAP PARKING
- EXISTING STORM DRAIN MANHOLE
- PROPOSED SIDEWALK DRAIN
- EXISTING DROP INLET
- PROPOSED DROP INLET
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE
- EXISTING FIRE HYDRANT
- PROPOSED CLEAN OUT
- PROPOSED FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- PROPOSED BLUE REFLECTIVE PAVEMENT MARKING
- EXISTING MISCELLANEOUS MANHOLE
- EXISTING POLE
- EXISTING STREET LIGHT
- EXISTING AREA LIGHT
- PROPOSED STREET LIGHT
- PROPOSED AREA LIGHT

ABBREVIATIONS

@	AT	LA	LANDSCAPE ARCHITECT
AB	AGGREGATE BASE	LF	LINEAR FEET
AC	ASPHALTIC CONCRETE	LP	LOW POINT
ADA	AMERICANS WITH DISABILITIES ACT	LS	LANDSCAPE
AVE	AVENUE	LT	LEFT
BC	BACK OF CURB	LVVWD	LAS VEGAS VALLEY WATER DISTRICT
BCR	BEGIN CURB RETURN	MAX	MAXIMUM
BLVD	BOULEVARD	ME	MATCH EXISTING
BM	BENCHMARK	MEP	MECHANICAL, ELECTRICAL AND PLUMBING
BVC	BEGIN VERTICAL CURVE		
BW	BOTTOM OF WALL	MH	MANHOLE
BWV	BACKWATER VALVE	MIN	MINIMUM
B/S	BACKSIDE	MUE	MUNICIPAL UTILITY EASEMENT
CALC	CALCULATED	N	NORTH
CC	CLARK COUNTY	NTS	NOT TO SCALE
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING	N/S	NORTH/SOUTH
		OC	ON CENTER
CL	CENTERLINE	P.A.E.	PUBLIC ACCESS EASEMENT
CJ	CONSTRUCTION JOINT	PC	POINT OF CURVATURE
COH	CITY OF HENDERSON	PCC	PORTLAND CEMENT CONCRETE
CUHBD	CITY OF HENDERSON BUILDING DEPARTMENT	PDE	PRIVATE DRAINAGE EASEMENT
		PR	PROPOSED
CO	CLEAN OUT	PRC	POINT OF REVERSE CURVATURE
CONN	CONNECTION	PROP	PROPOSED
CTV	CABLE TELEVISION	PRV	PRESSURE REDUCING VALVE
CY	CUBIC YARD	PT	POINT OF TANGENCY
Δ	DELTA (DIFFERENCE) / ANGLE	PVC	POLYVINYL CHLORIDE
D	DEPTH	PVI	POINT OF VERTICAL INFLECTION
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS	PUB	PUBLIC
		PVT	PRIVATE
		R	RADIUS
DG	DECOMPOSED GRANITE	RCB	REINFORCED CONCRETE BOX
DI	DUCTILE IRON	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	RT	RIGHT
E	EAST	R/W	RIGHT OF WAY
EA	EACH	S	SOUTH
EG	EXISTING GRADE	SD	STORM DRAIN
ESMT	EASEMENT	SDMH	STORM DRAIN MANHOLE
ECR	END CURB RETURN	SF	SQUARE FOOT OR FEET
ELEV	ELEVATION	SS	SANITARY SEWER
ELEC	ELECTRICAL	SSMH	SANITARY SEWER MANHOLE
EOP	EDGE OF PAVEMENT	ST	STREET
EVC	END VERTICAL CURVE	ST-LT	STREETLIGHT
EX.	EXISTING	STL	STEEL
E/W	EAST/WEST or EACH WAY	STD	STANDARD
FF	FINISHED FLOOR	SW	SIDEWALK
FFE	FINISHED FLOOR ELEVATION	SY	SQUARE YARDS
F-F	FACE OF CURB TO FACE OF CURB	TC	TOP OF CURB
FG	FINISHED GROUND	TF	TOP OF FOOTING
FH	FIRE HYDRANT	TG	TOP OF GRATE
FL	FLOWLINE	TRW	TOP OF RETAINING WALL
FT	FOOT or FEET	TYP	TYPICAL
GB	GRADE BREAK	TW	TOP OF WALL
GFE	GARAGE FACE ELEVATION	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
H	HEIGHT		
HDPE	HIGH-DENSITY POLYETHYLENE		
HP	HIGH POINT	VERT	VERTICAL
INT	INTERSECTION	W	WEST
INV	INVERT	WL	WATERLINE
L	LENGTH	WTR	WATER
		XFF	EXISTING FINISHED FLOOR ELEVATION
		±	PLUS OR MINUS

QUANTITIES ARE SHOWN FOR PERMIT PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN ESTIMATE FOR BIDDING AND SHALL BID A COMPLETE JOB. CONTRACTOR SHALL ADVISE OWNER & ENGINEER OF ANY APPARENT DISCREPANCIES IN ESTIMATE.

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24	C5.1	STORM DRAIN LATERALS
25	C7.1	TYPICAL SECTIONS
26	C7.2	TYPICAL DETAILS

No.	REVISIONS	DATE	BY

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA — TAMARA KAY WILLIAMS — No. 023519 — CIVIL — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

MASTER LEGEND & QUANTITIES

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

3
C0.3

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Plotted By:Kintner, Mikol Sheet Set:092935006 - Lennar Sunstone\Parcel D Layout:3 MASTER LEGEND & QUANTITIES July 02, 2020 11:27:58am K:\LAV Civil\092935006-CVL-D.dwg
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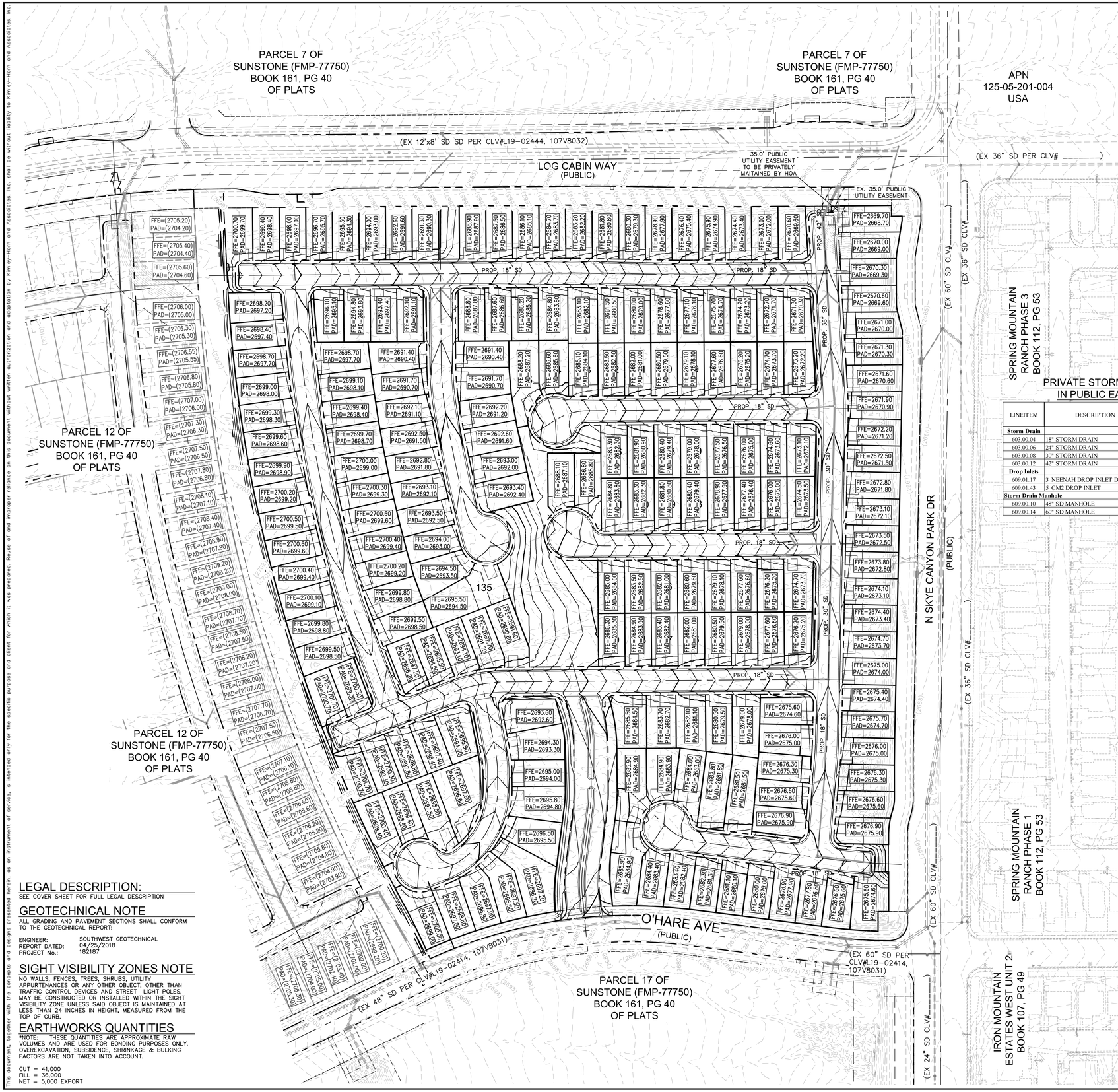

PRIVATE STORM QUANTITIES IN PUBLIC EASEMENTS:

LINEITEM	DESCRIPTION	Public Quantity	Private Quantity	Unit Type
Storm Drain				
603.00.04	18" STORM DRAIN		1566	LF
603.00.06	24" STORM DRAIN		177	LF
603.00.08	30" STORM DRAIN		688	LF
603.00.12	42" STORM DRAIN		153	LF
Drop Inlets				
609.01.17	3' NEENAH DROP INLET D=6' MAX		26	EA
609.01.43	5' CM2 DROP INLET		1	EA
Storm Drain Manhole				
609.00.10	48" SD MANHOLE		14	EA
609.00.14	60" SD MANHOLE		2	EA

ENGINEER'S NOTES

1. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.
3. ALL WORK SHALL CONFORM TO THE SOILS REPORT PREPARED BY SOUTHWEST GEOTECHNICAL, DATED 04/25/2018. PROJECT NO. 182187
4. ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST EDITION.
5. FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF INCH ABOVE THE TOP OF THE GUTTER (INCLUDING OPEN GRADE).
6. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION
7. THIS PLAN SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY ALL APPLICABLE GOVERNMENT AGENCIES.
8. ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
9. MATCH ELEVATIONS SHOWN TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.
10. PERIMETER SCREEN WALL AND RETAINING WALL PERMIT TO BE COMPLETED PER SEPARATE PLANS AND PERMIT BY OTHERS.
11. PER THE SOILS REPORT, POSITIVE DRAINAGE OF 5% MINIMUM SHALL BE MAINTAINED FOR AREAS ADJACENT TO STRUCTURES THAT ARE NOT COVERED BY CONCRETE OR ASPHALT. THE 5% SHOULD BE MAINTAINED FOR A DISTANCE OF 10'
12. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED
13. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION
14. THE CONTRACTOR SHALL VERIFY THE EX. GRADES PRIOR TO CONSTRUCTION. IF A CONFLICT EXISTS BETWEEN THE FIELD CONDITION AND THESE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
15. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE IS MAINTAINED.
16. ALL PAVEMENT SECTIONS SHOWN HEREIN ARE BASED ON THE RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER.
17. ONSITE STORMWATER CONVEYANCE SYSTEM IS TO BE PRIVATELY MAINTAINED.
18. ADD 2600' TO ALL 2-DIGIT ELEVATIONS UNLESS OTHERWISE NOTED.
19. REFER TO SHEET C0.3 FOR LEGEND AND ABBREVIATIONS.

STORMWATER MANAGEMENT NOTE

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CLARK COUNTY BUILDING ADMINISTRATIVE CODE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5274A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

SIGHT VISIBILITY ZONES NOTE

NO WALLS, FENCES, TREES, SHRUBS, UTILITY APPURTENANCES OR ANY OTHER OBJECT, OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES, MAY BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE UNLESS SAID OBJECT IS MAINTAINED AT LESS THAN 24 INCHES IN HEIGHT, MEASURED FROM THE TOP OF CURB.

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

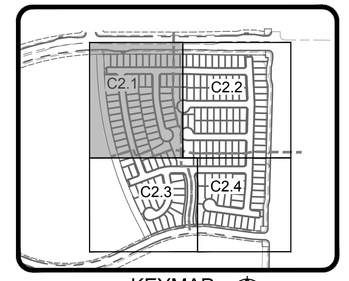
PROFESSIONAL ENGINEER — TAMARA CONNOLLY — STATE OF NEVADA — No. 025119 — EXPIRES 07/31/20 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

OVERALL GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

5 OF 22 SHEETS
C2.0



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
4. INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
8. CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.

ENGINEER'S NOTES

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2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

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ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

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2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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PROFESSIONAL ENGINEER — STATE OF NEVADA — TAMARA CONNOLLY — No. 025119 — EXPIRES 12/31/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C2.1

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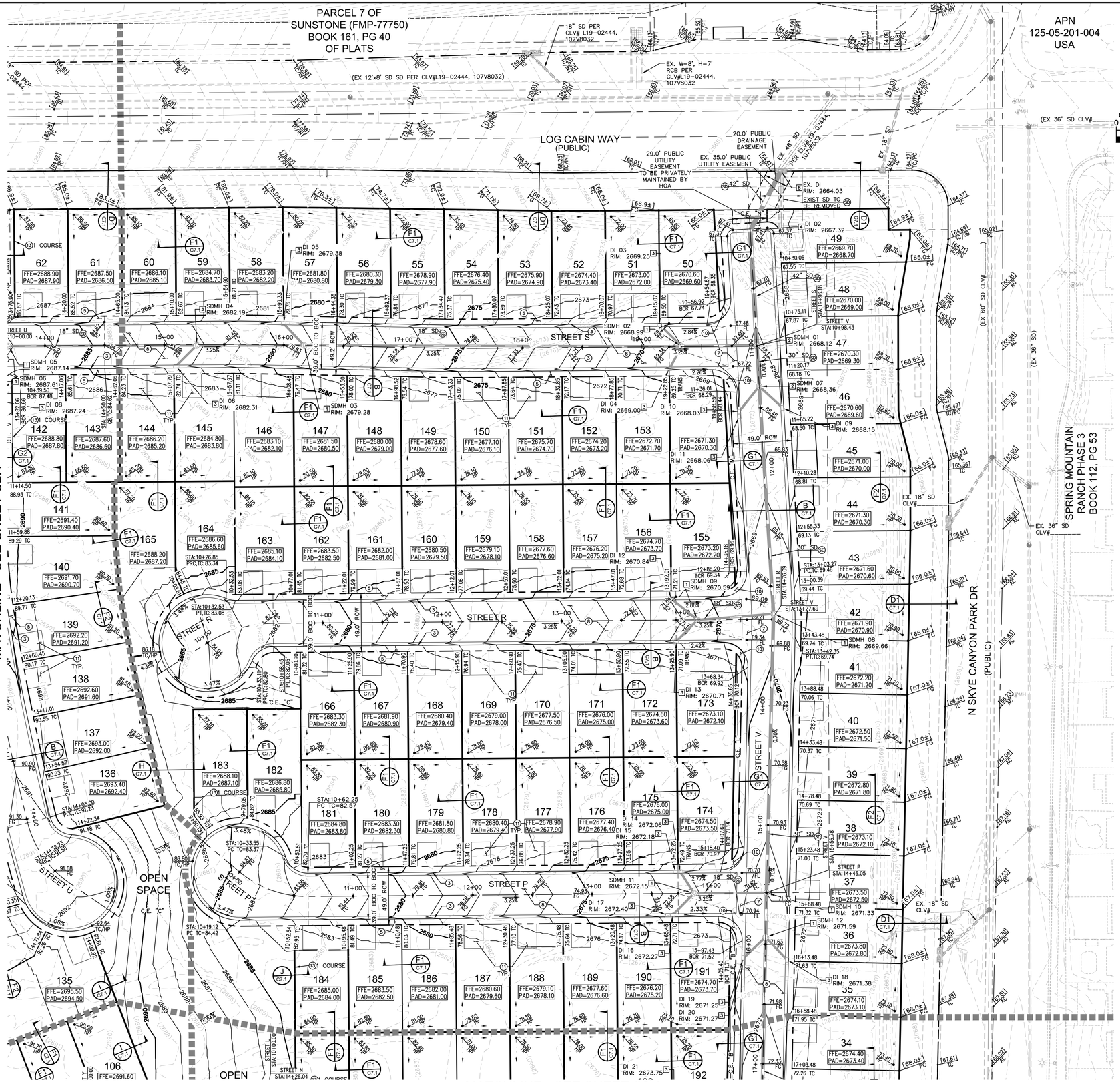

KEYMAP
N.T.S.

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
4. INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
8. CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.

ENGINEER'S NOTES

1. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-939-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — EXPIRES 07/31/2020 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

1. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
2. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
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11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN

ENGINEER'S NOTES

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STORMWATER QUANTITIES
SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE
SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE
SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE
ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES
SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES
SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:
SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE
THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS
NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK
MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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No.	REVISIONS	DATE	BY

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TAMARA CONNOLLY — NEVADA — CIVIL — No. 025119 — PROFESSIONAL ENGINEER — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

8 OF 22 SHEETS
C2.3

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KEYMAP
N.T.S.

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11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
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ENGINEER'S NOTES

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STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE "X" PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

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BENCHMARK

MONUMENT ID: USDA (1934) 19

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ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

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TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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No.	REVISIONS	DATE	BY

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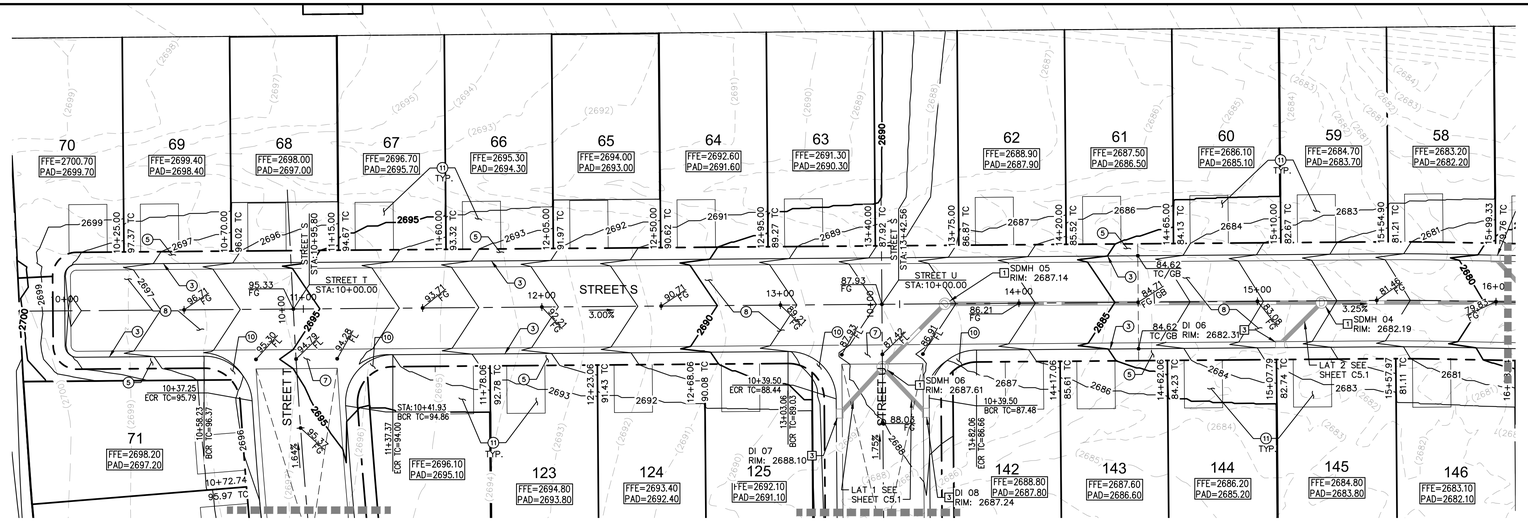
PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

9 OF 22 SHEETS
C2.4



STREET T
SEE SHEET C4.08

STREET U
SEE SHEET C4.10

STREET S (PRIVATE)
PLAN VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.02

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

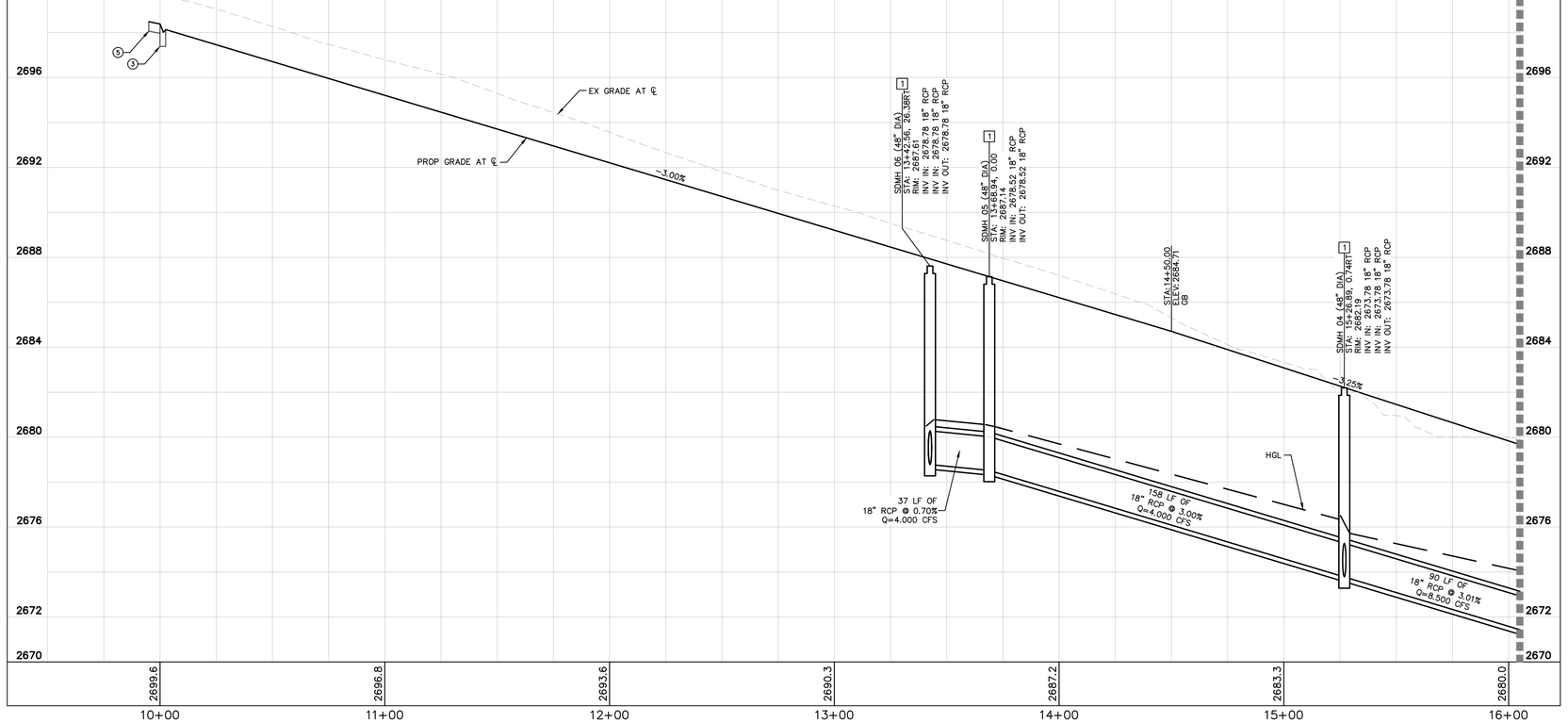
(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



MATCHLINE - SEE SHEET C4.02

STREET S (PRIVATE)
PROFILE VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

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ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

STATE OF NEVADA — JESSICA M. KRAMER — No. 23040 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET S PLAN & PROFILE STA 9+50 - 16+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C4.01

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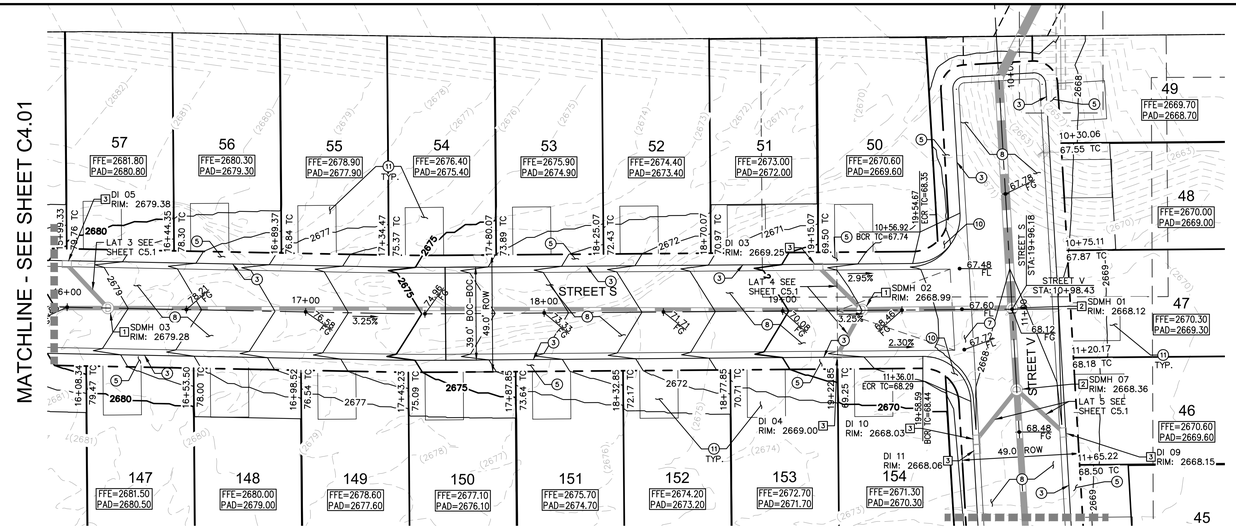


NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

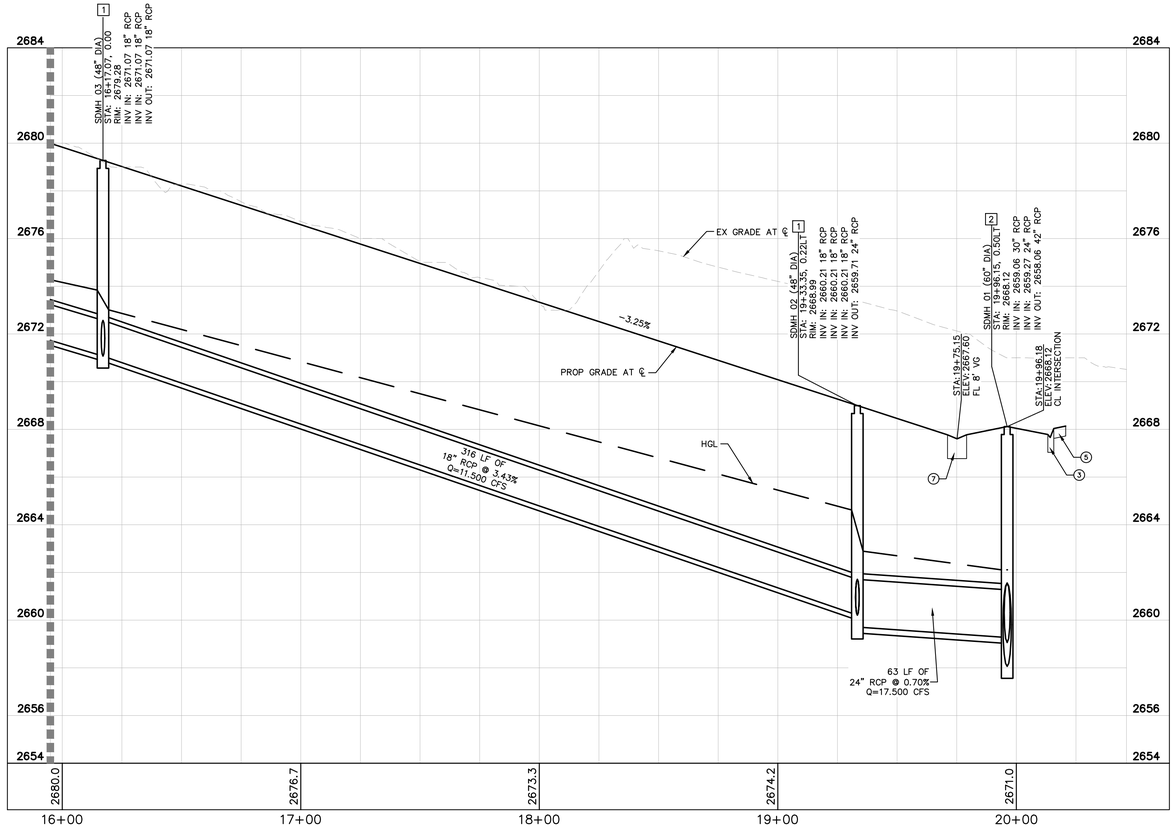
KEYMAP
N.T.S.

STREET S (PRIVATE)
PLAN VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'

STREET V
SEE SHEET C4.11

MATCHLINE - SEE SHEET C4.01



STREET S (PRIVATE)
PROFILE VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'
VERT: 1" = 3'

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

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(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

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NOTE

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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

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NAVD 88 DATUM

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PHONE: 702-498-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER NEVADA 19019 TIMOTHY L. CLARA 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET S PLAN & PROFILE STA 16+00 - 20+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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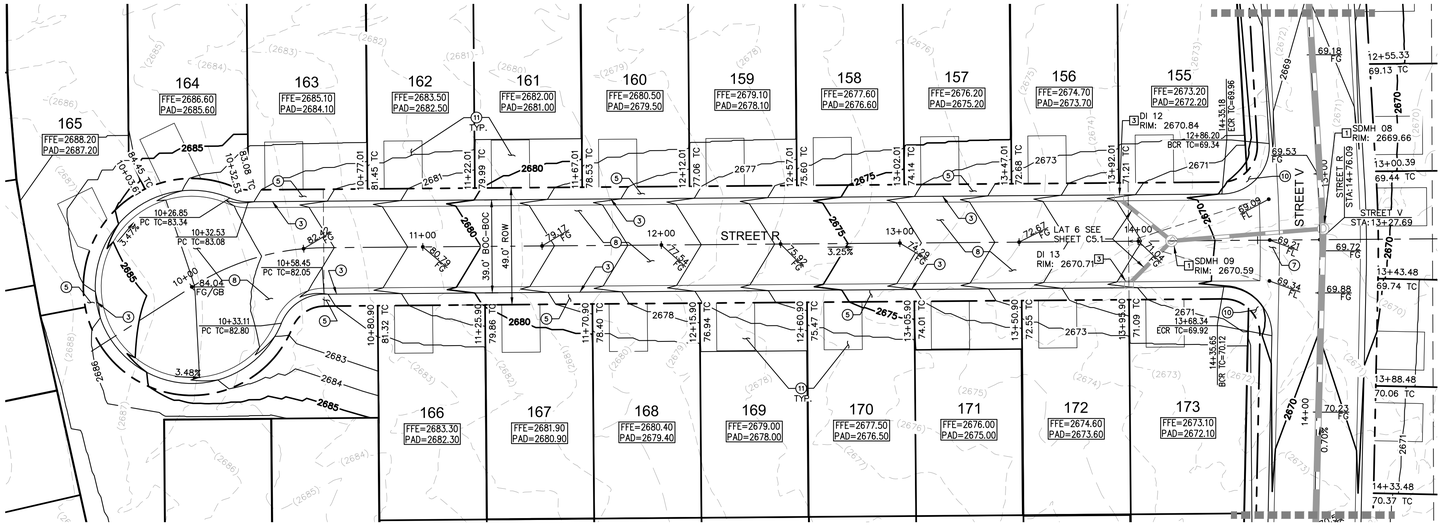
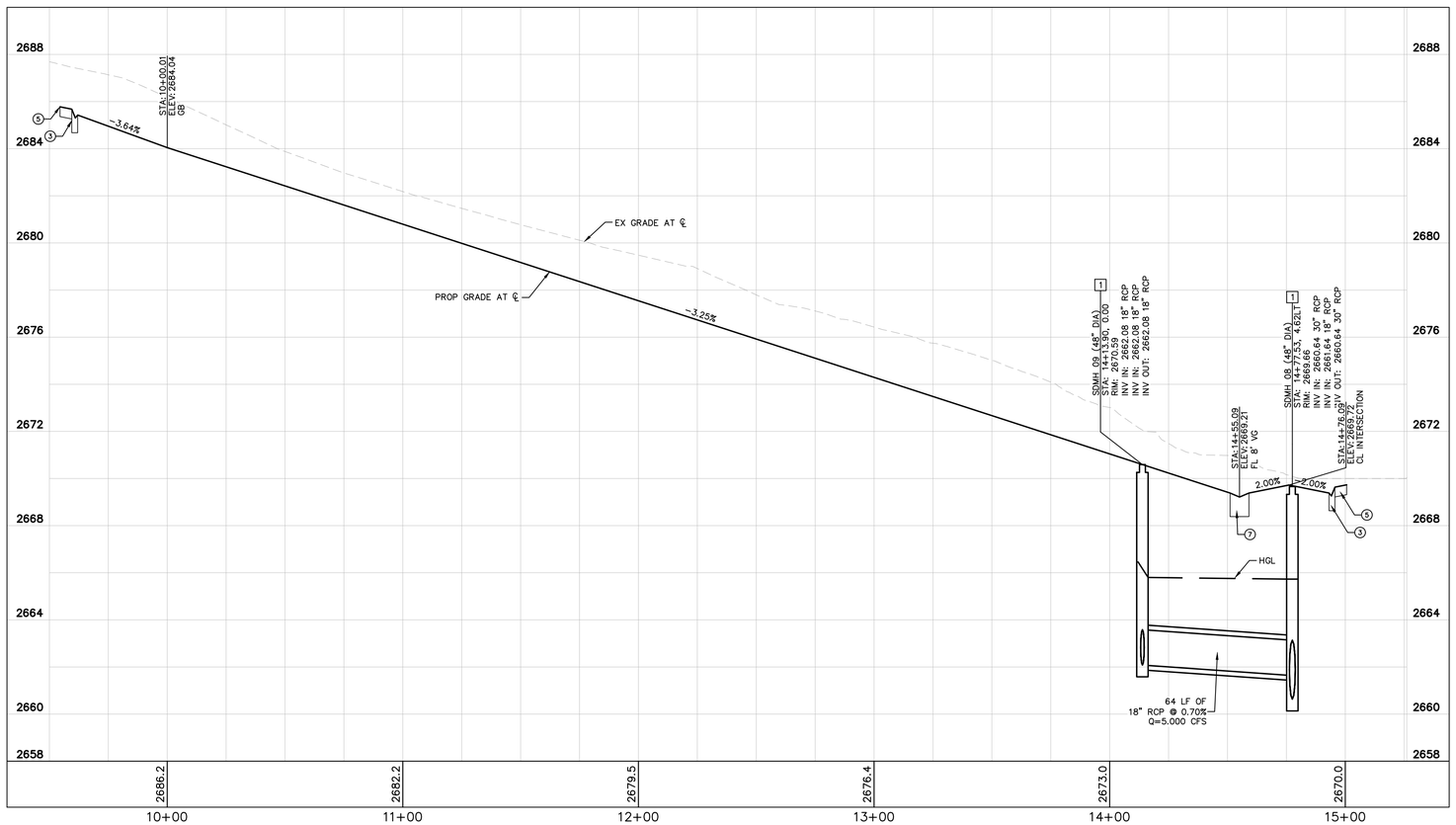


STREET R (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25
HORIZ: 1" = 30'



STREET R (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

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STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AND CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING AWYWHERE POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2018 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-562-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA 15673 CIVIL 07/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET R PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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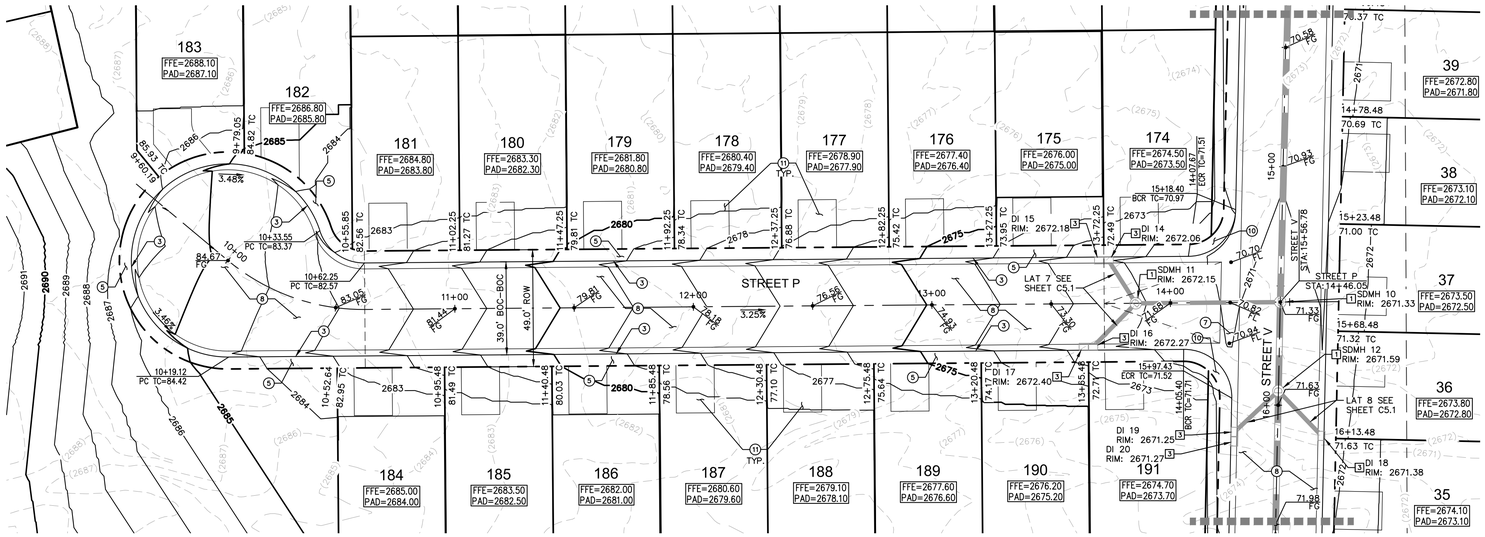
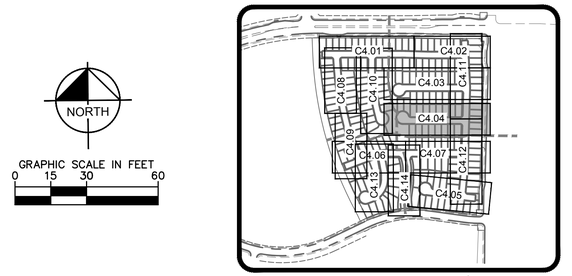




NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

STREET P (PRIVATE)
PLAN VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'

STREET P (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E, PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

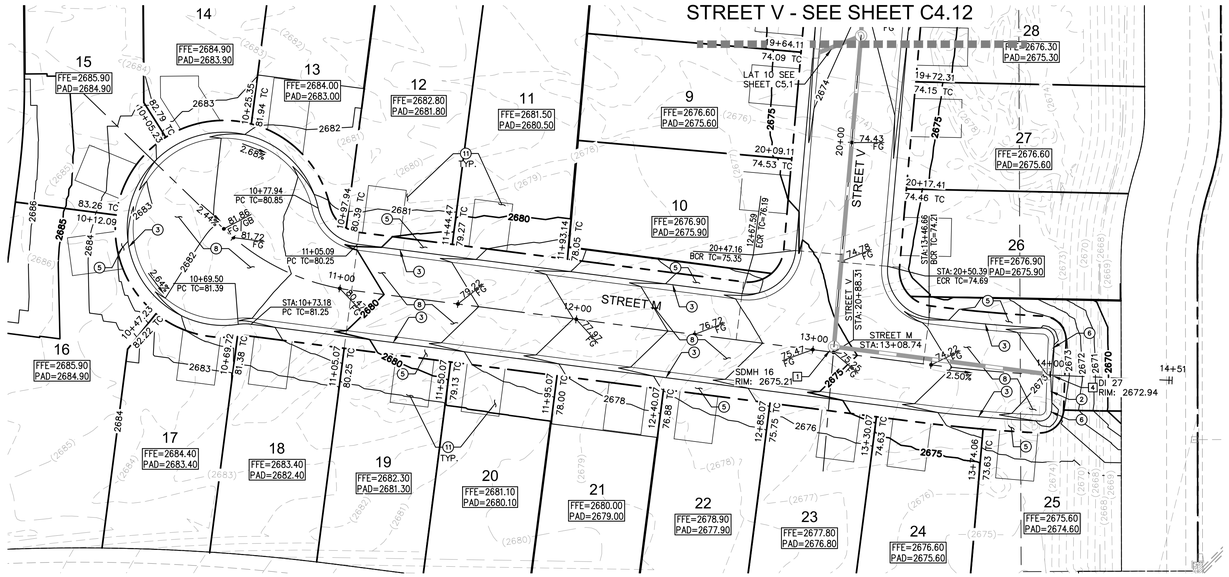
Kimley»Horn
© 2018 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MARA KAY JOHNSON No. 019 CIVIL
07/31/20
KJ SIGNATURE
07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

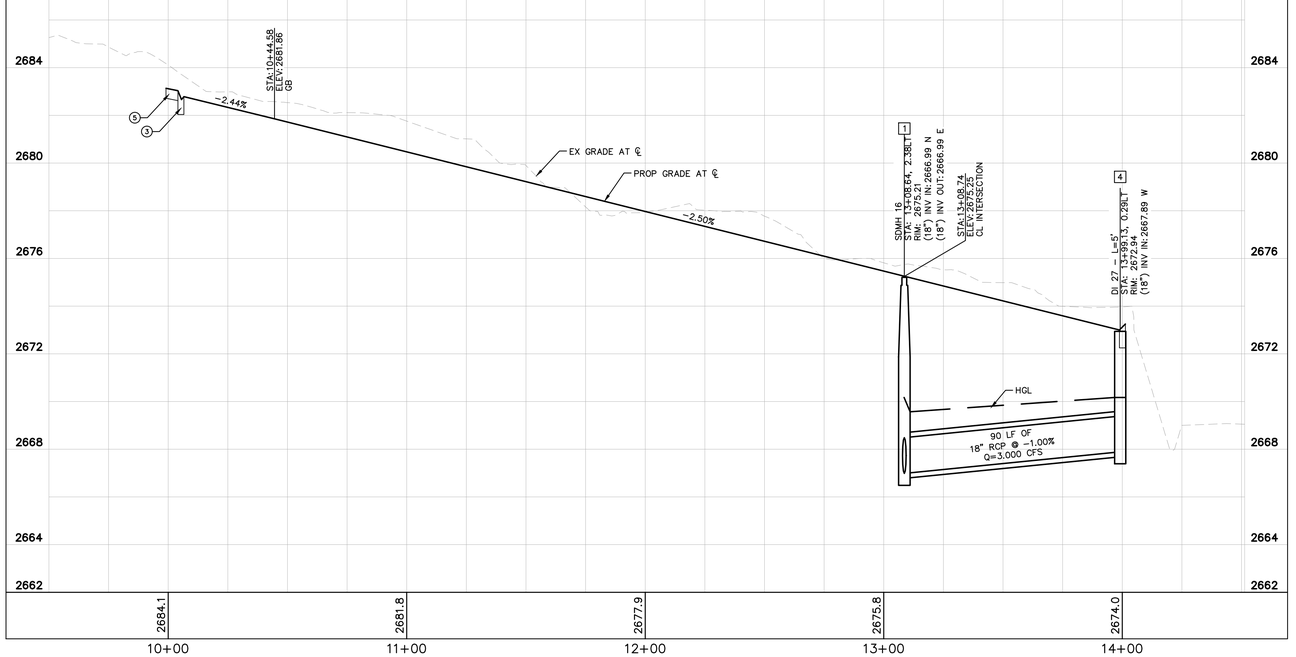
STREET P PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



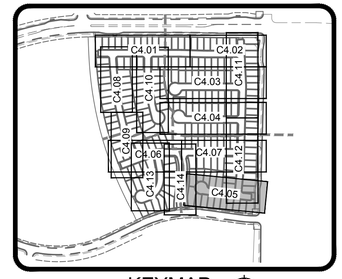
STREET M (PRIVATE)
PLAN VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'



STREET M (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(2) CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(6) TRANSITION FROM "L" CURB TO ROLL CURB

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

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AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CASSIDY — No. 025119 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET M PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

10 OF 22 SHEETS
C4.05

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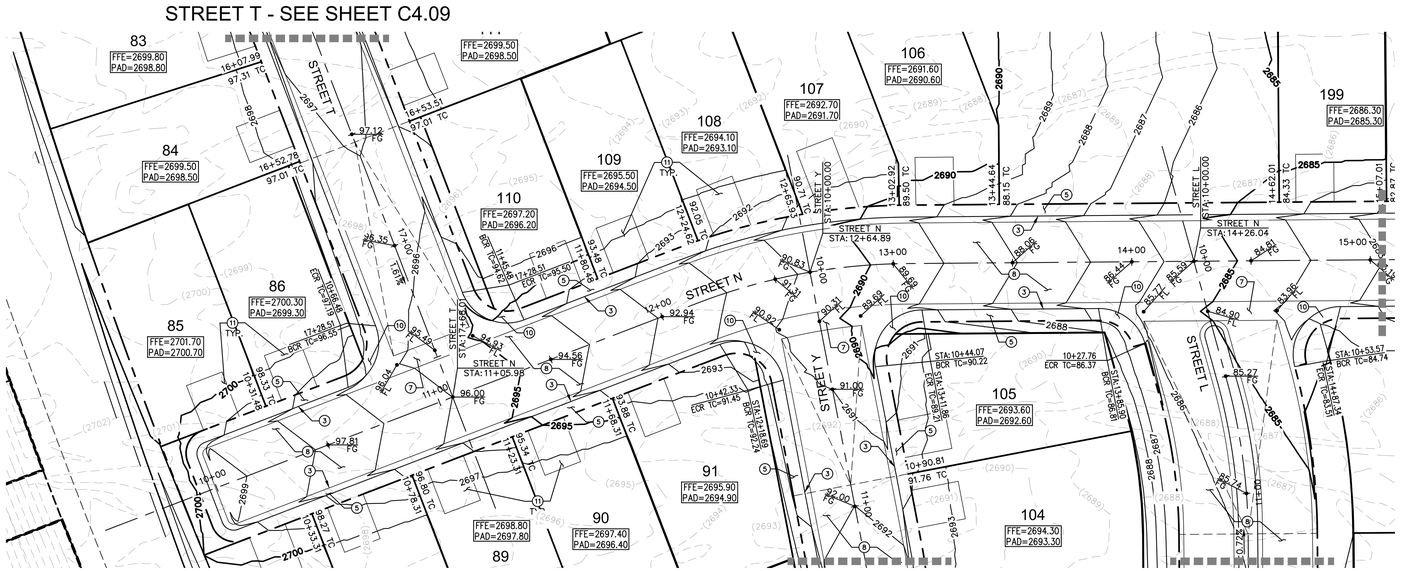

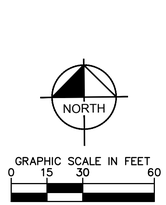

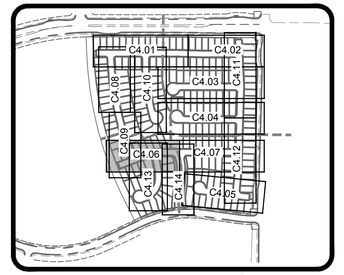

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET N (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+00

HORIZ: 1" = 30'

STREET N (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.07

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY A. HAMRA No. 13455 CIVIL 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 10+00 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

11 OF 22 SHEETS
C4.06

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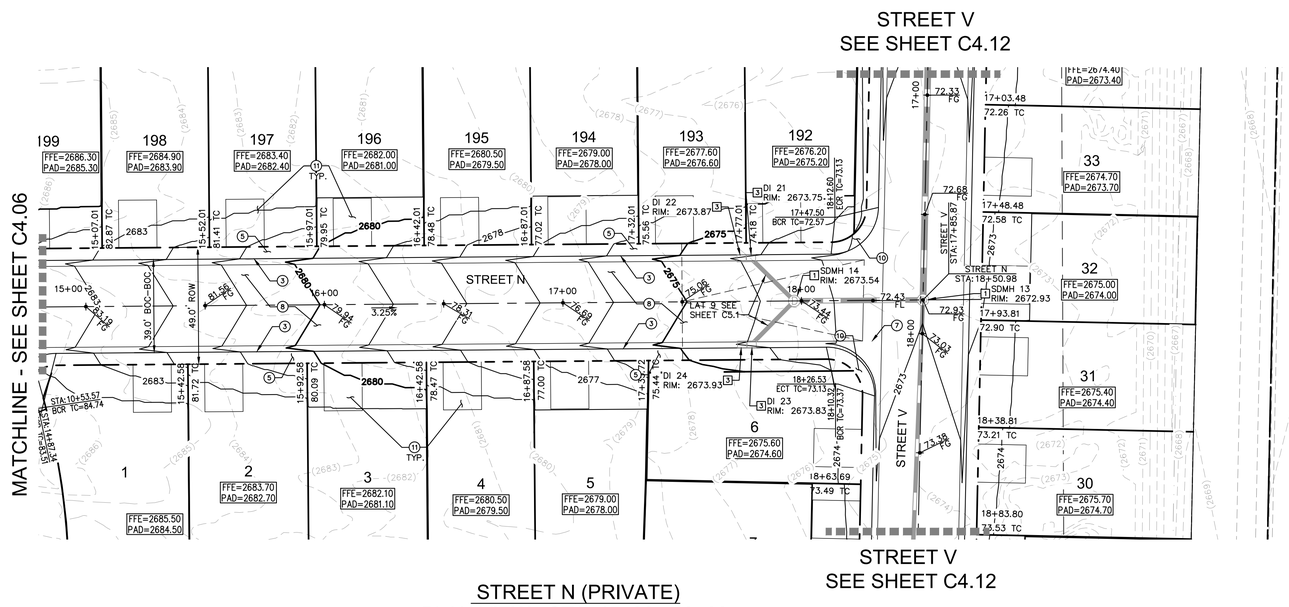
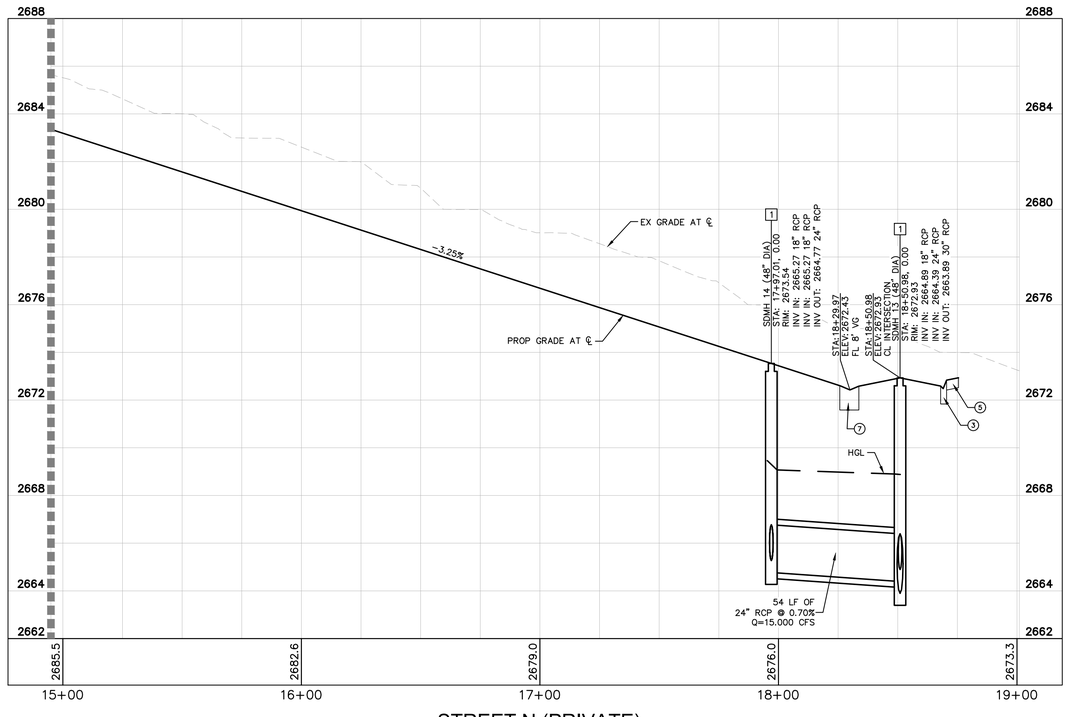
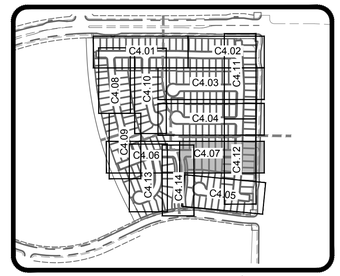


STREET N (PRIVATE)
PLAN VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'



STREET N (PRIVATE)
PROFILE VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'
VERT: 1" = 3'



NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 CRITICAL PART OF REGIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AND OUTAGE UNDERGROUND UTILITY FACILITIES CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S DEADLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TAMARA A. MARA EXPIRES: 12/31/20 CIVIL No. 23040 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 15+00 - 19+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

12 OF 22 SHEETS
C4.07

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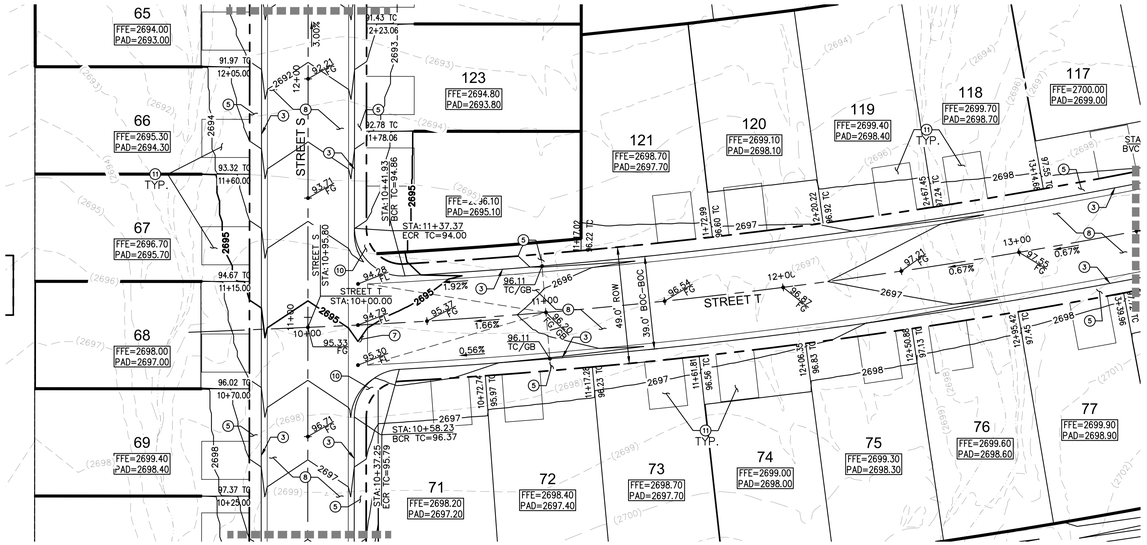
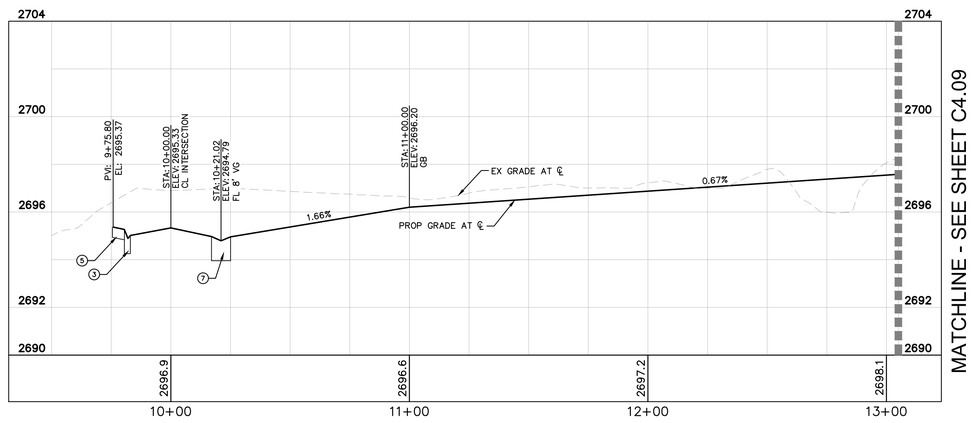


STREET T (PRIVATE)
PLAN VIEW - STA: 9+00 - 13+05
HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.09



MATCHLINE - SEE SHEET C4.09

STREET T (PRIVATE)
PROFILE VIEW - STA: 9+50 - 13+05
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
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AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3600
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PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARMAN — No. 023519 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET T PLAN & PROFILE STA 9+50 - 13+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

17 OF 22 SHEETS
C4.08

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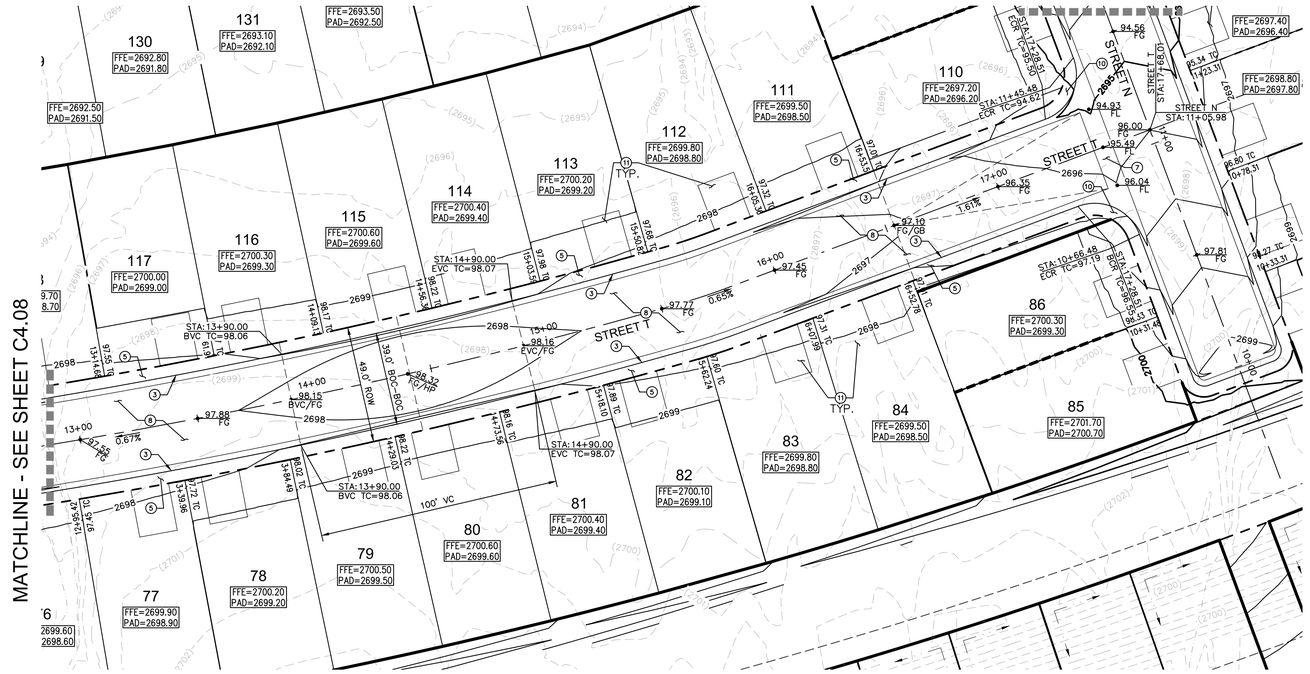


GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

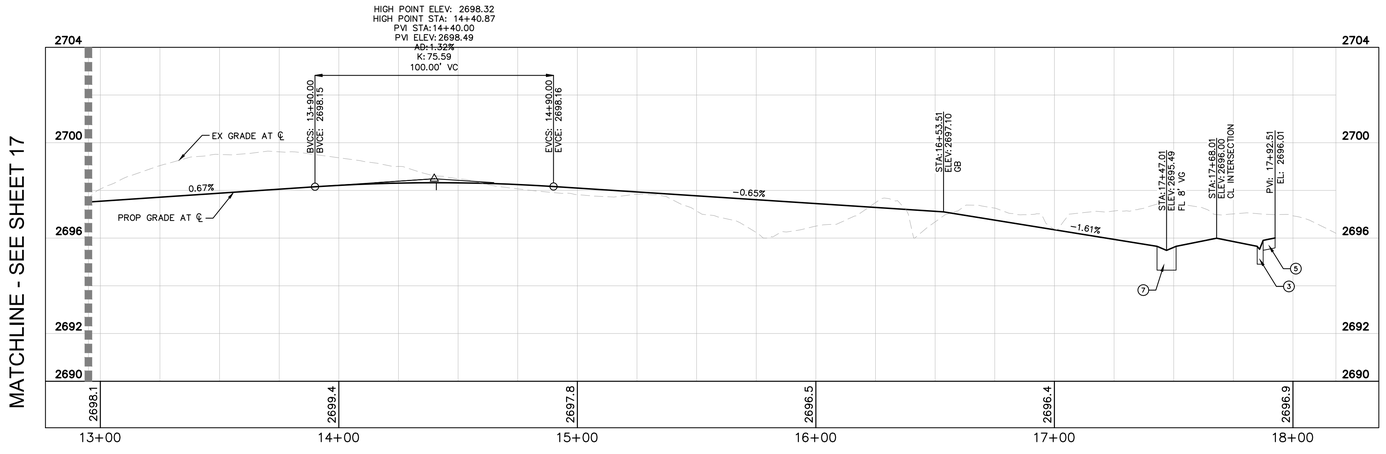
(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET T (PRIVATE)
PLAN VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'



STREET T (PRIVATE)
PROFILE VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK– 2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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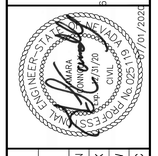

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET T PLAN & PROFILE STA 13+00 - 18+25

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

18 OF 22 SHEETS
C4.09

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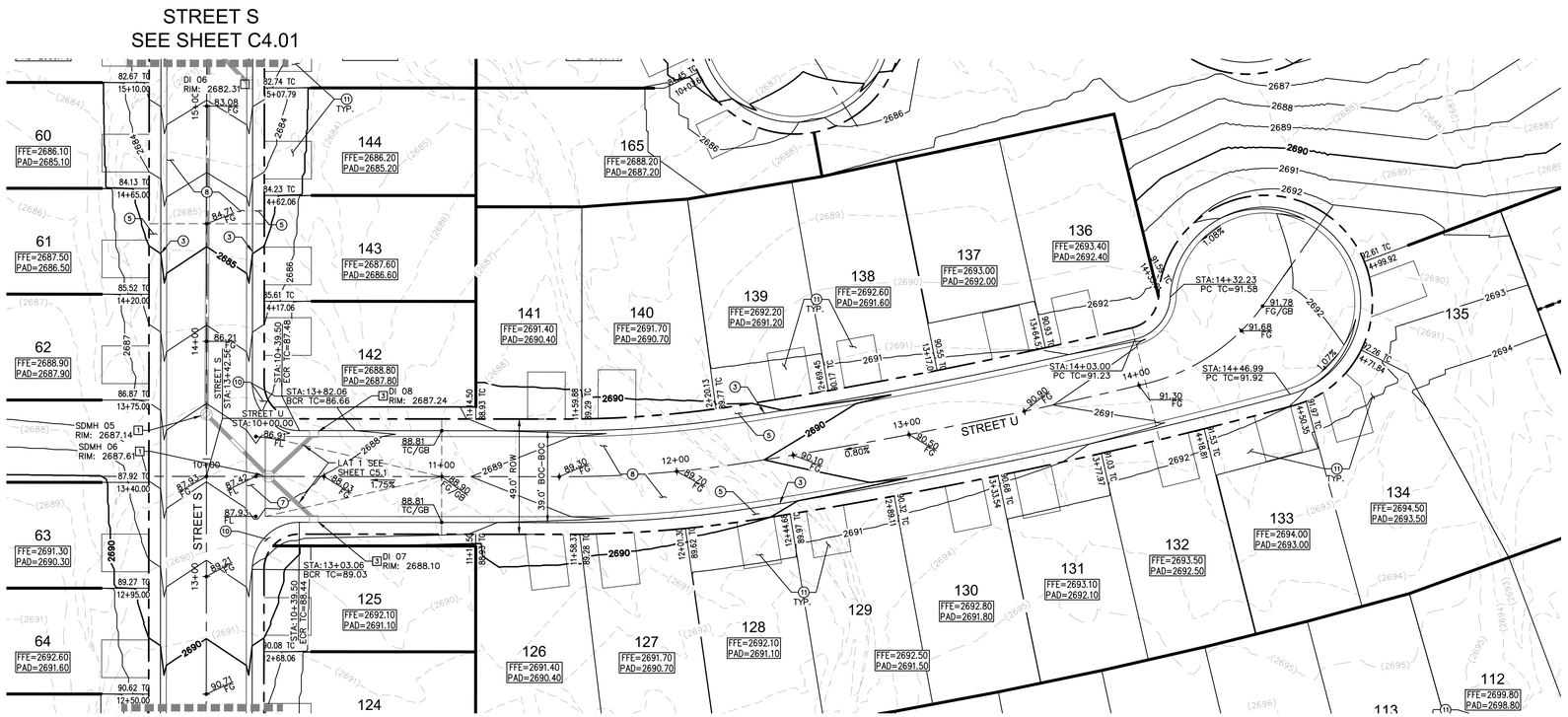
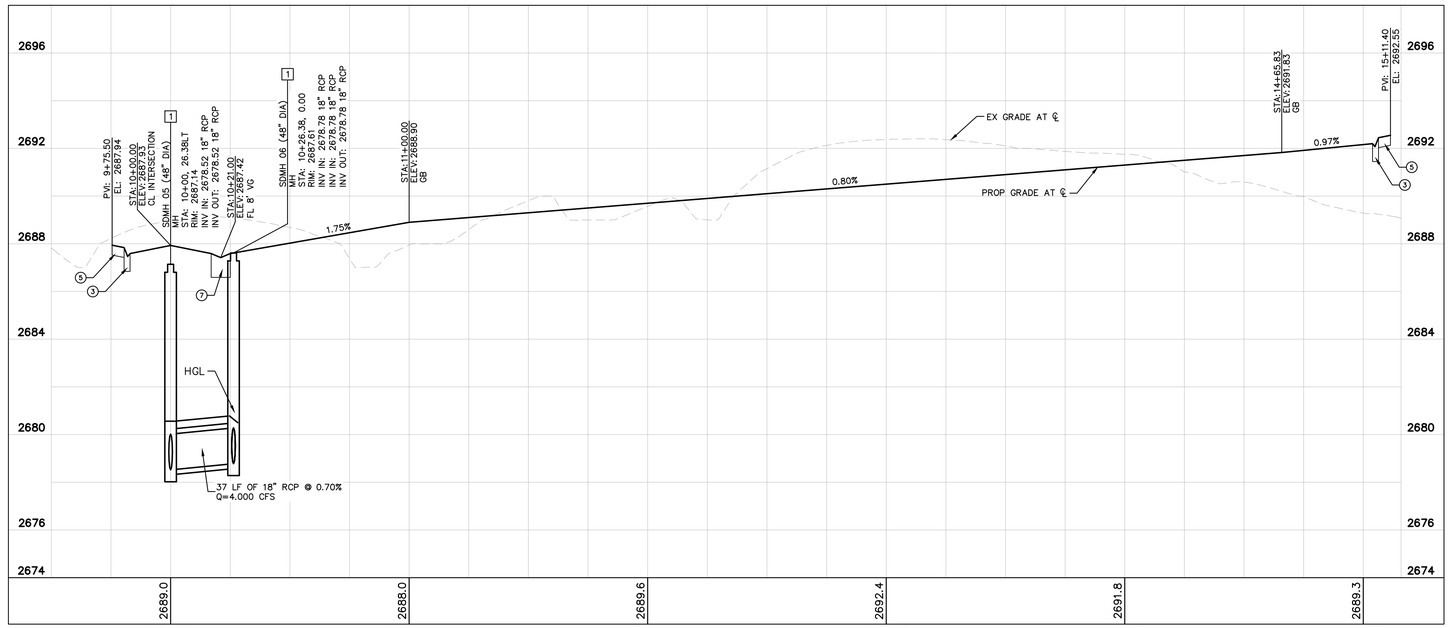


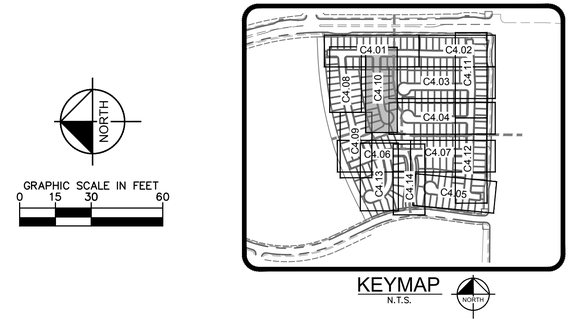
STREET U (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25

HORIZ: 1" = 30'



STREET U (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25

HORIZ: 1" = 30'
VERT: 1" = 3'



GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

NOTE

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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

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SEE SHEET C2.0 FOR ENGINEER NOTES

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SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

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REPORT DATED: 04/25/2018
PROJECT No.: 182187

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

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NAVD 88 DATUM

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Call before you Dig CALL 811 OR 1-800-227-2600

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No.	REVISIONS	DATE	BY

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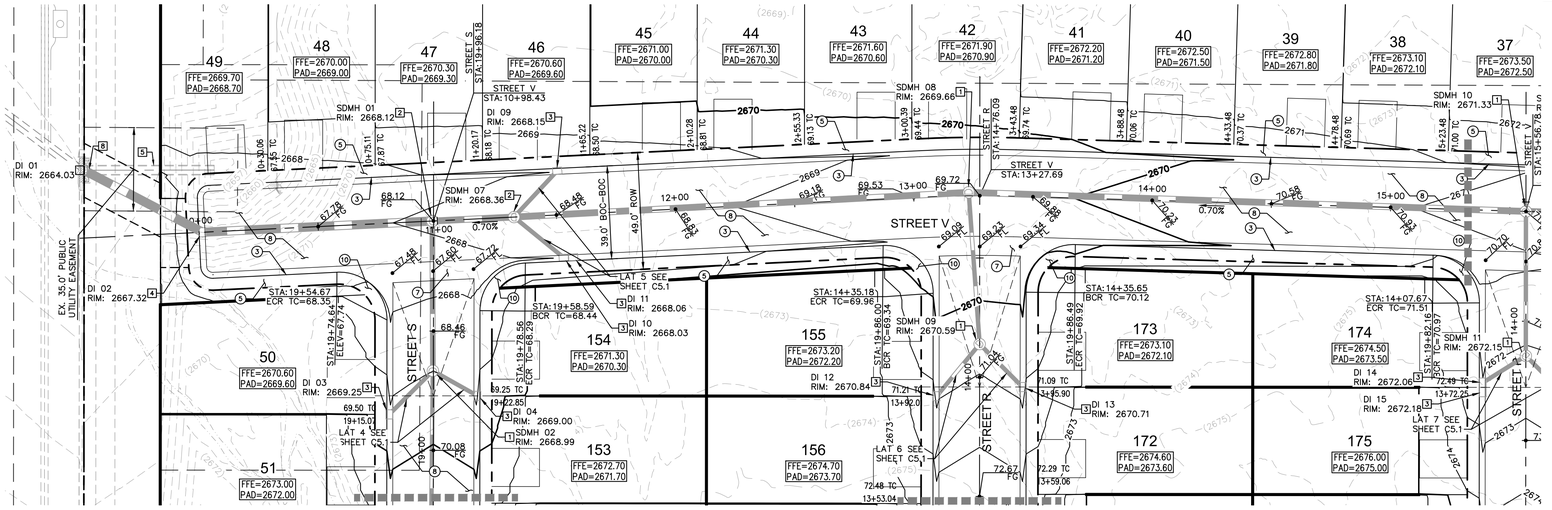
PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — CIVIL — No. 23903 — EXPIRES 06/30/2021 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET U PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



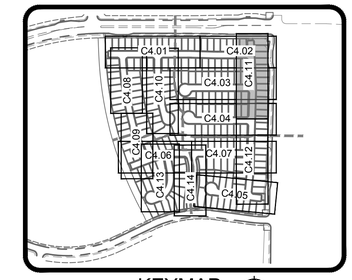
STREET S
SEE SHEET C4.02

STREET R
SEE SHEET C4.03

STREET V (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+05

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.12



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

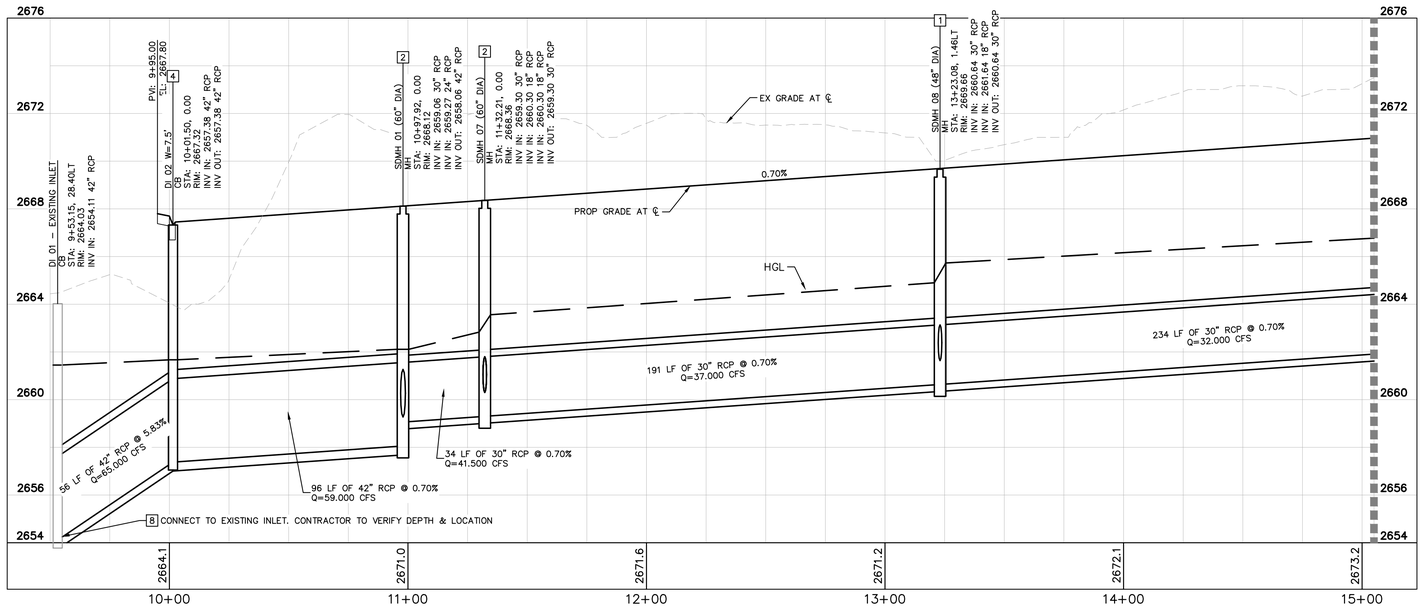
[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[5] EXIST STORM DRAIN TO BE REMOVED.

[8] CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.



STREET V (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.12

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

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BENCHMARK

MONUMENT ID: USDA (1934) 19

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NAVD 88 DATUM

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No.	REVISIONS	DATE	BY

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PHONE: 702-589-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARTER — No. 23006 — CIVIL — 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET V PLAN & PROFILE 9+50 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

20 OF 22 SHEETS
C4.11

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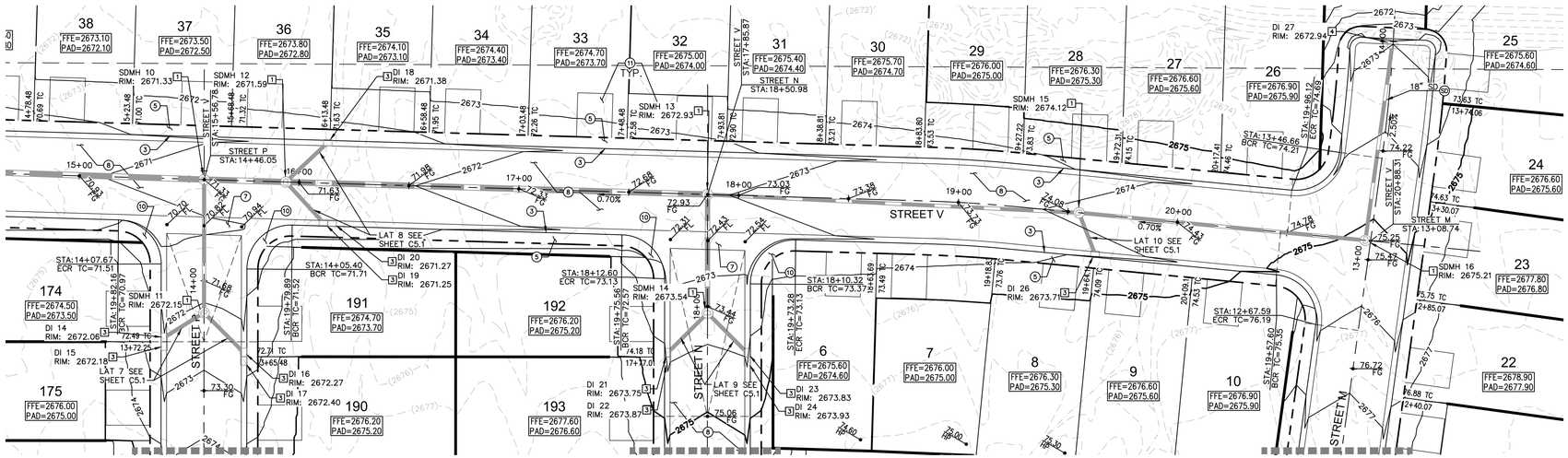


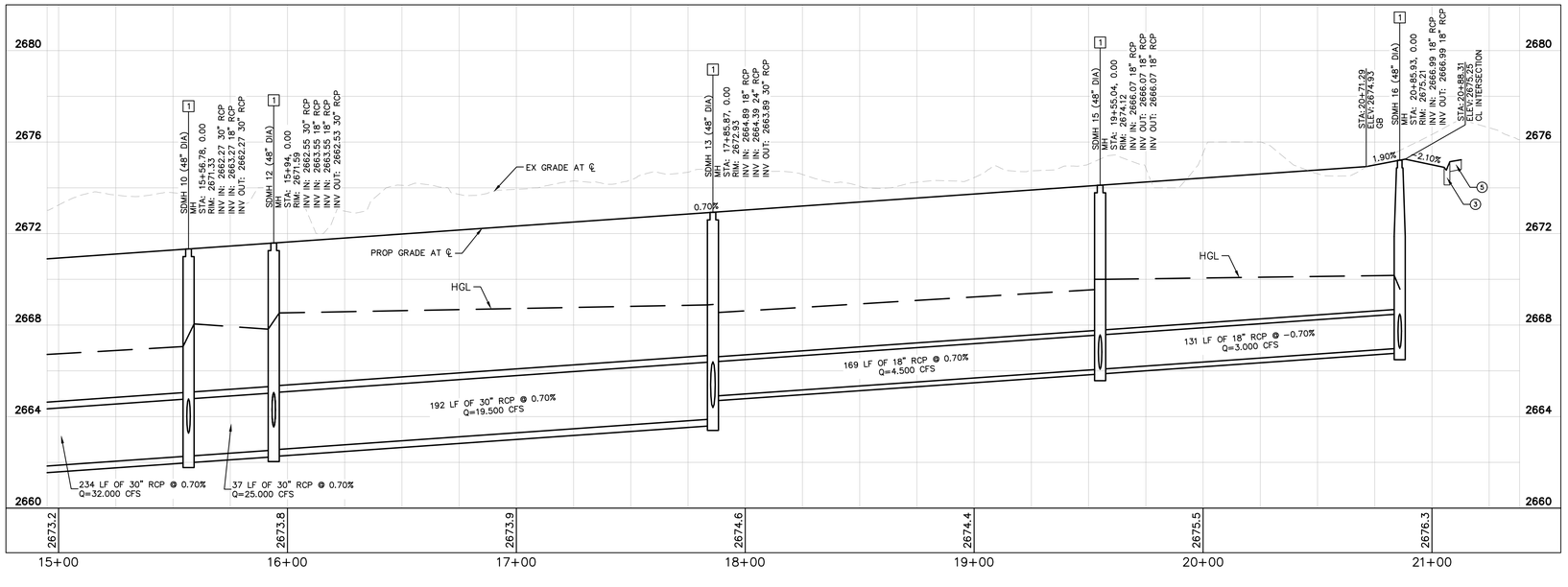
STREET P
SEE SHEET C4.04

STREET N
SEE SHEET C4.07

STREET M
SEE SHEET C4.05

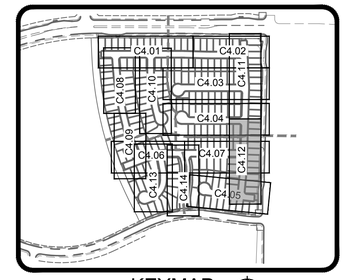
STREET V (PRIVATE)
PLAN VIEW - STA: 15+00 - 21+00

HORIZ: 1" = 30'



STREET V (PRIVATE)
PROFILE VIEW - STA: 15+00 - 21+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

(SD) STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

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SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

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ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

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NAVD 88 DATUM

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PHONE: 702-489-2500
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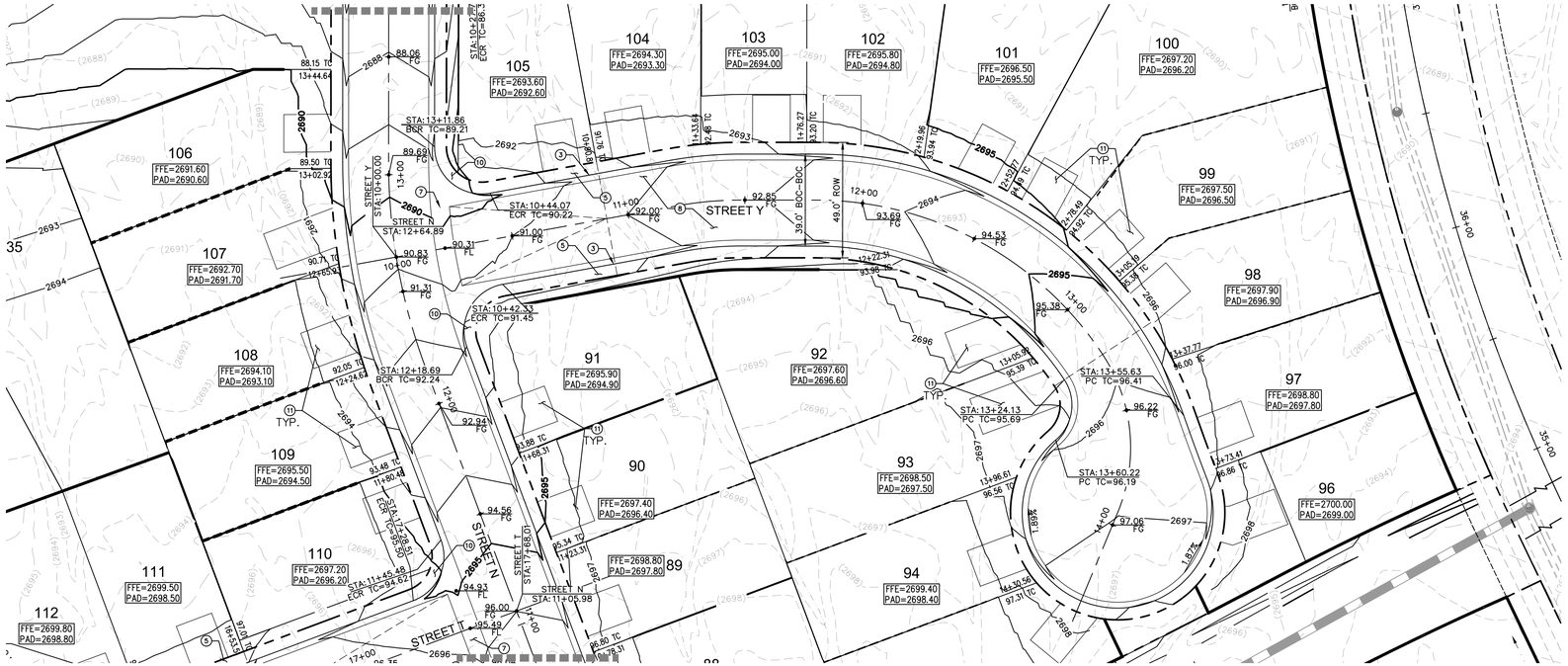
PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA No. 23806 CIVIL 07/31/20 RENEWAL: 12/31/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET V PLAN & PROFILE 15+00 - 21+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

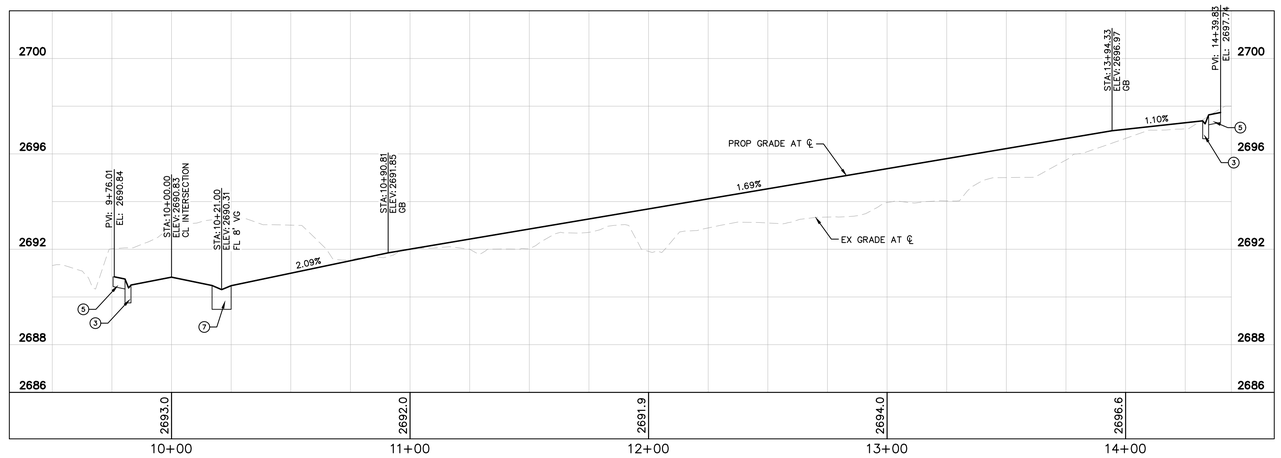
21 OF 22 SHEETS
C4.12



STREET N
SEE SHEET C4.06

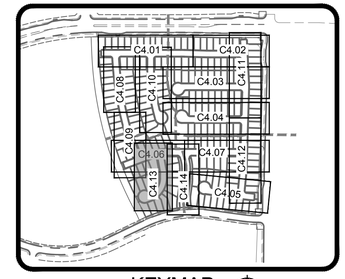
STREET Y (PRIVATE)
PLAN VIEW - STA: 10+00 - 14+00

HORIZ: 1" = 30'



STREET Y (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

CONSTRUCTION NOTES

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(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

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SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

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SEE SHEET C2.0 FOR ENGINEER NOTES

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No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-262-4500
WWW.KIMLEY-HORN.COM

REGISTERED PROFESSIONAL ENGINEER — TRACY L. CLEMENS — No. 13500 — CIVIL — STATE OF NEVADA — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET Y PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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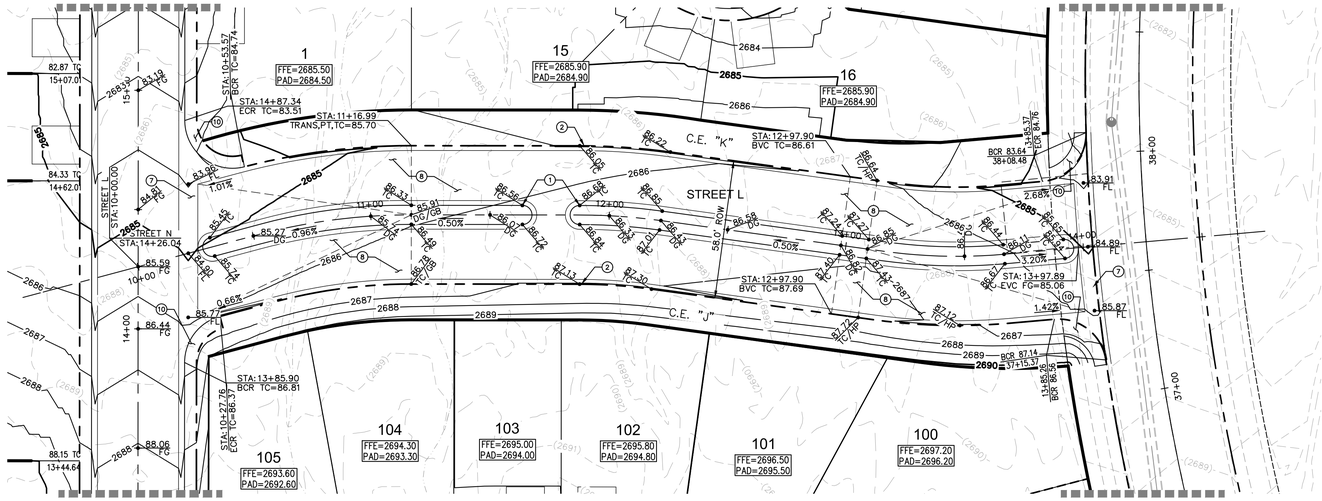
STREET N
SEE SHEET C4.07
O'HARE AVE
STREET N
SEE SHEET C4.06
O'HARE AVE
STREET L
C.E. "K"
C.E. "J"
STA:12+97.90
BVC TC=86.61
STA:12+97.90
BVC TC=87.69
STA:13+97.89
EVC FG=85.06
STA:14+87.34
ECR TC=83.51
STA:11+16.99
TRANS,PT,TC=85.70
STA:13+85.90
BCR TC=86.81
STA:10+27.79
ECR TC=86.35
STA:10+53.57
BCR TC=84.74
STA:14+26.04
STREET N
STREET
STA:10+00.00
1
FFE=2685.50
PAD=2684.50
15
FFE=2685.90
PAD=2684.90
16
FFE=2685.90
PAD=2684.90
104
FFE=2694.30
PAD=2693.30
103
FFE=2695.00
PAD=2694.00
102
FFE=2695.80
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FFE=2696.50
PAD=2695.50
100
FFE=2697.20
PAD=2696.20
105
FFE=2693.60
PAD=2692.60
82.87 TC
15+07.01
84.33 TC
14+62.01
88.15 TC
13+44.64
BCR 83.64
38+08.48
ECR 84.76
38+00
37+00
37+15.37
BCR 87.14
37+15.37
ECR 86.55
BCR 86.55
83.91 FL
84.89 FL
85.87 FL
85.77 FL
84.90 FL
88.06 FC
86.44 FC
84.56 FC
85.59 FC
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87.73 FC

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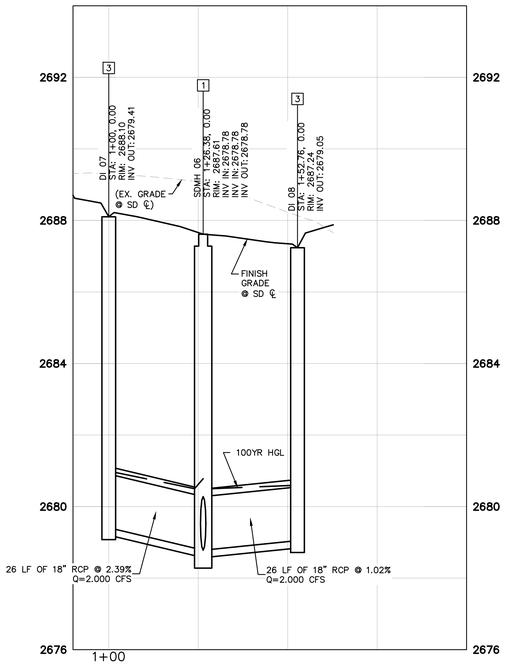
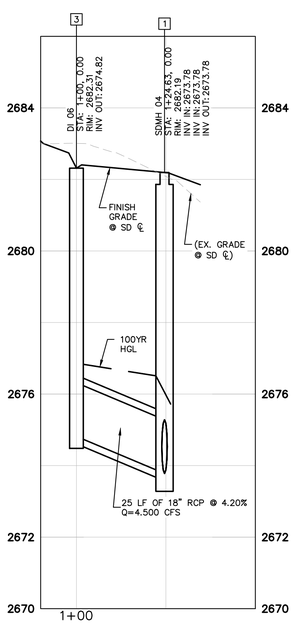
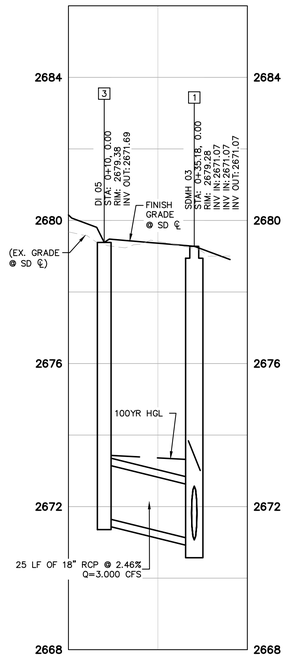


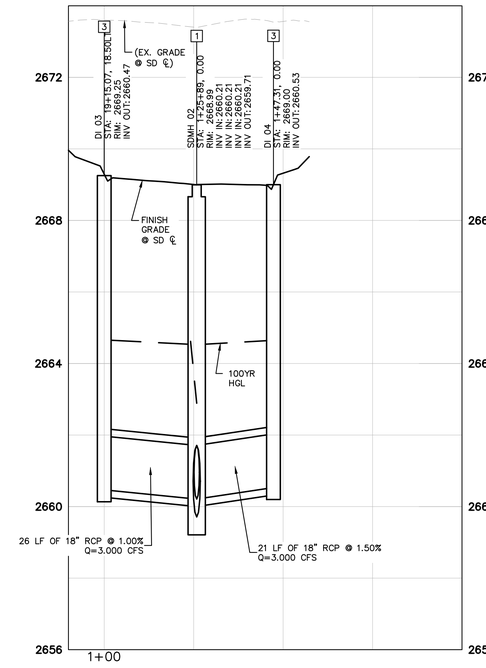
LAT 1 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



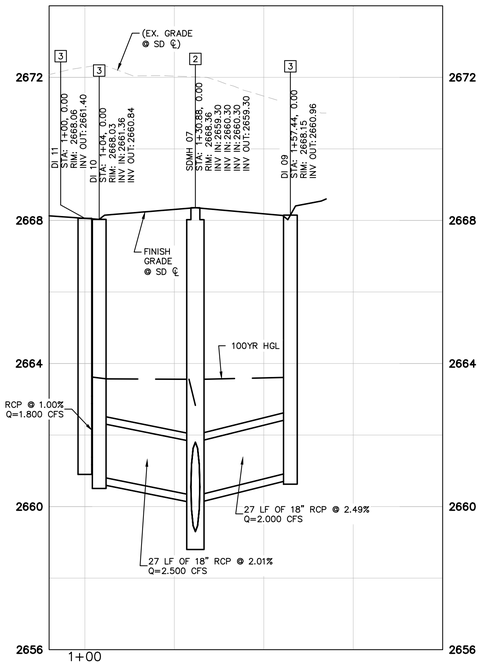
LAT 2 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 3 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



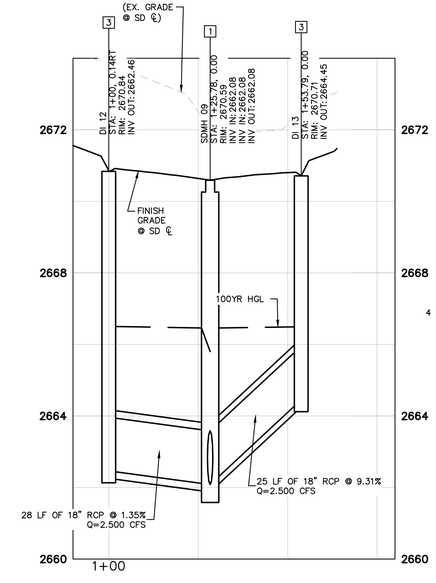
LAT 4 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



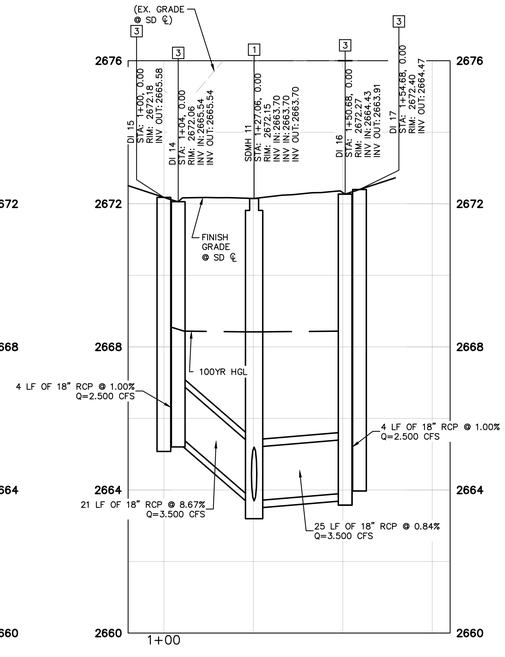
LAT 5 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

STORM DRAIN NOTES

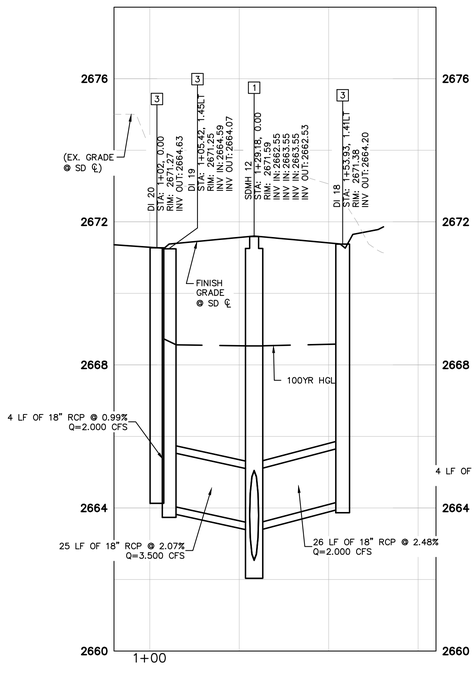
1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



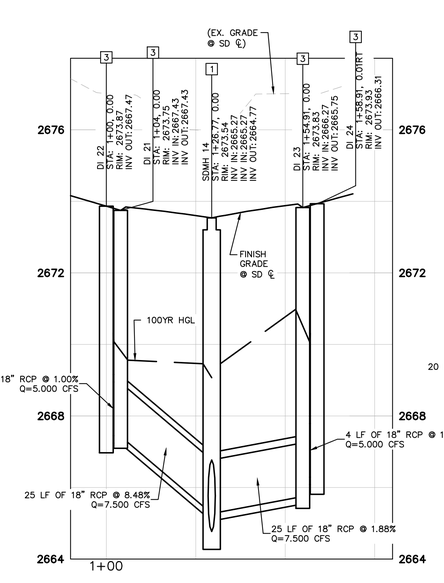
LAT 6 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



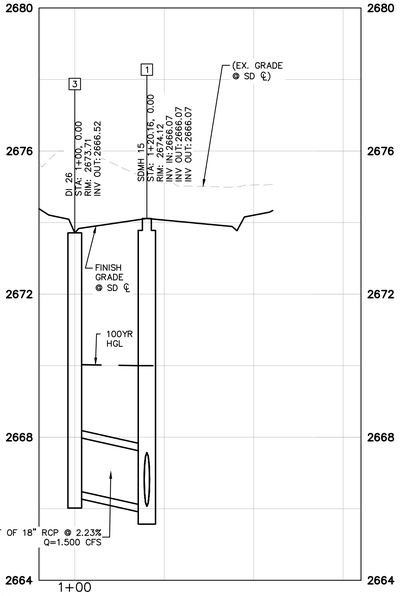
LAT 7 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 8 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 9 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 10 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — EXPIRATION DATE: 12/31/20 — CIVIL — No. 23036 — 07/01/2020

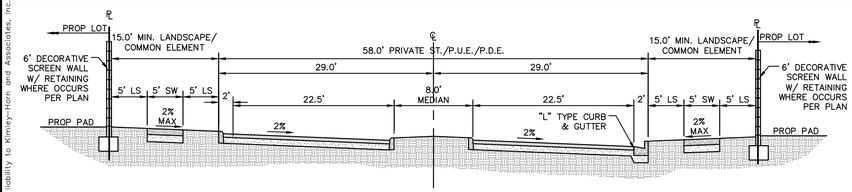
KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STORM DRAIN LATERALS

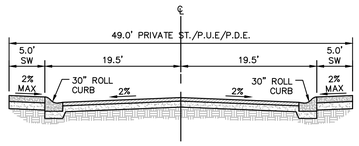
SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

24 OF 32 SHEETS

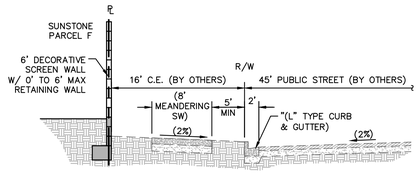
C5.1



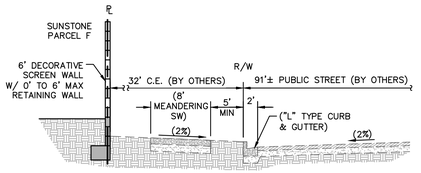
A C7.1 PRIVATE ENTRY SECTION NTS



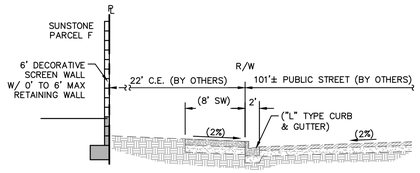
B C7.1 TYPICAL PRIVATE STREET SECTION (PARKING BOTH SIDES) NTS



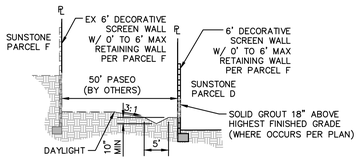
C C7.1 O'HARE AVE LANDSCAPE ESMT. NTS



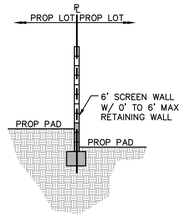
D1 C7.1 LOG CABIN WAY AND N SKYE CANYON PARK DRIVE LANDSCAPE ESMT. NTS



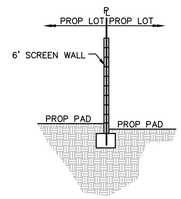
D2 C7.1 LOG CABIN WAY LANDSCAPE ESMT. NTS



E C7.1 WEST BOUNDARY PASEO NTS



F1 C7.1 TYPICAL YARD SECTION NTS



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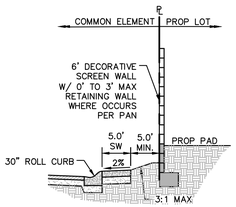
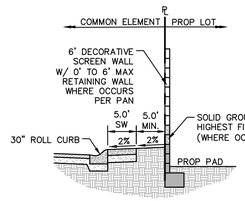
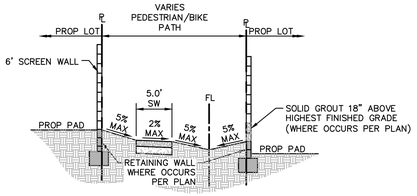


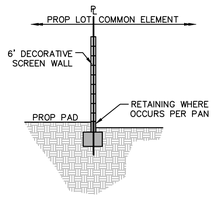
G1 C7.1 TYPICAL CORNER LOT SECTION NTS



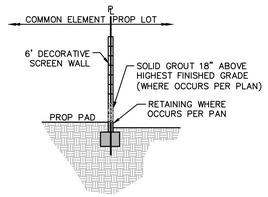
G2 C7.1 TYPICAL CORNER LOT SECTION NTS



H C7.1 TYPICAL COMMON ELEMENT SECTION NTS



I C7.1 TYPICAL YARD SECTION NTS



J C7.1 TYPICAL YARD SECTION NTS

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL SECTIONS

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

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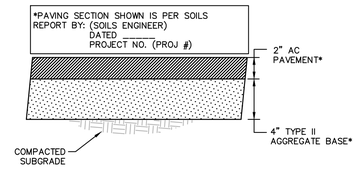

1 C7.2 ONSITE PAVEMENT SECTION
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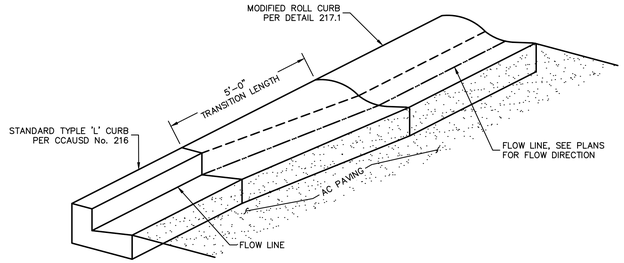
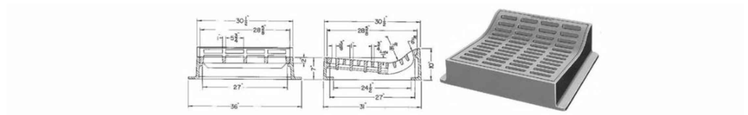
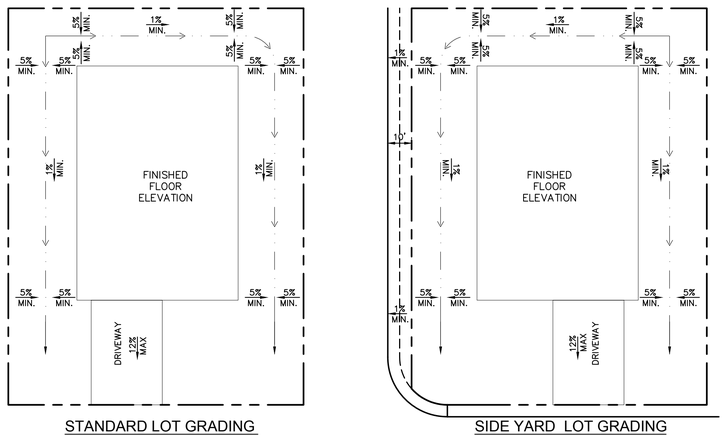


2 C7.2 MODIFIED ROLL CURB TRANSITION TO 6" CURB OR 'L' TYPE CURB
NTS



A-Grate Dimensions	B-Grate Thickness	C-Clear Opening	E-Base Flange	F-Frame Height	Grate Type	Square Feet Open	Weir Perimeter Lineal Feet
28-5/8 x 28-5/8	2	24-1/2 x 27	31 x 36	7 to 10	C	2.6	5.5

3 C7.2 R-3501-R DROP INLET (NEENAH)
NTS



4 C7.2 TYPICAL LOT GRADING
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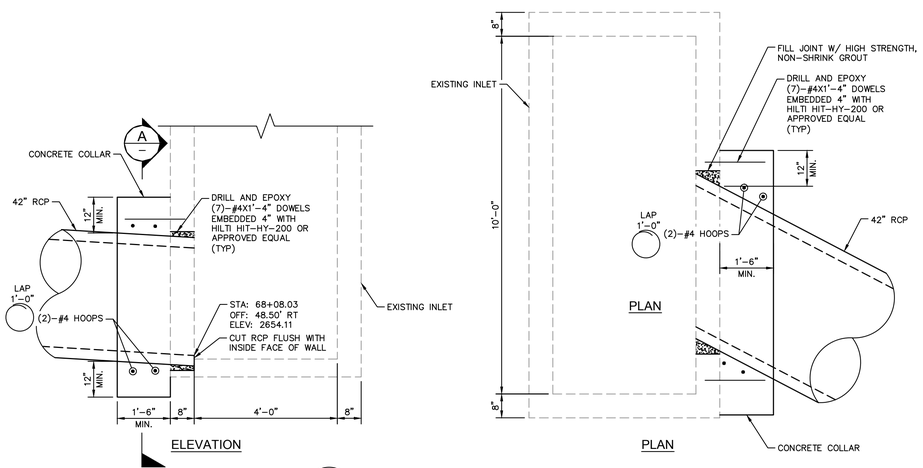
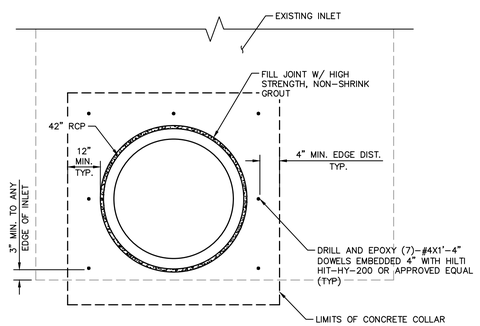


5 C7.2 PIPE PENETRATION DETAIL
SCALE: ½" = 1'-0"



SECTION A
SCALE: ½" = 1'-0"

PIPE PENETRATION NOTES:

1. CONCRETE SHALL BE CLASS AA MODIFIED (TYPE V CEMENT), f'c = 4500 PSI MIN.
2. REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, fy = 60,000 PSI.
3. ALL REINFORCING SHALL HAVE 2" CLEAR COVER UNLESS NOTED OTHERWISE.
4. CUT HOLE IN WALL OF BOX CULVERT TO A MINIMUM ½" TO MAXIMUM 2" LARGER THAN THE OUTSIDE DIAMETER OF THE 42" RCP.
5. CUT RCP FLUSH WITH INSIDE FACE OF CULVERT WALL.
6. FILL OPENING WITH HIGH STRENGTH, NON-SHRINK GROUT.
7. POUR MINIMUM 12" THICK CONCRETE COLLAR AROUND RCP.

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-862-3500
WWW.KIMLEY-HORN.COM

NEVADA — ENGINEER — KRISTA L. MARA — 12/31/20 — CIVIL — No. 023019 — STATE OF NEVADA — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL DETAILS

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

Addendum to the Technical Drainage Study for

SUNSTONE PARCEL D

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

Kimley»Horn

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Sunstone Parcel D Date: July 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Skye Canyon Park Drive

East/West: Log Cabin Way & O'Hare Road

b) Section: 6 Township: 19S Range: 60E

c) APN : 125-06-701-001

Name of Owner: Lennar - Robert Flaxa

Telephone No.: 702.821.4651 Fax No.: E-Mail Address: robert.flaxa@lennar.com

Address: 9275 W Russell Rd, Suite 400 Las Vegas NV 89119

Contact Person-Name: Rachael R. Dennis, P.E. **Telephone No.:** 702.734.5666

* **E-Mail Address:** rachael.dennis@kimley-horn.com **Fax No.:**

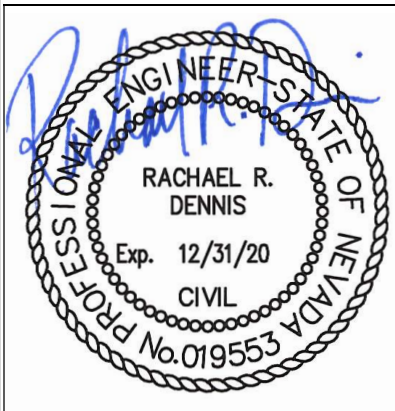
Firm: KIMLEY-HORN

Address: 6671 Las Vegas Boulevard South, Suite 320 Las Vegas, NV 89119

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☒	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit	GRADING PERMIT	

1. Total Owned Land Area: At Site: +/- 238.14 acres Being Developed/Disturbed: +/- 28.7 acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site: n/a
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: 1. UP to TDS Sunstone Phase 1 Infrastructure, 2. Skye Canyon Master Drainage Study Update #5
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: 1. Existing 48" RCP Lateral in Log Cabin Way 2. Minor surface flows to O'Hare Road.
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: June 4, 2020
TO: **Land Development Services** Department of Building & Safety				FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Sunstone Parcel D				Kimley-Horn
Cross Streets:	Skye Canyon Park Drive and Log Cabin Way/O'Hare Road			Lennar
File Number:	F:\Depot\DSMemos\DS5281A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-701-001			CCRFCD
Zoning Action:				
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/13/2020	6/4/2020	See Comments Below	$400.00	3848812: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.
2. Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.
3. The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

   When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

4. The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.
5. The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.
6. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.
7. Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.
8. Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.
9. As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.
10. It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.
11. This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).
12. Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.
13. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."
14. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.
15. Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Lob Cabin Way.
16. Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.
17. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).
18. Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.
19. The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de-sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.
20. Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.

21. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
22. Call out detail 7/C7.2 on the Grading Plans.
23. Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.
24. It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.
25. Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.
26. Revise the lateral profile callouts on Sheets C4.03 and C4.07.
27. Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.
28. Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.
29. Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.
30. Revise the Drainage Certification block to reference City of Las Vegas.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
JKS

T/R/S: T19S/R60E/6
AREA G-06

Kimley»Horn

July 1, 2020

Mr. Albert Sung, P.E.
City of Las Vegas Flood Control
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Addendum to the Technical Drainage Study for Sunstone Parcel D***

Dear Mr. Sung,

This letter certifies that all items provided on the *Addendum to the Technical Drainage Study for Sunstone Parcel D* electronic submittal matches the paper version bound into the study.

With Kimley-Horn, you should expect more and will experience better. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or concerns.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.T

Kimley»Horn

Addendum to the Technical Drainage Study for *SUNSTONE PARCEL D*

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

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July 2020
KH Project #092935006

Kimley»Horn

July 2, 2020

Ms. Jennifer Shinn, P.E.
City of Las Vegas
Department of Public Works
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Technical Drainage Study for Sunstone Parcel D (DS5281)***

Ms. Shinn,

This letter is being submitted in response to the subject Drainage Study Comment Letter dated June 4, 2020. These comments have been reviewed and are addressed herein.

Comment 1: **Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.**

Response: Zoning and Planning Conditions (**TMP-78151**) for the proposed site have been included in **Appendix A**.

Comment 2: **Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.**

Response: CLV Department of Planning Approval received on May 27, 2020 for the proposed onsite grade difference of 2 feet above or below existing grades has been included in **Appendix A**.

Comment 3: **The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.**

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

When it's applicable, structural calculations of facilities must be approved by the City prior to the Clark County Regional Flood Control District for their review and concurrence.

Response: Noted. We request that the structural calculations and plans be a condition of the TDS approval.

Comment 4: **The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.**

Response: Noted.

Comment 5: **The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.**

Response: Noted.

Comment 6: **This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.**

Response: Noted.

Comment 7: **Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.**

Response: The finish floor elevation for Lot 10 has been updated to match the grading plan on the **Finish Floor Check** included in **Appendix B**.

Comment 8: **Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.**

Response: The drop inlet identifiers have been added to the drop inlet summary table on **Figures ULT-1** and **FAC-1** for clarity. Note that the design remains unchanged from the previous submittal. Copies of **Figures ULT-1** and **FAC-1** has been included in **Appendix A**.

Comment 9: **As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.**

Response: Solid grouted walls have been provided to a minimum of twice the depth of flow above the adjacent flow line elevation for lots that do not meet the minimum FFE requirements. Callouts for the solid grouted walls have been added to the grading plans and **Details H** and **J** on Sheet **C7.1** in **Appendix D**.

Comment 10: **It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.**

Response: For Lots 71-85 along the future paseo, solid grouted walls have been provided to a minimum of twice the depth of flow highest adjacent finished grade have been added to maintain flood protection. Refer to **Detail E** on Sheet **C7.1** in **Appendix D**.

Comment 11: **This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).**

Response: Interim swales have been added in the future paseo area between Parcels D and F to direct flows north and south into Log Cabin Way and O'Hare Road, respectively. The proposed interim swale grading is consistent with the referenced Ultimate Condition analysis from the *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95)* (hereinafter referred to as *Master Study)*. The *Master Study* analyzed the future developed condition paseos as part of Subbasins **ELOG1** (35 cfs) and **EOHR1** (29 cfs). Flows for the proposed interim channels were prorated

from the *Master Study*. Referenced *Master Study* **Exhibit E – Ultimate Condition Onsite Hydrologic Map** in **Appendix C** depicts the subbasins and drainage patterns used in the ultimate condition hydrologic analysis for the future paseo. Referenced hydrologic calculations from the *Master Study* have been included in **Appendix C**. Prorate calculations for the future paseo subbasins have been included on **Figure ULT-1**. Hydraulic calculations for the proposed interim swales have been included in **Appendix B**. **Figure ULT-1** in **Appendix A** shows the locations of the cross sections and summary tables corresponding to the calculations. The revised grading plans have been included in **Appendix D**.

Comment 12: **Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.**

Response: Acknowledged. Permission to grade is being coordinated. We request the permission to grade be a condition of the TDS approval.

Comment 13: **Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA,"**

Response: The following note has been provided on the grading plans in **Appendix D**: "**All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."**

Comment 14: **All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.**

Response: Noted. All public drainage easements and common lots have been labeled on the grading plans. All drainage easements have been labeled as **"Public Drainage Easements to be Privately Maintained By the HOA**". Refer to the improvement plans in **Appendix D**.

Comment 15: **Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Log Cabin Way.**

Response: A 29-foot wide Public Drainage Easement has been added to the grading plans where the storm drain crosses Common Lot N. Refer to the improvement plans in **Appendix D**.

Comment 16: **Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.**

Response: Noted. Construction notes and callouts for all manholes and drop inlets referencing standard drawings and details have been added to the grading plans in **Appendix D**.

Comment 17: **Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).**

Response: Construction Notes 3 and Note 4 calling out USDCCA Drawing No. 421 have been added to the grading plans in **Appendix D**.

Comment 18: **Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.**

Response: A connection detail (Detail **5/C7.2)** for the proposed storm drain connection to the existing drop inlet in Log Cabin Way has been added to the grading plans in **Appendix D**.

Comment 19: **The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de- sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.**

Response: The proposed cul-de-sacs have been revised to reflect a 1% minimum slope. Refer to the improvement plans in **Appendix D**.

Comment 20: **Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.**

Response: Grading has been revised to reflect a swale in Common Element P and the driveway inadvertently shown at this location has also been removed. Refer to the improvement plans in **Appendix D**.

Comment 21: **The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.**

Response: Noted. A quantity estimate of all the drainage improvements has been added to the grading plans on Sheet **C2.0**. Refer to the improvement plans in **Appendix D**.

Comment 22: **Call out detail 7/C7.2 on the Grading Plans.**

Response: A pipe penetration Detail **5/C7.2** has been added to the grading plans in **Appendix D**.

Comment 23: **Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.**

Response: Most of the onsite storm drain has been revised to provide adequate utility clearances; however, the utilities have not been shown on the plans since they are not complete. It is acknowledged, that as the utility design **progresses, a drainage study update may be necessary if there is any significant storm drain** revision. Standard Form 6 models for the revised mainline and laterals have been included in **Appendix B**. All existing and proposed flood control facilities have been shown on the **Figure FAC-1** and the plans included in **Appendix D**. Note that although the storm drain lengths, slopes and manhole angles have been revised, the design intent is consistent with the previous submittal.

Additionally, the slopes for street **Cross Sections** and **Drop Inlets D-1** and **D-3B** were updated to match the revised plans. The resulting street flow and drop inlet collection data based on the flows generated during ultimate conditions has been presented in **tables on Figure ULT-1** in **Appendix A.** Hydraulic calculations have been included in **Appendix B**. Note that although the slopes for **D-1** and **D-3B** have been revised, the design intent is consistent with the previous submittal.

Comment 24: **It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.**

Response: Unnecessary construction note callouts have been removed from the profile view. Refer to the improvement plans in **Appendix D**.

Comment 25: **Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.**

Response: **LAT 4** has been updated to reflect the correct flow rates. Refer to the improvement plans in **Appendix D**.

Comment 26: **Revise the lateral profile callouts on Sheets C4.03 and C4.07.**

Response: Lateral callouts have been revised on **Sheets C4.03** and **C4.07.** Refer to the improvement plans in **Appendix D**.

Comment 27: **Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.**

Response: The flow rate has been updated on **Sheet C4.11.** Refer to the improvement plans in **Appendix D**.

Comment 28: **Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.**

Response: The Flood Zone Note has been corrected to Panel Number 1735. Refer to the improvement plans in **Appendix D.**

Comment 29: **Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.**

Response: CLV drawing numbers for the existing storm drain facilities in the perimeter streets have been added where approved.

Comment 30: **Revise the Drainage Certification block to reference City of Las Vegas.**

Response: Drainage Certification block has been revised to reference the City of Las Vegas. Refer to the Improvement Plans in **Appendix D**.

We anticipate that the above responses address your concerns/comments. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or need any additional information.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.

Kimley»Horn

LIST OF APPENDICES

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
  - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Appendix C – Reference Materials

- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95);* December 2018.

Appendix D – Improvement Plans

Addendum to the Technical Drainage Study for

SUNSTONE PARCEL D

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

Kimley»Horn

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Sunstone Parcel D Date: July 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Skye Canyon Park Drive

East/West: Log Cabin Way & O'Hare Road

b) Section: 6 Township: 19S Range: 60E

c) APN : 125-06-701-001

Name of Owner: Lennar - Robert Flaxa

Telephone No.: 702.821.4651 Fax No.: E-Mail Address: robert.flaxa@lennar.com

Address: 9275 W Russell Rd, Suite 400 Las Vegas NV 89119

Contact Person-Name: Rachael R. Dennis, P.E. **Telephone No.:** 702.734.5666

* **E-Mail Address:** rachael.dennis@kimley-horn.com **Fax No.:**

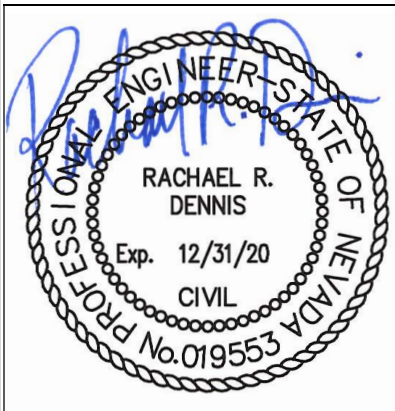
Firm: KIMLEY-HORN

Address: 6671 Las Vegas Boulevard South, Suite 320 Las Vegas, NV 89119

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☒	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit	GRADING PERMIT	

1. Total Owned Land Area: At Site: +/- 238.14 acres Being Developed/Disturbed: +/- 28.7 acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site: n/a
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: 1. UP to TDS Sunstone Phase 1 Infrastructure, 2. Skye Canyon Master Drainage Study Update #5
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: 1. Existing 48" RCP Lateral in Log Cabin Way 2. Minor surface flows to O'Hare Road.
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: June 4, 2020
TO: **Land Development Services** Department of Building & Safety				FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Sunstone Parcel D				Kimley-Horn
Cross Streets:	Skye Canyon Park Drive and Log Cabin Way/O'Hare Road			Lennar
File Number:	F:\Depot\DSMemos\DS5281A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-701-001			CCRFCD
Zoning Action:				
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/13/2020	6/4/2020	See Comments Below	$400.00	3848812: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.
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3. The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

   When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

4. The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.
5. The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.
6. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.
7. Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.
8. Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.
9. As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.
10. It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.
11. This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).
12. Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.
13. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."
14. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.
15. Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Lob Cabin Way.
16. Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.
17. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).
18. Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.
19. The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de-sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.
20. Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.

21. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
22. Call out detail 7/C7.2 on the Grading Plans.
23. Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.
24. It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.
25. Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.
26. Revise the lateral profile callouts on Sheets C4.03 and C4.07.
27. Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.
28. Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.
29. Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.
30. Revise the Drainage Certification block to reference City of Las Vegas.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
JKS

T/R/S: T19S/R60E/6
AREA G-06

Kimley»Horn

July 1, 2020

Mr. Albert Sung, P.E.
City of Las Vegas Flood Control
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Addendum to the Technical Drainage Study for Sunstone Parcel D***

Dear Mr. Sung,

This letter certifies that all items provided on the *Addendum to the Technical Drainage Study for Sunstone Parcel D* electronic submittal matches the paper version bound into the study.

With Kimley-Horn, you should expect more and will experience better. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or concerns.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.T

Kimley»Horn

Addendum to the Technical Drainage Study for *SUNSTONE PARCEL D*

Date Prepared:
July 2020

Prepared for:
Lennar
9275 W Russell Rd, Suite 400
Las Vegas, NV 89148
702.821.4651

Prepared by:
Kimley-Horn and Associates, Inc.
6671 Las Vegas Boulevard South, Suite 320
Las Vegas, NV 89119
702.862.3600

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July 2020
KH Project #092935006

Kimley»Horn

July 2, 2020

Ms. Jennifer Shinn, P.E.
City of Las Vegas
Department of Public Works
333 Rancho Drive
Las Vegas, NV 89106

RE: ***Technical Drainage Study for Sunstone Parcel D (DS5281)***

Ms. Shinn,

This letter is being submitted in response to the subject Drainage Study Comment Letter dated June 4, 2020. These comments have been reviewed and are addressed herein.

Comment 1: **Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.**

Response: Zoning and Planning Conditions (**TMP-78151**) for the proposed site have been included in **Appendix A**.

Comment 2: **Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.**

Response: CLV Department of Planning Approval received on May 27, 2020 for the proposed onsite grade difference of 2 feet above or below existing grades has been included in **Appendix A**.

Comment 3: **The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.**

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

When it's applicable, structural calculations of facilities must be approved by the City prior to the Clark County Regional Flood Control District for their review and concurrence.

Response: Noted. We request that the structural calculations and plans be a condition of the TDS approval.

Comment 4: **The study assumes the storm drain infrastructure proposed by the Technical Drainage Study for Sunstone Phase 1 Infrastructure is in place and functioning. Substantial completion of the Sunstone Phase 1 Infrastructure facilities is required prior to residential occupancy permits.**

Response: Noted.

Comment 5: **The substantial completion of the developer's Moccasin facility prior to any residential occupancy permits within the Sunstone development is required.**

Response: Noted.

Comment 6: **This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.**

Response: Noted.

Comment 7: **Review the Finish Floor Check Table entry for Lot 10 as it does not match the finish floor shown on the Grading Plan. Revise plan/table accordingly.**

Response: The finish floor elevation for Lot 10 has been updated to match the grading plan on the **Finish Floor Check** included in **Appendix B**.

Comment 8: **Several entries on the Drop Inlet Summary Table on Figure ULT-1 do not match the flows shown on FAC-1, specifically at D7A and D8. In addition, the drop inlet labeling is confusing. Please provide labels for each drop inlet as they correspond to the provide FlowMaster models.**

Response: The drop inlet identifiers have been added to the drop inlet summary table on **Figures ULT-1** and **FAC-1** for clarity. Note that the design remains unchanged from the previous submittal. Copies of **Figures ULT-1** and **FAC-1** has been included in **Appendix A**.

Comment 9: **As indicated in the report, several finish floor elevations do not meet the minimum Manual criteria. Provide details and/or callouts for solid grouted walls for the following Lots 1, 15, 16. In addition, revise details H/C7.1 and J/C7.1 to callout solid grouted walls per the Grading Plans.**

Response: Solid grouted walls have been provided to a minimum of twice the depth of flow above the adjacent flow line elevation for lots that do not meet the minimum FFE requirements. Callouts for the solid grouted walls have been added to the grading plans and **Details H** and **J** on Sheet **C7.1** in **Appendix D**.

Comment 10: **It appears that the existing contours at the western property line are above the proposed finish floor elevations of Lots 71-85. Provide flood protection for the lots along the western property line and revise all pertinent section details accordingly.**

Response: For Lots 71-85 along the future paseo, solid grouted walls have been provided to a minimum of twice the depth of flow highest adjacent finished grade have been added to maintain flood protection. Refer to **Detail E** on Sheet **C7.1** in **Appendix D**.

Comment 11: **This project creates the 50-foot paseo along the western boundary of the subject site thus creating an area that no longer drains freely to the east. Provide interim grading in the future paseo to allow the area to drain. Provide sidewalk underdrain(s) to convey the runoff to the street(s).**

Response: Interim swales have been added in the future paseo area between Parcels D and F to direct flows north and south into Log Cabin Way and O'Hare Road, respectively. The proposed interim swale grading is consistent with the referenced Ultimate Condition analysis from the *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95)* (hereinafter referred to as *Master Study)*. The *Master Study* analyzed the future developed condition paseos as part of Subbasins **ELOG1** (35 cfs) and **EOHR1** (29 cfs). Flows for the proposed interim channels were prorated

from the *Master Study*. Referenced *Master Study* **Exhibit E – Ultimate Condition Onsite Hydrologic Map** in **Appendix C** depicts the subbasins and drainage patterns used in the ultimate condition hydrologic analysis for the future paseo. Referenced hydrologic calculations from the *Master Study* have been included in **Appendix C**. Prorate calculations for the future paseo subbasins have been included on **Figure ULT-1**. Hydraulic calculations for the proposed interim swales have been included in **Appendix B**. **Figure ULT-1** in **Appendix A** shows the locations of the cross sections and summary tables corresponding to the calculations. The revised grading plans have been included in **Appendix D**.

Comment 12: **Secure a notarized letter of permission from the property owner allowing the offsite grading indicated in Comment #8. This letter is required prior to final acceptance of the drainage study.**

Response: Acknowledged. Permission to grade is being coordinated. We request the permission to grade be a condition of the TDS approval.

Comment 13: **Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA,"**

Response: The following note has been provided on the grading plans in **Appendix D**: "**All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."**

Comment 14: **All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map. The minimum width for a public drainage easement is 10' if the 100-year flow is less than 20 CFS.**

Response: Noted. All public drainage easements and common lots have been labeled on the grading plans. All drainage easements have been labeled as **"Public Drainage Easements to be Privately Maintained By the HOA**". Refer to the improvement plans in **Appendix D**.

Comment 15: **Provide a public drainage easement where the proposed storm drain crosses the common lot adjacent to Log Cabin Way.**

Response: A 29-foot wide Public Drainage Easement has been added to the grading plans where the storm drain crosses Common Lot N. Refer to the improvement plans in **Appendix D**.

Comment 16: **Provide construction notes and callouts for all manholes and drop inlets, referencing standard drawings and/or details. Callouts for the drop inlets shall include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.**

Response: Noted. Construction notes and callouts for all manholes and drop inlets referencing standard drawings and details have been added to the grading plans in **Appendix D**.

Comment 17: **Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).**

Response: Construction Notes 3 and Note 4 calling out USDCCA Drawing No. 421 have been added to the grading plans in **Appendix D**.

Comment 18: **Provide details for the storm drain connection to the existing drop inlet on Log Cabin Way.**

Response: A connection detail (Detail **5/C7.2)** for the proposed storm drain connection to the existing drop inlet in Log Cabin Way has been added to the grading plans in **Appendix D**.

Comment 19: **The Regional Flood Control District Manual requires 1% minimum slope around the bulb of a cul-de- sac where storm water is drained through per Section 1602. Provide the required slopes in all proposed cul-de-sacs.**

Response: The proposed cul-de-sacs have been revised to reflect a 1% minimum slope. Refer to the improvement plans in **Appendix D**.

Comment 20: **Provide grading at C.E. "P" to demonstrate how it drains. In addition, please address the driveway shown at the common element.**

Response: Grading has been revised to reflect a swale in Common Element P and the driveway inadvertently shown at this location has also been removed. Refer to the improvement plans in **Appendix D**.

Comment 21: **The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.**

Response: Noted. A quantity estimate of all the drainage improvements has been added to the grading plans on Sheet **C2.0**. Refer to the improvement plans in **Appendix D**.

Comment 22: **Call out detail 7/C7.2 on the Grading Plans.**

Response: A pipe penetration Detail **5/C7.2** has been added to the grading plans in **Appendix D**.

Comment 23: **Show the proposed utility crossings on the profile sheets to verify adequate clearance is provided.**

Response: Most of the onsite storm drain has been revised to provide adequate utility clearances; however, the utilities have not been shown on the plans since they are not complete. It is acknowledged, that as the utility design **progresses, a drainage study update may be necessary if there is any significant storm drain** revision. Standard Form 6 models for the revised mainline and laterals have been included in **Appendix B**. All existing and proposed flood control facilities have been shown on the **Figure FAC-1** and the plans included in **Appendix D**. Note that although the storm drain lengths, slopes and manhole angles have been revised, the design intent is consistent with the previous submittal.

Additionally, the slopes for street **Cross Sections** and **Drop Inlets D-1** and **D-3B** were updated to match the revised plans. The resulting street flow and drop inlet collection data based on the flows generated during ultimate conditions has been presented in **tables on Figure ULT-1** in **Appendix A.** Hydraulic calculations have been included in **Appendix B**. Note that although the slopes for **D-1** and **D-3B** have been revised, the design intent is consistent with the previous submittal.

Comment 24: **It is unclear what the two callouts shown on the profile on Sheet C4.12 represent. Please address in the next submittal.**

Response: Unnecessary construction note callouts have been removed from the profile view. Refer to the improvement plans in **Appendix D**.

Comment 25: **Revise the flow rates shown on LAT 4 on Sheet C5.1 to match Figure FAC-1.**

Response: **LAT 4** has been updated to reflect the correct flow rates. Refer to the improvement plans in **Appendix D**.

Comment 26: **Revise the lateral profile callouts on Sheets C4.03 and C4.07.**

Response: Lateral callouts have been revised on **Sheets C4.03** and **C4.07.** Refer to the improvement plans in **Appendix D**.

Comment 27: **Revise the flow rates shown on Sheet C4.11 to match Figure FAC-1.**

Response: The flow rate has been updated on **Sheet C4.11.** Refer to the improvement plans in **Appendix D**.

Comment 28: **Revise the Flood Zone Note on the Grading Plans to reflect the correct Panel Number 1735.**

Response: The Flood Zone Note has been corrected to Panel Number 1735. Refer to the improvement plans in **Appendix D.**

Comment 29: **Label the existing storm drain facilities in the perimeter streets with the CLV Drawing Numbers.**

Response: CLV drawing numbers for the existing storm drain facilities in the perimeter streets have been added where approved.

Comment 30: **Revise the Drainage Certification block to reference City of Las Vegas.**

Response: Drainage Certification block has been revised to reference the City of Las Vegas. Refer to the Improvement Plans in **Appendix D**.

We anticipate that the above responses address your concerns/comments. Please contact me at (702) 734-5666 or rachael.dennis@kimley-horn.com should you have any questions or need any additional information.

Sincerely,

Rachael R. Dennis, P.E.

Autumn Lyn Donovan, E.I.

Kimley»Horn

LIST OF APPENDICES

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
  - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Appendix C – Reference Materials

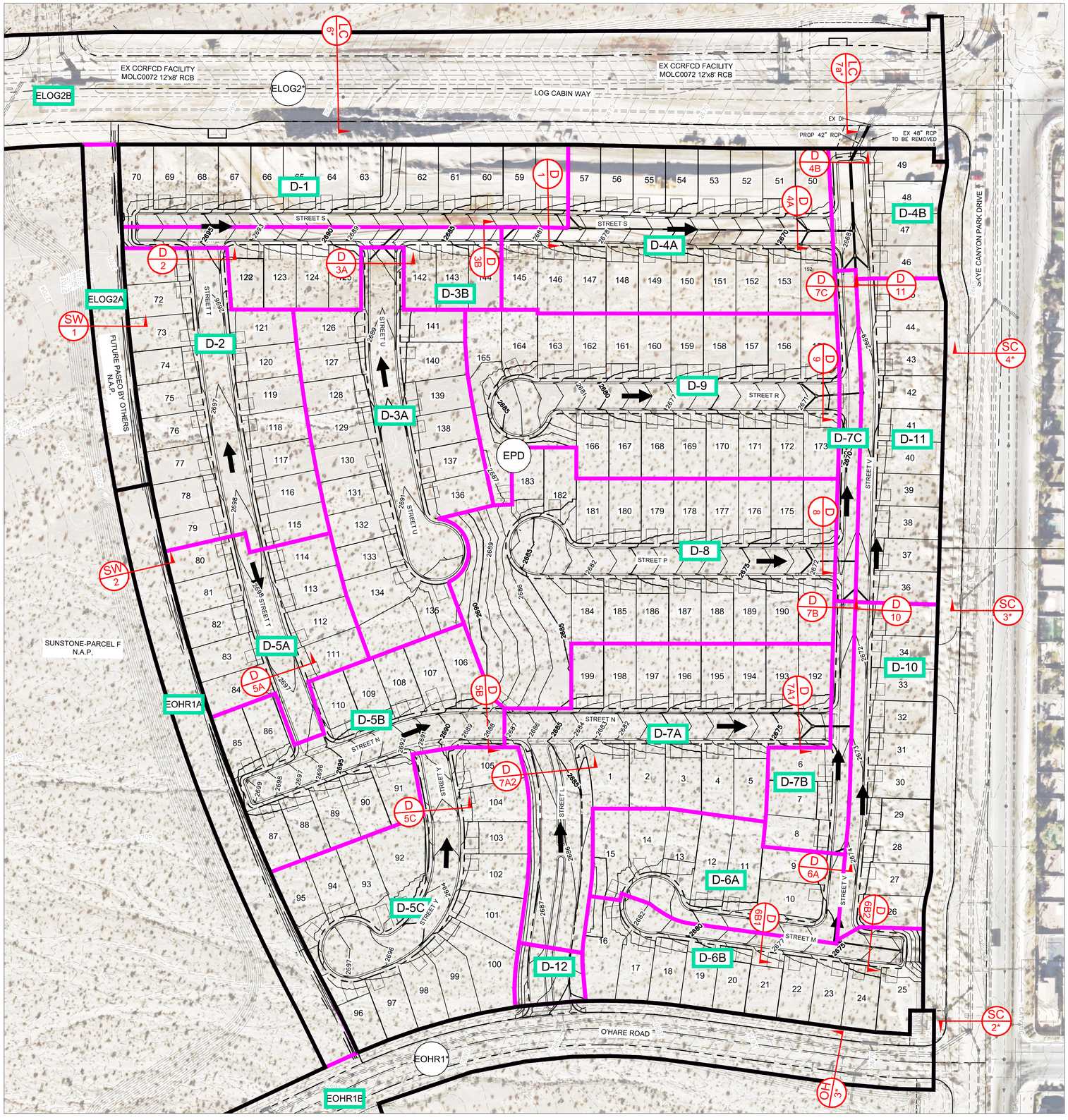
- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95);* December 2018.

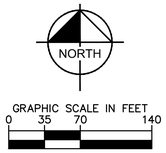
Appendix D – Improvement Plans

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.





LEGEND

- SITE — BASIN ID
- XXX — PRORATED BASIN BOUNDARY ID
- BASIN BOUNDARY
- PRORATED BASIN BOUNDARY
- FLOW ARROW
- X / XX — SECTION ID

ULTIMATE CONDITION PRORATED FLOW SUMMARY

Ultimate Onsites			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
EPD*	65	28.7	2.26
ELOG2*	35	12.1	2.89
EOHR1*	29	10.1	2.87
Ultimate Onsite Prorated Basins			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
D-1	4	1.6	2.26
D-2	4.5	2.0	2.26
D-3A	5	2.3	2.26
D-3B	2	1.0	2.26
D-4A	5	2.2	2.26
D-4B	1.5	0.6	2.26
D-5A	2.5	1.2	2.26
D-5B	4	1.7	2.26
D-5C	5	2.2	2.26
D-6A	2	1.1	2.26
D-6B	3	1.4	2.26
D-7A	6	2.5	2.26
D-7B	1	0.5	2.26
D-7C	1	0.3	2.26
D-8	7	3.0	2.26
D-9	6	2.6	2.26
D-10	3	1.2	2.26
D-11	2.5	1.2	2.26
D-12	<1	0.1	2.26
TOTAL	**65**	**28.7**	**NA**
ELOG2A	2	0.6	2.89
ELOG2B	33	11.5	2.89
TOTAL	**35**	**12.1**	**NA**
EOHR1A	3	1.0	2.87
EOHR1B	26	9.1	2.87
TOTAL	**29**	**10.1**	**NA**

*Referenced from the Master Study

STREET HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
D-1	3.25	4.0	0.29	3.70	1.07
D-2	1.66	4.5	0.27	2.50	0.68
D-3A	1.75	5.0	0.28	2.62	0.73
D-3B	3.25	7.5	0.35	4.29	1.50
D-4A	3.25	9.0	0.30	3.76	1.13
D-4B	0.70	6.0	0.33	1.93	0.64
D-5A	1.61	2.5	0.27	1.53	0.41
D-5B	3.25	11.5	0.32	4.03	1.29
D-5C	1.69	5.0	0.28	2.59	0.73
D-6A	0.70	2.0	0.30	0.30	0.09
D-6B1	2.50	3.0	0.28	3.14	0.88
D-6B2	2.50	3.0	0.23	2.70	0.62
D-7A1	3.25	17.5	0.36	4.45	1.60
D-7A2	0.50	2.0	0.30	1.33	0.40
D-7B	0.70	4.0	0.36	2.06	0.74
D-7C	0.70	2.5	0.32	1.84	0.59
D-8	3.25	7.0	0.28	3.60	1.01
D-9	3.25	6.0	0.27	3.47	0.94
D-10	0.70	3.0	0.33	1.93	0.64
D-11	0.70	3.5	0.35	1.99	0.70

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

REFERENCED HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	Q_{10} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
LC6*	3.83	13	0.37	4.57	1.69	5	0.29	3.74	1.08
LC7a*	3.83	5.5	0.35	4.40	1.54	2	0.27	3.59	0.97
OH3*	3.76	36	0.49	5.73	2.81		-		
SC2*	0.46	14.5	0.61	2.37	1.45		-		
SC3*	0.22	3	0.44	1.24	0.55	1	0.33	3.89	1.28
SC4*	0.65	2	0.34	1.73	0.59	1	0.28	1.52	0.43

CHANNEL HYDRAULIC SECTIONS

SWALE SECTION	TRIBUTARY BASINS	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	TYPE	SIDE SLOPES		Red'd d_{50}
SW-1	ELOG2A	1.00	2.0	0.53	2.37	1.26	V-Ditch	3:1	3:1	N/A
SW-2	EOHR1A	1.00	3.0	0.62	2.62	1.62	V-Ditch	3:1	3:1	N/A

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2018 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BLVD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702.589.3500
WWW.KIMLEY-HORN.COM

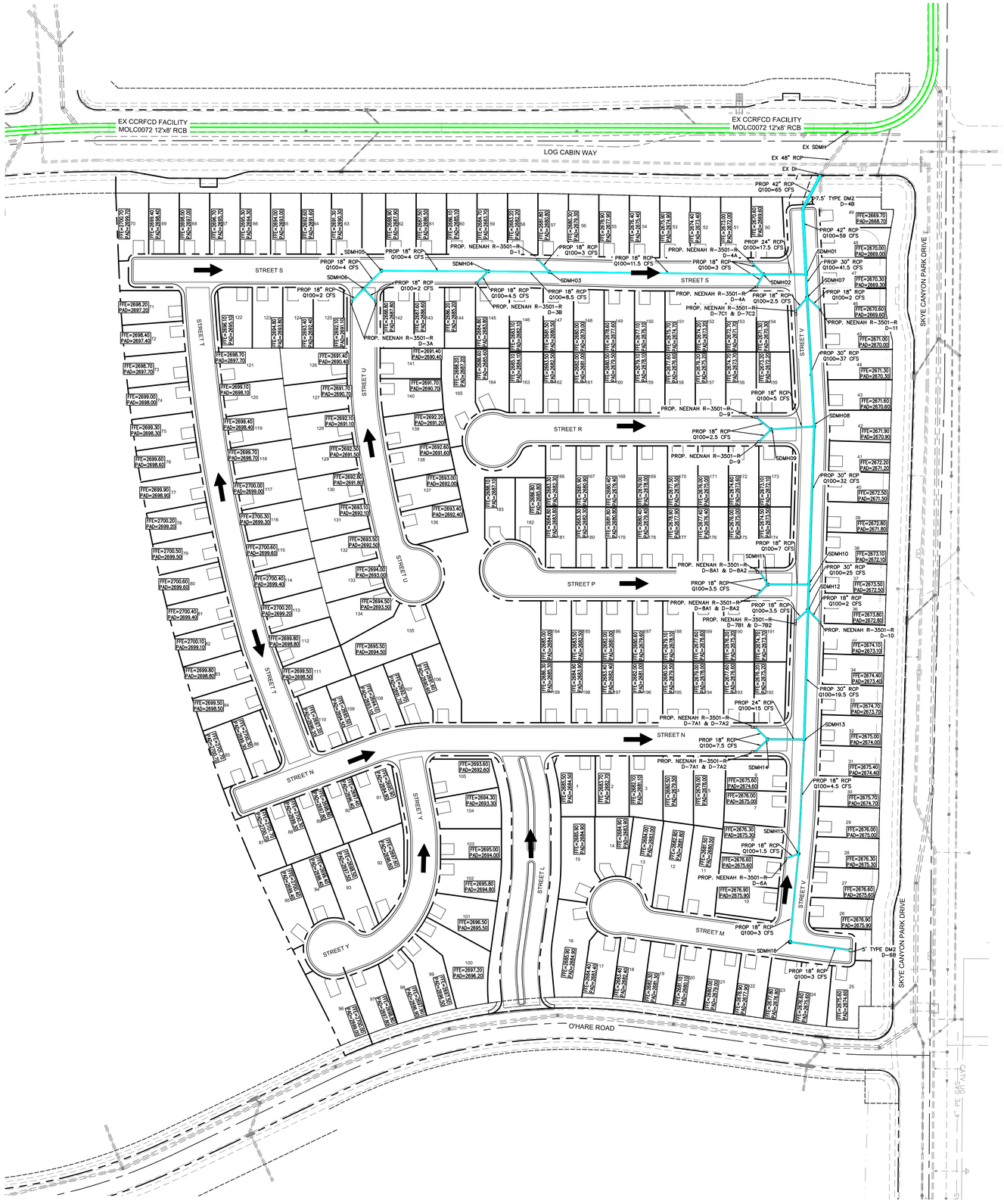
KHA PROJECT 092935006
DATE 3/17/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

ULTIMATE CONDITION BASIN MAP

SUNSTONE - PARCEL D

PREPARED FOR
LENNAR HOMES

ULT-1



NORTH

LEGEND

- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING CCRFCD FACILITY
- FLOW ARROW

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BLVD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

KHA PROJECT 092935006
DATE 5/5/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

FACILITY MAP

SUNSTONE PARCEL D
PREPARED FOR
LENNAR HOMES
CITY OF LAS VEGAS NEVADA

FAC-1

Plotted By:Donovan, Autumlyn Sheet Set:Kha Layout:FAC-1 July 01, 2020 10:47:37am K:\LAV_Civil\092935006-Lennar Sunstone\Reports\DRAINAGE\Parcel D\02_ADD\Figures\CAD\ADD_Facility_Map.dwg

City of Las Vegas

AGENDA MEMO - PLANNING

PLANNING COMMISSION MEETING DATE: MARCH 10, 2020
DEPARTMENT: PLANNING
ITEM DESCRIPTION: APPLICANT: GREYSTONE NEVADA, LLC - OWNER: EASTLAND, LLC

** STAFF RECOMMENDATION(S) **

CASE NUMBER	*RECOMMENDATION*	*REQUIRED FOR APPROVAL*
TMP-78151	Staff recommends APPROVAL, subject to conditions:	

** NOTIFICATION **

NEIGHBORHOOD ASSOCIATIONS NOTIFIED N/A

NOTICES MAILED N/A

PROTESTS 0

APPROVALS 0

SS

**** CONDITIONS ****

TMP-78151 CONDITIONS

Planning

1. Approval of the Tentative Map shall be for no more than four (4) years. If a Final Map is not recorded on all or a portion of the area embraced by the Tentative Map within four (4) years of the approval of the Tentative Map, this action is void.

2. All development shall conform to the Sunstone Development Agreement and related exhibits as amended, including the Sunstone Design Guidelines and Sunstone Parks Agreement.

3. Street names must be provided in accordance with the City's Street Naming Regulations.

4. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.

5. In conjunction with creation, declaration and recordation of the subject common-interest community, and prior to recordation of the Covenants, Codes and Restrictions ("CC&R"), or conveyance of any unit within the community, the Developer is required to record a Declaration of Private Maintenance Requirements ("DPMR") as a covenant on all associated properties, and on behalf of all current and future property owners. The DPMR is to include a listing of all privately owned and/or maintained infrastructure improvements, along with assignment of maintenance responsibility for each to the common interest community or the respective individual property owners, and is to provide a brief description of the required level of maintenance for privately maintained components. The DPMR must be reviewed and approved by the City of Las Vegas Department of Field Operations prior to recordation, and must include a statement that all properties within the community are subject to assessment for all associated costs should private maintenance obligations not be met, and the City of Las Vegas be required to provide for said maintenance. Also, the CC&R are to include a statement of obligation of compliance with the DPMR. Following recordation, the Developer is to submit copies of the recorded DPMR and CC&R documents to the City of Las Vegas Department of Field Operations.

6. All development is subject to the conditions of City Departments and State Subdivision Statutes.

Public Works

7. Private streets must be granted and labeled on the Final Map for this site as Public Utility Easements (P.U.E.), Public Sewer Easements, and Public Drainage Easements with private surface maintenance by the Homeowner's Association.

8. In accordance with Condition #10 of TMP-76718 and Section 3.04 of the Sunstone Development Agreement, if not already constructed or guaranteed by the master developer, a minimum two lanes of asphalt pavement on village streets providing the main access to this site and a working sanitary sewer connection shall be provided prior to a final inspection of any dwelling units within this Tentative Map. Complete construction of Village streets shall conform to Section 3.04 of the Sunstone Development Agreement. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.

9. Common Element "N" shall be a minimum 40-foot wide Public Sewer, Public Drainage, and Public Utility Easement to Be Privately Maintained. The boundary between Lot 52 and Common Element "N" may need to move east to accommodate the proposed easement. No trees or landscaping over three feet tall shall be allowed within the public sewer easement.

10. Construct paved access to any proposed manholes not located within the private streets.

11. Prior to the recordation of a Final Map for this site, submit a pedestrian circulation plan to identify nearby pedestrian attractors and recommend measures to accommodate pedestrians, such as but not limited to pedestrian access, crosswalk, pedestrian activated flashers and temporary sidewalks.

12. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building, grading permits or the recordation of a Final Map, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

13. The approval of all Public Works related improvements shown on this Tentative Map is in concept only. Specific design and construction details relating to size, type and/or alignment of improvements, including but not limited to street, sewer and drainage improvements, shall be resolved prior to approval of the construction plans by the City. No deviations from adopted City Standards shall be allowed unless specific written approval for such is received from the City Engineer prior to the recordation of a Final Map or the approval of subdivision related construction plans, whichever may occur first. Approval of this Tentative Map does not constitute approval of any deviations. If such approval cannot be obtained, a revised Tentative Map must be submitted showing elimination of such deviations. Roadway locations and parcel entries are schematic and final studies and engineering improvements designs. Geometric design of Parcel entry points must be approved through the development review of each parcel.

14. Site development to comply with all applicable conditions of approval for the Sunstone master Tentative Map (TMP-76718) and any other site related actions.

** STAFF REPORT **

PROJECT DESCRIPTION

The applicant requests review of a Tentative Map for a 199-lot private gated single family residential subdivision on 30.74 acres of undeveloped land at the southeast corner of Log Cabin Way and N Skye Canyon Park Dr.

ISSUES

- The boundary between Lot 52 and Common Element "N" may need to move east to accommodate a 40-foot public sewer easement required by Public Works condition.
- The Tentative Map was reviewed and approved by the Master Developer of Sunstone on December 23, 2019 prior to submittal to the City for review.

ANALYSIS

The proposed subdivision is part of a 630-acre master planned development (Sunstone) generally located east of U.S. 95 and south of Moccasin Road. The Sunstone community is zoned T-D (Traditional Development), a district which was established to permit and encourage the development of comprehensively planned mixed-use communities with a minimum of 80 contiguous acres of land under one ownership or control that can generally exist as a self-contained community.

Development of the site is subject to the terms of an approved Development Agreement between the Master Developer and the City of Las Vegas, which includes the Sunstone Design Guidelines. The Development Agreement indicates that the proposed subdivision is part of Phase 2 of development. The developer has requested that Sunstone R-SL (Residential Small Lot) standards be used for this subdivision, which conforms to the L (Residential Low) Sunstone land use category designated for this parcel by the Development Agreement. The minimum lot size under the Sunstone R-SL standards is 2,800 square feet and the minimum lot width is 35 feet; this subdivision proposes lots with an average size of 4,343 square feet and 45 feet in width. Two-story units are planned with sizes ranging between 2,400 to 2,800 square feet. The density of this subdivision is 6.47 dwelling units per acre, which is below the maximum 15 dwelling units per acre required by the Sunstone Master Land Use Plan for L (Residential Low) designated parcels.

Access to the site is from Ohare Road, which was designed and recorded through a Parent Final Map (FMP-77750) on February 10, 2020. Interior streets, trails, open spaces and drainage corridors are private and will be maintained by a Homeowners' Association. Private streets are 49 feet wide with sidewalks on both sides as required by the Sunstone Development Agreement. A 50-foot paseo separates this parcel from another residential parcel to the west (Parcel F). A trail will be installed within the paseo and maintained by the Master Developer. Perimeter landscaping will be provided through the Master Developer along Ohare Road, N Skye Canyon Park Dr and Log Cabin Way and will conform to Sunstone Design Guidelines.

As this site is part of a master plan with specific offsite improvement standards and trail pathways, it is not subject to Title 19.04 street section and connectivity requirements. Stub street terminations are permitted by the Sunstone Development Agreement. The Tentative Map indicates a Connectivity Ratio of 1.18 and includes multiple bicycle and pedestrian connections. The site slopes down from west to east approximately 3% and from south to north less than 1%. Per Section 6.B.3 of the Sunstone Design Guidelines, the maximum retaining wall height is six feet. The submitted cross sections show tiered retaining walls of 3.5 feet and 5.5 feet along the west property line. No retaining walls over six feet in height are shown. Sunstone Design Guidelines allow up to 12 feet of exposure.

The Clark County School District (CCSD) has commented on the impact future development might have on the three levels of schools in the area. CCSD projects that approximately 86 additional primary and secondary school students will be generated by the proposed development on this site. According to CCSD, Bilbray and Scherkenback Elementary Schools and Ralph Cadwallader Middle School are slightly below capacity for the 2019-20 school year. Arbor View High School is 129% over program capacity. No new schools are planned in the area.

FINDINGS (TMP-78151)

The Tentative Map generally conforms to the terms of the Sunstone Development Agreement. The map also conforms to Nevada Revised Statutes as applicable for tentative maps. Staff recommends approval, subject to conditions.

BACKGROUND INFORMATION

Related Relevant City Actions by Planning, Fire, Bldg., etc.	
06/19/19	The City Council approved the First Amendment and Restatement of the Sunstone Development Agreement (thereby dissolving the Eastland Development Agreement) on approximately 628 acres at the southwest corner of Moccasin Road and N Skye Canyon Park Dr (DIR-76290). The Planning Commission and staff recommended approval.
	The City Council approved the First Amendment and Restatement of the Sunstone Parks Agreement (DIR-76291). The Planning Commission and staff recommended approval.
07/23/19	The Planning Commission approved a Parent Tentative Map (TMP-76718) for a 22-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr. Staff recommended approval.
02/10/20	A Parent Final Map (FMP-77750) for a 20-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr was recorded.

Most Recent Change of Ownership	
11/07/13	A deed was recorded for a change in ownership.

Related Building Permits/Business Licenses
There are no related building permits or business licenses associated with the subject site.

Pre-Application Meeting	
12/23/19	Department of Planning staff met with the applicant to discuss submittal requirements for a Tentative Map application. The applicant was advised that a map could be submitted but would not be placed on an agenda until the parent final map for Sunstone recorded.

Neighborhood Meeting
A neighborhood meeting was not required, nor was one held.

Field Check	
01/30/20	The site is undeveloped with native desert vegetation. A staging area for a paving project is located at the corner of Log Cabin Way and N Skye Canyon Park Dr.

Details of Application Request	
Site Area	
Gross Acres	30.74

Surrounding Property	***Existing Land Use Per Title 19.12***	***Planned or Special Land Use Designation***	***Existing Zoning District***
Subject Property	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
North	Undeveloped	L (Residential Low) - Sunstone P (Park and Trail) - Sunstone	T-D (Traditional Development)
South	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
East	Single Family, Detached	PCD (Planned Community Development)	R-PD6 (Residential Planned Development – 6 Units per Acre)
West	Undeveloped	P (Park and Trail) - Sunstone	T-D (Traditional Development)

Master and Neighborhood Plan Areas	***Compliance***
Sunstone Development Agreement	Y
Special Area and Overlay Districts	***Compliance***
T-D (Traditional Development) District	Y
Other Plans or Special Requirements	***Compliance***
Trails (by others)	N/A
Las Vegas Redevelopment Plan Area	N/A
Interlocal Agreement	N/A
Project of Significant Impact (Development Impact Notification Assessment)	N/A
Project of Regional Significance	N/A

DEVELOPMENT STANDARDS

Pursuant to the Sunstone Design Guidelines for the R-SL (Residential Small Lot) density category, the following standards apply:

Standard	*Required/Allowed*	*Provided*	*Compliance*
Housing Type	Single Family Residential	Single Family Residential	Y
Min. Lot Size	2,800 SF	4,038 SF	Y
Min. Lot Width	35 Feet	45 Feet	Y
Min. Setbacks			
• Front (single story living element or porch)*	14 Feet	14 Feet	Y
• Front (to garage door)	18 Feet	18 Feet	Y
• Front (2nd story elements)	20 Feet	20 Feet	Y
• Side	5 Feet	5 Feet	Y
• Corner Side	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	Y
• Rear	10 Feet to single story living element 15 Feet to 2nd story living element**	10 Feet to single story living element 15 Feet to 2nd story living element	Y
Max. Lot Coverage	60 %	60 %	Y
Max. Building Height	3 stories/35 Feet	1 story/35 Feet	Y

*May be reduced to 10 feet for single family living or porch elements for 30% of building width.
**May be reduced by 5 feet for 50% of building width.

Street Name	***Functional Classification of Street(s)***	***Governing Document***	***Actual Street Width (Feet)***	***Compliance with Street Section***
N Skye Canyon Park Dr	Primary Arterial	Planned Streets and Highways Map	43-70	N*
	Arterial with Trail	Sunstone DA		
Ohare Rd	Minor Collector with Bike Lanes	Sunstone DA	0	N*
Log Cabin Way	Arterial	Sunstone DA	0	N*

*Public perimeter streets will be improved according to the requirements of the Sunstone Development Agreement.

19.04.040 Connectivity		
Transportation Network Element	***# Links***	***# Nodes***
Internal Street	20	
Intersection – Internal		10
Cul-de-sac Terminus		5
Intersection – External Street or Stub Terminus		4
Intersection – Stub Terminus w/ Temporary Turn Around Easements		0
Non-Vehicular Path - Unrestricted	2.5	
Total	22.5	19
	Required	***Provided***
Connectivity Ratio (Links / Nodes):	**N/A**	**1.18**

Pursuant to Title 19.08 and 19.12, the following parking standards apply:

Parking Requirement							
Use	***Gross Floor Area or Number of Units***	***Required***			***Provided***		***Compliance***
		Parking Ratio	*Parking*		*Parking*		
			Regular	Handi-capped	Regular	Handi-capped	
Single Family, Detached	199 units	2 spaces per unit w/in enclosed garage	398				
TOTAL SPACES REQUIRED			398		398		Y
Regular and Handicap Spaces Required			398	0	398	0	Y

SS

Kimley»Horn

May 21, 2020

Department of Planning
City of Las Vegas
333 N Rancho Dr
Las Vegas, Nevada 89106

RE: ***Justification Letter for TMP-78141/PRJ-78003, Sunstone – Parcel D (Parcel 13 of Sunstone Final Map – FMP-77750) cut and fill more than two feet***

To Whom it May Concern:

We hereby submit the attached grading plans for review by the CLV Planning Department of Sunstone – Parcel F (Parcel 12 of Sunstone Final Map – FMP-77750), a single-family residential subdivision located within the 630+/- acre Sunstone master planned community at the SWC of the intersection of N. Skye Canyon Park Dr. and Log Cabin Way.

Due to the existing topography of the site, generally having an existing slope of 4% to 5% from west to east, the site will have areas of cut and fill of greater than two feet onsite. In addition, the 30+/- acre site's current natural topography contains ridges and valleys traversing through the site with height/depth greater than four feet requiring adequate cut or fill accordingly. The site is currently being designed to blend with the Sunstone infrastructure roadways, maintain drainage per the approved master technical drainage study, attain balanced earthworks, and reduce earthwork movement onsite to the greatest extent practicable.

On behalf of the owner, EASTLAND LLC, we'd like to respectfully request approval for the cut and fill heights exceeding two feet as shown in the grading plans included with this review. Thank you for your consideration, we look forward to working with the Planning Department for a favorable recommendation for this project. Please contact me at (702) 862-3632 or Mikal.Kintner@kimley-horn.com should you have any questions or concerns.

Sincerely,

Mikal Kintner

Mikal Kintner
cc: Lennar Homes

PLANS APPROVED
PLANNING
Dept of Planning
City of Las Vegas, Nevada
2 FOOT GRADE DIFFERENCE ONLY
LHM MAY 21 2020

Conforms to the minimum requirement of LVMC Title 19 applicable Master Plan Development standards and/or Conditions of Approval. Make No Change Without Approval. Plan is Not a Permit to Violate Any Ordinance.

FMP.

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
    - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Worksheet for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	4.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.29 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.1 ft²
Wetted Perimeter	10.37 ft
Hydraulic Radius	0.10 ft
Top Width	10.28 ft
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Critical Slope	0.73 %
Velocity	3.70 ft/s
Velocity Head	0.21 ft
Specific Energy	0.51 ft
Froude Number	2.012
Flow Type	Supercritical

Worksheet for D-1 (Half Street)

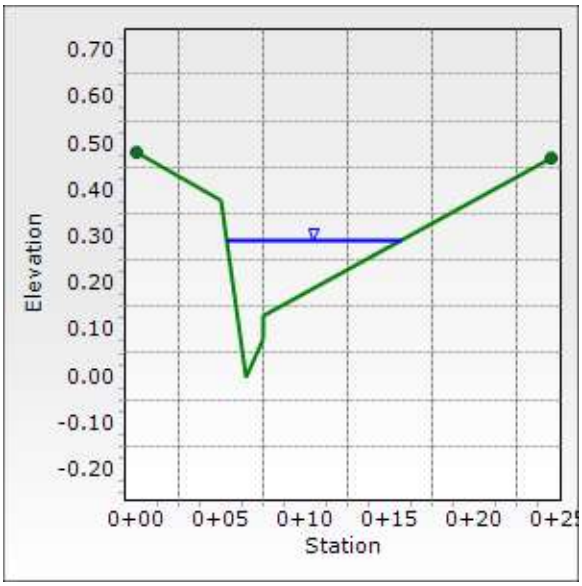
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Channel Slope	3.25 %
Critical Slope	0.73 %

Cross Section for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.29 ft
Discharge	4.00 cfs



Worksheet for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	7.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.35 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.7 ft²
Wetted Perimeter	13.42 ft
Hydraulic Radius	0.13 ft
Top Width	13.33 ft
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Critical Slope	0.70 %
Velocity	4.29 ft/s
Velocity Head	0.29 ft
Specific Energy	0.64 ft
Froude Number	2.089
Flow Type	Supercritical

Worksheet for D-3B (Half Street)

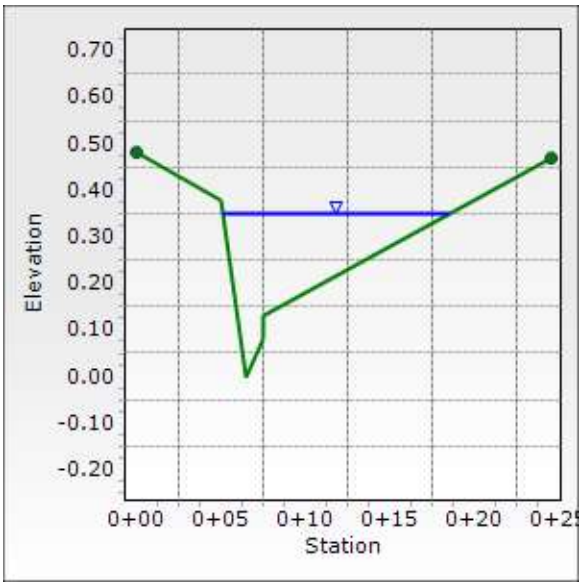
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Channel Slope	3.25 %
Critical Slope	0.70 %

Cross Section for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.35 ft
Discharge	7.50 cfs



Worksheet for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	0.53 ft
Flow Area	0.8 ft²
Wetted Perimeter	3.35 ft
Hydraulic Radius	0.25 ft
Top Width	3.18 ft
Critical Depth	0.49 ft
Critical Slope	1.56 %
Velocity	2.37 ft/s
Velocity Head	0.09 ft
Specific Energy	0.62 ft
Froude Number	0.811
Flow Type	Subcritical

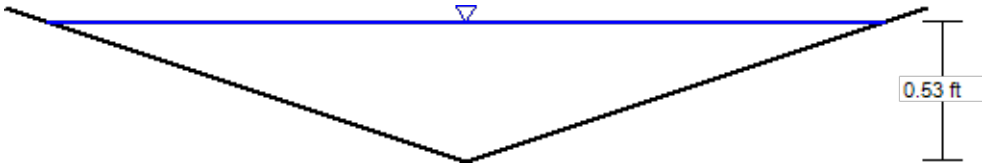
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

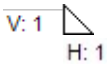
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.53 ft
Critical Depth	0.49 ft
Channel Slope	1.00 %
Critical Slope	1.56 %

Cross Section for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.53 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs





Worksheet for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs

Results	
Normal Depth	0.62 ft
Flow Area	1.1 ft²
Wetted Perimeter	3.91 ft
Hydraulic Radius	0.29 ft
Top Width	3.71 ft
Critical Depth	0.57 ft
Critical Slope	1.48 %
Velocity	2.62 ft/s
Velocity Head	0.11 ft
Specific Energy	0.72 ft
Froude Number	0.832
Flow Type	Subcritical

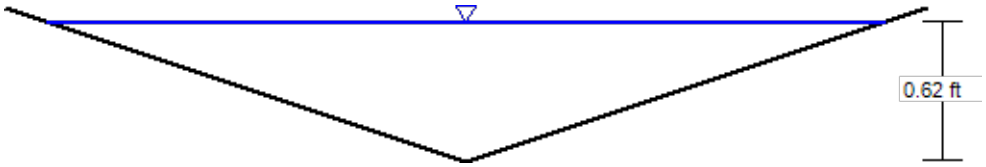
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

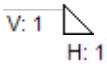
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.62 ft
Critical Depth	0.57 ft
Channel Slope	1.00 %
Critical Slope	1.48 %

Cross Section for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.62 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs





Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED MAINLINE - Connect to 42" RCP in Log Cabin Way to Street V to Street N

DATE: 06/30/20 FILE: SF6.xls

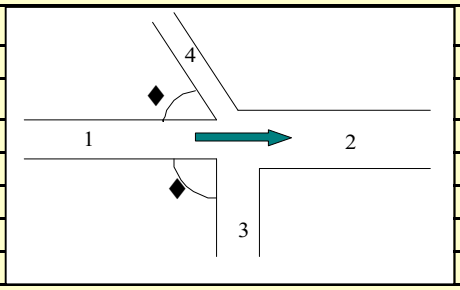
Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		42			54.11																					Outlet K_o=	1.0									62.16	61.45		
1000.00	1053.57	R	42	1	54.11	57.23	53.6	5.83%	9.62	0.0049	65.0	6.76	0.71	0.0042	0.0042	0.22																		0.00	62.38	61.67			FULL	U/S
1053.57	1058.57	T	42	1	57.23	57.40	5.0	3.29%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0038		0.02	30	0.22	0.16	45	0.50	0.42											0.59			62.97	62.39	FULL	U/S
1058.57	1150.00	R	42	1	57.40	58.04	91.4	0.70%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0034	0.31																		0.00	63.29	62.70			FULL	U/S
1150.00	1155.00	T	30	1	58.04	59.08	5.0	20.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0068		0.03	0	0.02	0.01	90	0.25	0.31											0.35			63.64	62.53	FULL	U/S
1155.00	1184.29	R	30	1	59.08	59.28	29.3	0.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0102	0.30																		0.00	63.94	62.83			FULL	U/S
1184.29	1189.29	T	30	1	59.28	59.32	5.0	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0092		0.05	0	0.02	0.02													0.43	0.50			64.44	63.55	FULL	U/S
1189.29	1375.21	R	30	1	59.32	60.62	185.9	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0081	1.51																		0.00	65.95	65.06			FULL	U/S
1375.21	1380.21	T	30	1	60.62	60.66	5.0	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0071		0.04	3	0.02	0.02	90	0.25	0.72											0.77			66.72	66.06	FULL	U/S
1380.21	1608.96	R	30	1	60.66	62.25	228.8	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0061	1.39																		0.00	68.10	67.44			FULL	U/S
1608.96	1613.96	T	30	1	62.25	62.29	5.0	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0049		0.02	0	0.02	0.01	90	0.25	0.56											0.60			68.70	68.30	FULL	U/S
1613.96	1646.18	R	30	1	62.29	62.51	32.2	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0037	0.12																		0.00	68.82	68.42			FULL	U/S
1646.18	1651.18	T	30	1	62.51	62.57	5.0	1.10%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0030		0.01	0	0.02	0.01													0.30	0.32			69.14	68.90	FULL	U/S
1651.18	1838.06	R	30	1	62.57	63.87	186.9	0.70%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0023	0.42																		0.00	69.56	69.32			FULL	U/S
1838.06	1843.06	T	24	1	63.87	64.41	5.0	10.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0033		0.02	90	1.33	0.33														0.34			69.91	69.55	FULL	U/S
1843.06	1892.02	R	24	1	64.41	64.75	49.0	0.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0044	0.21																		0.00	70.12	69.77			FULL	U/S
1892.02	1897.02	T	18	1	64.75	65.32	5.0	11.29%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0047		0.02	45	0.46	0.16	45	0.50	0.21											0.40			70.52	70.24	FULL	U/S
1897.02	1917.48	R	18	1	65.32	65.70	20.5	1.89%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.10																		0.00	70.63	70.35			FULL	U/S
1917.48	1922.48	T	18	1	65.70	66.08	5.0	7.44%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	0	0.02	0.01	45	0.50	0.22											0.24			70.87	70.74	FULL	U/S
1922.48	1923.98	R	18	1	66.08	66.27	1.5	13.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	70.87	70.75			FULL	U/S
1923.98	1923.98	R	18	1	66.27	66.27	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			70.98	70.98	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	37
Flow in Pipe 2 (cfs)	42
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	44
Angle of Pipe 4*	42



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77
Head Loss at Junction (ft)	**0.43**

Equation Used:

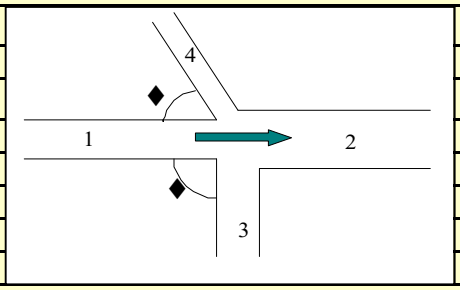
Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	19
Flow in Pipe 2 (cfs)	25
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	4
Angle of Pipe 3	44
Angle of Pipe 4*	46



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**0.30**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Mainline - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	54.11	57.61	62.16	61.45	64.03	EXDI	OK	NO
1053.57	57.23	60.73	62.38	61.67	66.82	DI02	OK	NO
1058.57	57.40	60.90	62.97	62.39	66.82	DI02	OK	NO
1150.00	58.04	61.54	63.29	62.70	68.12	SDMH01	OK	NO
1155.00	59.08	61.58	63.64	62.53	68.12	SDMH01	OK	NO
1184.29	59.28	61.78	63.94	62.83	68.36	SDMH07	OK	NO
1189.29	59.32	61.82	64.44	63.55	68.36	SDMH07	OK	NO
1375.21	60.62	63.12	65.95	65.06	69.66	SDMH08	OK	NO
1380.21	60.66	63.16	66.72	66.06	69.66	SDMH08	OK	NO
1608.96	62.25	64.75	68.10	67.44	71.33	SDMH10	OK	NO
1613.96	62.29	64.79	68.70	68.30	71.33	SDMH10	OK	NO
1646.18	62.51	65.01	68.82	68.42	71.59	SDMH12	OK	NO
1651.18	62.57	65.07	69.14	68.90	71.59	SDMH12	OK	NO
1838.06	63.87	66.37	69.56	69.32	72.93	SDMH13	OK	NO
1843.06	64.41	66.41	69.91	69.55	72.93	SDMH13	OK	NO
1892.02	64.75	66.75	70.12	69.77	73.54	SDMH14	OK	NO
1897.02	65.32	66.82	70.52	70.24	73.54	SDMH14	OK	NO
1917.48	65.70	67.20	70.63	70.35	73.45	DI23	OK	NO
1922.48	66.08	67.58	70.87	70.74	73.45	DI23	OK	NO
1923.98	66.27	67.77	70.87	70.75	73.55	DI24	OK	NO
1923.98	66.27	67.77	70.98	70.98	73.55	DI24	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH 01 (Street S Mainline)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

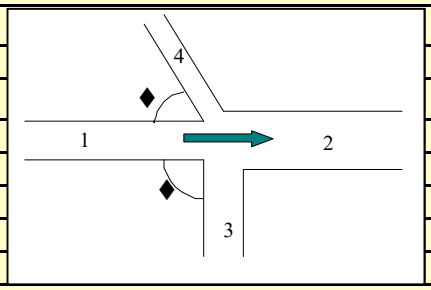
CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S										H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		24			59.27																					Outlet K_o=	1.0									63.18	62.70		
1000.00	1060.50	R	24	1	59.27	59.69	60.5	0.70%	3.14	0.0049	17.5	5.57	0.48	0.0060	0.0060	0.36																		0.00	63.54	63.06			FULL	U/S
1060.50	1065.50	T	18	1	59.69	60.30	5.0	12.06%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0090		0.04	0	0.02	0.01													1.60	1.66			65.20	64.54	FULL	U/S
1065.50	1376.74	R	18	1	60.30	70.98	311.2	3.43%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0119	3.72																		0.00	73.14	72.48			PART	D/S
1376.74	1381.74	T	18	1	70.98	71.15	5.0	3.22%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0092		0.05	0	0.02	0.01	47	0.50	0.48											0.54			73.68	73.32	FULL	U/S
1381.74	1466.74	R	18	1	71.15	73.70	85.0	3.01%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0065	0.55																		0.00	75.56	75.20			PART	D/S
1466.74	1471.74	T	18	1	73.70	73.86	5.0	3.01%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0040		0.02	0	0.02	0.01	45	0.50	0.32											0.35			75.91	75.83	FULL	U/S
1471.74	1624.74	R	18	1	73.86	78.45	153.0	3.00%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.22																		0.00	80.02	79.95			PART	D/S
1624.74	1629.74	T	18	1	78.45	78.54	5.0	1.85%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014		0.01	45	0.46	0.04														0.04			80.12	80.04	FULL	D/S
1629.74	1661.74	R	18	1	78.54	78.76	32.0	0.70%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.05																		0.00	80.34	80.26			FULL	D/S
1661.74	1666.74	T	18	1	78.76	78.81	5.0	0.86%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0009		0.00	88	1.33	0.11	0	0.85	0.06											0.17			80.52	80.50	FULL	U/S
1666.74	1690.62	R	18	1	78.81	79.05	23.9	1.02%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	80.57	80.55			FULL	D/S
1690.62	1690.62	R	18	1	79.05	79.05	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.59	80.59	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	18.0
Diameter of Pipe 2 (in)	18.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	12
Flow in Pipe 2 (cfs)	18
Flow in Pipe 3 (cfs)	3
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	45
Angle of Pipe 4*	45

*Optional



Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	1.77
Area of Pipe 2 (ft^2)	1.77
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**1.60**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

SDMH 01 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	59.27	61.27	63.18	62.70	68.12	SDMH01	OK	NO
1060.50	59.69	61.69	63.54	63.06	68.99	SDMH02	OK	NO
1065.50	60.30	61.80	65.20	64.54	68.99	SDMH02	OK	NO
1376.74	70.98	72.48	73.14	72.48	79.28	SDMH03	OK	NO
1381.74	71.15	72.65	73.68	73.32	79.28	SDMH03	OK	NO
1466.74	73.70	75.20	75.56	75.20	82.19	SDMH04	OK	NO
1471.74	73.86	75.36	75.91	75.83	82.19	SDMH04	OK	NO
1624.74	78.45	79.95	80.02	79.95	87.14	SDMH05	OK	NO
1629.74	78.54	80.04	80.12	80.04	87.14	SDMH05	OK	NO
1661.74	78.76	80.26	80.34	80.26	87.61	SDMH06	OK	NO
1666.74	78.81	80.31	80.52	80.50	87.61	SDMH06	OK	NO
1690.62	79.05	80.55	80.57	80.55	86.86	DI08	OK	NO
1690.62	79.05	80.55	80.59	80.59	86.86	DI08	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0											64.58	64.54		
1000.00	1025.89	R	18	1	60.21	60.47	25.9	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.61	64.56			FULL	U/S
1025.89	1025.89	R	18	1	60.47	60.47	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.65	64.65	FULL	U/S

SDMH 02 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.99	SDMH02	OK	NO
1025.89	60.47	61.97	64.61	64.56	68.87	DI03	OK	NO
1025.89	60.47	61.97	64.65	64.65	68.87	DI03	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 South

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0									64.58	64.54		
1000.00	1021.46	R	18	1	60.21	60.53	21.5	1.50%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.60	64.56			FULL	U/S
1021.46	1021.46	R	18	1	60.53	60.53	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.64	64.64	FULL	U/S

SDMH 02 South - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.32	SDMH02	OK	NO
1021.46	60.53	62.03	64.60	64.56	68.62	DI04	OK	NO
1021.46	60.53	62.03	64.64	64.64	68.62		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH03

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			71.07																					Outlet K_o=	1.0									73.36	73.32		
1000.00	1025.18	R	18	1	71.07	71.69	25.2	2.46%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																			0.00	73.39	73.34			FULL	U/S
1025.18	1025.18	R	18	1	71.69	71.69	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			73.43	73.43	FULL	U/S

SDMH 03 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	71.07	72.57	73.36	73.32	79.28	SDMH03	OK	NO
1025.18	71.69	73.19	73.39	73.34	79.38	DI05	OK	NO
1025.18	71.69	73.19	73.43	73.43	79.38	DI05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH04

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			73.78																					Outlet K_o=	1.0										75.93	75.83		
1000.00	1024.63	R	18	1	73.78	74.82	24.6	4.22%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.05																		0.00	76.42	76.32			PART	D/S
1024.63	1024.63	R	18	1	74.82	74.82	0.0		1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.00					45	0.50	0.05	Ki=	0.4	0.04								0.09			76.51	76.51	FULL	U/S

SDMH 04 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	73.78	75.28	75.93	75.83	82.19	SDMH04		OK	NO
1024.63	74.82	76.32	76.42	76.32	81.93	DI06		OK	NO
1024.63	74.82	76.32	76.51	76.51	81.93	DI06		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH06 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			78.78																					Outlet K_o=	1.0											80.52	80.50		
1000.00	1026.38	R	18	1	78.78	79.41	26.4	2.39%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																			0.00	80.93	80.91			PART	D/S
1026.38	1026.38	R	18	1	79.41	79.41	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.95	80.95	FULL	U/S

SDMH 06 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	78.78	80.28	80.52	80.50	87.61	SDMH06	OK	NO
1026.38	79.41	80.91	80.93	80.91	87.72	DI07	OK	NO
1026.38	79.41	80.91	80.95	80.95	87.72	DI07	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.30																					Outlet K_o=	1.0											63.57	63.55		
1000.00	1026.56	R	18	1	60.30	60.96	26.6	2.49%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	63.58	63.56			FULL	U/S
1026.56	1026.56	R	18	1	60.96	60.96	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			63.60	63.60	FULL	U/S

SDMH 07 East - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.57	63.55	68.36	SDMH07	OK	NO
1026.56	60.96	62.46	63.58	63.56	67.77	DI09	OK	NO
1026.56	60.96	62.46	63.60	63.60	67.77	DI09	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			60.30																					Outlet K_o=	1.0										63.58	63.55		
1000.00	1024.39	R	18	1	60.30	60.79	24.4	2.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	63.59	63.56			FULL	U/S
1024.39	1029.39	T	18	1	60.79	61.39	5.0	11.90%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0004		0.00	42	0.32	0.01	45	0.50	0.02											0.04			63.63	63.61	FULL	U/S
1029.39	1030.89	R	18	1	61.39	61.40	1.5	1.00%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00																	0.00	63.63	63.61			FULL	U/S
1030.89	1030.89	R	18	1	61.40	61.40	0.0		1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00					45	0.50	0.01	Ki=	0.4	0.01							0.01			63.64	63.64	FULL	U/S

SDMH 07 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.58	63.55	68.36	SDMH07	OK	NO
1024.39	60.79	62.29	63.59	63.56	67.65	DI10	OK	NO
1029.39	61.39	62.89	63.63	63.61	67.65	DI10	OK	NO
1030.89	61.40	62.90	63.63	63.61	67.68	DI11	OK	NO
1030.89	61.40	62.90	63.64	63.64	67.68	DI11	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH08 (Street R)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)=	0.013	Inlet Structure Type or K_i=	D	Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			61.64																					Outlet K_o=	1.0									66.18	66.06		
1000.00	1061.30	R	18	1	61.64	62.07	61.3	0.70%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.14																		0.00	66.32	66.20			FULL	U/S
1061.30	1066.30	T	18	1	62.07	62.32	5.0	5.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0014		0.01	45	0.46	0.06	45	0.50	0.11											0.17			66.50	66.46	FULL	U/S
1066.30	1089.25	R	18	1	62.32	64.45	23.0	9.31%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	66.51	66.48			FULL	U/S
1089.25	1089.25	R	18	1	64.45	64.45	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 08 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	61.64	63.14	66.18	66.06	69.66	SDMH08	OK	NO
1061.30	62.07	63.57	66.32	66.20	70.59	SDMH09	OK	NO
1066.30	62.32	63.82	66.50	66.46	70.59	SDMH09	OK	NO
1089.25	64.45	65.95	66.51	66.48	70.33	DI13	OK	NO
1089.25	64.45	65.95	66.54	66.54	70.33	DI13	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH09 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			62.08																					Outlet K_o=	1.0									66.49	66.46		
1000.00	1028.34	R	18	1	62.08	62.47	28.3	1.35%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.02																		0.00	66.51	66.48			FULL	U/S
1028.34	1028.34	R	18	1	62.47	62.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 09 North- Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	62.08	63.58	66.49	66.46	70.59	SDMH09	OK	NO
1028.34	62.47	63.97	66.51	66.48	70.46	DI12	OK	NO
1028.34	62.47	63.97	66.54	66.54	70.46	DI12	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH10

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.27																					Outlet K_o=	1.0								68.54	68.30		
1000.00	1058.50	R	18	1	63.27	63.68	58.5	0.70%	1.77	0.0049	7.0	3.96	0.24	0.0044	0.0044	0.26																		0.00	68.80	68.56			FULL	U/S
1058.50	1063.50	T	18	1	63.68	63.72	5.0	0.78%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0028		0.01	0	0.02	0.00	45	0.50	0.21												0.23			69.03	68.97	FULL	U/S
1063.50	1083.50	R	18	1	63.72	63.89	20.0	0.84%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.06	69.00			FULL	U/S
1083.50	1088.50	T	18	1	63.89	64.46	5.0	11.32%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	47	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1088.50	1090.00	R	18	1	64.46	64.47	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1090.00	1090.00	R	18	1	64.47	64.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 10 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.27	64.77	68.54	68.30	71.33	SDMH10	OK	NO
1058.50	63.68	65.18	68.80	68.56	72.15	SDMH11	OK	NO
1063.50	63.72	65.22	69.03	68.97	72.15	SDMH11	OK	NO
1083.50	63.89	65.39	69.06	69.00	71.89	DI16	OK	NO
1088.50	64.46	65.96	69.13	69.10	71.89	DI16	OK	NO
1090.00	64.47	65.97	69.13	69.10	72.02	DI7	OK	NO
1090.00	64.47	65.97	69.16	69.16	72.02	DI7	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH11 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.70																					Outlet K_o=	1.0												
1000.00	1018.50	R	18	1	63.70	65.32	18.5	8.77%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.05	68.99			FULL	U/S
1018.50	1023.50	T	18	1	65.32	65.57	5.0	4.84%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	51	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1023.50	1025.00	R	18	1	65.57	65.58	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1025.00	1025.00	R	18	1	65.58	65.58	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 11 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.70	65.20	69.03	68.97	72.15	SDMH11	OK	NO
1018.50	65.32	66.82	69.05	68.99	71.68	DI14	OK	NO
1023.50	65.57	67.07	69.13	69.10	71.68	DI14	OK	NO
1025.00	65.58	67.08	69.13	69.10	71.80	DI15	OK	NO
1025.00	65.58	67.08	69.16	69.16	71.80	DI15	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			63.55																					Outlet K_o=	1.0									68.92	68.90		
1000.00	1026.16	R	18	1	63.55	64.20	26.2	2.48%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	68.93	68.91			FULL	U/S
1026.16	1026.16	R	18	1	64.20	64.20	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			68.95	68.95	FULL	U/S

SDMH 12 East - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	63.55	65.05	68.92	68.90	71.59	SDMH12	Connect to Mainline	OK	NO
1026.16	64.20	65.70	68.93	68.91	71.00	DI18	Eastern DI	OK	NO
1026.16	64.20	65.70	68.95	68.95	71.00	DI18	Eastern DI	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.55																					Outlet K_o=	1.0									68.96	68.90		
1000.00	1022.68	R	18	1	63.55	64.02	22.7	2.07%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.03																		0.00	68.99	68.93			FULL	U/S
1022.68	1027.68	T	18	1	64.02	64.62	5.0	11.93%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0007		0.00	46	0.46	0.03	45	0.50	0.05												0.08			69.07	69.05	FULL	U/S
1027.68	1029.18	R	18	1	64.62	64.63	1.5	1.00%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00																		0.00	69.07	69.05			FULL	U/S
1029.18	1029.18	R	18	1	64.63	64.63	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01									0.02			69.09	69.09	FULL	U/S

SDMH 12 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.55	65.05	68.96	68.90	71.59	SDMH12	OK	NO
1022.68	64.02	65.52	68.99	68.93	70.87	DI19	OK	NO
1027.68	64.62	66.12	69.07	69.05	70.87	DI19	OK	NO
1029.18	64.63	66.13	69.07	69.05	70.89	DI20	OK	NO
1029.18	64.63	66.13	69.09	69.09	70.89	DI20	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH13

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			64.89																															69.65	69.55		
																												Outlet K_o=		1.0										
1000.00	1166.50	R	18	1	64.89	66.05	166.5	0.70%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.30																		0.00	69.96	69.85			FULL	U/S
1166.50	1171.50	T	18	1	66.05	66.09	5.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0013		0.01	5	0.05	0.00	66	0.33	0.09											0.09			70.05	70.01	FULL	U/S
1171.50	1297.50	R	18	1	66.09	66.97	126.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.10																		0.00	70.15	70.11			FULL	U/S
1297.50	1302.50	T	18	1	66.97	67.02	5.0	0.85%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008		0.00	90	1.33	0.06														0.06			70.22	70.17	FULL	U/S
1302.50	1390.00	R	18	1	67.02	67.89	87.5	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.07																		0.00	70.29	70.24			FULL	U/S
1390.00	1390.00	R	18	1	67.89	67.89	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02									0.04			70.33	70.33	FULL	U/S

SDMH 13 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	64.89	66.39	69.65	69.55	72.93	SDMH13	C4.12	OK	NO
1166.50	66.05	67.55	69.96	69.85	74.12	SDMH15	C4.12	OK	NO
1171.50	66.09	67.59	70.05	70.01	74.12	SDMH15	C4.12	OK	NO
1297.50	66.97	68.47	70.15	70.11	75.21	SDMH16	C4.12	OK	NO
1302.50	67.02	68.52	70.22	70.17	75.21	SDMH16	C4.05	OK	NO
1390.00	67.89	69.39	70.29	70.24	72.56	DI27	C4.05	OK	NO
1390.00	67.89	69.39	70.33	70.33	72.56	DI27	C4.05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH14 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			65.27																					Outlet K_o=	1.0									70.52	70.24		
1000.00	1022.50	R	18	1	65.27	67.22	22.5	8.66%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.11																		0.00	70.63	70.35			FULL	U/S
1022.50	1027.50	T	18	1	67.22	67.46	5.0	4.74%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	52	0.46	0.13	45	0.50	0.22											0.36			71.00	70.87	FULL	U/S
1027.50	1029.00	R	18	1	67.46	67.47	1.5	1.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	71.00	70.88			FULL	U/S
1029.00	1029.00	R	18	1	67.47	67.47	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			71.11	71.11	FULL	U/S

SDMH 14 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	65.27	66.77	70.52	70.24	73.54	SDMH14	OK	NO
1022.50	67.22	68.72	70.63	70.35	73.37	DI21	OK	NO
1027.50	67.46	68.96	71.00	70.87	73.37	DI21	OK	NO
1029.00	67.47	68.97	71.00	70.88	73.49	DI22	OK	NO
1029.00	67.47	68.97	71.11	71.11	73.49	DI22	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH15 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			66.07																					Outlet K_o=	1.0									70.02	70.01		
1000.00	1020.16	R	18	1	66.07	66.52	20.2	2.23%	1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00																		0.00	70.03	70.01			FULL	U/S
1020.16	1020.16	R	18	1	66.52	66.52	0.0		1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00					45	0.50	0.01	Ki=	0.4	0.00								0.01			70.04	70.04	FULL	U/S

SDMH 15 West - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	66.07	67.57	70.02	70.01	74.12	SDMH15	C5.1	OK	NO
1020.16	66.52	68.02	70.03	70.01	73.33	DI26	C5.1	OK	NO
1020.16	66.52	68.02	70.04	70.04	73.33	DI26	C5.1	OK	NO

Worksheet for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

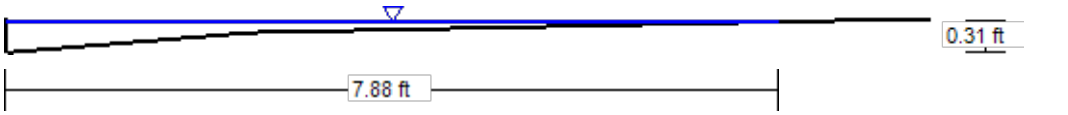
Options	
Grate Flow Option	Exclude None

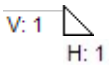
Results	
Efficiency	75.91 %
Intercepted Flow	3.04 cfs
Bypass Flow	0.96 cfs
Spread	7.88 ft
Depth	0.31 ft
Flow Area	0.8 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	4.95 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.038
Grate Flow Ratio	0.750
Active Grate Length	1.13 ft

Cross Section for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	75.91 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

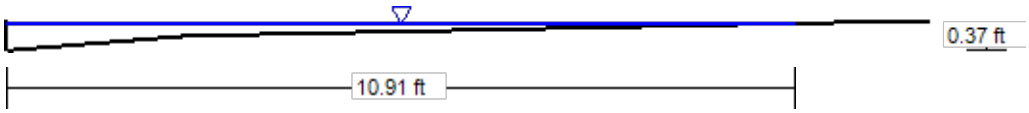
Options	
Grate Flow Option	Exclude None

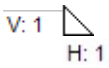
Results	
Efficiency	60.95 %
Intercepted Flow	4.57 cfs
Bypass Flow	2.93 cfs
Spread	10.91 ft
Depth	0.37 ft
Flow Area	1.4 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.44 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.032
Grate Flow Ratio	0.597
Active Grate Length	1.13 ft

Cross Section for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	60.95 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

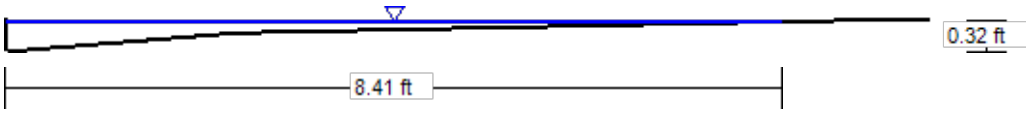


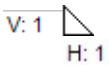


Cross Section for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	73.03 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	73.03 %
Intercepted Flow	3.29 cfs
Bypass Flow	1.21 cfs
Spread	8.41 ft
Depth	0.32 ft
Flow Area	0.9 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.03 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.037
Grate Flow Ratio	0.720
Active Grate Length	1.13 ft

Sunstone Parcel D - Technical Drainage Study								
LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
1	85.50	85.70	84.74	0.60	0.30	-0.42	D-7A2	Street L, 1 course solid grout
1	85.50	83.51	81.72	0.76	0.36	1.65	D-7A1	Street N
2	83.70	81.72	80.09	0.76	0.36	1.64	D-7A1	Street N
3	82.10	80.09	78.47	0.76	0.36	1.67	D-7A1	Street N
4	80.50	78.47	77.00	0.76	0.36	1.69	D-7A1	Street N
5	79.00	77.00	75.44	0.76	0.36	1.66	D-7A1	Street N
6	75.60	75.44	73.37	0.76	0.36	-0.18	D-7B	Street N, 1 course solid grout
6	75.60	73.49	73.13	0.76	0.36	1.77	D-7B	Street V
7	76.00	73.76	73.49	0.76	0.36	1.90	D-7B	Street V
8	76.30	74.09	73.76	0.76	0.36	1.87	D-7B	Street V
9	76.60	74.53	74.09	0.76	0.30	1.85	D-6A	Street V
10	76.90	75.35	74.53	0.76	0.30	1.33	D-6A	Street V
10	76.90	78.05	76.19	0.76	0.30	-1.37	D-6A	Street M, 3 course solid grout
11	81.50	79.27	78.05	0.76	0.30	2.01	D-6A	Street M
12	82.80	80.45	79.27	0.76	0.30	2.13	D-6A	Street M
13	84.00	81.96	80.45	0.76	0.30	1.82	D-6A	Street M
14	84.90	82.79	81.96	0.76	0.30	1.89	D-6A	Street M
15	85.90	83.26	82.79	0.76	0.30	2.42	D-6A	Street M
15	85.90	86.22	85.70	0.60	0.30	-0.54	D-7A2	Street L, 1 course solid grout
16	85.90	83.26	82.22	0.76	0.28	2.46	D-6B	Street M
16	85.90	86.64	86.22	0.60	0.30	-0.96	D-7A2	Street L, 2 course solid grout
16	85.90	83.64	80.21	0.98	0.49	1.66	OH3*	O'Hare Road
17	84.40	82.22	81.41	0.76	0.28	2.00	D-6B	Street M
17	84.40	82.00	80.21	0.98	0.49	1.80	OH3*	O'Hare Road
18	83.40	81.41	80.25	0.76	0.28	1.81	D-6B	Street M
18	83.40	80.21	76.45	0.98	0.49	2.59	OH3*	O'Hare Road
19	82.30	80.25	79.13	0.76	0.28	1.87	D-6B	Street M
19	82.30	80.21	76.45	0.98	0.49	1.49	OH3*	O'Hare Road
20	81.10	79.13	78.00	0.76	0.28	1.79	D-6B	Street M
20	81.10	76.45	73.96	0.98	0.49	4.05	OH3*	O'Hare Road
21	80.00	78.00	76.88	0.76	0.28	1.82	D-6B	Street M
21	80.00	76.45	73.96	0.98	0.49	2.95	OH3*	O'Hare Road
22	78.90	76.88	75.75	0.76	0.28	1.84	D-6B	Street M
22	78.90	73.96	72.76	0.98	0.49	4.34	OH3*	O'Hare Road
23	77.80	75.75	74.63	0.76	0.28	1.87	D-6B	Street M
23	77.80	72.76	70.09	0.98	0.49	4.44	OH3*	O'Hare Road
24	76.60	74.63	73.63	0.76	0.28	1.79	D-6B	Street M
24	76.60	72.76	70.09	0.98	0.49	3.24	OH3*	O'Hare Road
25	75.60	73.63	72.94	0.76	0.28	1.79	D-6B	Street M
25	75.60	70.09	69.24	0.98	0.49	4.91	OH3*	O'Hare Road
26	76.90	74.21	72.96	0.76	0.28	2.51	D-6B	Street M
26	76.90	74.69	74.46	0.76	0.33	1.93	D-10	Street V
27	76.60	74.46	74.15	0.76	0.33	1.86	D-10	Street V
28	76.30	74.15	73.83	0.76	0.33	1.87	D-10	Street V
29	76.00	73.83	73.53	0.76	0.33	1.89	D-10	Street V
30	75.70	73.53	73.21	0.76	0.33	1.89	D-10	Street V
31	75.40	73.21	72.90	0.76	0.33	1.91	D-10	Street V
32	75.00	72.90	72.58	0.76	0.33	1.82	D-10	Street V
33	74.70	72.58	72.26	0.76	0.33	1.84	D-10	Street V
34	74.40	72.26	71.95	0.76	0.33	1.86	D-10	Street V
35	74.10	71.95	71.63	0.76	0.33	1.87	D-10	Street V
36	73.80	71.63	71.32	0.76	0.35	1.85	D-11	Street V
37	73.50	71.32	71.00	0.76	0.35	1.86	D-11	Street V
38	73.10	71.00	70.69	0.76	0.35	1.78	D-11	Street V
39	72.80	70.69	70.37	0.76	0.35	1.79	D-11	Street V
40	72.50	70.37	70.06	0.76	0.35	1.81	D-11	Street V
41	72.20	70.06	69.74	0.76	0.35	1.82	D-11	Street V
42	71.90	69.74	69.44	0.76	0.35	1.84	D-11	Street V
43	71.60	69.44	69.13	0.76	0.35	1.84	D-11	Street V
44	71.30	69.13	68.81	0.76	0.35	1.85	D-11	Street V
45	71.00	68.81	68.50	0.76	0.35	1.87	D-11	Street V
46	70.60	68.50	68.18	0.76	0.33	1.82	D-4B	Street V
47	70.30	68.18	67.87	0.76	0.33	1.84	D-4B	Street V
48	70.00	67.87	67.55	0.76	0.33	1.85	D-4B	Street V

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
49	69.70	67.55	67.41	0.76	0.33	1.87	D-4B	Street V
49	69.70	64.41	64.13	0.70	0.35	4.97	LC7a*	Log Cabin Way
50	70.60	67.74	67.41	0.76	0.33	2.58	D-4B	Street V
50	70.60	69.50	68.35	0.76	0.30	0.88	D-4A	Street S
50	70.60	66.03	64.41	0.70	0.35	4.25	LC7a*	Log Cabin Way
51	73.00	68.25	66.03	0.70	0.35	4.43	LC7a*	Log Cabin Way
51	73.00	70.97	69.50	0.76	0.30	1.81	D-4A	Street S
52	74.40	68.25	66.03	0.70	0.35	5.83	LC7a*	Log Cabin Way
52	74.40	72.43	70.97	0.76	0.30	1.75	D-4A	Street S
53	75.90	73.08	69.21	0.70	0.35	2.50	LC7a*	Log Cabin Way
53	75.90	73.89	72.43	0.76	0.30	1.79	D-4A	Street S
54	76.40	73.08	69.21	0.70	0.35	3.00	LC7a*	Log Cabin Way
54	76.40	75.37	73.89	0.76	0.30	0.81	D-4A	Street S
55	78.90	76.92	73.08	0.70	0.35	1.66	LC7a*	Log Cabin Way
55	78.90	76.84	75.37	0.76	0.30	1.84	D-4A	Street S
56	80.30	76.92	73.08	0.70	0.35	3.06	LC7a*	Log Cabin Way
56	80.30	78.30	76.84	0.76	0.30	1.78	D-4A	Street S
57	81.80	76.92	73.08	0.70	0.35	4.56	LC7a*	Log Cabin Way
57	81.80	79.76	78.30	0.76	0.30	1.82	D-4A	Street S
58	83.20	80.79	76.92	0.70	0.35	2.09	LC7a*	Log Cabin Way
58	83.20	81.21	79.76	0.76	0.30	1.77	D-1	Street S
59	84.70	80.79	76.92	0.70	0.35	3.59	LC7a*	Log Cabin Way
59	84.70	82.67	81.21	0.76	0.30	1.81	D-1	Street S
60	86.10	84.62	80.79	0.70	0.35	1.16	LC7a*	Log Cabin Way
60	86.10	84.13	82.67	0.76	0.30	1.75	D-1	Street S
61	87.50	84.62	80.79	0.70	0.35	2.56	LC7a*	Log Cabin Way
61	87.50	85.52	84.13	0.76	0.30	1.76	D-1	Street S
62	88.90	86.00	84.62	0.70	0.35	2.58	LC7a*	Log Cabin Way
62	88.90	86.87	85.52	0.76	0.30	1.81	D-1	1 course solid grout along common element
63	91.30	89.00	87.00	0.74	0.37	1.94	LC6*	Log Cabin Way
63	91.30	89.27	87.92	0.76	0.30	1.81	D-1	Street S
64	92.60	91.00	88.45	0.74	0.37	1.24	LC6*	Log Cabin Way
64	92.60	90.62	89.27	0.76	0.30	1.76	D-1	Street S
65	94.00	92.28	90.00	1.00	0.37	1.36	LC6*	Log Cabin Way
65	94.00	91.97	90.62	0.76	0.30	1.81	D-1	Street S
66	95.30	94.50	92.28	0.74	0.37	0.44	LC6*	Log Cabin Way,
66	95.30	93.32	91.97	0.76	0.30	1.76	D-1	Street S
67	96.70	96.00	94.12	0.74	0.37	0.34	LC6*	Log Cabin Way
67	96.70	94.67	93.32	0.76	0.30	1.81	D-1	Street S
68	98.00	97.00	95.40	0.74	0.37	0.64	LC6*	Log Cabin Way
68	98.00	96.02	94.67	0.76	0.30	1.76	D-1	Street S
69	99.40	98.13	97.00	0.74	0.37	0.91	LC6*	Log Cabin Way
69	99.40	97.37	96.02	0.76	0.30	1.81	D-1	Street S
70	100.70	98.60	98.13	0.74	0.37	1.74	LC6*	Log Cabin Way
70	100.70	98.38	97.37	0.76	0.30	2.10	D-1	Street S
70	100.70	100.00	99.50	1.06	0.53	0.02	SW-1	Paseo, 3 course solid grout
71	98.20	98.09	96.37	0.76	0.35	-0.21	D-3B	Street S, 1 course solid grout
71	98.20	95.97	95.79	0.76	0.27	2.07	D-2	Street T
71	98.20	101.43	101.09	1.06	0.53	-3.91	SW-1	Paseo, 3 course solid grout
72	98.40	96.23	95.97	0.76	0.27	2.01	D-2	Street T
72	98.40	102.00	101.43	1.06	0.53	-4.28	SW-1	Paseo, 3 course solid grout
73	98.70	96.56	96.23	0.76	0.27	1.98	D-2	Street T
73	98.70	102.35	102.00	1.06	0.53	-4.33	SW-1	Paseo, 3 course solid grout
74	99.00	96.83	96.56	0.76	0.27	2.01	D-2	Street T
74	99.00	103.00	102.35	1.06	0.53	-4.68	SW-1	Paseo, 3 course solid grout
75	99.30	97.13	96.56	0.76	0.27	2.01	D-2	Street T
75	99.30	103.00	103.00	1.06	0.53	-4.38	SW-1	Paseo, 3 course solid grout
76	99.60	97.45	97.13	0.76	0.27	1.99	D-2	Street T
76	99.60	103.95	103.00	1.06	0.53	-5.03	SW-1	Paseo, 3 course solid grout
77	99.90	97.72	97.45	0.76	0.27	2.02	D-2	Street T
77	99.90	104.26	103.95	1.06	0.53	-5.04	SW-1	Paseo, 3 course solid grout
78	100.20	98.02	97.72	0.76	0.27	2.02	D-2	Street T
78	100.20	104.26	104.00	1.24	0.62	-4.92	SW-2	Paseo, 3 course solid grout
79	100.50	98.22	98.02	0.76	0.27	2.12	D-2	Street T
79	100.50	104.00	103.41	1.24	0.62	-4.36	SW-2	Paseo, 3 course solid grout

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
80	100.60	98.22	98.16	0.76	0.27	2.22	D-5A	Street T
80	100.60	103.41	103.00	1.24	0.62	-3.67	SW-2	Paseo, 3 course solid grout
81	100.40	98.16	97.89	0.76	0.27	2.08	D-5A	Street T
81	100.40	103.00	102.52	1.24	0.62	-3.46	SW-2	Paseo, 3 course solid grout
82	100.10	97.89	97.60	0.76	0.27	2.05	D-5A	Street T
82	100.10	102.52	102.00	1.24	0.62	-3.28	SW-2	Paseo, 3 course solid grout
83	99.80	97.60	97.31	0.76	0.27	2.04	D-5A	Street T
83	99.80	102.00	101.50	1.24	0.62	-3.06	SW-2	Paseo, 3 course solid grout
84	99.50	97.31	97.01	0.76	0.27	2.03	D-5A	Street T
84	99.50	101.50	100.95	1.24	0.62	-2.86	SW-2	Paseo, 3 course solid grout
85	101.70	99.61	98.33	0.76	0.32	1.83	D-5B	Street N
85	101.70	100.95	100.00	1.24	0.62	-0.11	SW-2	Paseo, 3 course solid grout
86	100.30	98.33	97.19	0.76	0.32	1.71	D-5B	Street N
86	100.30	97.01	96.55	0.76	0.27	3.13	D-5A	Street T
87	101.70	99.61	98.27	0.76	0.32	1.83	D-5B	Street N
87	101.70	99.48	100.00	1.24	0.62	1.36	SW-2	Paseo, 3 course solid grout
88	100.30	98.27	96.80	0.76	0.32	1.77	D-5B	Street N
89	98.80	96.80	95.34	0.76	0.32	1.74	D-5B	Street N
90	97.40	95.34	93.88	0.76	0.32	1.80	D-5B	Street N
91	95.90	93.88	92.24	0.76	0.32	1.76	D-5B	Street N
91	95.90	92.16	91.45	0.76	0.28	3.56	D-5C	Street Y
92	97.60	95.39	92.16	0.76	0.28	2.03	D-5C	Street Y
93	98.50	96.56	95.39	0.76	0.28	1.76	D-5C	Street Y
94	99.40	97.31	96.56	0.76	0.28	1.91	D-5C	Street Y
95	100.40	98.09	97.31	0.76	0.28	2.13	D-5C	Street Y
95	100.40	100.00	97.25	1.24	0.62	-0.46	SW-2	Paseo, 3 course solid grout
96	100.00	98.09	96.86	0.76	0.28	1.73	D-5C	Street Y
96	100.00	94.18	87.14	0.98	0.49	5.22	OH3*	O'Hare Road
96	100.00	96.77	95.00	1.24	0.62	2.37	SW-2	Paseo, 3 course solid grout
97	98.80	96.86	96.00	0.76	0.28	1.76	D-5C	Street Y
97	98.80	94.18	87.14	0.98	0.49	4.02	OH3*	O'Hare Road
98	97.90	96.00	95.38	0.76	0.28	1.72	D-5C	Street Y
98	97.90	94.18	87.14	0.98	0.49	3.12	OH3*	O'Hare Road
99	97.50	95.38	94.92	0.76	0.28	1.94	D-5C	Street Y
99	97.50	94.18	87.14	0.98	0.49	2.72	OH3*	O'Hare Road
100	97.20	94.92	94.49	0.76	0.28	2.10	D-5C	Street Y
100	97.20	87.72	86.56	0.76	0.30	9.26	D-7A2	Street L
100	97.20	94.18	87.14	0.98	0.49	2.42	OH3*	O'Hare Road
101	96.50	94.49	93.94	0.76	0.28	1.83	D-5C	Street Y
101	96.50	87.72	87.44	0.76	0.30	8.56	D-7A2	Street L
102	95.80	93.94	93.20	0.76	0.28	1.68	D-5C	Street Y
102	95.80	87.44	87.10	0.76	0.30	8.14	D-7A2	Street L
103	95.00	93.20	92.48	0.76	0.28	1.62	D-5C	Street Y
103	95.00	87.10	86.87	0.76	0.30	7.68	D-7A2	Street L
104	94.30	92.48	91.76	0.76	0.28	1.64	D-5C	Street Y
104	94.30	86.87	86.54	0.76	0.30	7.21	D-7A2	Street L
105	93.60	91.76	90.22	0.76	0.28	1.66	D-5C	Street Y
105	93.60	89.21	86.81	0.76	0.32	4.13	D-5B	Street N
105	93.60	86.48	86.37	0.76	0.30	6.90	D-7A2	Street L
106	91.60	89.50	88.15	0.76	0.32	1.84	D-5B	Street N
107	92.70	90.71	89.50	0.76	0.32	1.73	D-5B	Street N
108	94.10	92.05	90.71	0.76	0.32	1.79	D-5B	Street N
109	95.50	93.48	92.05	0.76	0.32	1.76	D-5B	Street N
110	97.20	94.62	93.48	0.76	0.32	2.32	D-5B	Street N
110	97.20	97.01	95.50	0.76	0.27	0.03	D-5A	Street T
111	99.50	97.32	97.01	0.76	0.27	2.02	D-5A	Street T
112	99.80	97.68	97.32	0.76	0.27	1.96	D-5A	Street T
113	100.20	97.98	97.68	0.76	0.27	2.06	D-5A	Street T
114	100.40	98.22	97.98	0.76	0.27	2.02	D-5A	Street T
115	100.60	98.22	98.17	0.76	0.27	2.22	D-2	Street T
116	100.30	98.17	97.87	0.76	0.27	1.97	D-2	Street T
117	100.00	97.87	97.55	0.76	0.27	1.97	D-2	Street T
118	99.70	97.55	97.24	0.76	0.27	1.99	D-2	Street T
119	99.40	97.24	96.92	0.76	0.27	2.00	D-2	Street T
120	99.10	96.92	96.60	0.76	0.27	2.02	D-2	Street T

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
121	98.70	96.60	96.22	0.76	0.27	1.94	D-2	Street T
122	96.10	96.22	94.86	0.76	0.27	-0.28	D-2	Street T, 1 course solid grout
122	96.10	94.00	92.78	0.76	0.35	1.78	D-3B	Street S
123	94.80	92.78	91.43	0.76	0.35	1.70	D-3B	Street S
124	93.40	91.43	90.08	0.76	0.35	1.65	D-3B	Street S
125	92.10	90.08	89.03	0.76	0.35	1.70	D-3B	Street S
125	92.10	88.93	88.44	0.76	0.28	2.99	D-3A	Street U
126	91.40	89.28	88.93	0.76	0.28	1.94	D-3A	Street U
127	91.70	89.62	89.28	0.76	0.28	1.90	D-3A	Street U
128	92.10	89.97	89.62	0.76	0.28	1.95	D-3A	Street U
129	92.50	90.32	89.97	0.76	0.28	2.00	D-3A	Street U
130	92.80	90.68	90.32	0.76	0.28	1.94	D-3A	Street U
131	93.10	91.03	90.68	0.76	0.28	1.89	D-3A	Street U
132	93.50	91.53	91.03	0.76	0.28	1.79	D-3A	Street U
133	94.00	91.97	91.53	0.76	0.28	1.85	D-3A	Street U
134	94.50	92.26	91.97	0.76	0.28	2.06	D-3A	Street U
135	95.50	92.61	92.26	0.76	0.28	2.71	D-3A	Street U
136	93.40	91.48	90.93	0.76	0.28	1.74	D-3A	Street U
137	93.00	90.93	90.55	0.76	0.28	1.89	D-3A	Street U
138	92.60	90.55	90.17	0.76	0.28	1.87	D-3A	Street U
139	92.20	90.17	89.77	0.76	0.28	1.85	D-3A	Street U
140	91.70	89.77	89.29	0.76	0.28	1.75	D-3A	Street U
141	91.40	89.29	88.93	0.76	0.28	1.93	D-3A	Street U
142	88.80	88.93	87.48	0.76	0.28	-0.31	D-3A	Street U, 1 course solid grout
142	88.80	86.66	85.61	0.76	0.35	1.82	D-3B	Street S
143	87.60	85.61	84.23	0.76	0.35	1.67	D-3B	Street S
144	86.20	84.23	82.74	0.76	0.35	1.65	D-3B	Street S
145	84.80	82.74	81.11	0.76	0.30	1.84	D-4A	Street S
146	83.10	81.11	79.47	0.76	0.30	1.77	D-4A	Street S
147	81.50	79.47	78.00	0.76	0.30	1.81	D-4A	Street S
148	80.00	78.00	76.54	0.76	0.30	1.78	D-4A	Street S
149	78.60	76.54	75.09	0.76	0.30	1.84	D-4A	Street S
150	77.10	75.09	73.64	0.76	0.30	1.79	D-4A	Street S
151	75.70	73.64	72.17	0.76	0.30	1.84	D-4A	Street S
152	74.20	72.17	70.71	0.76	0.30	1.81	D-4A	Street S
153	72.70	70.71	69.25	0.76	0.30	1.77	D-4A	Street S
154	71.30	69.25	68.44	0.76	0.30	1.83	D-4A	Street S
154	71.30	68.82	68.29	0.76	0.32	2.22	D-7C	Street V
155	73.20	69.34	68.82	0.76	0.32	3.60	D-7C	Street V
155	73.20	71.21	69.96	0.76	0.27	1.83	D-9	Street R
156	74.70	72.68	71.21	0.76	0.27	1.86	D-9	Street R
157	76.20	74.14	72.68	0.76	0.27	1.90	D-9	Street R
158	77.60	75.60	74.14	0.76	0.27	1.84	D-9	Street R
159	79.10	77.06	75.60	0.76	0.27	1.88	D-9	Street R
160	80.50	78.53	77.06	0.76	0.27	1.81	D-9	Street R
161	82.00	79.09	78.53	0.76	0.27	2.75	D-9	Street R
162	83.50	81.45	79.09	0.76	0.27	1.89	D-9	Street R
163	85.10	83.08	81.45	0.76	0.27	1.86	D-9	Street R
164	86.60	84.45	83.08	0.76	0.27	1.99	D-9	Street R
165	88.20	86.18	84.45	0.76	0.27	1.86	D-9	Street R
166	83.30	81.32	79.86	0.76	0.27	1.82	D-9	Street R
167	81.90	79.86	78.40	0.76	0.27	1.88	D-9	Street R
168	80.40	78.40	76.94	0.76	0.27	1.84	D-9	Street R
169	79.00	76.94	75.47	0.76	0.27	1.90	D-9	Street R
170	77.50	75.47	74.01	0.76	0.27	1.87	D-9	Street R
171	76.00	74.01	72.55	0.76	0.27	1.83	D-9	Street R
172	74.60	72.55	71.09	0.76	0.27	1.89	D-9	Street R
173	73.10	71.09	70.12	0.76	0.27	1.85	D-9	Street R
173	73.10	70.44	70.12	0.76	0.32	2.40	D-7C	Street V
174	74.50	70.97	70.44	0.76	0.32	3.27	D-7C	Street V
174	74.50	72.49	71.14	0.76	0.28	1.83	D-8	Street P
175	76.00	73.95	72.49	0.76	0.28	1.87	D-8	Street P
176	77.40	75.42	73.95	0.76	0.28	1.80	D-8	Street P
177	78.90	76.88	75.42	0.76	0.28	1.84	D-8	Street P
178	80.40	78.34	76.88	0.76	0.28	1.88	D-8	Street P

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
179	81.80	79.81	78.34	0.76	0.28	1.81	D-8	Street P
180	83.30	81.27	79.81	0.76	0.28	1.85	D-8	Street P
181	84.80	82.79	81.27	0.76	0.28	1.83	D-8	Street P
182	86.80	84.82	82.79	0.76	0.28	1.80	D-8	Street P
183	88.10	85.93	84.82	0.76	0.28	1.99	D-8	1 course solid grout along common element
184	85.00	82.95	81.49	0.76	0.28	1.87	D-8	1 course solid grout along common element
185	83.50	81.49	80.03	0.76	0.28	1.83	D-8	Street P
186	82.00	80.03	78.56	0.76	0.28	1.79	D-8	Street P
187	80.60	78.56	77.10	0.76	0.28	1.86	D-8	Street P
188	79.10	77.10	75.64	0.76	0.28	1.82	D-8	Street P
189	77.60	75.64	74.17	0.76	0.28	1.78	D-8	Street P
190	76.20	74.17	72.71	0.76	0.28	1.85	D-8	Street P
191	74.70	72.71	71.71	0.76	0.28	1.81	D-8	Street P
191	74.70	72.05	71.52	0.76	0.33	2.37	D-10	Street V
192	76.20	72.57	72.05	0.76	0.33	3.35	D-10	Street V
192	76.20	74.18	73.13	0.76	0.36	1.68	D-7A1	Street N
193	77.60	75.56	74.18	0.76	0.36	1.70	D-7A1	Street N
194	79.00	77.02	75.56	0.76	0.36	1.64	D-7A1	Street N
195	80.50	78.48	77.02	0.76	0.36	1.68	D-7A1	Street N
196	82.00	79.95	78.48	0.76	0.36	1.71	D-7A1	Street N
197	83.40	81.41	79.95	0.76	0.36	1.65	D-7A1	Street N
198	84.90	82.87	81.41	0.76	0.36	1.69	D-7A1	Street N
199	86.30	84.33	82.87	0.76	0.36	1.63	D-7A1	1 course solid grout along common element

Lots adjacent to Skye Canyon Park Drive are significantly elevated above the adjacent TC's

Appendix C – Reference Materials

- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95); December 2018*

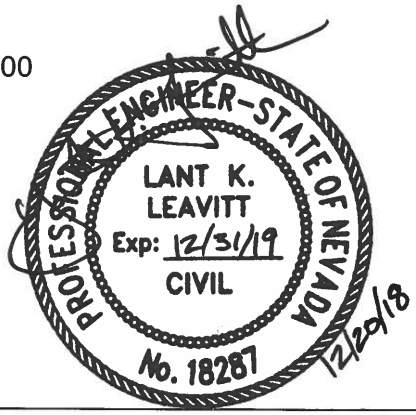
MASTER DRAINAGE STUDY
UPDATE #5
(for Development East of US-95)

Skye Canyon
City of Las Vegas, Nevada

Job No.: EST1801.000
Date: December 2018

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Eastland Co., LLC
2490 Paseo Verde Pkwy, Suite 120
Henderson, NV 89074
Phone: 702-736-9100 ▪ Fax: 702-736-9200



Lant Leavitt, P.E.
NV Professional Engineer No. 18287

Assisted By: Cameron Bencini, P.E.
Jonathan Rocha, E.I.

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: January 28, 2019
TO: **Land Development Services** Department of Public Works				FROM: Oh Sang Kwon, P.E. Flood Control Section Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Master Drainage Study – SUNSTONE (Formally Update #5 to Skye Canyon Master)				Slater Hanifan Group
Cross Streets:	Fort Apache Road & Moccasin Road			Eastland Co., LLC
File Number:	F:\Depot\DSMemos\DS5081A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-501-001			CCRFCD
Zoning Action:	Eastland Development Agreement			CCPW
FEMA Flood Zone	YES	NO **X**		NDOT
Proposed Storm Drain	YES **X**	NO		NV Energy

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	12/26/2018	1/28/2019	Conditionally Approved	$400.00	502000: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS: **1st Submittal: Master Study for Development split off from Skye Canyon. SUNSTONE is the Development east of US-95 that was previously incorporated into the Skye Canyon Master Study.**

The Skye Canyon East (SUNSTONE) / Skye Canyon Master Plan MPU Facilities are being incorporated into the 2018 CCRFCD Master Plan. A separate MPA is not required at this time. Further changes to the MPU Facilities within SUNSTONE Master Drainage Study shall require an MPA that must be submitted to *City of Las Vegas* and *CCRFCD* for approval and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject Overall Master Study.

This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy. Permits for development within Designated Builder Parcels shall not be issued if the associated Master Plan facilities are not under construction.

The Master Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Department of Public Works concurrence.
X	is conditionally approved subject to Nevada Department of Transportation concurrence.
	is conditionally approved subject to BLM concurrence/approval.

The Master Drainage Study for SUNSTONE (Update #5 to Skye Canyon Master Drainage Study) provides additional information that addresses the design parameters used as the basis for the Development east of US-95. **This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy**. The ultimate condition infrastructure drainage facilities that are assumed to be in place include:

- The Moccasin Master Plan Regional Facility – Upper Las Vegas Wash to west of US-95. This includes the Interim Collection Facility west of US-95.
- Skye Canyon Detention Basin #2.
- Skye Canyon Phase 3A regional Facility – Skye Canyon Park Dr. to Iron Mountain Rd.
- The US-95 Local Facility – Brent Lane to Kyle Canyon Interchange. This connects into the existing MPU Facility along US-95.

The construction of these Ultimate Facilities will make US 95 a 100-yr cutoff through the reach south of the Moccasin Master Plan Regional Facility crossing, thereby meeting the full intent of the CCRFCD Master Plan.

Changes and timing of the corresponding infrastructure improvements that protect the SUNSTONE Development shall require Updating the Master Drainage Study Phasing.

1. The overall concept presented in the Master Drainage Study for SUNSTONE appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the National Monument. This shall also include the extension of Local Facilities along the northern boundary (Moccasin Alignment) Between Brightstone Trail and Sun Park Drive (Skye Village Road to Fort Apache). Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed local facilities needed for each phase of development.

2. The Local Facility extension along the Moccasin alignment shall include 100-year local collection between EC19 to EC21 and shall be shown on Exhibit J of this Master Study. The Master Drainage Study for Skye Canyon – Update #4, Supplemental; Identified the 150 cfs increase to the proposed Moccasin Road MPU Facility from Skye Canyon Park Drive to the Upper Las Vegas Wash (due to removal of an upstream diversion across Moccasin Road to the north). This Local Facility extension shall be addressed with the Specific Technical Drainage Studies for development that specifically address the impacts of development and storm discharge along the Moccasin corridor prior to the City removing the requirement of BLM and National Park Service concurrence

3. The implementation of the CCRFCD Master Plan facilities along US-95, south of Kyle Canyon Interchange, has been completed by NDOT. With the ultimate condition infrastructure drainage facilities noted above the development west of US-95 will no longer have flows crossing US-95 as per the CCRFCD Master Plan and also noted within the NDOT concurrence for the Skye Canyon Master Drainage Study dated March 8, 2018. The required Technical Drainage Study necessary for the US-95 Local Facility shall address the removal of the culverts allowing flows to cross to the east side of US-95.

4. The ***Master Land Use Plan*** has been submitted as a part of the (SUNSTONE) Eastland DA, any changes to the flows shown in this Master Drainage Study due to the Master Land Use Plan shall require a complete update to the Master Drainage Study.

5. High velocity flows within the future MPU facilities is a critical concern of the City and Regional Flood. Where velocities exceed 25 fps the City is considering 6,000 psi concrete with 2-inches of sacrificial concrete on the invert. Where velocities exceed 35 fps, additional design mitigation shall be reviewed on a case by case basis. The engineer shall review the velocity impacts and recommend a course of action for City approval with each technical drainage study for the corresponding facilities.

6. CCRFCD concurrence has previously been provided for Skye Canyon Master Drainage Study Update #4. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from CCRFCD after Conditional Approval by the City of Las Vegas.

7. CCPW concurrence was provided covering Skye Canyon Master Drainage Study Update #4. New County concurrence is not required for the SUNSTONE Master Drainage Study.

8. NDOT concurrence was provided covering Skye Canyon Master Drainage Study Update #4. NDOT concurrence for Skye Canyon Master Drainage Study Update #4 supports the proposed MPU facilities and the elimination of the flows crossing US-95 per the Master Plan and shown on Exhibit J. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from NDOT after Conditional Approval by the City of Las Vegas.

9. Please note that the Traffic Study must be approved prior to final approval of the Master Drainage Study. If the street layout does not match the Master Drainage Study, an update to the Master Drainage Study must be submitted to address the changes.

10. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (ie. Changes in pods, infrastructure, flows etc.) will require an update to the Master Drainage Study and this update must be approved by the *City of Las Vegas Flood Control Section* prior to final approval of technical drainage study.

11. Please note that the proposed 100-year flood protection facilities identified on Exhibit J must be constructed by the Master Developer as a part of the master planned infrastructure. Technical drainage studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.

12. Technical drainage studies are required for each of the Pod's. The technical drainage studies for the Pod's may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted Pod drainage studies.

13. Building permits for the homes within the individual Pod's will not be issued until construction of the street and flood control infrastructure around the Pod is substantially complete or interim protection is provided per the approved technical drainage study.

14. Please note that all proposed interim facilities must be maintained by the master developer.

15. Provide a legal description of the proposed drainage facilities located outside of dedicated public right-of-way prior to recordation of the parent final map.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved master drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section.* Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
Osk/pbj

T/R/S: T19S/R60E/6 & 7
AREA G-6 & 7

REGIONAL FLOOD CONTROL DISTRICT

Steven C. Parrish, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

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City of Las Vegas

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City of Boulder City

March 6, 2019

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

DISTRICT CONCURRENCE: SUNSTONE (FORMALLY UPDATE# 5 SKYE CANYON MASTER)
(DS5081A) (RFCD No. 19-11214)

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated December 26, 2018 for above-mentioned project as submitted by SLATER HANIFAN GROUP. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated January 28, 2019.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works with the following conditions:

> Per District's Uniform Regulations for the Control of Drainage, Section VIII.D.13, the Lead Entity shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by SLATER HANIFAN GROUP may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 685-0000 • FAX: (702) 685-0001
Website: http://www.regionalflood.org

REGIONAL FLOOD CONTROL DISTRICT

STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY:
Ching C. Wang, P.E.
Senior Civil Engineer

CCW:dd

c: Lant K. Leavitt, P.E, Slater Hanifan Group

P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\L-19-11214as_built doc

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
1263 S. Stewart Street
Carson City, Nevada 89712

BRIAN SANDOVAL
Governor

RUDY MALFABON, P.E., *Director*

February 20, 2019

In Reply, Refer to:

Lant K. Leavitt, P.E.
5740 S. Arville St, Suite 216
Las Vegas, NV 89118

TECHNICAL DRAINAGE STUDY
Sunstone Master Drainage Study, Update #5
Clark County

Dear Mr. Leavitt:

The Nevada Department of Transportation (NDOT) Hydraulics Section has received and reviewed the following document(s) for the above-referenced project.

Document:	**Dated:**
Transmittal Letter from Lant K. Leavitt, P.E., SHG	Feb. 4, 2019
Executive Summary for Master Drainage Study Update #5 for Skye Canyon Development East of US 95 - Sunstone	Feb. 1, 2019
Master Drainage Study Update #5 for Skye Canyon Development (for Development East of US 95) Skye Canyon	Dec. 20, 2018
Drainage Information Form tamped by Lant K. Leavitt, P.E., SHG	Feb. 1, 2019

The drainage design information presented in the reviewed document(s):

X	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project.
	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project. The following comments should be addressed with the permit application:
	must be supplemented or modified to satisfy the following comment(s) before preliminary Hydraulic Section approval can be granted:

All submittals regarding this project must be forwarded through (or copied to) the local NDOT District permitting office. All pertinent drainage design documents (including those previously submitted for preliminary review) must be submitted to the local NDOT District permitting office with the Right-Of-Way Occupancy Permit Application. All plans and reports must be signed and stamped by a Nevada registered civil engineer.

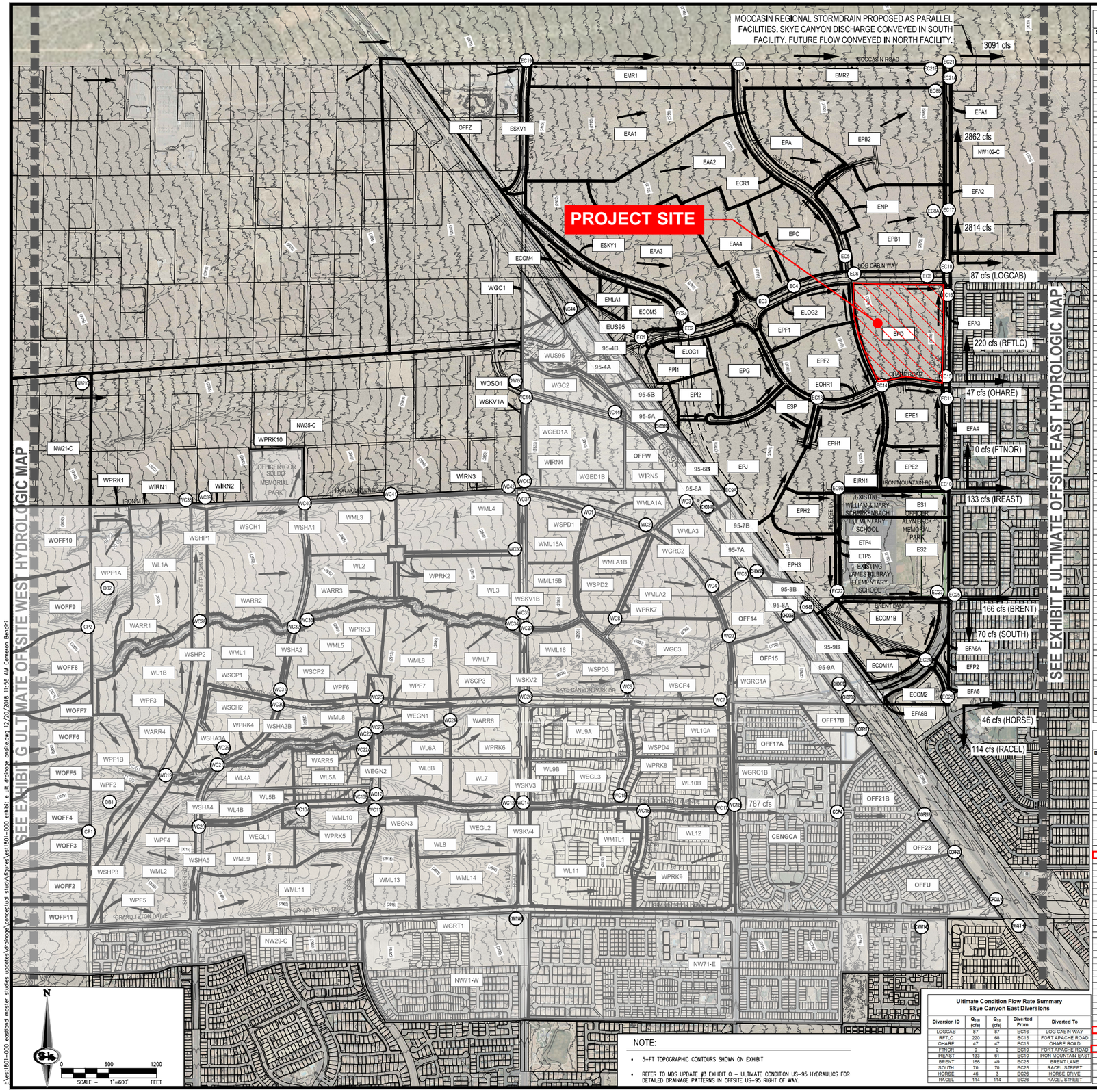
No liability is assumed by the Department in performing this review. Verification and acceptance of all background information, design data and conclusions is the responsibility of the consulting engineer.

Please call me at (775) 888-7621 should you have any questions.

Sincerely,

Brian A. Matthews, P.E.
Professional Engineering Specialist

c: Mary Martini, P.E., District 1 Engineer
Michael Yates, District 1 Assistant Engineer, Permit Coordinator
Charles Molisee, District 1 Permit Coordinator
Charles Pratt, HQ Permit Coordinator
Mario Gomez, District 1 Assistant Engineer



NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- REFER TO MDS UPDATE #3 EXHIBIT O – ULTIMATE CONDITION US-95 HYDRAULICS FOR DETAILED DRAINAGE PATTERNS IN OFFSITE US-95 RIGHT OF WAY.

Ultimate Condition Flow Rate Summary Skye Canyon East Diversions

Diversion ID	Q_{100} (cfs)	Q_{10} (cfs)	Diverted From	Diverted To
LOGCAB	87	87	EC16	LOG CABIN WAY
RFTLC	220	68	EC15	FORT APACHE ROAD
OHARE	47	47	EC15	OHARE ROAD
FTNOR	0	0	EC10	FORT APACHE ROAD
IREAST	133	61	EC10	IRON MOUNTAIN EAST
BRENT	166	49	EC25	BRENT LANE
SOUTH	70	70	EC25	RACEL STREET
HORSE	46	3	EC26	HORSE DRIVE
RACEL	114	114	EC26	RACEL STREET

Ultimate Condition Flow Rate Summary Skye Canyon West Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
WARR1	3.6	9	4
WARR2	2.8	7	3
WARR3	7.1	17	7
WARR4	1.3	3	1
WARR5	8.0	18	8
WARR6	2.4	6	2
WGC1	8.3	24	11
WGC2	8.3	23	10
WGC3	30.4	95	47
WGED1A	28.4	77	35
WGED1B	11.5	33	16
WL10A	17.1	46	21
WL10B	18.3	49	22
WL11	36.7	99	46
WL12	31.4	84	38
WL1A	29.8	81	38
WL1B	28.0	79	36
WL2	15.7	45	21
WL3	24.9	69	32
WL4A	8.0	23	10
WL4B	8.9	27	12
WL5A	10.9	32	15
WL5B	3.8	12	5
WL6A	6.2	19	9
WL6B	10.6	30	14
WL7	11.5	34	16
WL8	17.4	48	22
WL9A	18.2	49	22
WL9B	14.4	39	18
WML1	18.0	52	24
WML10	11.6	38	19
WML11	16.0	48	23
WML12	15.1	44	20
WML13	16.4	49	25
WML14	19.2	59	29
WML15A	12.3	40	20
WML15B	11.2	34	17
WML16	22.2	64	32
WML2	27.4	78	38
WML3	17.3	56	28
WML4	25.1	77	38
WML5	27.3	82	41
WML6	20.5	64	32
WML7	18.6	59	30
WML8	10.3	34	17
WML9	16.4	55	28
WMLA1A	6.5	20	10
WMLA1B	12.0	37	18
WMLA2	30.4	88	44
WMLA3	11.6	35	17
WPF1A	20.2	59	29
WPF1B	18.9	63	31
WPF2	3.1	10	5
WPF3	4.6	17	8
WPF4	5.7	19	9
WPF5	0.4	1	0
WPF6	1.0	4	2
WPF7	4.5	14	7
WPRK1	2.4	6	2
WPRK10	10.0	19	8
WPRK2	3.2	7	2
WPRK3	1.8	4	2
WPRK4	1.0	3	1
WPRK5	2.0	5	2
WPRK6	13.2	28	10
WPRK7	3.0	6	2
WPRK8	1.7	4	1
WPRK9	0.5	1	0
WSCH1	39.4	106	48
WSCH2	11.6	37	16
WEST ROADWAY BASINS			
WEGL1	3.4	12	6
WEGL2	3.3	12	7
WEGL3	4.8	16	9
WEGN1	0.5	2	1
WEGN2	2.1	7	1
WEGN3	3.3	10	6
WGRC1A	1.3	4	2
WGRC1B	3.2	10	5
WGRC2	2.7	9	5
WGRT1	11.7	30	16
WIRN1	0.6	2	1
WIRN2	2.2	7	4
WIRN3	1.3	5	3
WIRN4	2.7	9	5
WIRN5	0.7	3	2
WMTL1	1.3	5	2
WOSO1	2.2	8	4
WSCP1	1.5	6	3
WSCP2	3.0	11	6
WSCP3	3.5	13	7
WSCP4	7.8	25	14
WSHA1	2.3	6	2
WSHA2	1.5	5	2
WSHA3A	0.7	3	1
WSHA3B	1.6	6	3
WSHA4	1.4	6	3
WSHA5	2.4	8	5
WSHP1	6.4	19	9
WSHP2	9.3	27	13
WSHP3	10.4	31	15
WSKV1A	1.4	5	3
WSKV1B	3.5	11	6
WSKV2	2.0	19	8
WSKV3	4.2	14	7
WSKV4	4.5	15	8
WSPD1	0.7	3	1
WSPD2	2.1	3	2
WSPD3	0.9	3	2
WSPD4	2.3	8	4
WUS95	8.5	28	16

Ultimate Condition Flow Rate Summary Skye Canyon East Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
EAA1	55.0	114	49
EAA2	35.4	82	36
EAA3	51.2	102	45
EAA4	21.0	45	20
ECOM1A	9.9	30	15
ECOM1B	13.7	42	21
ECOM3	6.4	17	7
ECOM4	5.5	15	7
EMLA1	3.2	10	4
ENP	3.5	0	0
EPA	17.1	40	18
EPB1	31.6	50	16
EPB2	46.4	67	22
EPC	20.2	48	21
EPD	28.9	65	28
EPE1	12.5	29	13
EPE2	9.1	22	10
EPF1	13.5	32	14
EPF2	19.1	57	26
EPG	15.9	36	16
EPH1	23.9	56	25
EPH2	8.9	27	13
EPH3	15.4	44	22
EPI1	8.6	23	10
EPI2	7.4	20	9
EPJ	31.7	55	19
ES1	10.4	20	8
ES2	32.1	85	41
ESP	3.5	0	0
OFFZ	30.8	39	10
EAST ROADWAY BASINS			
EBRT1	1.8	6	3
ECR1	7.8	22	12
EFA1	2.7	8	4
EFA2	2.4	7	4
EFA3	2.5	7	4
EFA4	2.8	8	5
EFA5	0.9	3	2
EFA6A	2.5	9	5
EFA6B	5.7	18	10
EIRN1	1.9	6	3
ELOG1	4.3	15	8
ELOG2	12.1	35	19
EMR1	17.4	22	7
EMR2	19.2	26	8
EOHR1	10.1	29	16
ESKV1	3.9	11	6
ESKY1	8.2	23	13
ETP4	0.8	3	2
ETP5	0.9	3	2
EUS95	9.4	34	19

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	139
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	129
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon East Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
EC1 Q = WC44B + RETC02 + EU595 + 95-4A + 95-4B	4.96	2054	886
EC2 Q = EC1 + EC2a + ELOG1 + EPI	5.20	2330	1001
EC2A Q = WCAVAC + EC2A1 + EC2A4 + EBLK1 + EBLK1 + EBLK1	0.22	286	121
EC3 Q = EC2 + EBA3	5.28	2420	1038
EC4 Q = EC3 + EBA4	5.31	2460	1055
EC5 Q = EPC + EBA2 + ECR1	0.10	152	69
EC6 Q = EC4 + EC5	5.43	2622	1127
EC8 Q = EC6 + ELOG2	5.45	2654	1145
EC8A Q = EMP + EPE1	0.05	50	16
EC8B Q = EPA + EPE2	0.10	108	39
EC9A Q = 95-5A + 95-5B + 95-6A + 95-6B	0.03	57	27
EC9B Q = EC8A + EPH2 + ETP4	0.05	87	42
EC10 Q = EC8B + ERN1 + ES1	0.08	133	61
EC11 Q = EC10 + EPH4 + EPE1	0.10	37	18
EC13 Q = ESP + EPG + EPC + EPJ + ESP + ECHR1	0.11	136	58
EC14 Q = EC13 + EPF2 + EPH1	0.17	232	99
EC15 Q = EC11 + EC14	0.28	267	115
EC16 Q = EC14+EPA3 + EPD	0.33	287	148
EC17 Q = EC8 + EC8A	5.84	2862	1200
EC18 Q = EC8 + EC16	5.78	2814	1184
EC19 Q = OFFZ + EBKV1	0.05	50	16
EC20 Q = EC19 + EAA1 + EMR1	0.17	187	71
EC21A Q = EC17 + EFA1 + EOBB	5.94	2955	1232
EC21B Q = EC21 + EMR2	0.20	212	79
EC21 Q = EC21A + EC21B	6.14	3091	1276
EC22 Q = OBC4B + ETP5	0.05	94	48
EC23 Q = EC22 + EC2 + EBRT1	0.10	186	93
EC24 Q = 95-9B + EC2B1A + EFA6B	0.04	68	35
EC25 Q = EC23 + EC2B1B + EFA5A	0.13	236	119
EC26 Q = SOUTH + EC24 + EC2A2 + EFP2	0.18	160	117

Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WC1 Q = WML15A + WXPD1	0.02	43	21
WC2 Q = WC1 + WRN4 + WMLA1A	0.03	73	37
WC3 Q = WC2 + WGED1B + WRN5	0.05	109	54
WC4 Q = WRK7 + WMLA1B + WMLA2 + WGRC2	0.08	135	67
WC5 Q = WC4 + WML3	0.09	170	83
WC6 Q = WML16 + WXPD3	0.04	68	33
WC7 Q = WC6 + WL9A + WL10A + WSCP4	0.10	186	89
WC8 Q = WML15B + WXPD2	0.02	37	19
WC9 Q = WC7 + WGC3 + WGRC1A + WC8	0.17	322	155
WC10A Q = WML8 + WPR6	0.03	60	30
WC10B Q = WC10A + WL4B + WEGL1	0.05	99	48
WC11 Q = WML10 + WEGN3	0.07	127	61
WC12 Q = WC10B + WC11	0.11	226	109
WC13 Q = WC12 + WL6B + WL7 + WML13 + WEGL2	0.17	332	170
WC14 Q = WC13 + WML14 + WL8 + WSKV3 + WSKV4	0.24	485	236
WC15 Q = WL9B + WXPD4	0.03	46	21
WC16 Q = WL11 + WPR6B + WPR6D + WMTL1	0.06	106	48
WC17 Q = WC14 + WC15 + WC16 + WGEL3 + WL10B	0.37	695	331
WC18 Q = WC17 + WL12 + WGRC1B	0.42	787	372
WC19 Q = RDB3 + WSHP3 + WPF2	0.90	94	70
WC20 Q = WPF5 + WML2 + WSHA5	0.05	86	42
WC21 Q = WC19 + WC20 + WMR6 + WPF4 + WSHA4	0.96	201	121
WC22A Q = WL4A + WL5A + WL5B	0.05	67	43
WC22 Q = WC21 + WC22A + WPRK4 + WMR5	1.01	282	169
WC23 Q = WC22 + WL6 + WPR + WEGN1 + WEGN2	1.03	322	189
WC24 Q = WC23 + WMR6 + WPF7 + WL6A	1.05	359	194
WC25 Q = WC23 + WPR3	0.01	16	8
WC26 Q = WC24 + WC25 + WPR6 WSCP5	1.09	412	217
WC27 Q = WC26 + WML7 + WSKV2	1.12	487	253
WC28 Q = WL10 + WMR5 + WSHP2	0.06	113	53
WC29 Q = WPF4 + WSHA3A	0.01	19	10
WC30 Q = WC29 + WSCH2 + WSHA3B	0.04	62	29
WC31 Q = WC30 + WSCP1	0.04	68	33
WC32 Q = WC31 + WML1 + WSHA2	0.07	124	58
WC33 Q = WC28 + WC32 + WMR2	0.14	244	113
WC34 Q = WC33 + WMR5 + WML5 + WML6	0.23	404	191
WC35 Q = WC27 + WC34	1.34	876	436
WC36 Q = WL2 + WPR2	0.03	51	23
WC37 Q = WC35 + WC36 + WSKV1B + WL3	1.41	1000	492
WC38 Q = RDB2 + WPR1 + WMR1 + WL1A	0.62	139	84
WC39 Q = WC38 + WSHP1	0.63	157	93
WC40 Q = WC39 + WSHA1	0.07	112	50
WC41 Q = WC38 + WC39 + WPR2 + WC40 + WML3	0.72	321	170
WC42 Q = WC41 + WPR3 + WML4	0.77	398	209
WC43 Q = WL3T + WC42	2.18	1325	648
WC43A Q = WC43 + WSKV1A	2.19	1330	650
CNW2SC Q = RDNW01 + NW50-C + WPRK10	2.71	1201	347
CNW71F Q = RDNW01 + NW71-E	0.24	610	106
CNW71W Q = RNW29C + NW71-W	0.24	354	167
CP1FT Q = OFF17B + OFF17A	0.04	66	31
CP2FB Q = CON + OFF21B	0.55	990	469
CP2FZ Q = RDP23 + OFF23	0.01	19	9
CP4FZ Q = RDF41 + OFF4-2	0.72	871	245
CP5FS1 Q = RDF4T4 + OFF5-1	1.02	1182	352
DB1 Q = CP1 + WOFF4 + WOFF5 + WOFF6 + WFF1B	0.88	793	313
RDB1 (FROM DB1)	0.88	71	57
DB2 Q = CP2 + WOFF9 + WOFF10 + WPF1A	0.57	667	254
RDB2 (FROM DB2)	0.57	70	53
EAST CONCENTRATION POINTS			
EC2F Q = EC21 + NW102-C	6.34	3308	1338
EC2B Q = EC21 + NW130-W	6.52	3369	1346
US95 CONCENTRATION POINTS			
CHDD6B Q = EXDD2B + WC3 + OFFW	0.08	130	64
CHDD6B Q = CHDD6B + WC5	0.17	301	147
CHDD6B Q = CHDD6B + WC6 + OFF14	0.36	648	315
CHDD7B Q = CHDD6B + 95-9A	0.37	669	325
CHDD7B2 Q = CHDD7B + OFF15	0.40	731	357
95-9B Q = 95-7A + 95-7B + 95-8A + 95-8B	0.02	47	24
OFCULV Q = CHDTRIB + CCP1FT + CCP2FB + CCP2FZ3 + OFFU	1.05	1836	877
95STN Q = CPCULV + CBWT1E	1.54	2285	1070

LEGEND

- BASIN BOUNDARY (UNCHANGED BASIN)
- BASIN BOUNDARY
- MATCHLINE SEE EXHIBIT FOR MAP EXTENSION
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- ID — FLOW DIRECTION
- ID — FLOW SPLIT

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.	APP. DATE

EASTLAND COMPANY, LLC

SKYE CANYON - MASTER DRAINAGE STUDY UPDATE

ULTIMATE CONDITION ONSITE HYDROLOGIC MAP

DATE: DEC. 2018
DRAFTER: CWB
DESIGNER: CWB
CHECKED: LL
PROJECT NO.
EST1801-000

EXHIBIT E
SHEET 1 OF 1

J:\est\1801-000 eastland master studies updates\drainage\conceptual study\figures\est1801-000 exhibit e ult drainage onsite.dwg 12/20/2018 11:56 AM Cameron Benzel

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: Skye Canyon MDS UP5 - Eastland
Description:
By: CWB
Date: 12/17/2018

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EAA1	D	90.10	0.799	55.00	0.0859	105	1.00	5.55	3598	2.3	3.05	4.62	13.91	19.45	3703	30.572	0.195
EAA2	D	90.10	0.799	35.40	0.0553	105	1.00	5.55	2452	2.6	3.26	4.94	9.13	14.68	2557	24.206	0.147
EAA3	D	90.10	0.799	51.20	0.0800	105	1.00	5.55	3578	1.9	2.76	4.18	15.28	20.82	3683	30.461	0.208
EAA4	D	90.10	0.799	21.00	0.0328	358	3.07	7.05	1655	0.9	1.93	2.92	10.92	17.97	2013	21.183	0.180
EBRT1	D	98.00	0.904	1.80	0.0028	20	1.00	1.58	1361	3.1	3.55	5.38	5.01	6.60	1381	17.672	0.066
ECOM1A	D	95.00	0.864	9.90	0.0155	50	1.00	3.00	1317	2.1	2.95	4.47	5.88	8.88	1367	17.594	0.089
ECOM1B	D	95.00	0.864	13.70	0.0214	50	1.00	3.00	1286	2.2	2.98	4.52	5.69	8.70	1336	17.422	0.087
ECOM2	D	95.00	0.864	4.70	0.0073	50	1.00	3.00	575	2.4	3.15	4.77	2.91	5.91	625	13.472	0.059
ECOM3	D	90.10	0.799	6.40	0.0100	50	1.00	3.83	747	1.3	2.34	3.54	4.73	8.55	797	14.428	0.086
ECOM4	D	90.10	0.799	5.50	0.0086	50	1.00	3.83	874	2.3	3.06	4.63	4.07	7.90	924	15.133	0.079
ECR1	D	97.40	0.896	7.80	0.0122	33	2.00	1.68	2468	1.3	2.27	3.43	13.22	14.90	2501	23.894	0.149
EFA1	D	98.00	0.904	2.70	0.0042	37	2.00	1.71	1491	0.5	1.43	2.16	13.47	15.17	1528	18.489	0.152
EFA2	D	98.00	0.904	2.40	0.0038	51	2.00	2.00	981	0.5	1.43	2.16	9.54	11.54	1032	15.733	0.115
EFA3	D	98.00	0.904	2.50	0.0039	32	2.00	1.59	1116	0.5	1.43	2.16	10.58	12.17	1148	16.378	0.122
EFA4	D	98.00	0.904	2.80	0.0044	79	2.00	2.49	1220	0.5	1.43	2.16	11.38	13.87	1299	17.217	0.139
EFA5	D	98.00	0.904	0.90	0.0014	40	2.00	1.77	266	4.5	4.29	6.50	1.03	2.81	306	11.700	0.050
EFA6A	D	98.00	0.904	2.50	0.0039	83	2.00	2.56	671	1.8	2.70	4.09	3.78	6.34	754	14.189	0.063
EFA6B	D	98.00	0.904	5.70	0.0089	27	2.00	1.46	1852	2.3	3.04	4.61	7.63	9.08	1879	20.439	0.091
EFP2	D	95.00	0.864	1.00	0.0016	50	1.00	3.00	110	12.7	7.21	10.92	0.25	3.26	160	10.889	0.050
EIRN1	D	92.20	0.827	1.90	0.0030	14	2.00	1.46	1317	3.0	3.52	5.34	4.92	6.38	1331	17.394	0.064
ELOG1	D	98.00	0.904	4.30	0.0067	51	2.00	2.00	934	1.8	2.73	4.13	4.81	6.81	985	15.472	0.068
ELOG2	D	97.90	0.902	12.10	0.0189	45	2.00	1.89	2847	2.9	3.41	5.17	10.02	11.91	2892	26.067	0.119
EMLA1	D	90.10	0.799	3.20	0.0050	50	1.00	3.83	344	4.9	4.49	6.80	1.28	5.10	394	12.189	0.051
EMR1	D	79.90	0.665	17.40	0.0272	191	1.00	10.83	2364	3.0	3.48	5.26	8.30	19.13	2555	24.194	0.191
EMR2	D	81.70	0.688	19.20	0.0300	304	1.00	12.92	2237	2.5	3.19	4.84	8.59	21.51	2541	24.117	0.215
ENP	D	55.30	0.340	3.50	0.0055	79	1.00	12.16	620	1.3	2.29	3.48	4.21	16.37	699	13.883	0.139
EOHR1	D	97.50	0.897	10.10	0.0158	21	2.00	1.33	2845	2.3	3.05	4.62	11.19	12.52	2866	25.922	0.125
EPA	D	90.10	0.799	17.10	0.0267	107	1.00	5.60	1441	1.6	2.56	3.87	7.31	12.91	1548	18.600	0.129
EPB1	D	82.20	0.695	31.60	0.0494	110	1.00	7.65	1930	1.8	2.72	4.12	8.86	16.50	2040	21.333	0.165
EPB2	D	82.20	0.695	46.40	0.0725	100	1.00	7.29	2604	1.7	2.63	3.98	11.99	19.28	2704	25.022	0.193
EPC	D	90.10	0.799	20.20	0.0316	95	1.00	5.28	1389	1.7	2.66	4.02	6.82	12.09	1484	18.244	0.121
EPD	D	90.10	0.799	28.90	0.0452	152	1.00	6.67	1237	0.7	1.73	2.61	9.53	16.20	1389	17.717	0.162
EPE1	D	90.10	0.799	12.50	0.0195	133	1.00	6.24	1126	1.2	2.17	3.28	7.03	13.27	1259	16.994	0.133

Skye Canyon Update #5

EST1801-000 GIS Curve Number.xlsx

BASIN ID	Soil Survey	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
EAA1	LV	18	314	90.05	55.00	55.00	100.0%	100.0%	90.05	90.05	**90.1**
EAA2	LV	18	314	90.05	35.40	35.40	100.0%	100.0%	90.05	90.05	**90.1**
EAA3	LV	18	314	90.05	51.20	51.20	100.0%	100.0%	90.05	90.05	**90.1**
EAA4	LV	18	314	90.05	21.00	21.00	100.0%	100.0%	90.05	90.05	**90.1**
EBRT1	LV	4	400	98	1.80	1.80	100.0%	100.0%	98.00	98.00	**98.0**
ECOM1A	LV	10	400	95	9.90	9.90	100.0%	100.0%	95.00	95.00	**95.0**
ECOM1B	LV	10	400	95	13.70	13.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM2	LV	10	400	95	4.70	4.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM3	LV	10	314	90.05	6.40	6.40	100.0%	100.0%	90.05	90.05	**90.1**
ECOM4	LV	10	314	90.05	5.50	5.50	100.0%	100.0%	90.05	90.05	**90.1**
ECR1	LV	4	314	98	5.60	7.80	71.8%	71.8%	70.36	70.36	
ECR1	LV	9	314	96	0.60	7.80	7.7%	79.5%	7.38	77.74	
ECR1	LV	9	314	96	1.60	7.80	20.5%	100.0%	19.69	97.44	**97.4**
EFA1	LV	4	314	98	2.70	2.70	100.0%	100.0%	98.00	98.00	**98.0**
EFA2	LV	4	314	98	2.40	2.40	100.0%	100.0%	98.00	98.00	**98.0**
EFA3	LV	4	314	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA4	LV	4	314	98	2.80	2.80	100.0%	100.0%	98.00	98.00	**98.0**
EFA5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EFA6A	LV	4	400	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA6B	LV	4	400	98	5.70	5.70	100.0%	100.0%	98.00	98.00	**98.0**
EIRN1	LV	4	314	98	1.20	1.90	63.2%	63.2%	61.89	61.89	
EIRN1	LV	9	314	96	0.60	1.90	31.6%	94.7%	30.32	92.21	**92.2**
ELOG1	LV	4	314	98	4.30	4.30	100.0%	100.0%	98.00	98.00	**98.0**
ELOG2	LV	4	314	98	11.50	12.10	95.0%	95.0%	93.14	93.14	
ELOG2	LV	9	314	96	0.60	12.10	5.0%	100.0%	4.76	97.90	**97.9**
EMLA1	LV	10	314	90.05	3.20	3.20	100.0%	100.0%	90.05	90.05	**90.1**
EMR1	LV	4	314	98	4.00	17.40	23.0%	23.0%	22.53	22.53	
EMR1	LV	13	314	67.45	10.10	17.40	58.0%	81.0%	39.15	61.68	
EMR1	LV	9	314	96	3.30	17.40	19.0%	100.0%	18.21	79.89	**79.9**
EMR2	LV	13	314	67.45	10.00	19.20	52.1%	52.1%	35.13	35.13	
EMR2	LV	9	314	96	2.60	19.20	13.5%	65.6%	13.00	48.13	
EMR2	LV	9	314	96	0.40	19.20	2.1%	67.7%	2.00	50.13	
EMR2	LV	9	314	96	0.70	19.20	3.6%	71.4%	3.50	53.63	
EMR2	LV	4	314	98	5.50	19.20	28.6%	100.0%	28.07	81.70	**81.7**
ENP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
EOHR1	LV	4	314	98	7.40	10.10	73.3%	73.3%	71.80	71.80	
EOHR1	LV	9	314	96	0.90	10.10	8.9%	82.2%	8.55	80.36	
EOHR1	LV	9	314	96	0.80	10.10	7.9%	90.1%	7.60	87.96	
EOHR1	LV	9	314	96	1.00	10.10	9.9%	100.0%	9.50	97.47	**97.5**
EPA	LV	18	314	90.05	17.10	17.10	100.0%	100.0%	90.05	90.05	**90.1**
EPB1	LV	19	314	82.15	31.60	31.60	100.0%	100.0%	82.15	82.15	**82.2**
EPB2	LV	19	314	82.15	46.40	46.40	100.0%	100.0%	82.15	82.15	**82.2**
EPC	LV	18	314	90.05	20.20	20.20	100.0%	100.0%	90.05	90.05	**90.1**
EPD	LV	18	314	90.05	28.90	28.90	100.0%	100.0%	90.05	90.05	**90.1**
EPE1	LV	18	314	90.05	12.50	12.50	100.0%	100.0%	90.05	90.05	**90.1**
EPE2	LV	18	314	90.05	9.10	9.10	100.0%	100.0%	90.05	90.05	**90.1**
EPF1	LV	18	314	90.05	13.50	13.50	100.0%	100.0%	90.05	90.05	**90.1**
EPF2	LV	18	314	90.05	19.10	19.10	100.0%	100.0%	90.05	90.05	**90.1**
EFP2	LV	10	400	95	1.00	1.00	100.0%	100.0%	95.00	95.00	**95.0**
EPG	LV	18	314	90.05	15.90	15.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH1	LV	18	314	90.05	23.90	23.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH2	LV	18	314	90.05	1.90	8.90	21.3%	21.3%	19.22	19.22	
EPH2	LV	18	400	95	7.00	8.90	78.7%	100.0%	74.72	93.94	**93.9**
EPH3	LV	18	400	95	15.40	15.40	100.0%	100.0%	95.00	95.00	**95.0**
EPI1	LV	10	314	90.05	8.60	8.60	100.0%	100.0%	90.05	90.05	**90.1**
EPI2	LV	10	314	90.05	7.40	7.40	100.0%	100.0%	90.05	90.05	**90.1**
EPJ	LV	16	400	93	4.70	31.70	14.8%	14.8%	13.79	13.79	
EPJ	LV	16	314	83.15	27.00	31.70	85.2%	100.0%	70.82	84.61	**84.6**
ES1	LV	37	314	83.51	8.20	10.40	78.8%	78.8%	65.84	65.84	
ES1	LV	37	400	92.96	2.20	10.40	21.2%	100.0%	19.66	85.51	**85.5**
ES2	LV	37	400	92.96	32.10	32.10	100.0%	100.0%	92.96	92.96	**93.0**
ESKV1	LV	4	314	98	3.90	3.90	100.0%	100.0%	98.00	98.00	**98.0**
ESKY1	LV	4	314	98	8.20	8.20	100.0%	100.0%	98.00	98.00	**98.0**
ESP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
ETP4	LV	4	400	98	0.50	0.80	62.5%	62.5%	61.25	61.25	
ETP4	LV	4	314	98	0.30	0.80	37.5%	100.0%	36.75	98.00	**98.0**
ETP5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EUS95	LV	4	314	98	9.40	9.40	100.0%	100.0%	98.00	98.00	**98.0**
OFFZ	LV	20	314	78.65	30.80	30.80	100.0%	100.0%	78.65	78.65	**78.7**
NW102-C	LV	48	314	93.4175	0.40	128.10	0.3%	0.3%	0.29	0.29	
NW102-C	LV	48	314	93.4175	5.40	128.10	4.2%	4.5%	3.94	4.23	
NW102-C	LV	47	314	86.478	7.70	128.10	6.0%	10.5%	5.20	9.43	
NW102-C	LV	48	314	93.4175	114.60	128.10	89.5%	100.0%	83.57	93.00	**93.0**
NW103-W	LV	47	314	86.478	0.10	99.80	0.1%	0.1%	0.09	0.09	
NW103-W	LV	44	630	88.9	0.10	99.80	0.1%	0.2%	0.09	0.18	
NW103-W	LV	46	630	92.68	0.10	99.80	0.1%	0.3%	0.09	0.27	
NW103-W	LV	47	630	94.08	0.20	99.80	0.2%	0.5%	0.19	0.46	
NW103-W	LV	46	630	92.68	0.20	99.80	0.2%	0.7%	0.19	0.64	
NW103-W	LV	44	630	88.9	0.30	99.80	0.3%	1.0%	0.27	0.91	

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   18DEC18  TIME  12:41:55  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE.INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     LENNAR HOMES
    3         ID     SKYE CANYON
    4         ID     MASTER DRAINAGE STUDY - UPDATE #5
    5         ID     ULTIMATE DRAINAGE CONDITION - REVISED EAST AREA
    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR   PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    2.77
   32         PC      0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC  0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC  0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC  0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC  0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC  0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC  0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC  0.998   0.999   1.000
   40         LS      0    98.0
   41         UD  0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

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                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```



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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    2.77
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```

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             *

1561         KK    EPI2
1562         BA  0.0116
1563         LS       0    90.1
1564         UD   0.081
             *

1565         KK   EOHR1
1566         BA  0.0158
1567         LS       0    97.5
1568         UD   0.125
             *

1569         KK     ESP
1570         BA  0.0055
1571         LS       0    55.3
1572         UD   0.128
             *

1573         KK    EC13
1574         HC       5
             *

1575         KK    EPF2
1576         BA  0.0298
1577         LS       0    90.1
1578         UD   0.050
             *

1579         KK    EPH1
1580         BA  0.0373
1581         LS       0    90.1
1582         UD   0.141
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1583         KK    EC14
1584         HC       3
             *

1585         KK    EC15
1586         HC       2
             *

1587         KK   RFTLC
1588         KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
1589         DT   OHARE
1590         DI       0     115    5000
1591         DQ       0      47      47
             *

1592         KK    EFA3
1593         BA  0.0039
1594         LS       0    98.0
1595         UD   0.122
             *

1596         KK     EPD
1597         BA  0.0452
1598         LS       0    90.1
1599         UD   0.162
             *

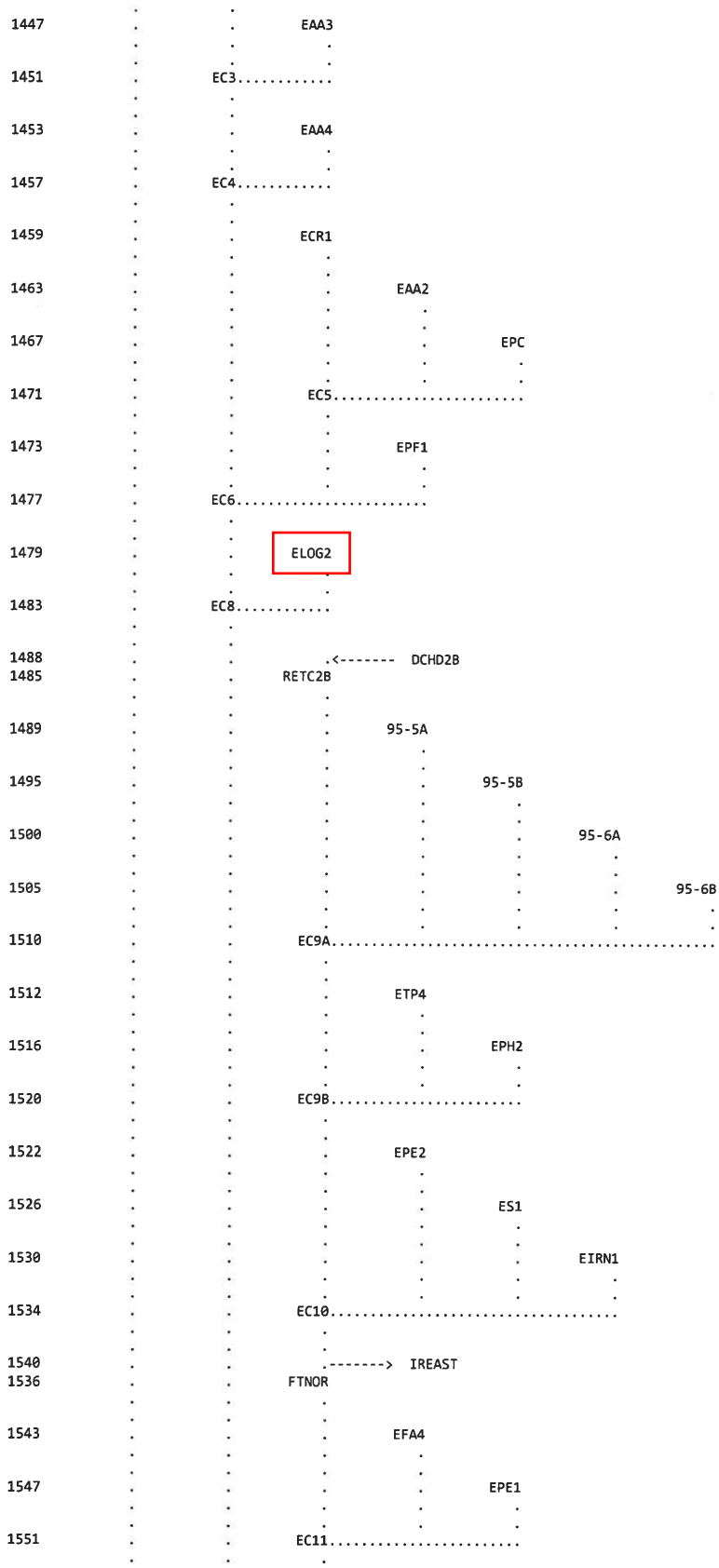
1600         KK    EC16
1601         HC       3
             *

1602         KK  R2FTLC
1603         KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
1604         DT  LOGCAB
1605         DI       0      87    5000
1606         DQ       0      87      87
             *

1607         KK    EC18
1608         HC       2
             *

1609         KK     ENP
1610         BA  0.0055
1611         LS       0    45.3
1612         UD   0.139
             *

1613         KK    EPB1
```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EC5
1473
EPF1
1477
EC6
1479
ELOG2
1483
EC8
1488
DCHD2B
1485
RETC2B
1489
95-5A
1495
95-5B
1500
95-6A
1505
95-6B
1510
EC9A
1512
ETP4
1516
EPH2
1520
EC9B
1522
EPE2
1526
ES1
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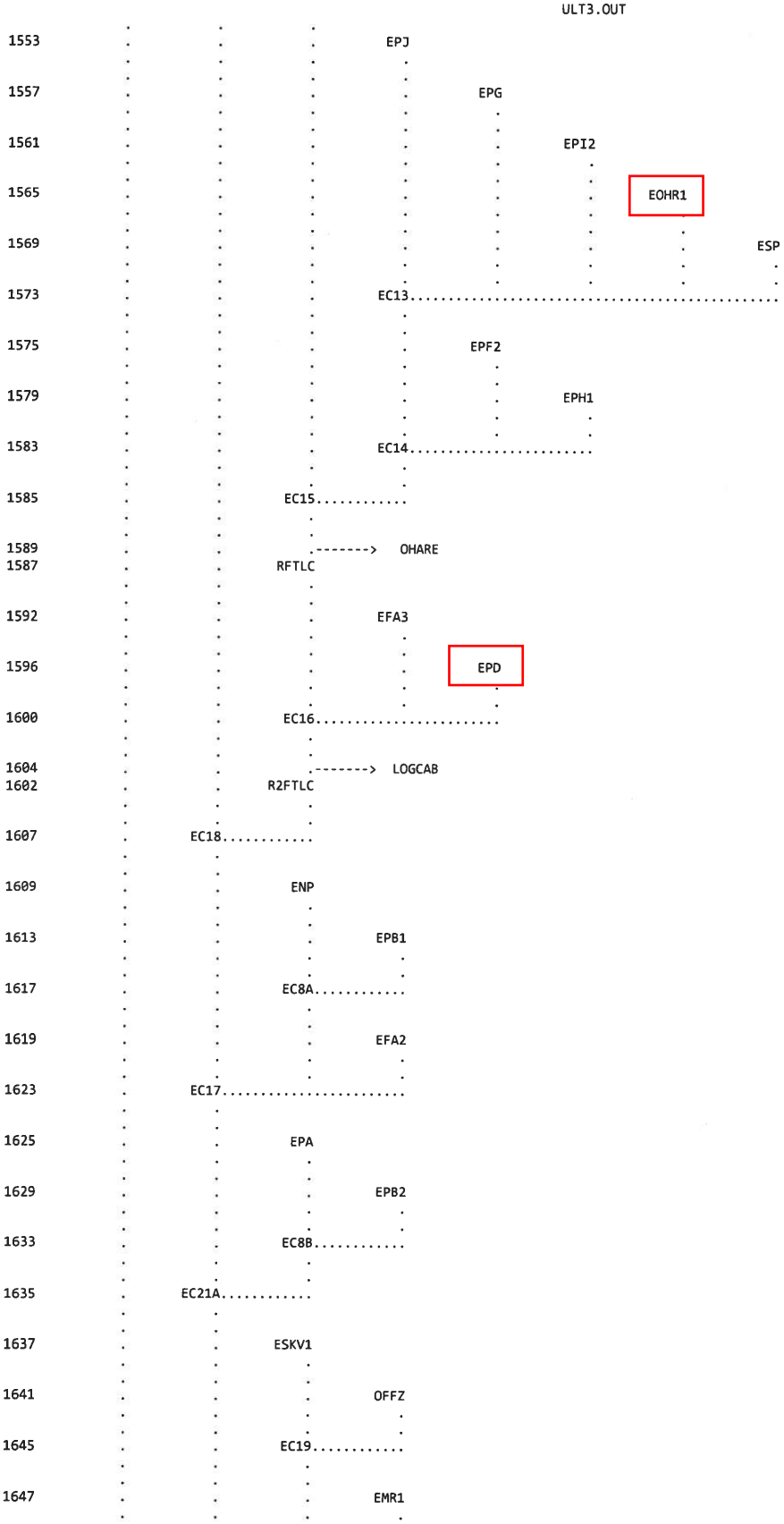
EC11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ESP
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EC13
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EPH1
1583
EC14
1585
EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

HYDROGRAPH AT										
+	EPF1	.02	1	FLOW	32.	31.	31.	29.	28.	28.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC6	5.43	1	FLOW	2977.	2897.	2858.	2701.	2622.	2579.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	35.	34.	34.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC8	5.45	1	FLOW	3012.	2931.	2892.	2734.	2654.	2611.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	12.	12.	11.	11.	11.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	11.	11.	11.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	19.	18.	18.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	12.	12.	12.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	57.	55.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	27.	26.	26.	25.	24.	24.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	87.	85.	83.	79.	77.	76.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	22.	22.	21.	20.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	20.	20.	19.	18.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	8.	8.	8.	8.	7.	7.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	29.	29.	28.	27.	26.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	37.	36.	36.	34.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	55.	53.	52.	49.	47.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	36.	35.	34.	32.	31.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	20.	19.	19.	18.	17.	17.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	29.	29.	28.	27.	26.	26.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	4.92	4.92	4.92
5 COMBINED AT										
+	EC13	.11	1	FLOW	136.	132.	130.	123.	119.	117.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	57.	56.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	56.	54.	53.	50.	49.	48.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	232.	225.	222.	209.	203.	200.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	267.	259.	256.	241.	234.	230.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	OHARE	.28	1	FLOW	47.	47.	47.	47.	47.	47.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	220.	212.	209.	194.	187.	183.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	65.	63.	62.	59.	57.	56.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	287.	278.	273.	255.	247.	242.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	200.	191.	186.	168.	160.	155.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	3211.	3122.	3078.	2902.	2814.	2766.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	4.92	4.92	4.92	5.00	5.00	5.08
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18DEC18  TIME  12:39:20  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     LENNAR HOMES
    3         ID     SKYE CANYON
    4         ID     MASTER DRAINAGE STUDY - UPDATE #5
    5         ID     ULTIMATE DRAINAGE CONDITION - REVISED EAST AREA
    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3 - 10yr.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR    PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    1.58
   32         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC   0.998   0.999   1.000
   40         LS       0    98.0
   41         UD   0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

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                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```



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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    1.58
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```

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                *
     1561       KK    EPI2
     1562       BA  0.0116
     1563       LS       0    90.1
     1564       UD   0.081
                *
     1565       KK   EOHR1
     1566       BA  0.0158
     1567       LS       0    97.5
     1568       UD   0.125
                *
     1569       KK     ESP
     1570       BA  0.0055
     1571       LS       0    55.3
     1572       UD   0.128
                *
     1573       KK    EC13
     1574       HC       5
                *
     1575       KK    EPF2
     1576       BA  0.0298
     1577       LS       0    90.1
     1578       UD   0.050
                *
     1579       KK    EPH1
     1580       BA  0.0373
     1581       LS       0    90.1
     1582       UD   0.141
                *
1                                       HEC-1 INPUT                                          PAGE 44

     LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

     1583       KK    EC14
     1584       HC       3
                *
     1585       KK    EC15
     1586       HC       2
                *
     1587       KK   RFTLC
     1588       KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
     1589       DT   OHARE
     1590       DI       0     115    5000
     1591       DQ       0       0      47
                *
     1592       KK    EFA3
     1593       BA  0.0039
     1594       LS       0    98.0
     1595       UD   0.122
                *
     1596       KK     EPD
     1597       BA  0.0452
     1598       LS       0    90.1
     1599       UD   0.162
                *
     1600       KK    EC16
     1601       HC       3
                *
     1602       KK  R2FTLC
     1603       KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
     1604       DT  LOGCAB
     1605       DI       0      87    5000
     1606       DQ       0      87      87
                *
     1607       KK    EC18
     1608       HC       2
                *
     1609       KK     ENP
     1610       BA  0.0055
     1611       LS       0    55.3
     1612       UD   0.139
                *
     1613       KK    EPB1
```

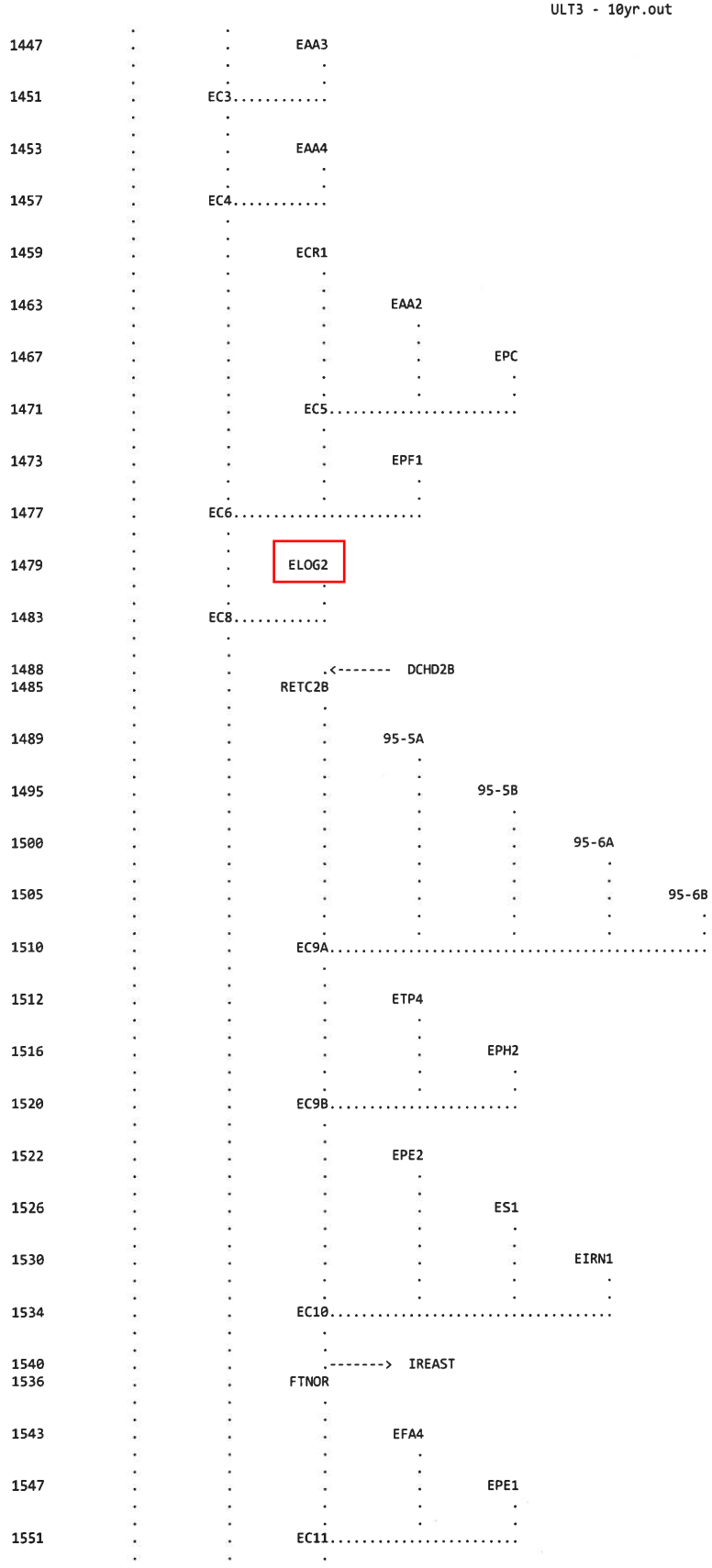
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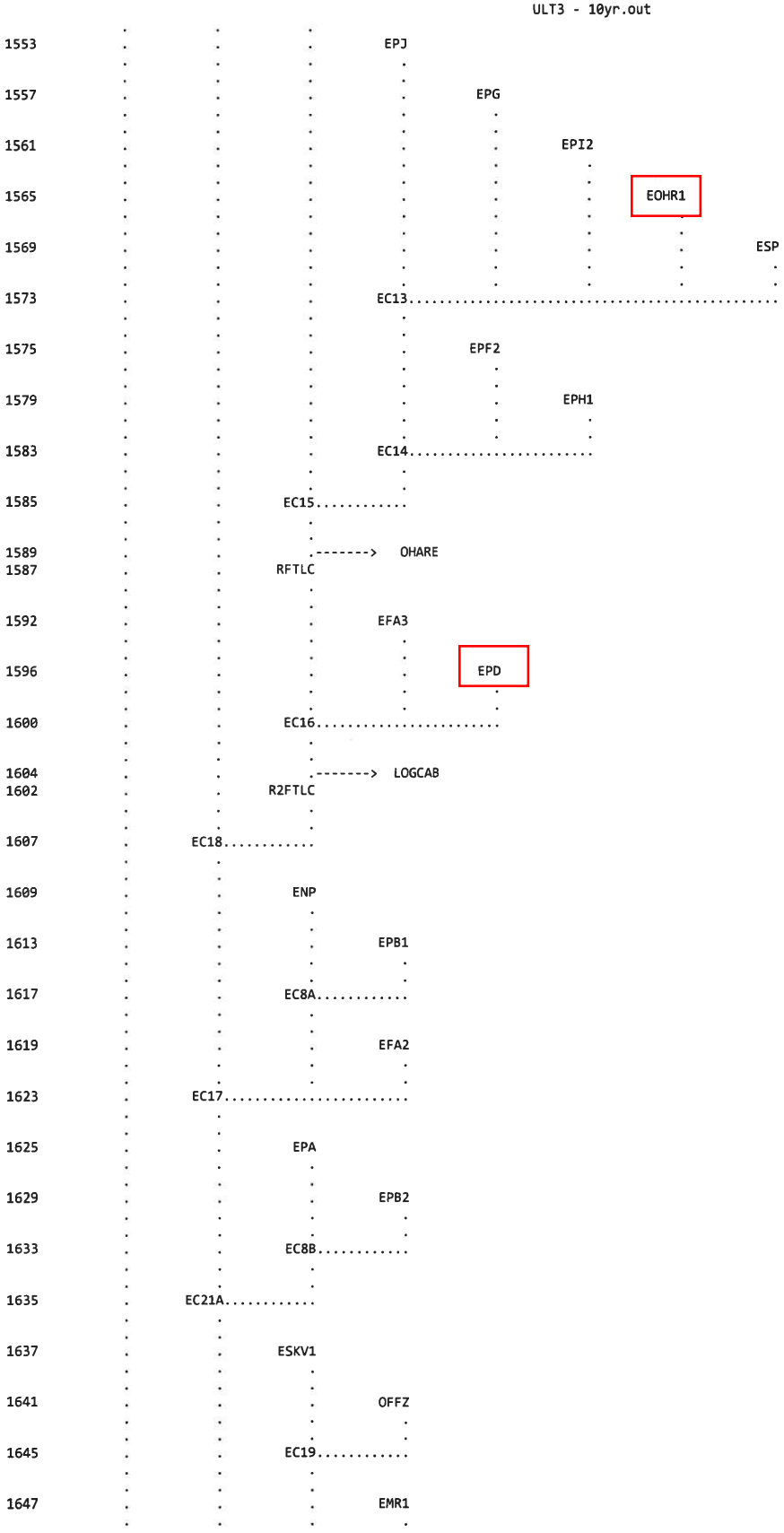
1453 EAA4
1457 EC4
1459 ECR1
1463 EAA2
1467 EPC
1471 EC5
1473 EPF1
1477 EC6
1479 ELOG2
1483 EC8
1488 DCHD2B
1485 RETC2B
1489 95-5A
1495 95-5B
1500 95-6A
1505 95-6B
1510 EC9A
1512 ETP4
1516 EPH2
1520 EC9B
1522 EPE2
1526 ES1
1530 EIRN1
1534 EC10
1540 IREAST
1536 FTNOR
1543 EFA4
1547 EPE1
1551 EC11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EPJ
1557
EPG
1561
EPI2
1565
EOHR1
1569
ESP
1573
EC13
1575
EPF2
1579
EPH1
1583
EC14
1585
EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

+	EPF1	.02	1	FLOW	14.	14.	14.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC6	5.43	1	FLOW	1296.	1258.	1238.	1164.	1127.	1108.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	19.	19.	19.	18.	18.	17.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58
2 COMBINED AT										
+	EC8	5.45	1	FLOW	1315.	1277.	1257.	1182.	1145.	1125.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	5.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	27.	26.	26.	24.	23.	23.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	13.	13.	13.	12.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	42.	41.	40.	38.	37.	36.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	10.	9.	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	8.	7.	7.	7.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	5.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	13.	13.	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	18.	17.	17.	16.	15.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	19.	18.	18.	16.	16.	15.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	16.	15.	15.	14.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	9.	8.	8.	8.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	16.	16.	16.	15.	14.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
5 COMBINED AT										
+	EC13	.11	1	FLOW	58.	56.	55.	52.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	26.	25.	25.	23.	22.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	25.	24.	23.	22.	21.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	99.	96.	94.	88.	84.	83.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	OHARE	.28	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.58	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	28.	28.	27.	25.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	148.	143.	141.	131.	127.	124.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	61.	56.	54.	44.	40.	37.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	1376.	1333.	1311.	1226.	1184.	1163.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC17	5.84	1	FLOW	1396.	1352.	1329.	1243.	1200.	1178.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

Appendix D – Improvement Plans

CIVIL IMPROVEMENT PLANS

FOR

SUNSTONE - PARCEL D

APN: 125-06-710-003

LAS VEGAS, NEVADA

PROJECT CONTACTS

DEVELOPER/OWNER
LENNAR
9275 W RUSSELL RD, SUITE 400
LAS VEGAS, NEVADA 89148

CONTACT: ROBERT FLAXA
(702) 821-4651

MASTER PLAN SURVEYOR
VTN NEVADA
2727 S RAINBOW BLVD
LAS VEGAS, NEVADA 89146

CONTACT: RAYMOND JOHNSON
(720) 873-7550

CIVIL ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD SOUTH, SUITE 320
LAS VEGAS, NEVADA 89119

CONTACT: MIKAL KINTNER
(702) 862-3632

PROJECT INFORMATION

NUMBER OF LOTS: 199
ACREAGE: ±30.74 ACRES (GROSS)

EXISTING ZONING: T-D EXISTING
PROPOSED ZONING: T-D

ENTITLEMENTS: TMP-78151

DRAINAGE STUDY: DS5281A

TRAFFIC STUDY: TIA75571-1

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE 'X' PER FEMA FLOOD INSURANCE MAP NUMBERS 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE¼) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

LEGAL DESCRIPTION

PARCEL 13 OF THE PARENT FINAL MAP OF SUNSTONE (FMP-77750) BOOK 161, PAGE 40 OF PLATS ON FILE WITH CLARK COUNTY NEVADA, RECORDER.

UTILITY NOTE

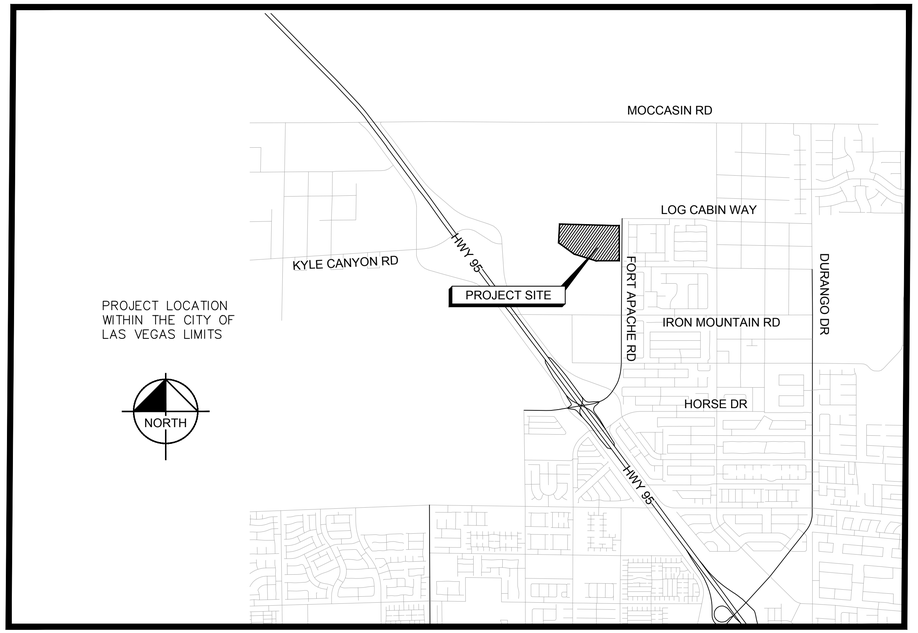
KIMLEY-HORN AND ASSOCIATES TAKES NO RESPONSIBILITY FOR EXISTING UTILITIES SHOWN HEREIN. THE EXISTING UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY-OTHER PARTIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND VERIFY THE LOCATIONS AND INVERTS OF THE EXISTING WITHIN THE VICINITY OF CONSTRUCTION ACTIVITIES. IF A CONFLICT IS FOUND TO EXIST, THE CONTRACTOR SHALL COORDINATE THE PROJECT ENGINEER, PROJECT ARCHITECT, AND THE OWNER IMMEDIATELY.

UTILITY PROVIDERS

WATER	LAS VEGAS VALLEY WATER DISTRICT
SEWER	CITY OF LAS VEGAS
ELECTRIC	NV ENERGY
SOLID WASTE DISPOSAL	REPUBLIC SERVICES
GAS	SOUTHWEST GAS
TELEPHONE	CENTURY LINK
COMMUNICATIONS	COX COMMUNICATIONS

GENERAL NOTES

1. THIS SUBDIVISION IS A PART OF THE SUNSTONE MASTER PLAN.
2. LANDSCAPING ON-SITE WILL BE MAINTAINED BY AN HOA
3. WATER POINT OF CONNECTION WILL COME OFF EXISTING WATER LINES STUBS IN O'HARE AVE & SKYE CANYON PARK DR.
4. SEWER POINT OF CONNECTION WILL COME OFF EXISTING SEWER LINES AT THE SOUTHEAST CORNER OF THE PARCEL
5. ABOVE GROUND UTILITY BOXES SHALL NOT BE PLACED WITHIN TRAIL CORRIDORS
6. ONSITE STREETS, TRAILS, OPEN SPACES, AND DRAINAGE CORRIDORS ARE TO BE PRIVATE AND MAINTAINED BY THE HOA
7. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA



LOCATION MAP
NTS

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER SOUTHWEST GEOTECHNICAL:
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

SHEET INDEX

SEE SHEET 3 FOR SHEET INDEX

APPROVALS

CITY OF LAS VEGAS

"APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY LISTED UNDER "DEVIATIONS FROM STANDARDS" THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATION FROM STANDARDS" IN FAVOR OF THE CITY OF LAS VEGAS IMPROVEMENT STANDARDS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA".

ALLEN PAVELKA, PE #09029
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

CITY OF LAS VEGAS PLANNING DEPARTMENT
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT

CITY OF LAS VEGAS FIRE DEPT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1625 GPM / ONSITE 1625 GPM

NV ENERGY* DATE

* NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK* DATE

* THE AFFIXED CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTIONS OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. DATE

SOUTHWEST GAS CORPORATION DATE

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MIKAL KINTNER EXPIRES 06/30/21 CIVIL No. 23006 — 07/01/2020

KHA PROJECT 092935006		DESIGNED BY	MK
DATE 07/01/2020		DRAWN BY	KJW
SCALE AS SHOWN		CHECKED BY	TLC

COVER SHEET

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

Plotted By:Kintner Mikal Sheet Set:092935006 - Lennar Sunstone Parcel D Layout:1 COVER SHEET July 02, 2020 11:27:52am K:\LAS_Civil\092935006-Lennar Sunstone\CAD\PlanSheets\Parcel D\092935006-Cv-D.dwg
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CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 'UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA', LATEST ISSUE; THE 'UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA', LATEST REVISED EDITION; THE 'SUMMERLIN IMPROVEMENT STANDARDS' FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS 'DEVIATIONS FROM STANDARDS'.
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STD STANDARD DRAWING 218.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY TERRACON CONSULTANTS INC. DATED DECEMBER 14, 2017 PROJECT NO. 64175087, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE A MINIMUM OF TWO (2) HORIZONTAL AND VERTICAL (INVERT) LOCATIONS OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER MAIN AND LATERALS TO THE HORIZONTAL SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
22. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC/ELECTRICAL FIELD OPERATIONS DIVISION AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623.1.0.03 (E) OF THE SPECIFICATIONS.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION. 4. ALL EMPTY CONDUIT SHALL HAVE PULL STRINGS INSTALLED PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE OF EIGHTEEN INCHES (18") TO THE FACE OF STREET LIGHTING POLE ON ALL SIDES WHEN STREETLIGHT IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE. 6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE ELECTRICAL SERVICES SECTION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NEVADA POWER COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREETLIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

NOTE TO CONTRACTOR:

1. CONTRACTOR IS REQUIRED TO NOTIFY THE ARCHITECT, ENGINEER AND OWNER IN WRITING BY RFI OF ANY TYPED, HANDWRITTEN, STAMPED OR LABELLED PLAN CHECK COMMENTS ON THE PERMITTED PLANS WITHIN 7 DAYS OF RECEIPT OF THE PERMITTED PLANS. FAILURE TO PROVIDE WITHIN 7 DAYS INDICATES CONTRACTOR HAS INCLUDED ALL COSTS WITHIN HIS BASE BID TO COMPLY WITH FEDERAL, STATE AND LOCAL CODES AND SHALL PERFORM THE WORK AT NO ADDITIONAL COST.
2. GENERAL CONTRACTOR SHALL INCLUDE CONTACTING, COORDINATING PERMITS, SCHEDULING AND SUPERVISING ALL WORK TO BE PERFORMED BY NVE, SOUTHWEST GAS, CENTURYLINK, COX CABLE OR OTHER UTILITY PURVEYOR WORK PRIOR TO AND DURING CONSTRUCTION INCLUDING BARRICADING PLANS, BARRICADE DESIGNS, PERMITS AND BARRICADE WORK.
3. GENERAL CONTRACTOR SHALL CONTACT AND MEET ONSITE WITH ALL UTILITY PURVEYORS FOR SCHEDULING AND COORDINATION PURPOSES AT LEAST 30 DAYS PRIOR TO INSTALLATION OF UTILITY WORK.
4. GENERAL CONTRACTOR SHALL PROVIDE AND PAY FOR ALL BARRICADING PLANS, APPROVALS AND BARRICADING WITHIN THE RIGHT OF WAY AS WELL AS ANY CHANGES REQUIRED BY THE GOVERNING AUTHORITY IN THE PERFORMANCE OF CONTRACTOR'S WORK.
5. THE OWNER AND/OR HIS CONSULTANTS ARE NOT RESPONSIBLE FOR DELAYS CAUSED BY CONTRACTOR'S FAILURE TO PROVIDE NOTIFICATIONS IN A TIMELY MANNER.
6. PROJECT CONSULTANTS SHALL RESPOND TO RFIS OR OTHER CONTRACTOR QUERIES WITHIN 5 BUSINESS DAYS.

DEVIATION FROM STANDARDS

NONE

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # 137252

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF THE UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES OR SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS OF CONSTRUCTION MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDED THE PLACEMENT OF APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

   ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. NO LEAD COMPLIANCE NOTE: TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE INSTALLED OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO._____####_____ FIRST APPROVED DATE:_____

SWPPP NOTES

1. CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVED ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS AND CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTION MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS FIRE & RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS-APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND FIRE HYDRANT MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 3310 & 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES OR CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC 507.2.1, NFPA 24]
8. PAINTING CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC 507.5.7.1]
10. PRIOR TO FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    RESIDENTIAL-500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED
    COMMERCIAL-300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FEET SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN ISLANDS, FIRE HYDRANTS SHALL BE PROVIDED ON TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC C102.1]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET. [IFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE FOUR (4) OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN TWO (2) FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 8% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FEET 6 INCHES. [IFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FEET FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD, NOT LESS THAN 24 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FEET. [IFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FEET IF THE BUILDING IS SPRINKLERED. [IFC 501.1.1]
25. APPROVED SECONDARY FIRE APPARATUS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FEET. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR E

MASTER LEGEND

- STREET CENTERLINE
- PROPERTY LINE / RIGHT OF WAY
- EASEMENT LINE
- EXISTING PATENT EASEMENT
- EXISTING WALL
- PROPOSED RETAINING OR STEM WALL
- PROPOSED SCREEN WALL
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED CONCRETE BARRIER RAIL
- EXISTING CURB & GUTTER
- PROPOSED CURB & GUTTER
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BOLLARD
- PROPOSED DOOR
- SCARP
- SLOPE
- EXISTING GRADE
- PROPOSED GRADE
- BACKWATER VALVE
- PRESSURE REDUCING VALVE

- EXISTING CONTOUR
- PROPOSED CONTOUR
- CUT FILL TRANSITION
- ADA ACCESS
- SAWCUT LIMITS
- GRADE BREAK
- FLOW LINE
- EXISTING STORM DRAIN
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- PROPOSED SEWER
- PROPOSED SEWER LATERAL
- PROPOSED WATER LINE
- PROPOSED STREET LIGHT / TRAFFIC CONDUIT
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN
- EXISTING HANDICAP PARKING
- PROPOSED HANDICAP PARKING
- EXISTING STORM DRAIN MANHOLE
- PROPOSED SIDEWALK DRAIN
- EXISTING DROP INLET
- PROPOSED DROP INLET
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE
- EXISTING FIRE HYDRANT
- PROPOSED CLEAN OUT
- PROPOSED FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- PROPOSED BLUE REFLECTIVE PAVEMENT MARKING
- EXISTING MISCELLANEOUS MANHOLE
- EXISTING POLE
- EXISTING STREET LIGHT
- EXISTING AREA LIGHT
- PROPOSED STREET LIGHT
- PROPOSED AREA LIGHT

ABBREVIATIONS

@	AT	LA	LANDSCAPE ARCHITECT
AB	AGGREGATE BASE	LF	LINEAR FEET
AC	ASPHALTIC CONCRETE	LP	LOW POINT
ADA	AMERICANS WITH DISABILITIES ACT	LS	LANDSCAPE
AVE	AVENUE	LT	LEFT
BC	BACK OF CURB	LVVWD	LAS VEGAS VALLEY WATER DISTRICT
BCR	BEGIN CURB RETURN	MAX	MAXIMUM
BLVD	BOULEVARD	ME	MATCH EXISTING
BM	BENCHMARK	MEP	MECHANICAL, ELECTRICAL AND PLUMBING
BVC	BEGIN VERTICAL CURVE		
BW	BOTTOM OF WALL	MH	MANHOLE
BWV	BACKWATER VALVE	MIN	MINIMUM
B/S	BACKSIDE	MUE	MUNICIPAL UTILITY EASEMENT
CALC	CALCULATED	N	NORTH
CC	CLARK COUNTY	NTS	NOT TO SCALE
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING	N/S	NORTH/SOUTH
		OC	ON CENTER
CL	CENTERLINE	P.A.E.	PUBLIC ACCESS EASEMENT
CJ	CONSTRUCTION JOINT	PC	POINT OF CURVATURE
COH	CITY OF HENDERSON	PCC	PORTLAND CEMENT CONCRETE
CUHBD	CITY OF HENDERSON BUILDING DEPARTMENT	PDE	PRIVATE DRAINAGE EASEMENT
		PR	PROPOSED
CO	CLEAN OUT	PRC	POINT OF REVERSE CURVATURE
CONN	CONNECTION	PROP	PROPOSED
CTV	CABLE TELEVISION	PRV	PRESSURE REDUCING VALVE
CY	CUBIC YARD	PT	POINT OF TANGENCY
Δ	DELTA (DIFFERENCE) / ANGLE	PVC	POLYVINYL CHLORIDE
D	DEPTH	PVI	POINT OF VERTICAL INFLECTION
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS	PUB	PUBLIC
		PVT	PRIVATE
		R	RADIUS
DG	DECOMPOSED GRANITE	RCB	REINFORCED CONCRETE BOX
DI	DUCTILE IRON	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	RT	RIGHT
E	EAST	R/W	RIGHT OF WAY
EA	EACH	S	SOUTH
EG	EXISTING GRADE	SD	STORM DRAIN
ESMT	EASEMENT	SDMH	STORM DRAIN MANHOLE
ECR	END CURB RETURN	SF	SQUARE FOOT OR FEET
ELEV	ELEVATION	SS	SANITARY SEWER
ELEC	ELECTRICAL	SSMH	SANITARY SEWER MANHOLE
EOP	EDGE OF PAVEMENT	ST	STREET
EVC	END VERTICAL CURVE	ST-LT	STREETLIGHT
EX.	EXISTING	STL	STEEL
E/W	EAST/WEST or EACH WAY	STD	STANDARD
FF	FINISHED FLOOR	SW	SIDEWALK
FFE	FINISHED FLOOR ELEVATION	SY	SQUARE YARDS
F-F	FACE OF CURB TO FACE OF CURB	TC	TOP OF CURB
FG	FINISHED GROUND	TF	TOP OF FOOTING
FH	FIRE HYDRANT	TG	TOP OF GRATE
FL	FLOWLINE	TRW	TOP OF RETAINING WALL
FT	FOOT or FEET	TYP	TYPICAL
GB	GRADE BREAK	TW	TOP OF WALL
GFE	GARAGE FACE ELEVATION	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
H	HEIGHT		
HDPE	HIGH-DENSITY POLYETHYLENE		
HP	HIGH POINT	VERT	VERTICAL
INT	INTERSECTION	W	WEST
INV	INVERT	WL	WATERLINE
L	LENGTH	WTR	WATER
		XFF	EXISTING FINISHED FLOOR ELEVATION
		±	PLUS OR MINUS

QUANTITIES ARE SHOWN FOR PERMIT PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN ESTIMATE FOR BIDDING AND SHALL BID A COMPLETE JOB. CONTRACTOR SHALL ADVISE OWNER & ENGINEER OF ANY APPARENT DISCREPANCIES IN ESTIMATE.

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No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA — TAMARA KAY WILLIAMS — No. 023519 — CIVIL — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

MASTER LEGEND & QUANTITIES

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

3
C0.3

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

Plotted By:Kintner, Mikol Sheet Set:092935006 - Lennar Sunstone\Parcel D Layout:3 MASTER LEGEND & QUANTITIES July 02, 2020 11:27:58am K:\LAV Civil\092935006-CVL-D.dwg
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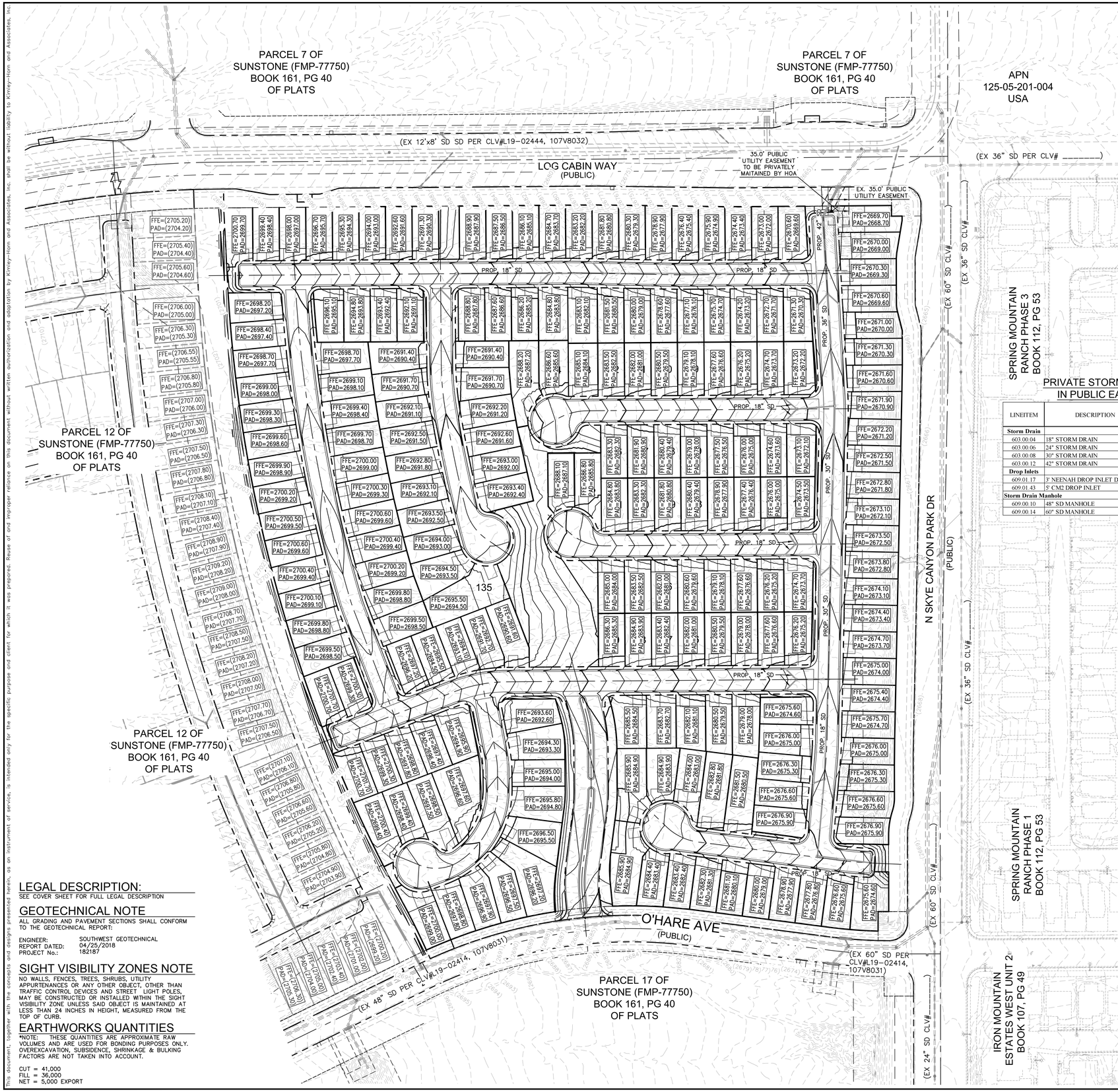

PRIVATE STORM QUANTITIES IN PUBLIC EASEMENTS:

LINEITEM	DESCRIPTION	Public Quantity	Private Quantity	Unit Type
Storm Drain				
603.00.04	18" STORM DRAIN		1566	LF
603.00.06	24" STORM DRAIN		177	LF
603.00.08	30" STORM DRAIN		688	LF
603.00.12	42" STORM DRAIN		153	LF
Drop Inlets				
609.01.17	3' NEENAH DROP INLET D=6' MAX		26	EA
609.01.43	5' CM2 DROP INLET		1	EA
Storm Drain Manhole				
609.00.10	48" SD MANHOLE		14	EA
609.00.14	60" SD MANHOLE		2	EA

ENGINEER'S NOTES

1. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.
3. ALL WORK SHALL CONFORM TO THE SOILS REPORT PREPARED BY SOUTHWEST GEOTECHNICAL, DATED 04/25/2018. PROJECT NO. 182187
4. ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST EDITION.
5. FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF INCH ABOVE THE TOP OF THE GUTTER (INCLUDING OPEN GRADE).
6. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION
7. THIS PLAN SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY ALL APPLICABLE GOVERNMENT AGENCIES.
8. ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
9. MATCH ELEVATIONS SHOWN TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.
10. PERIMETER SCREEN WALL AND RETAINING WALL PERMIT TO BE COMPLETED PER SEPARATE PLANS AND PERMIT BY OTHERS.
11. PER THE SOILS REPORT, POSITIVE DRAINAGE OF 5% MINIMUM SHALL BE MAINTAINED FOR AREAS ADJACENT TO STRUCTURES THAT ARE NOT COVERED BY CONCRETE OR ASPHALT. THE 5% SHOULD BE MAINTAINED FOR A DISTANCE OF 10'
12. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED
13. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION
14. THE CONTRACTOR SHALL VERIFY THE EX. GRADES PRIOR TO CONSTRUCTION. IF A CONFLICT EXISTS BETWEEN THE FIELD CONDITION AND THESE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
15. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE IS MAINTAINED.
16. ALL PAVEMENT SECTIONS SHOWN HEREIN ARE BASED ON THE RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER.
17. ONSITE STORMWATER CONVEYANCE SYSTEM IS TO BE PRIVATELY MAINTAINED.
18. ADD 2600' TO ALL 2-DIGIT ELEVATIONS UNLESS OTHERWISE NOTED.
19. REFER TO SHEET C0.3 FOR LEGEND AND ABBREVIATIONS.

STORMWATER MANAGEMENT NOTE

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CLARK COUNTY BUILDING ADMINISTRATIVE CODE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5274A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

SIGHT VISIBILITY ZONES NOTE

NO WALLS, FENCES, TREES, SHRUBS, UTILITY APPURTENANCES OR ANY OTHER OBJECT, OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES, MAY BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE UNLESS SAID OBJECT IS MAINTAINED AT LESS THAN 24 INCHES IN HEIGHT, MEASURED FROM THE TOP OF CURB.

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

FAST Call before you UnderGround 1-702-432-5300 — FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig — AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-498-3600
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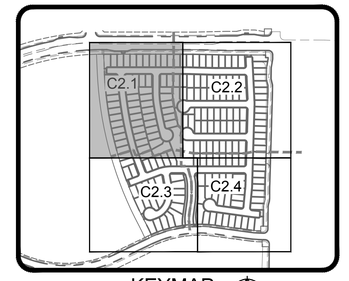
PROFESSIONAL ENGINEER — TAMARA CONNOLLY — STATE OF NEVADA — No. 025119 — EXPIRES 07/31/20 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

OVERALL GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

5 OF 22 SHEETS
C2.0



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
4. INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
8. CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.

ENGINEER'S NOTES

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2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

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No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER — STATE OF NEVADA — TAMARA CONNOLLY — No. 025119 — EXPIRES 12/31/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C2.1

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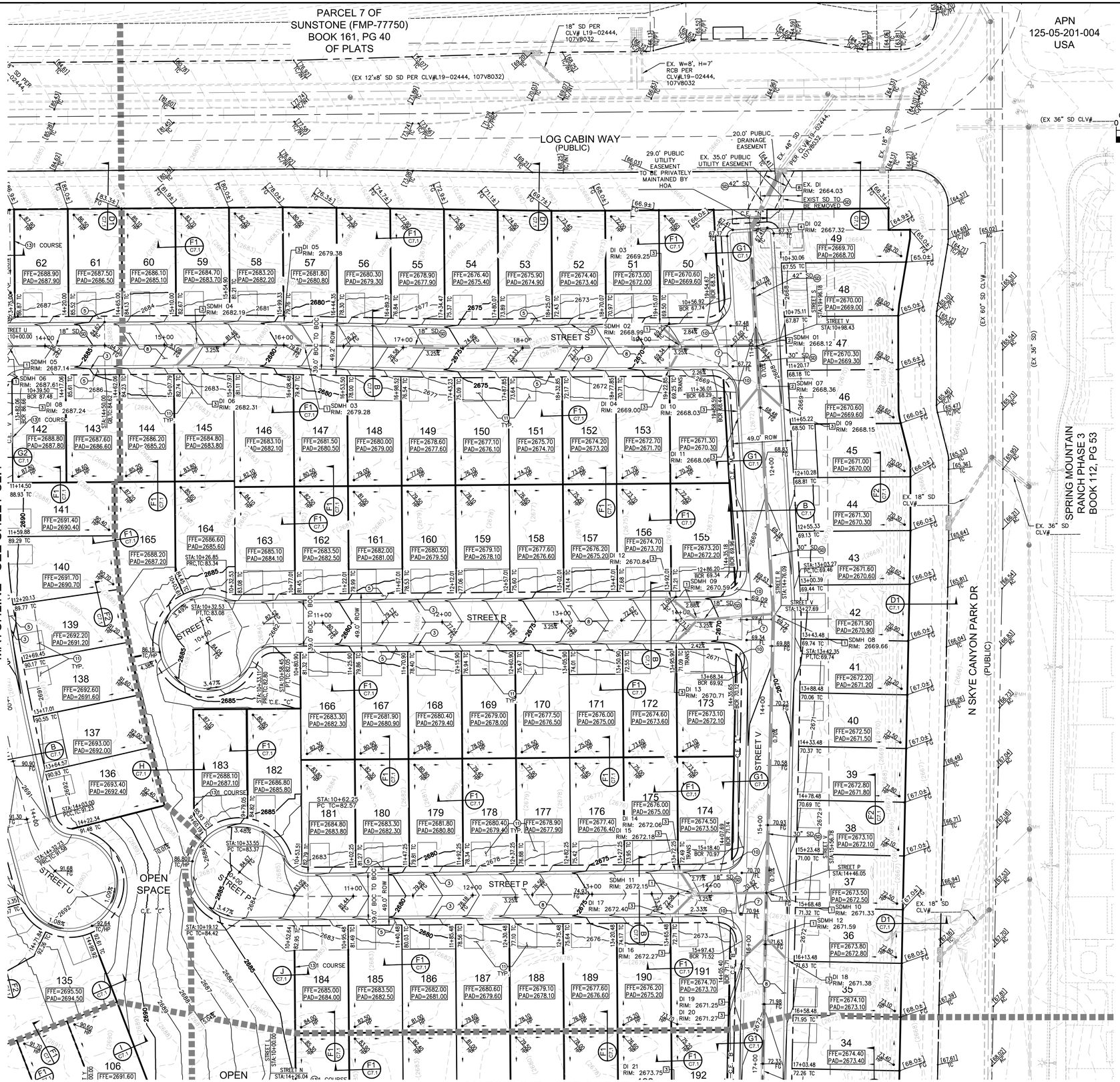

KEYMAP
N.T.S.

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
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10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
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SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
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3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
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ENGINEER'S NOTES

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STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — EXPIRES 07/31/2020 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

1. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
2. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
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STORMWATER QUANTITIES
SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE
SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE
SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE
ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES
SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES
SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:
SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE
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BENCHMARK
MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

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NAVD 88 DATUM

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TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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No.	REVISIONS	DATE	BY

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WWW.KIMLEY-HORN.COM

TAMARA CONNOLLY — NEVADA — CIVIL — No. 025119 — PROFESSIONAL ENGINEER — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

8 OF 22 SHEETS
C2.3

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STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE "X" PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

FAST Call before you UnderGround 1-702-432-5300 — FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3500
WWW.KIMLEY-HORN.COM

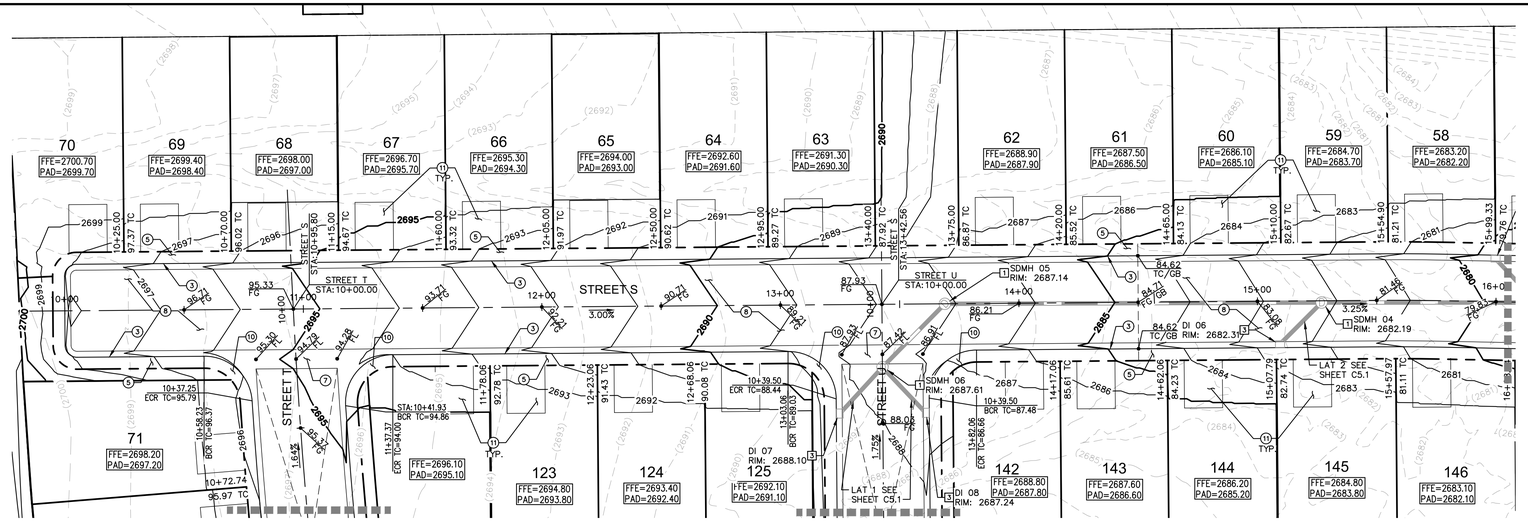
PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

9 OF 22 SHEETS
C2.4



STREET T
SEE SHEET C4.08

STREET U
SEE SHEET C4.10

STREET S (PRIVATE)
PLAN VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.02

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

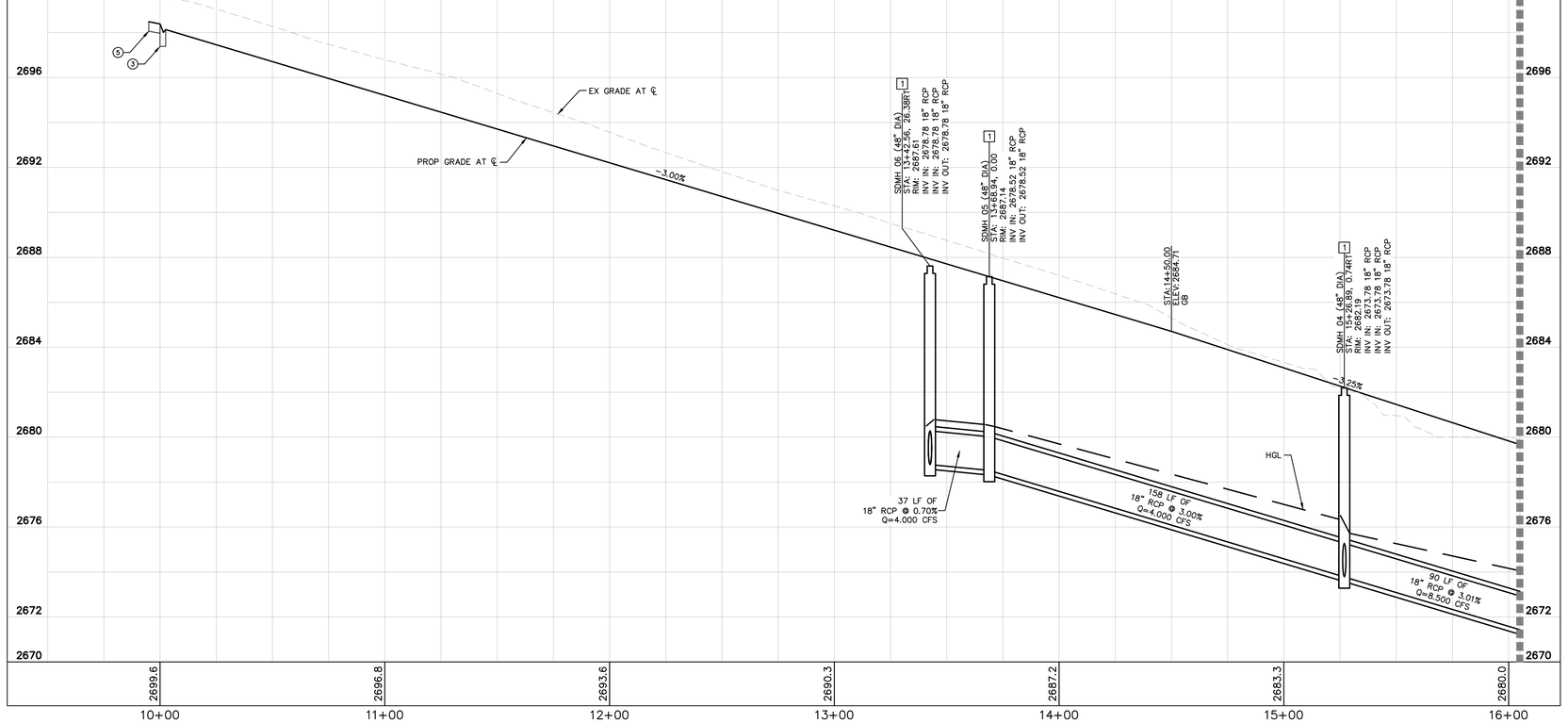
(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



MATCHLINE - SEE SHEET C4.02

STREET S (PRIVATE)
PROFILE VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

STATE OF NEVADA — JESSICA M. KRAMER — No. 23040 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET S PLAN & PROFILE STA 9+50 - 16+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C4.01

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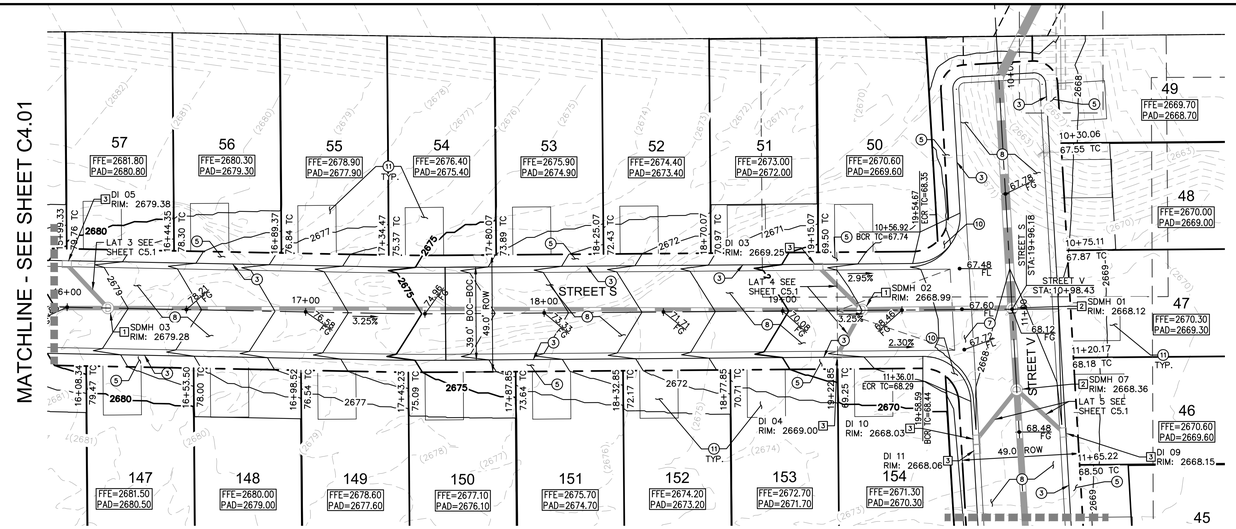


NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

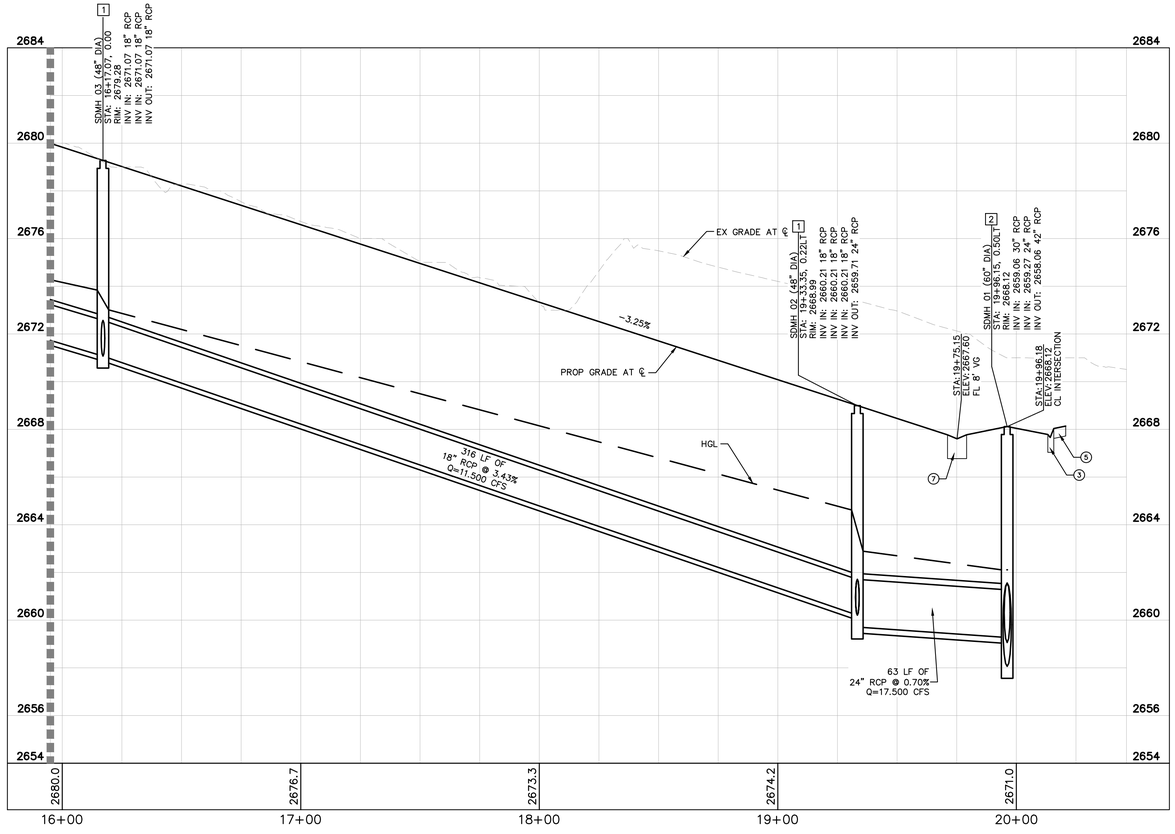
KEYMAP
N.T.S.

STREET S (PRIVATE)
PLAN VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'

STREET V
SEE SHEET C4.11

MATCHLINE - SEE SHEET C4.01



STREET S (PRIVATE)
PROFILE VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'
VERT: 1" = 3'

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER NEVADA 19019 TIMOTHY L. CLARA 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET S PLAN & PROFILE STA 16+00 - 20+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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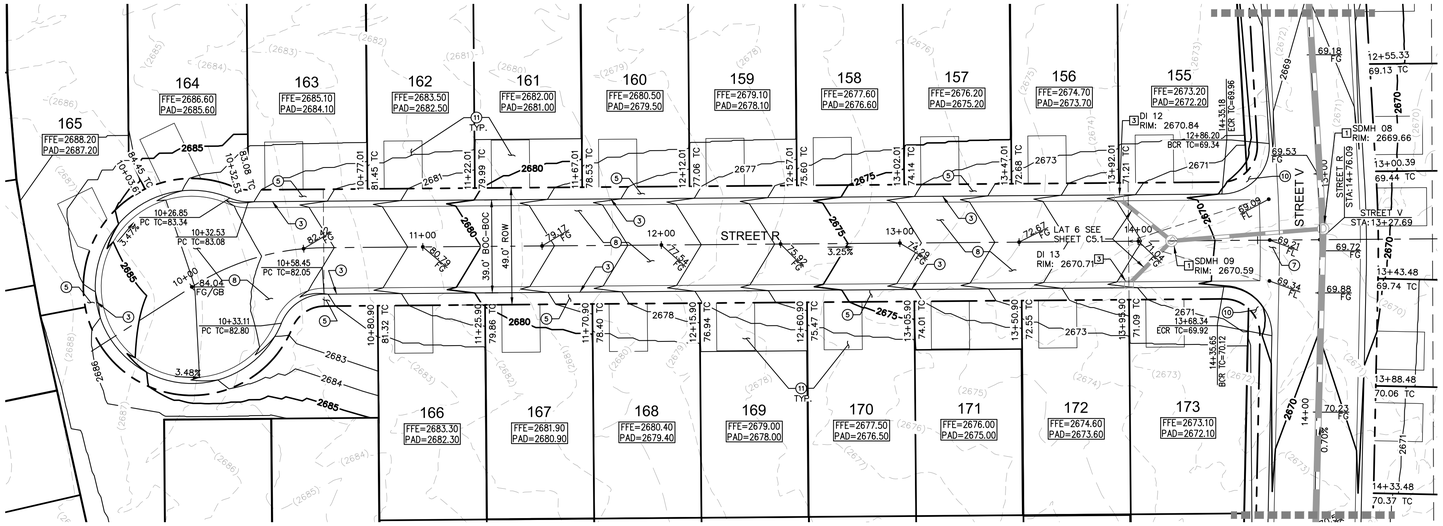
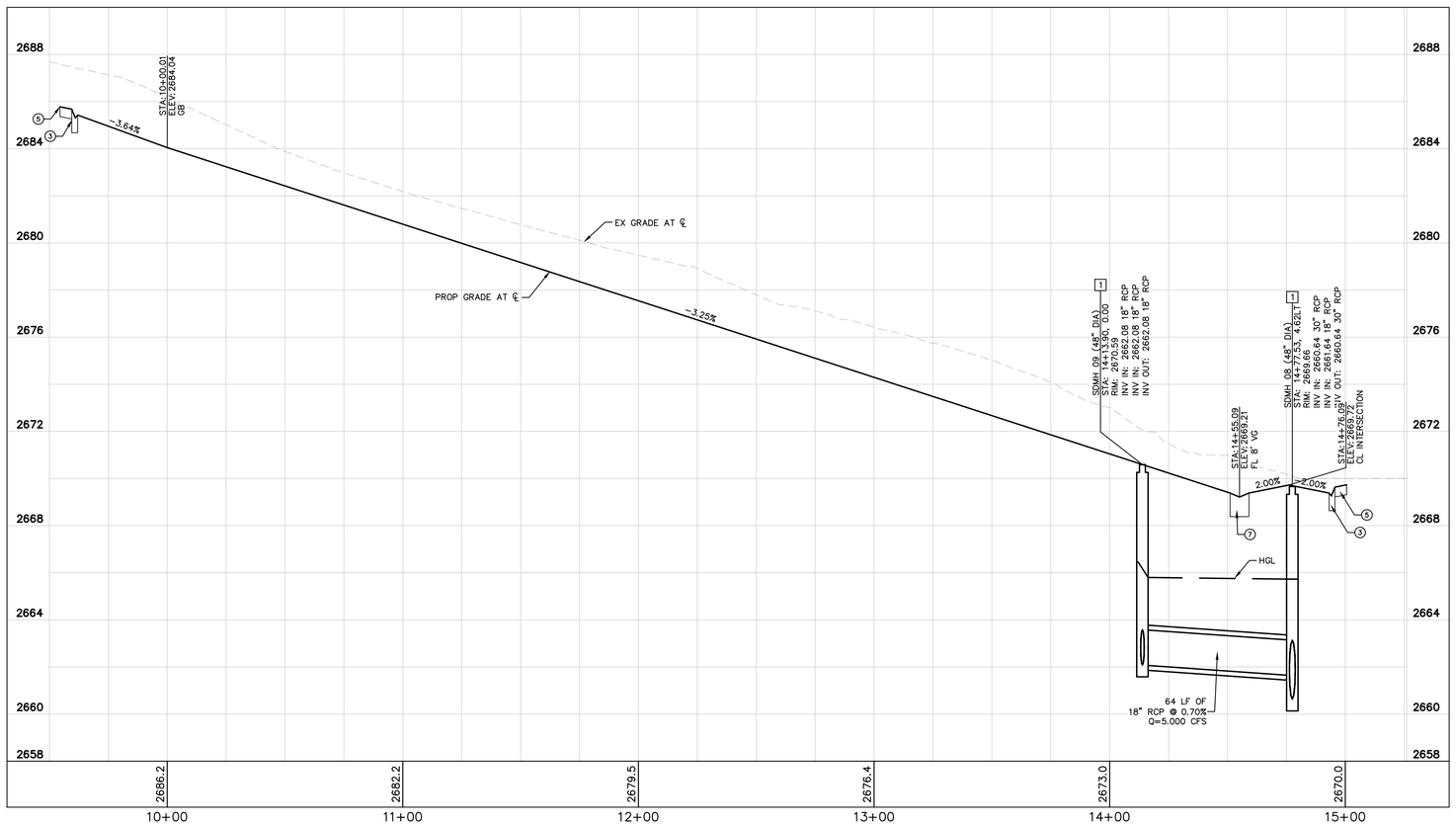


STREET R (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25
HORIZ: 1" = 30'



STREET R (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AND CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING AWYWHERE POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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PHONE: 702-562-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA 15673 CIVIL 07/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET R PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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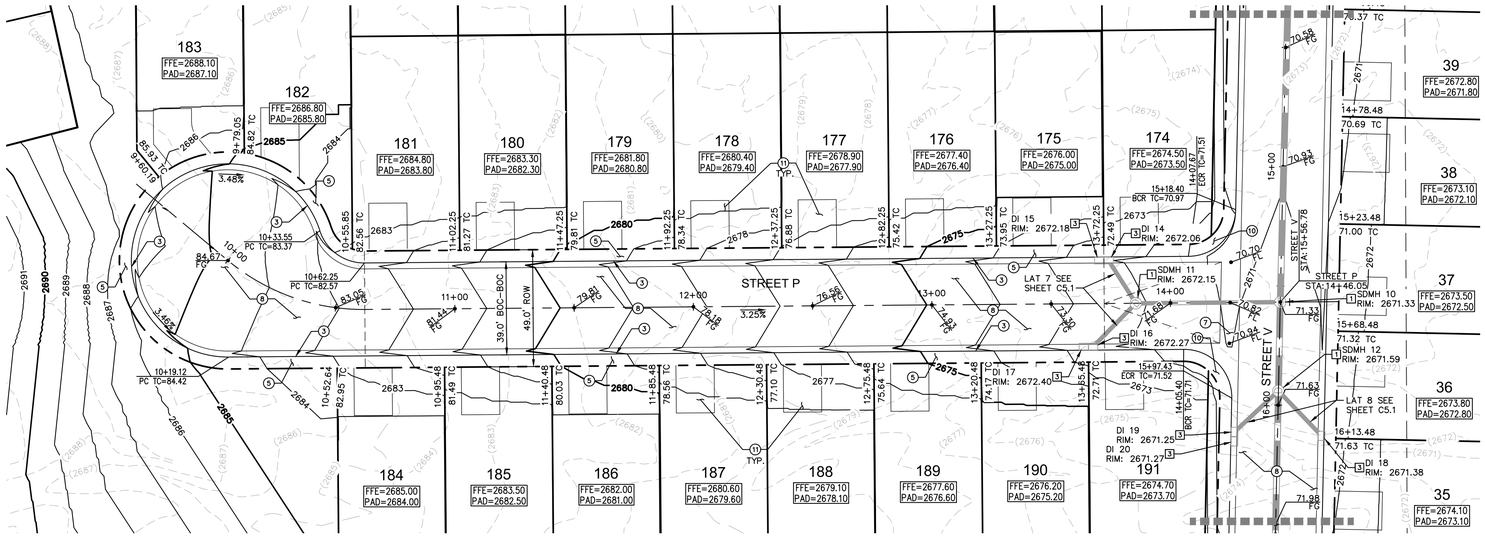

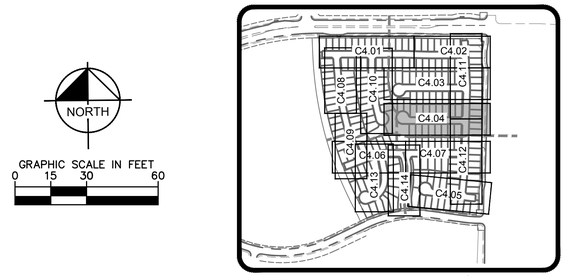

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

STREET P (PRIVATE)
PLAN VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'

STREET P (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E, PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

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No.	REVISIONS	DATE	BY

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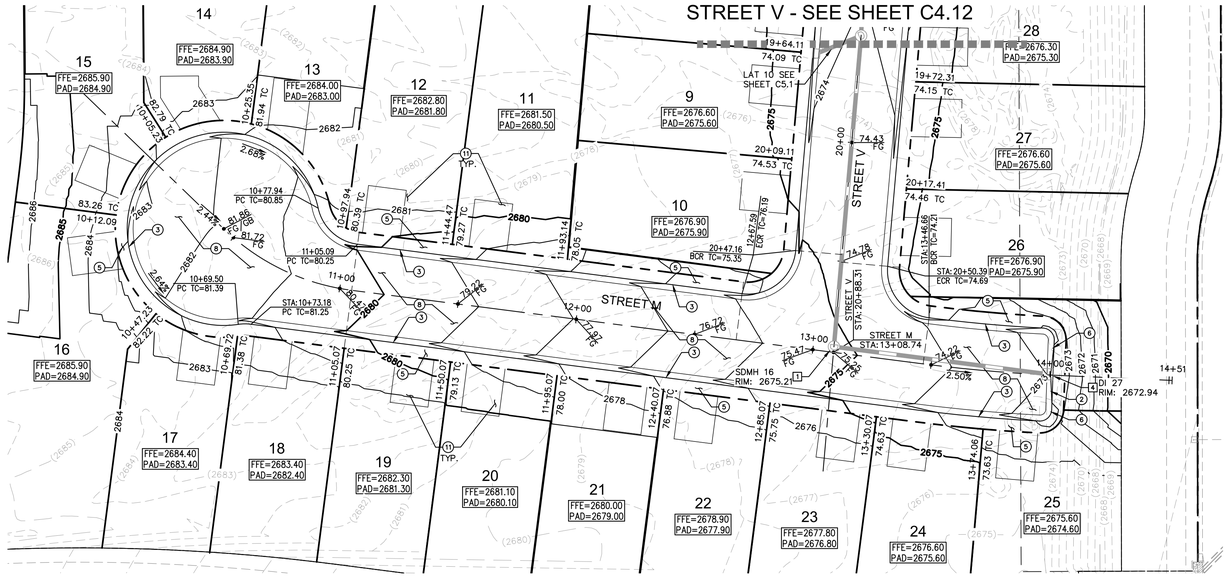
PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MARA KAY JOHNSON No. 019 CIVIL
07/31/20
KJ SIGNATURE
07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

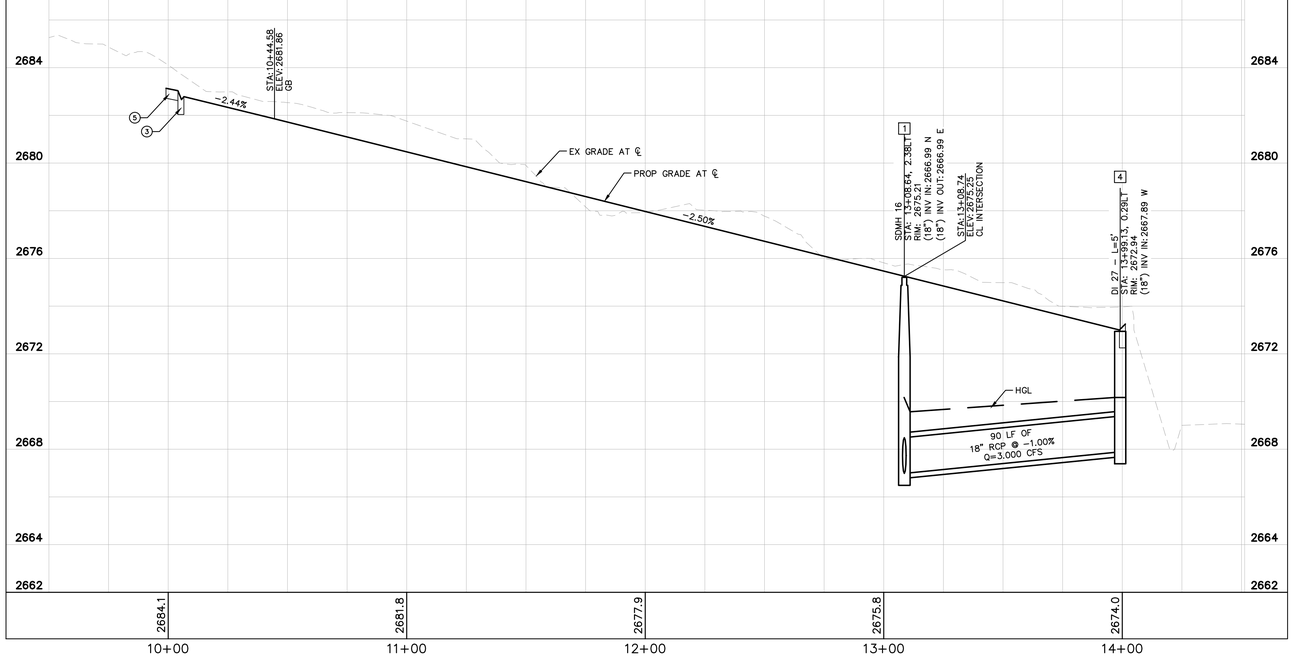
STREET P PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



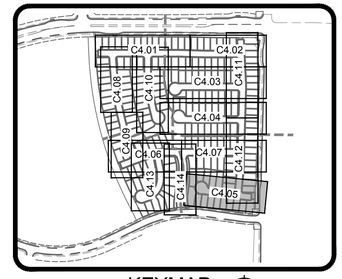
STREET M (PRIVATE)
PLAN VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'



STREET M (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(2) CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(6) TRANSITION FROM "L" CURB TO ROLL CURB

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
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Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CASSIDY — No. 025119 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET M PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

10 OF 22 SHEETS
C4.05

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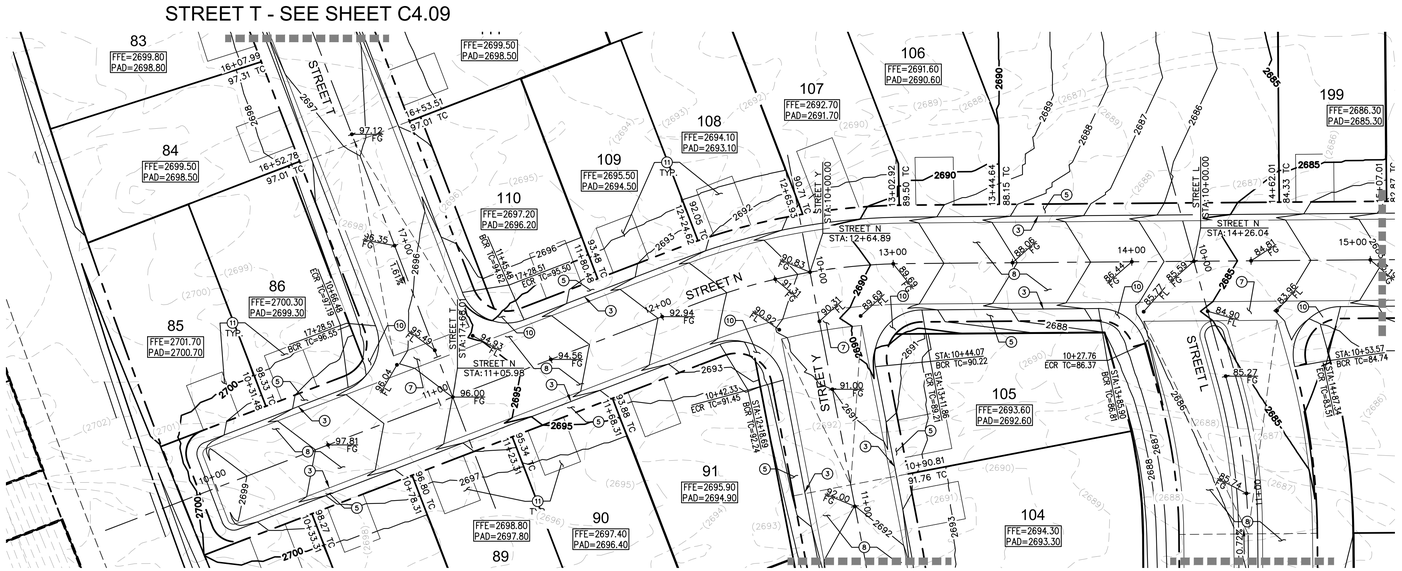

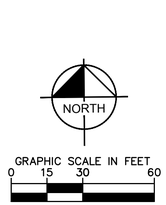

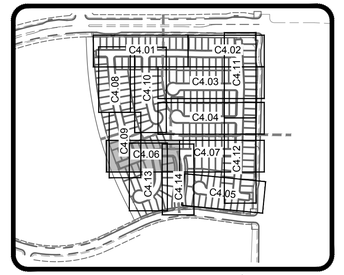

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET N (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+00

HORIZ: 1" = 30'

STREET N (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.07

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY A. HAMRA No. 13455 CIVIL 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 10+00 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

11 OF 22 SHEETS
C4.06

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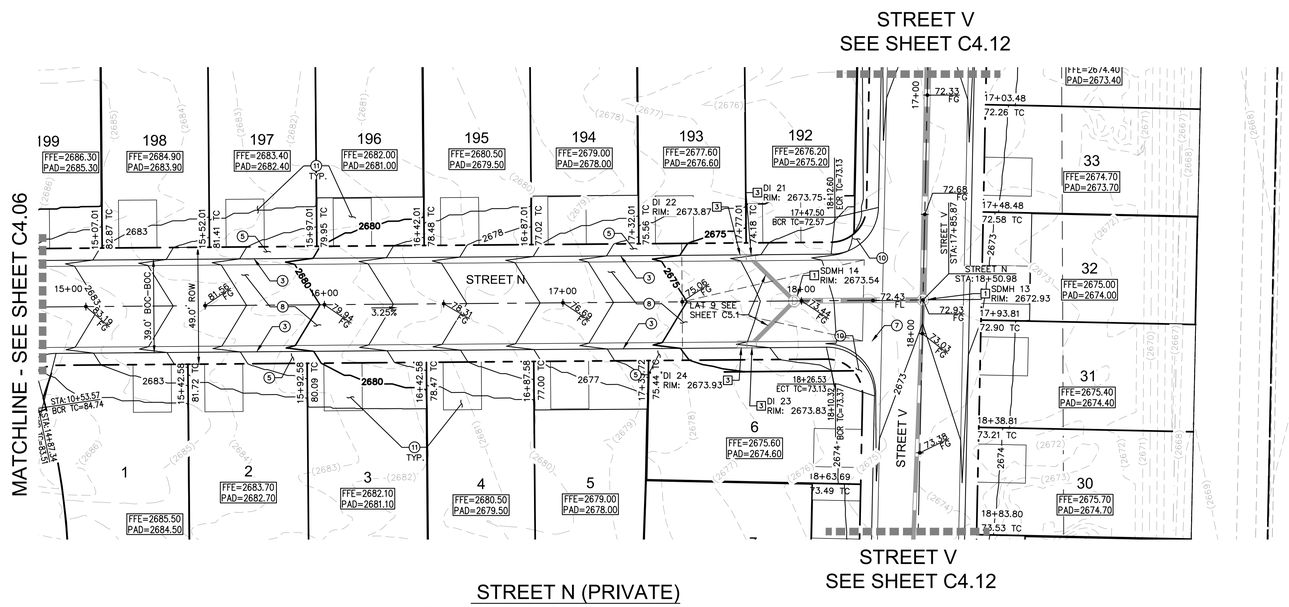
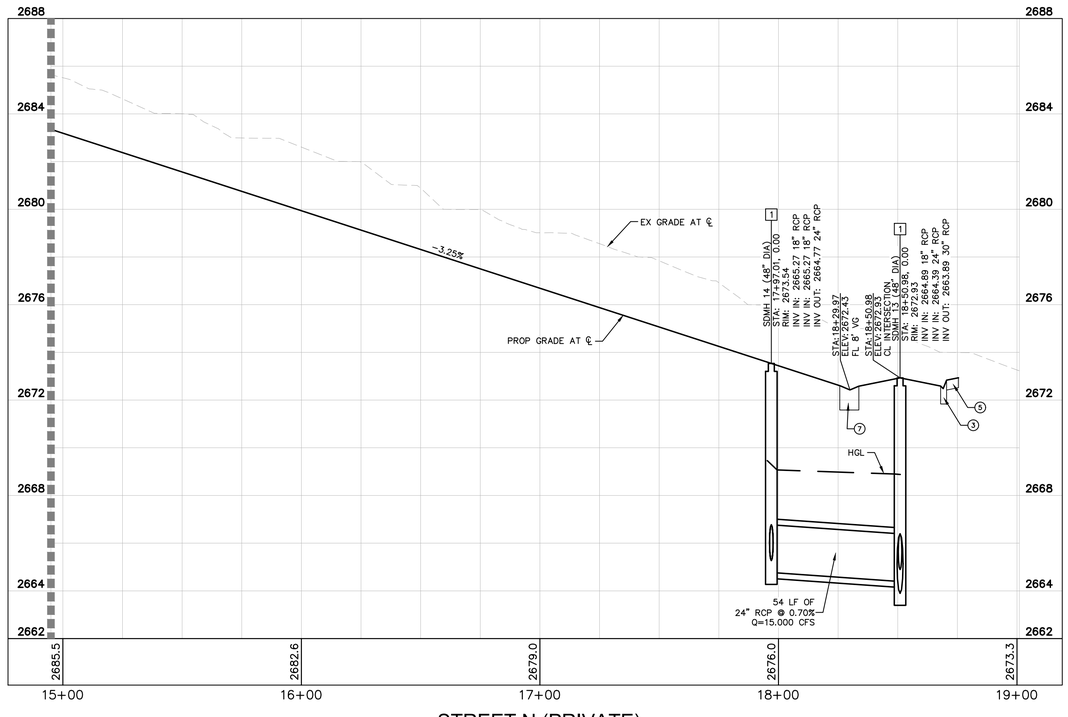
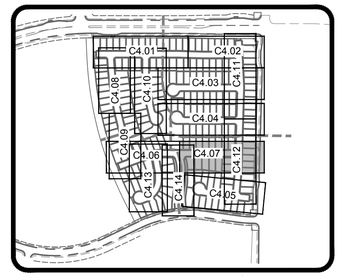


STREET N (PRIVATE)
PLAN VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'



STREET N (PRIVATE)
PROFILE VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'
VERT: 1" = 3'



NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 CRITICAL PART OF REGIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AND OUTAGE UNDERGROUND UTILITY FACILITIES CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S DEADLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER STATE OF NEVADA TAMARA A. MARA EXPIRES: 12/31/20 CIVIL No. 23040 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 15+00 - 19+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

12 OF 22 SHEETS
C4.07

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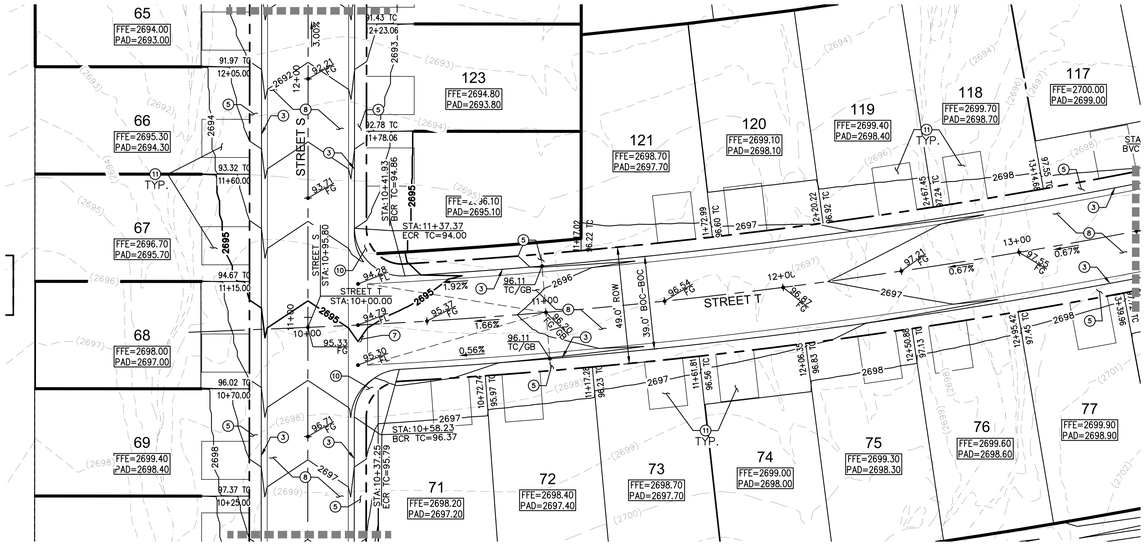
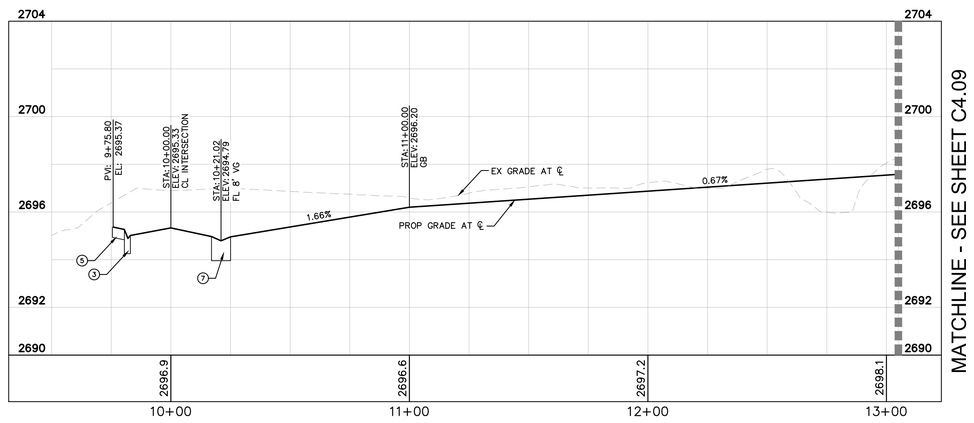


STREET T (PRIVATE)
PLAN VIEW - STA: 9+00 - 13+05
HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.09



MATCHLINE - SEE SHEET C4.09

STREET T (PRIVATE)
PROFILE VIEW - STA: 9+50 - 13+05
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARMAN — No. 023519 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET T PLAN & PROFILE STA 9+50 - 13+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

17 OF 22 SHEETS
C4.08

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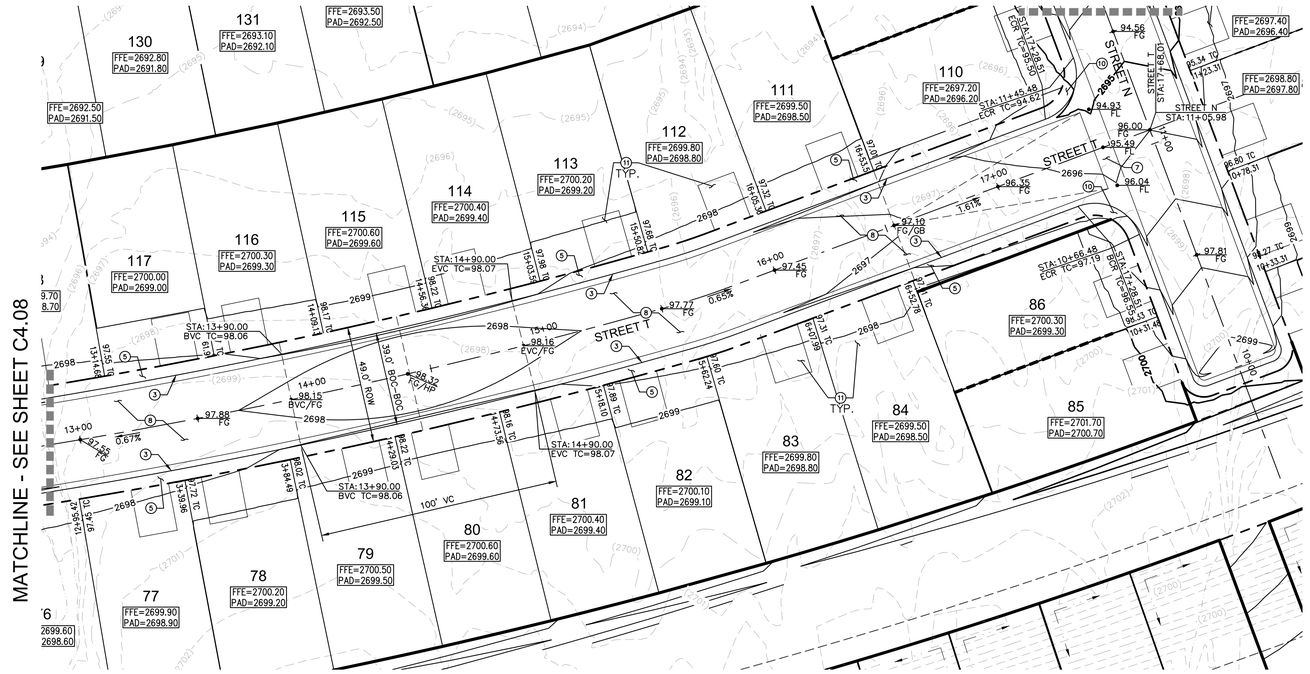


GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

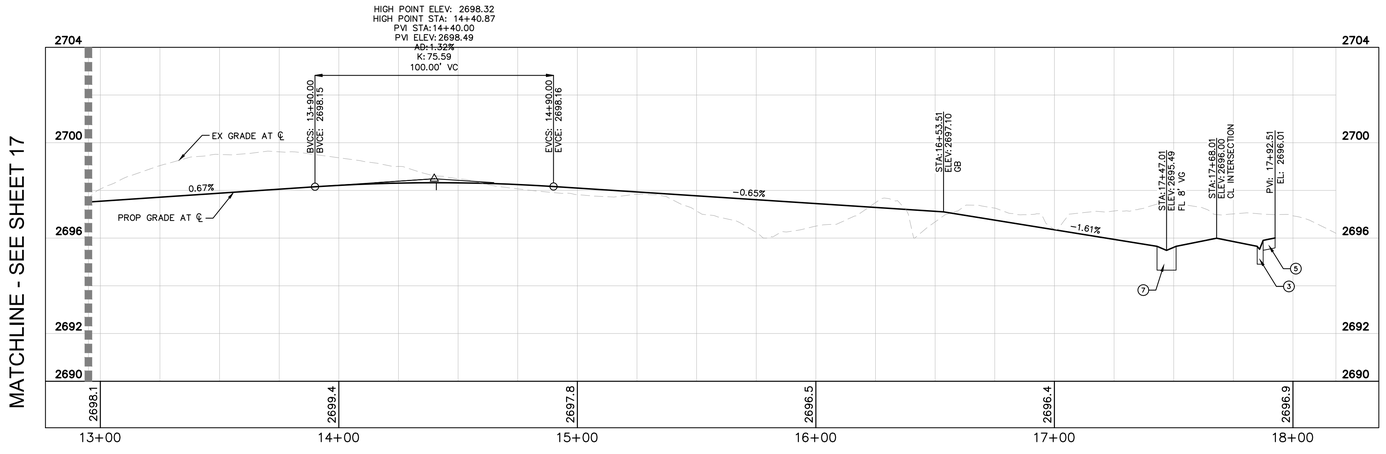
(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET T (PRIVATE)
PLAN VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'



STREET T (PRIVATE)
PROFILE VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK– 2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 702-589-3600
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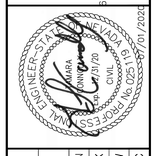

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET T PLAN & PROFILE STA 13+00 - 18+25

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

18 OF 22 SHEETS
C4.09

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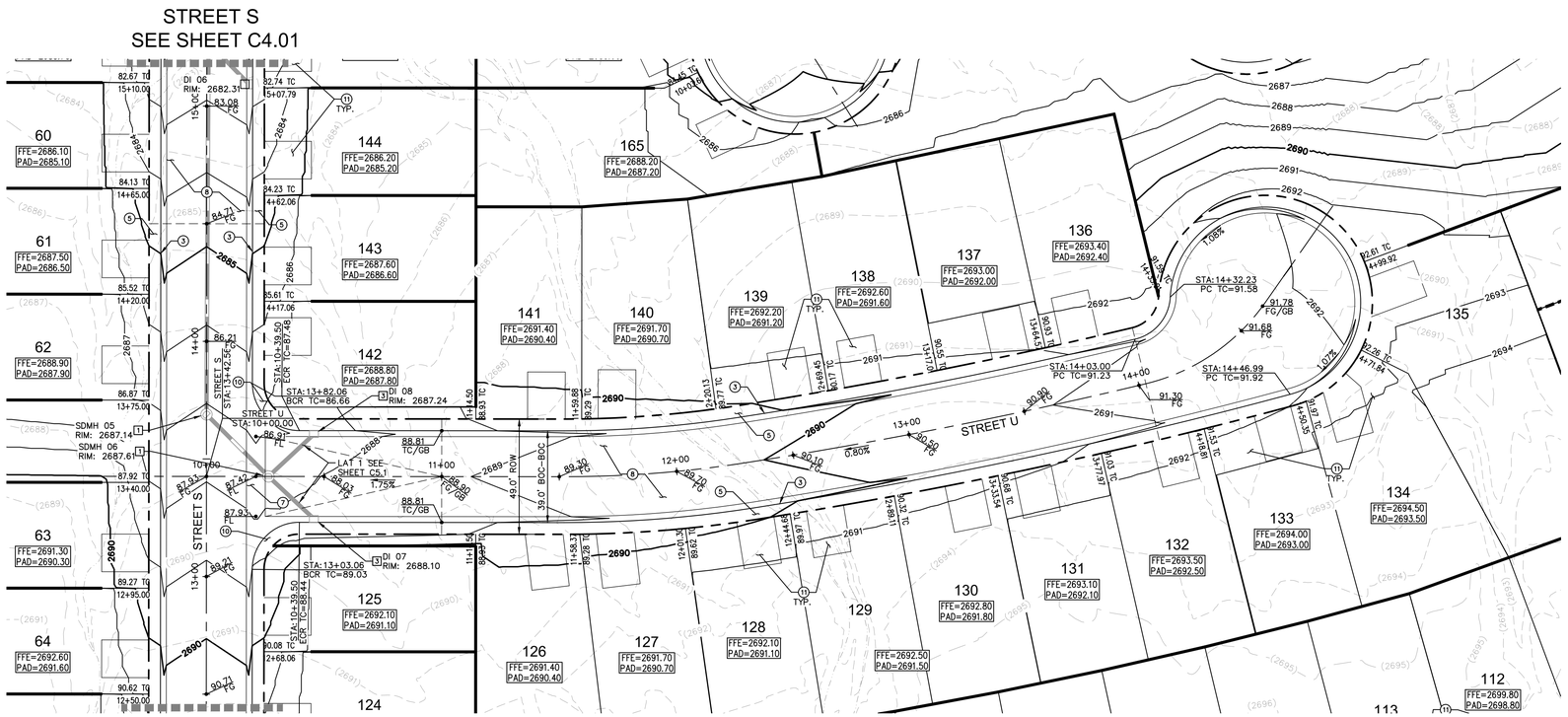
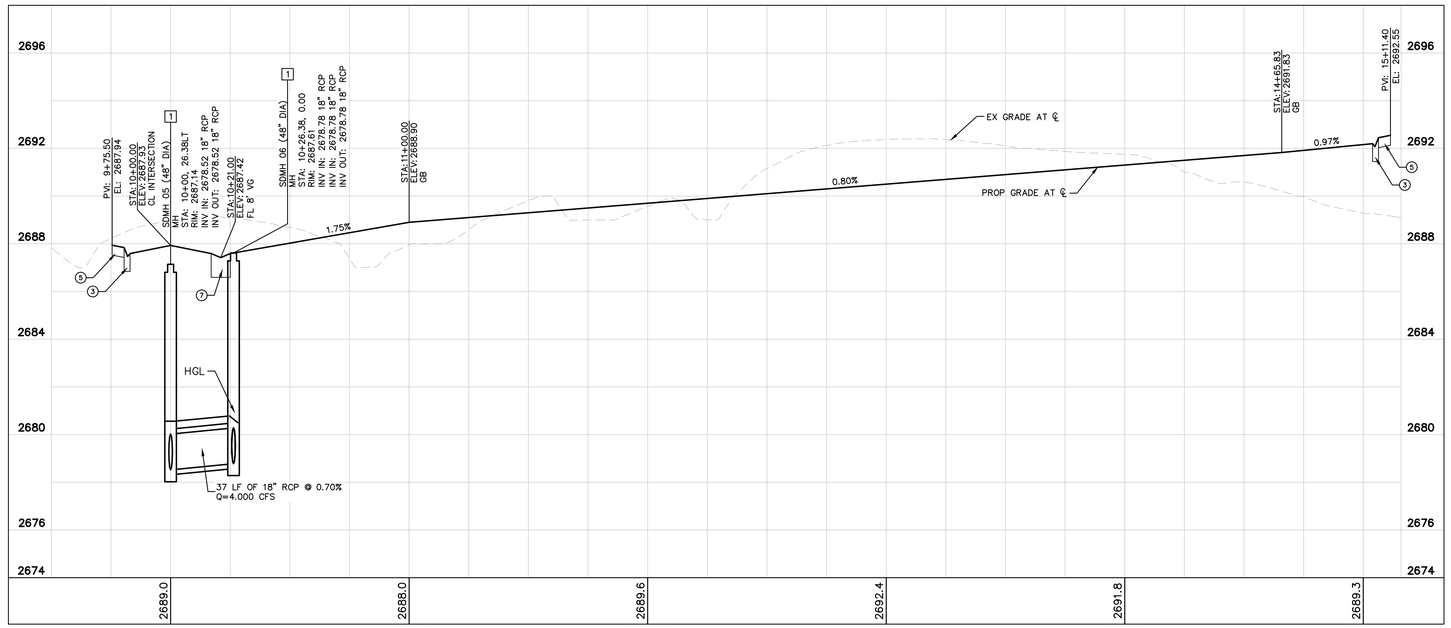


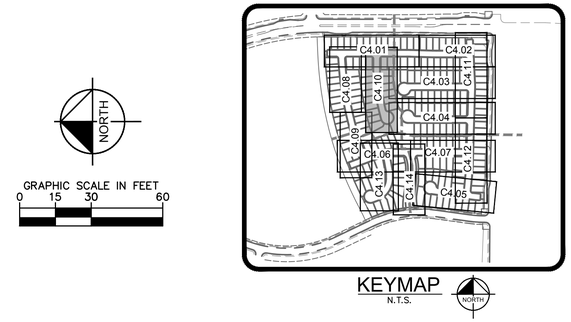
STREET U (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25

HORIZ: 1" = 30'



STREET U (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25

HORIZ: 1" = 30'
VERT: 1" = 3'



GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig CALL 811 OR 1-800-227-2600

AVOID LIFTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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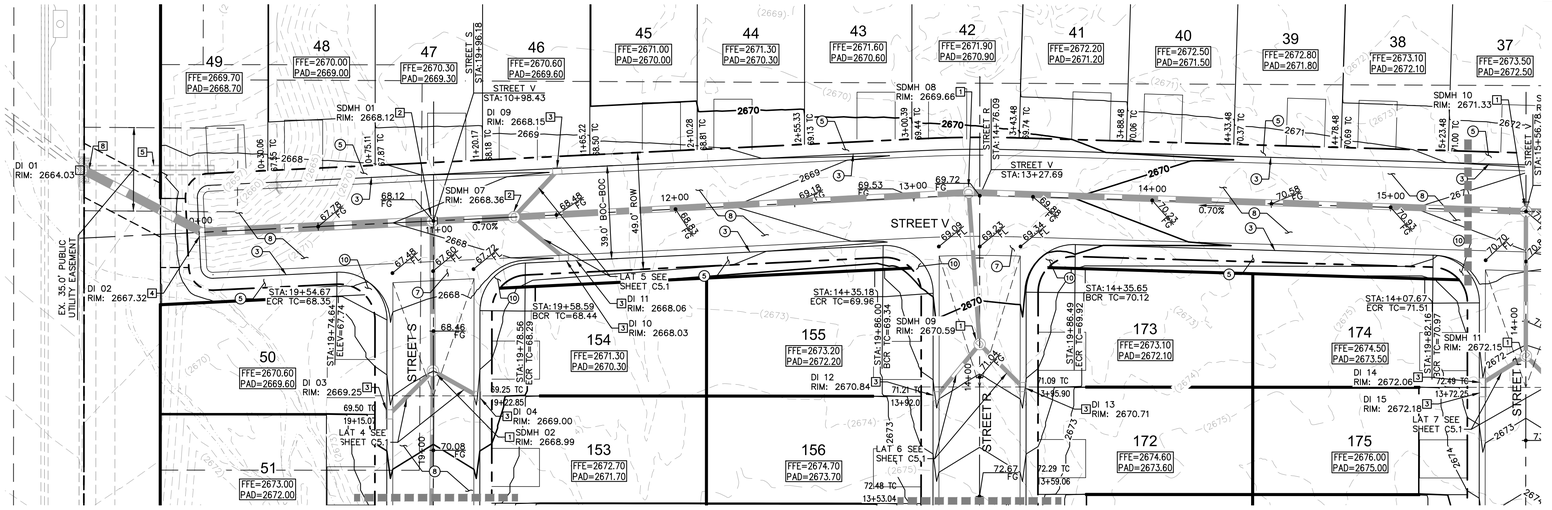
PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — CIVIL — No. 23903 — EXPIRES 06/30/2021 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET U PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



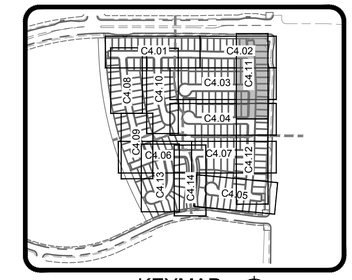
STREET S
SEE SHEET C4.02

STREET R
SEE SHEET C4.03

STREET V (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+05

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.12



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

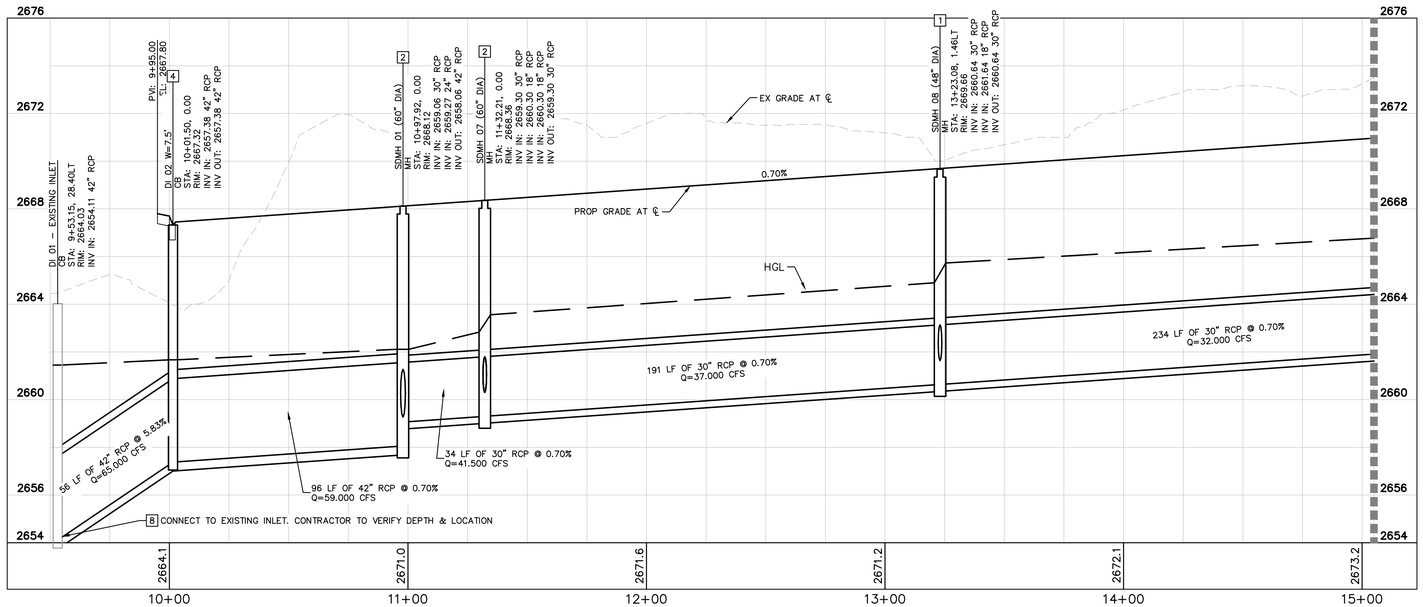
[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[5] EXIST STORM DRAIN TO BE REMOVED.

[8] CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.



STREET V (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.12

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING OR DAMAGING UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-589-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARTER — No. 23006 — CIVIL — 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET V PLAN & PROFILE 9+50 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

20 OF 22 SHEETS
C4.11

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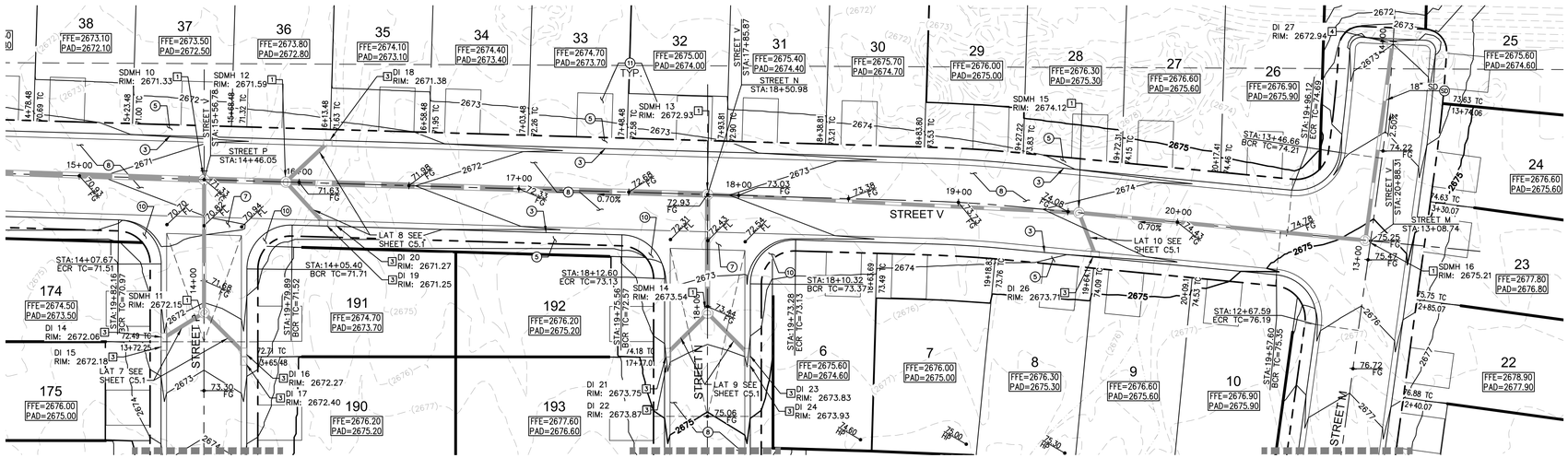


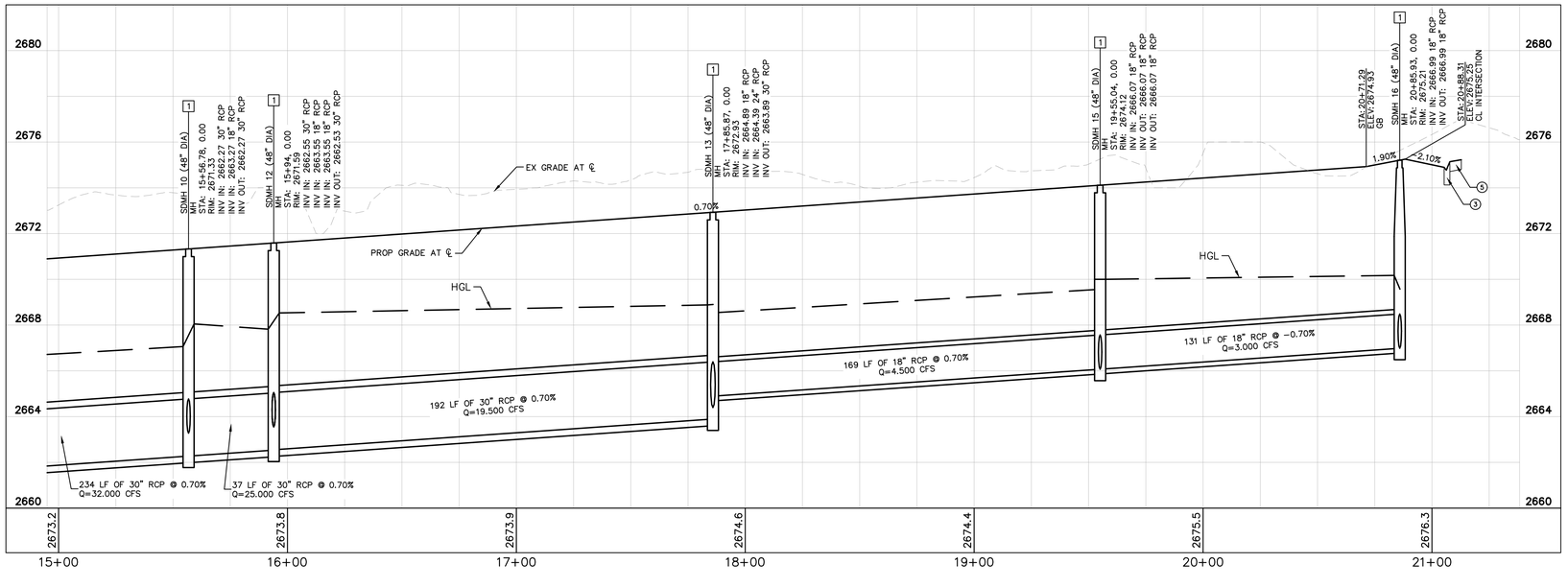
STREET P
SEE SHEET C4.04

STREET N
SEE SHEET C4.07

STREET M
SEE SHEET C4.05

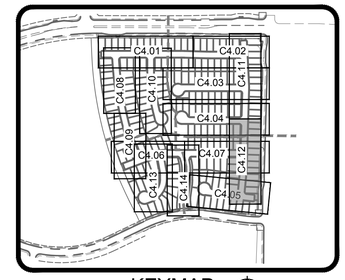
STREET V (PRIVATE)
PLAN VIEW - STA: 15+00 - 21+00

HORIZ: 1" = 30'



STREET V (PRIVATE)
PROFILE VIEW - STA: 15+00 - 21+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

(SD) STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK– 2008 ADJUSTMENT (UPDATED 05/24/2010)

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

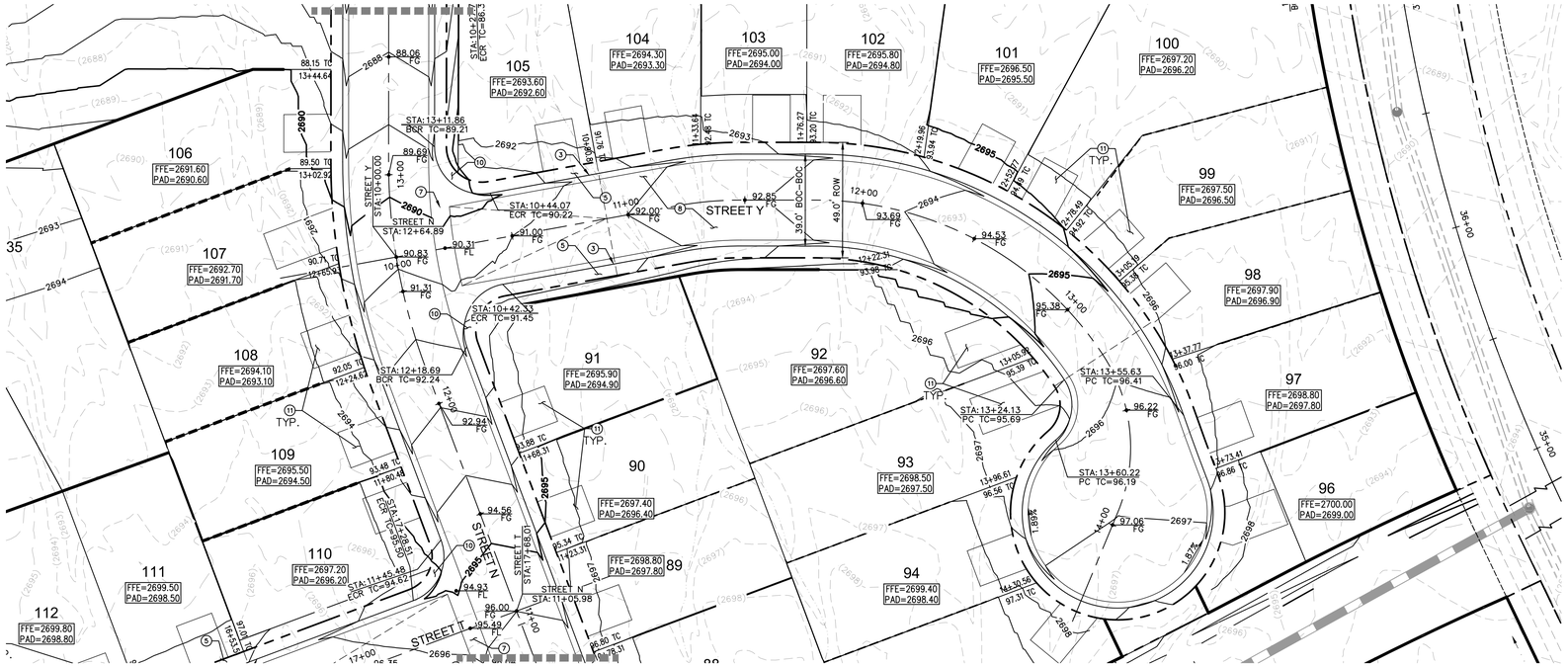
PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA No. 23806 CIVIL 07/31/20 RENEWAL: 12/31/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET V PLAN & PROFILE 15+00 - 21+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

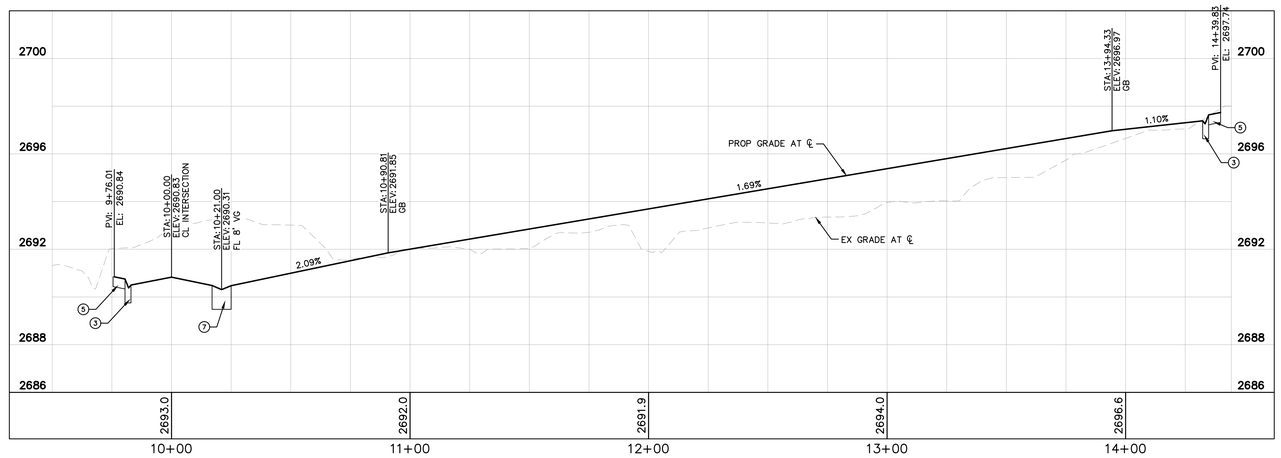
21 OF 22 SHEETS
C4.12



STREET N
SEE SHEET C4.06

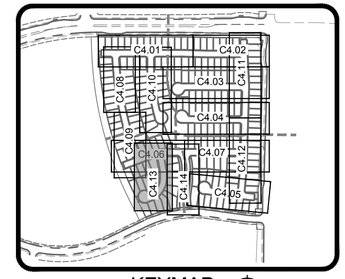
STREET Y (PRIVATE)
PLAN VIEW - STA: 10+00 - 14+00

HORIZ: 1" = 30'



STREET Y (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

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SEE SHEET C2.0 FOR ENGINEER NOTES

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No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 702-262-4500
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REGISTERED PROFESSIONAL ENGINEER — TRACY L. CLEMENS — No. 13500 — CIVIL — STATE OF NEVADA — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET Y PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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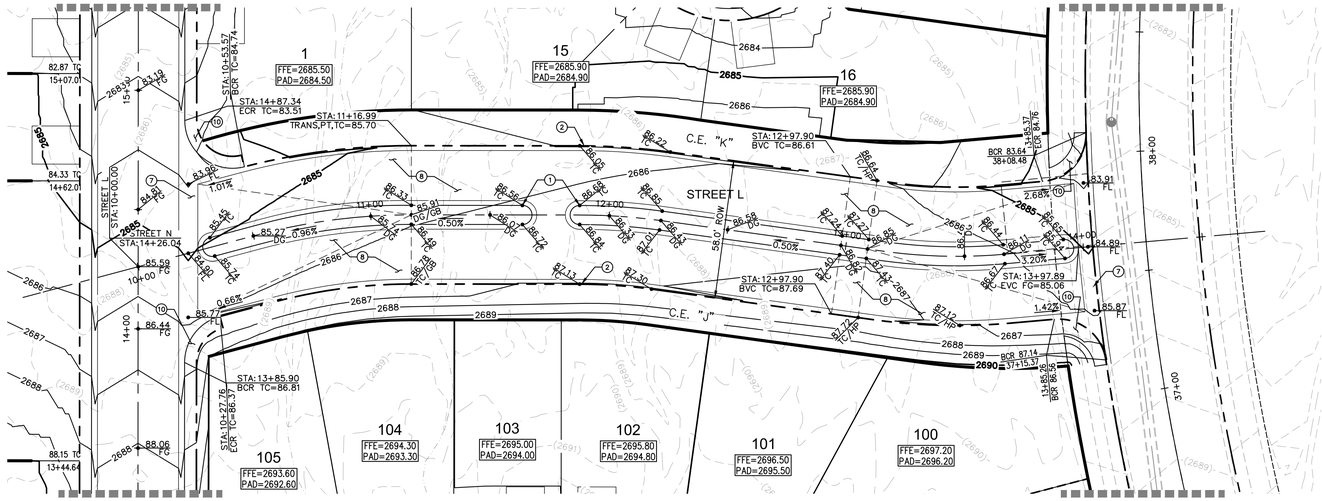
STREET N
SEE SHEET C4.07
O'HARE AVE
STREET N
SEE SHEET C4.06
O'HARE AVE
STREET L
C.E. "K"
C.E. "J"
STA:12+97.90
BVC TC=86.61
STA:12+97.90
BVC TC=87.69
STA:13+97.89
EVC FG=85.06
STA:14+87.34
ECR TC=83.51
STA:11+16.99
TRANS,PT,TC=85.70
STA:13+85.90
BCR TC=86.81
STA:10+27.79
ECR TC=86.35
STA:10+53.57
BCR TC=84.74
STA:14+26.04
STREET N
STREET
STA:10+00.00
1
FFE=2685.50
PAD=2684.50
15
FFE=2685.90
PAD=2684.90
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100
FFE=2697.20
PAD=2696.20
105
FFE=2693.60
PAD=2692.60
82.87 TC
15+07.01
84.33 TC
14+62.01
88.15 TC
13+44.64
BCR 83.64
38+08.48
ECR 84.76
38+00
37+00
37+15.37
BCR 87.14
37+15.37
ECR 86.55
BCR 86.55
83.91 FL
84.89 FL
85.87 FL
85.77 FL
84.90 FL
88.06 FC
86.44 FC
84.56 FC
85.59 FC
85.27 FC
86.33 FC
85.91 FC
86.56 FC
86.02 FC
86.72 FC
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87.37 FC
87.41 FC
87.45 FC
87.49 FC
87.53 FC
87.57 FC
87.61 FC
87.65 FC
87.69 FC
87.73 FC

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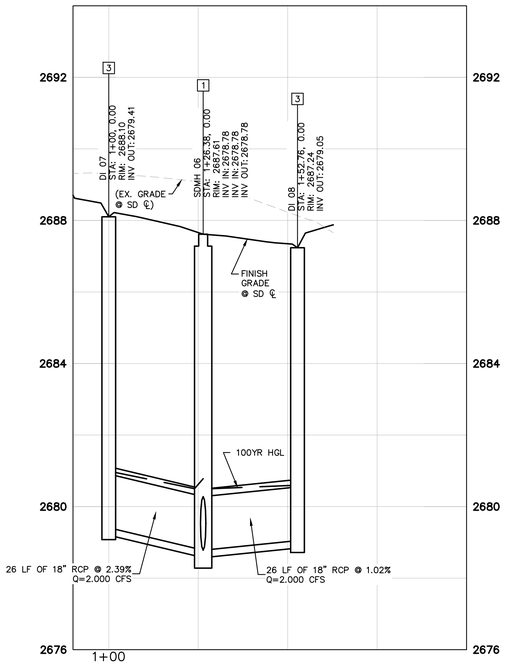
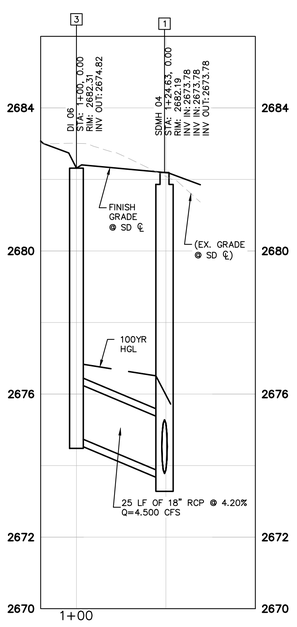
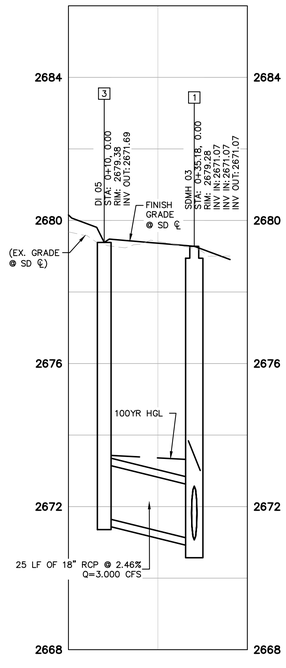


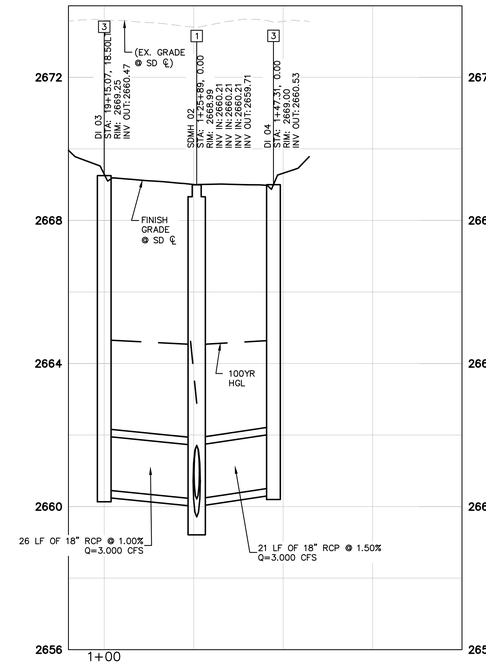
LAT 1 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



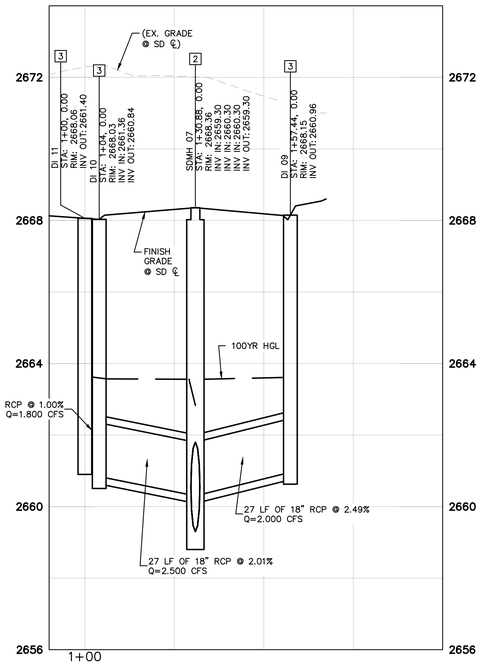
LAT 2 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 3 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



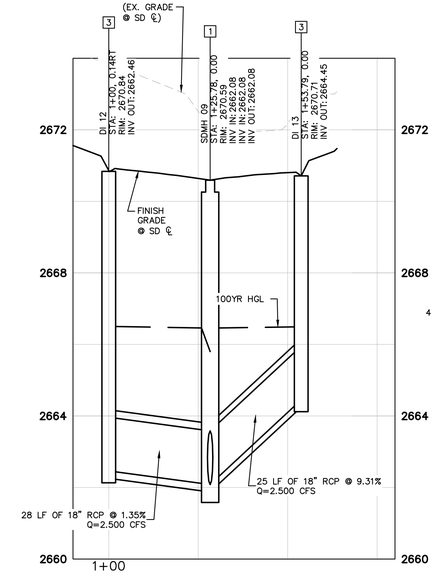
LAT 4 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



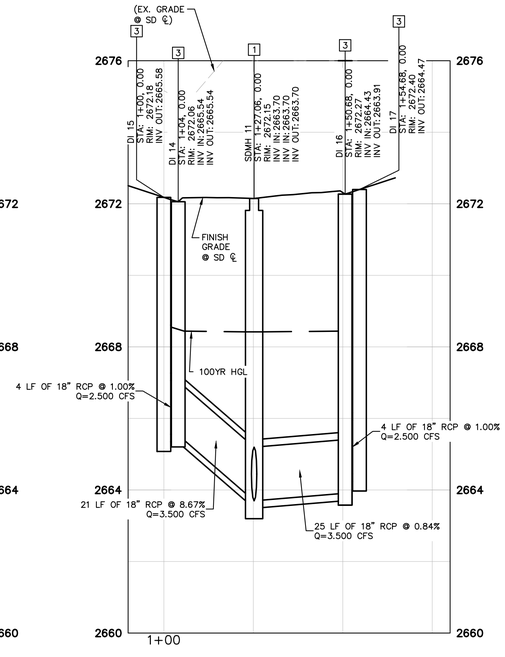
LAT 5 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

STORM DRAIN NOTES

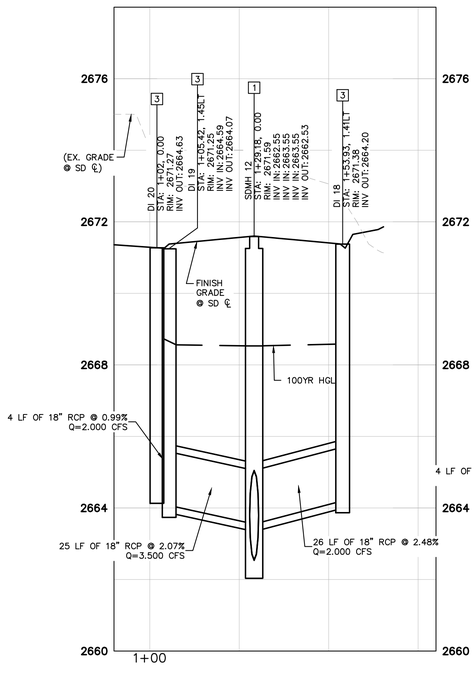
1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



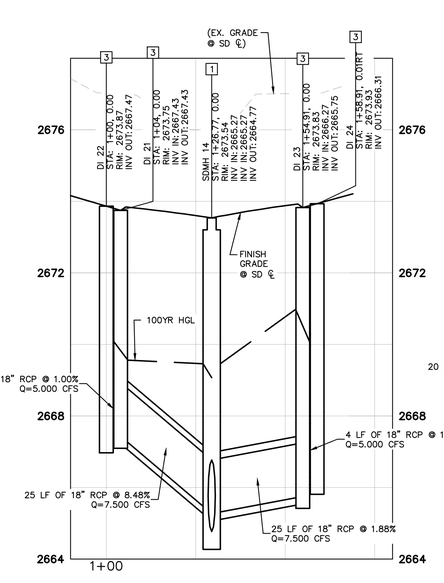
LAT 6 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



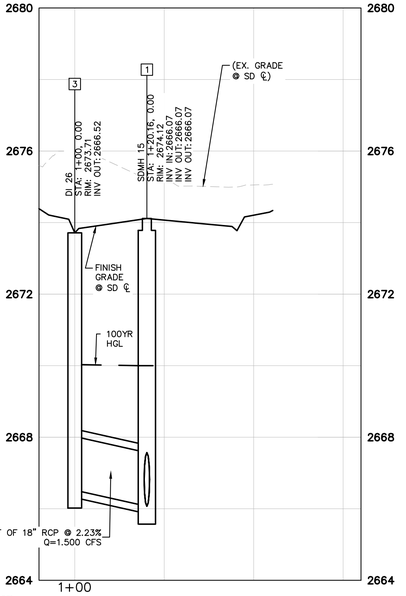
LAT 7 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 8 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 9 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 10 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — EXPIRATION DATE: 12/31/20 — CIVIL — No. 23036 — 07/01/2020

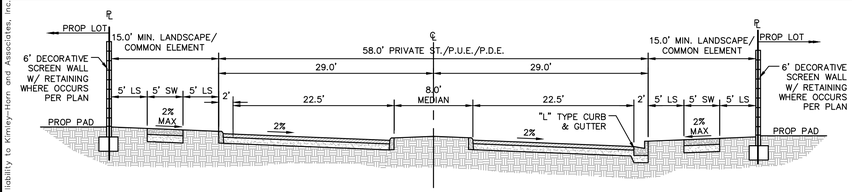
KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STORM DRAIN LATERALS

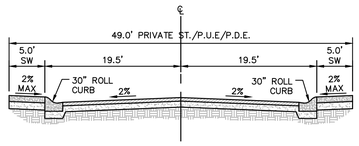
SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

24 OF 32 SHEETS

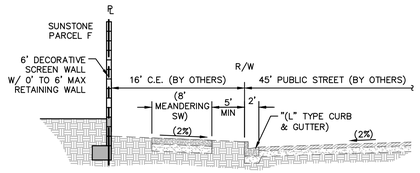
C5.1



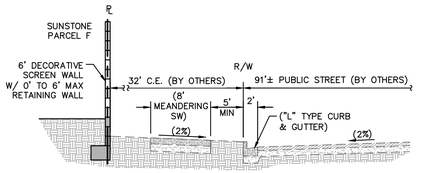
A C7.1 PRIVATE ENTRY SECTION NTS



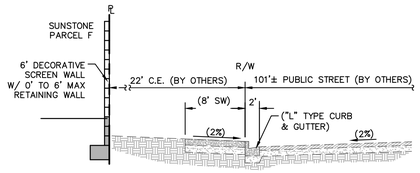
B C7.1 TYPICAL PRIVATE STREET SECTION (PARKING BOTH SIDES) NTS



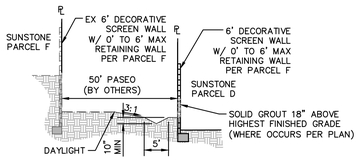
C C7.1 O'HARE AVE LANDSCAPE ESMT. NTS



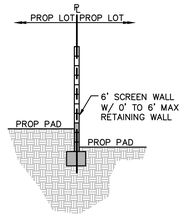
D1 C7.1 LOG CABIN WAY AND N SKYE CANYON PARK DRIVE LANDSCAPE ESMT. NTS



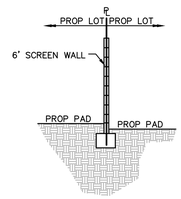
D2 C7.1 LOG CABIN WAY LANDSCAPE ESMT. NTS



E C7.1 WEST BOUNDARY PASEO NTS



F1 C7.1 TYPICAL YARD SECTION NTS



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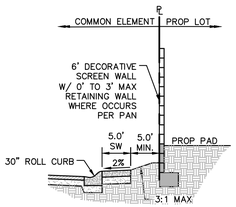
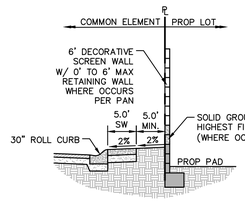
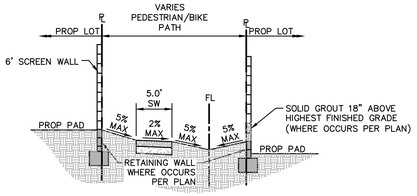


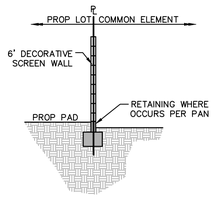
G1 C7.1 TYPICAL CORNER LOT SECTION NTS



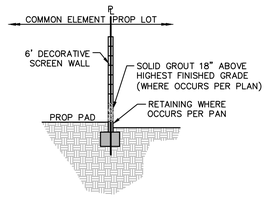
G2 C7.1 TYPICAL CORNER LOT SECTION NTS



H C7.1 TYPICAL COMMON ELEMENT SECTION NTS



I C7.1 TYPICAL YARD SECTION NTS



J C7.1 TYPICAL YARD SECTION NTS

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Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL SECTIONS

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION
Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600
AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

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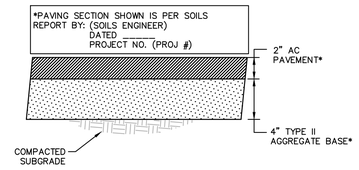
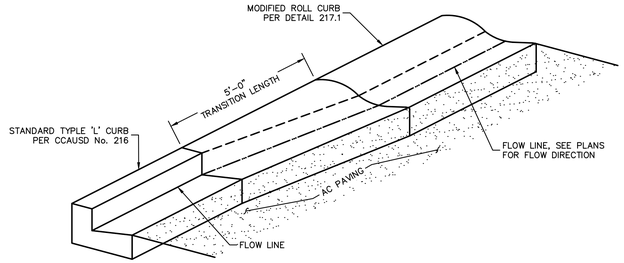
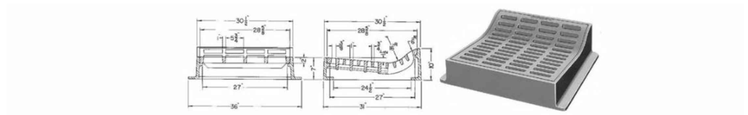


1 C7.2 ONSITE PAVEMENT SECTION
NTS

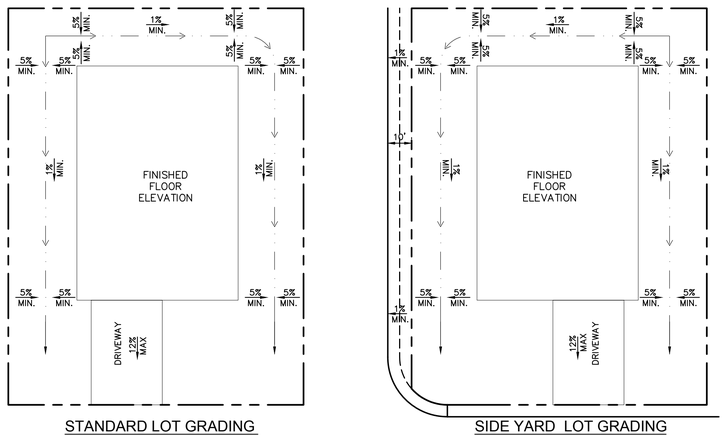


2 C7.2 MODIFIED ROLL CURB TRANSITION TO 6" CURB OR 'L' TYPE CURB
NTS

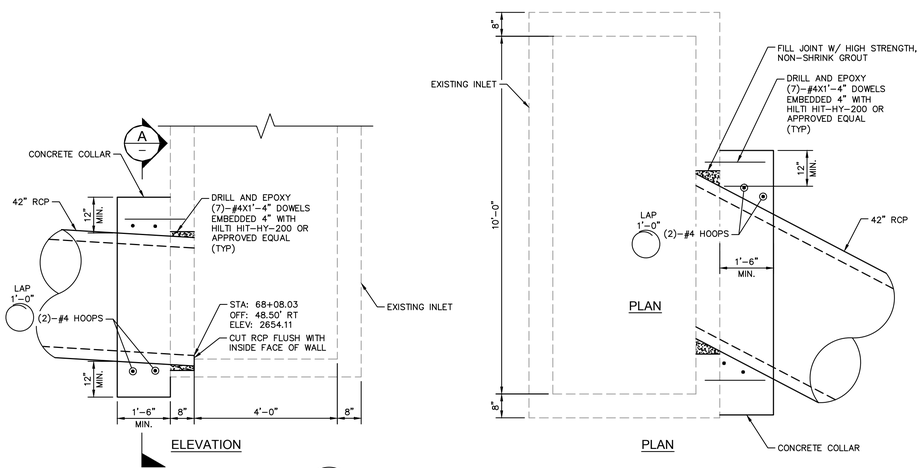


A-Grate Dimensions	B-Grate Thickness	C-Clear Opening	E-Base Flange	F-Frame Height	Grate Type	Square Feet Open	Weir Perimeter Lineal Feet
28-5/8 x 28-5/8	2	24-1/2 x 27	31 x 36	7 to 10	C	2.6	5.5

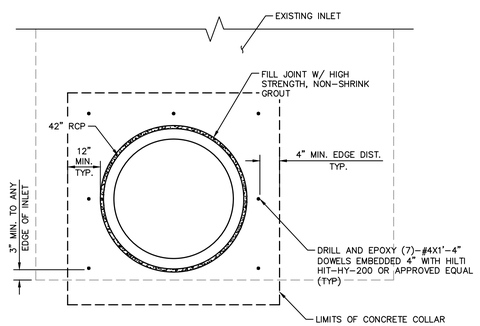
3 C7.2 R-3501-R DROP INLET (NEENAH)
NTS



4 C7.2 TYPICAL LOT GRADING
NTS



5 C7.2 PIPE PENETRATION DETAIL
SCALE: ½" = 1'-0"



SECTION A
SCALE: ½" = 1'-0"

PIPE PENETRATION NOTES:

1. CONCRETE SHALL BE CLASS AA MODIFIED (TYPE V CEMENT), f'c = 4500 PSI MIN.
2. REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, fy = 60,000 PSI.
3. ALL REINFORCING SHALL HAVE 2" CLEAR COVER UNLESS NOTED OTHERWISE.
4. CUT HOLE IN WALL OF BOX CULVERT TO A MINIMUM ½" TO MAXIMUM 2" LARGER THAN THE OUTSIDE DIAMETER OF THE 42" RCP.
5. CUT RCP FLUSH WITH INSIDE FACE OF CULVERT WALL.
6. FILL OPENING WITH HIGH STRENGTH, NON-SHRINK GROUT.
7. POUR MINIMUM 12" THICK CONCRETE COLLAR AROUND RCP.

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION
Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3500
WWW.KIMLEY-HORN.COM

NEVADA — ENGINEER — KRISTA L. MARA — 12/31/20 — CIVIL — No. 023019 — STATE OF NEVADA — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL DETAILS

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

Appendix A – Documents & Figures

- ULT-1 Ultimate Conditions Basin Map
- FAC-1 Facility Map
- TMP-78151/PRJ78003 Conditions and Staff Report
- CLV Planning Dept 2-ft Grade Difference Approval

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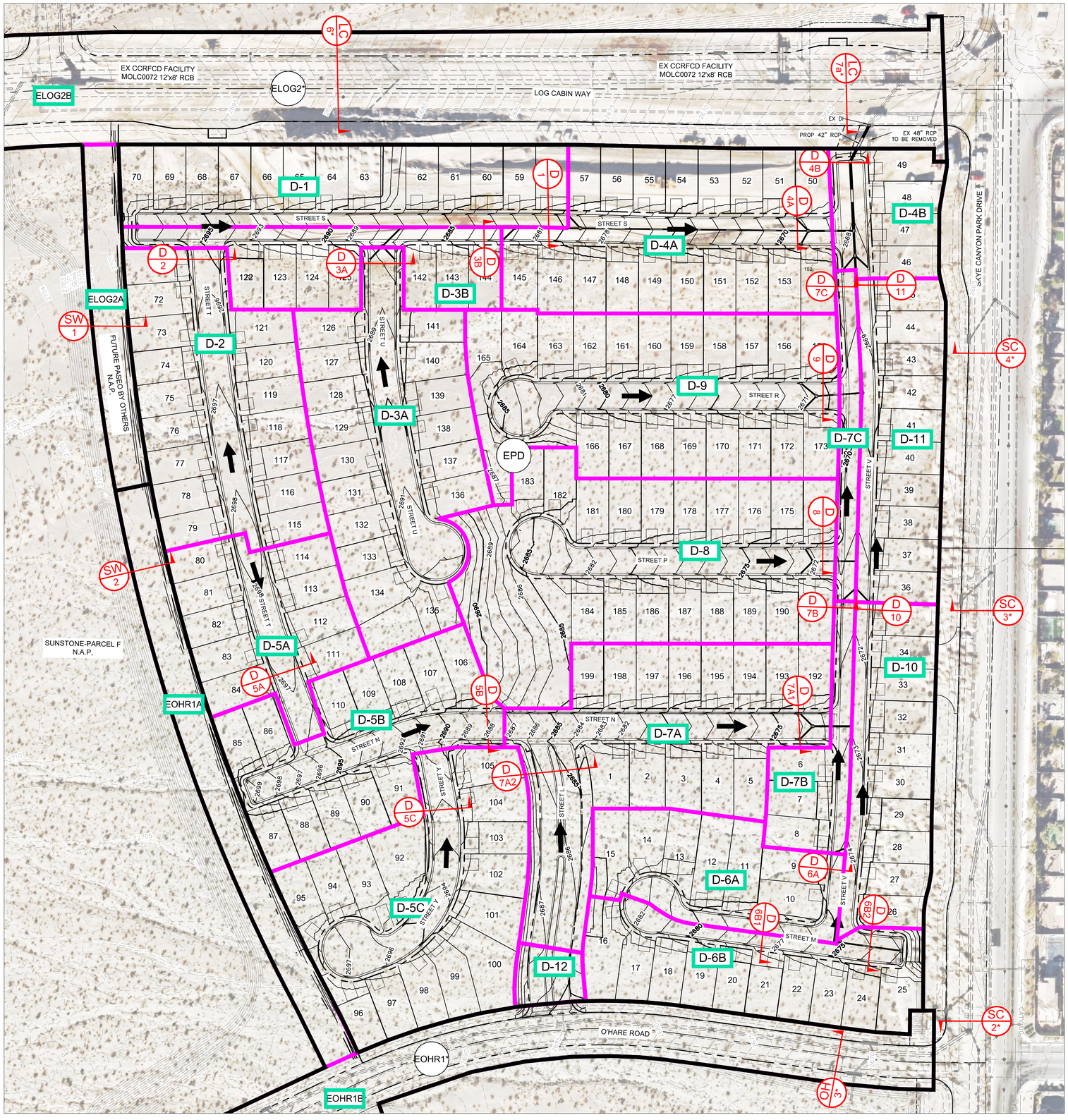

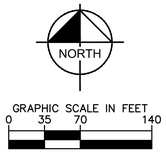

LEGEND

- SITE — BASIN ID
- XXX — PRORATED BASIN BOUNDARY ID
- BASIN BOUNDARY
- PRORATED BASIN BOUNDARY
- FLOW ARROW
- X / XX — SECTION ID

ULTIMATE CONDITION PRORATED FLOW SUMMARY

Ultimate Onsites			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
EPD*	65	28.7	2.26
ELOG2*	35	12.1	2.89
EOHR1*	29	10.1	2.87
Ultimate Onsite Prorated Basins			
SUBBASIN	Q_{100} (cfs)	AREA (ac)	CFS/ACRE
D-1	4	1.6	2.26
D-2	4.5	2.0	2.26
D-3A	5	2.3	2.26
D-3B	2	1.0	2.26
D-4A	5	2.2	2.26
D-4B	1.5	0.6	2.26
D-5A	2.5	1.2	2.26
D-5B	4	1.7	2.26
D-5C	5	2.2	2.26
D-6A	2	1.1	2.26
D-6B	3	1.4	2.26
D-7A	6	2.5	2.26
D-7B	1	0.5	2.26
D-7C	1	0.3	2.26
D-8	7	3.0	2.26
D-9	6	2.6	2.26
D-10	3	1.2	2.26
D-11	2.5	1.2	2.26
D-12	<1	0.1	2.26
TOTAL	**65**	**28.7**	**NA**
ELOG2A	2	0.6	2.89
ELOG2B	33	11.5	2.89
TOTAL	**35**	**12.1**	**NA**
EOHR1A	3	1.0	2.87
EOHR1B	26	9.1	2.87
TOTAL	**29**	**10.1**	**NA**

*Referenced from the Master Study

STREET HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
D-1	3.25	4.0	0.29	3.70	1.07
D-2	1.66	4.5	0.27	2.50	0.68
D-3A	1.75	5.0	0.28	2.62	0.73
D-3B	3.25	7.5	0.35	4.29	1.50
D-4A	3.25	9.0	0.30	3.76	1.13
D-4B	0.70	6.0	0.33	1.93	0.64
D-5A	1.61	2.5	0.27	1.53	0.41
D-5B	3.25	11.5	0.32	4.03	1.29
D-5C	1.69	5.0	0.28	2.59	0.73
D-6A	0.70	2.0	0.30	0.30	0.09
D-6B1	2.50	3.0	0.28	3.14	0.88
D-6B2	2.50	3.0	0.23	2.70	0.62
D-7A1	3.25	17.5	0.36	4.45	1.60
D-7A2	0.50	2.0	0.30	1.33	0.40
D-7B	0.70	4.0	0.36	2.06	0.74
D-7C	0.70	2.5	0.32	1.84	0.59
D-8	3.25	7.0	0.28	3.60	1.01
D-9	3.25	6.0	0.27	3.47	0.94
D-10	0.70	3.0	0.33	1.93	0.64
D-11	0.70	3.5	0.35	1.99	0.70

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

REFERENCED HYDRAULIC SECTIONS

STREET SECTION	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	Q_{10} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s
LC6*	3.83	13	0.37	4.57	1.69	5	0.29	3.74	1.08
LC7a*	3.83	5.5	0.35	4.40	1.54	2	0.27	3.59	0.97
OH3*	3.76	36	0.49	5.73	2.81		-		
SC2*	0.46	14.5	0.61	2.37	1.45		-		
SC3*	0.22	3	0.44	1.24	0.55	1	0.33	3.89	1.28
SC4*	0.65	2	0.34	1.73	0.59	1	0.28	1.52	0.43

CHANNEL HYDRAULIC SECTIONS

SWALE SECTION	TRIBUTARY BASINS	CHANNEL SLOPE %	Q_{100} (cfs)	FLOW DEPTH (ft)	VELOCITY (ft/s)	D*V ft^2/s	TYPE	SIDE SLOPES		Red'd d_{50}
SW-1	ELOG2A	1.00	2.0	0.53	2.37	1.26	V-Ditch	3:1	3:1	N/A
SW-2	EOHR1A	1.00	3.0	0.62	2.62	1.62	V-Ditch	3:1	3:1	N/A

No.	REVISIONS	DATE	BY

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PHONE: 702.589.3500
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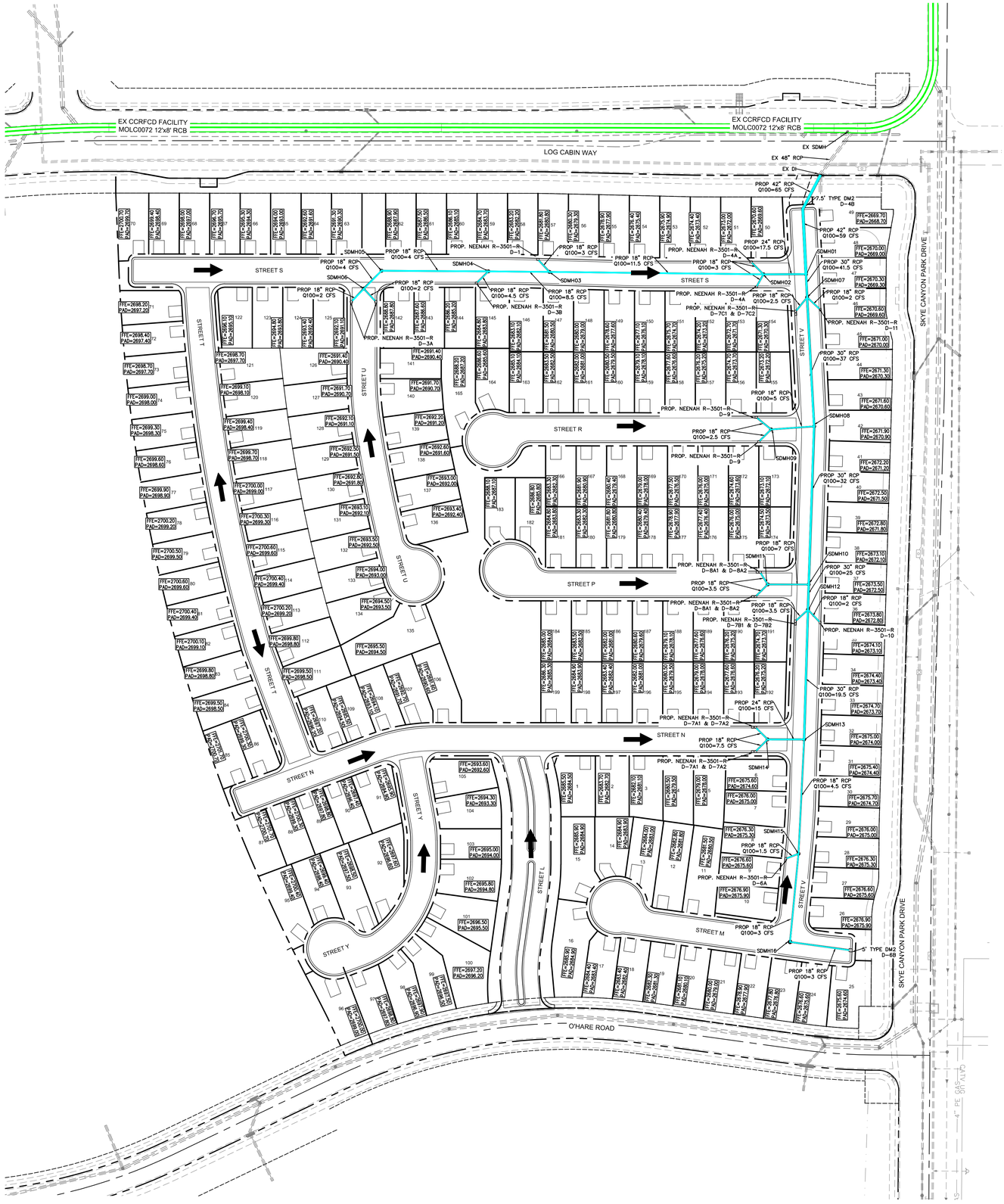
KHA PROJECT 092935006
DATE 3/17/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

ULTIMATE CONDITION BASIN MAP

SUNSTONE - PARCEL D

PREPARED FOR
LENNAR HOMES

ULT-1



NORTH

LEGEND

- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING CCRFCD FACILITY
- FLOW ARROW

DROP INLET SUMMARY TABLE

DROP INLET ID	Q_{100} (cfs)	SLOPE (%)	FLOW DEPTH (ft)	$Q_{INTERCEPTED}$ (cfs)	Q_{BYPASS} (cfs)	DI TYPE
D-1	4.0	3.25	0.31	3.0	1.0	(1) NEENAH R-3501-R
D-3A	5.0	1.75	0.29	4.0	1.0	(2) NEENAH R-3501-R
D-3B	7.5	3.25	0.37	4.5	3.0	(2) NEENAH R-3501-R
D-4A	9.0	3.25	0.32	6.0	3.0	(2) NEENAH R-3501-R
D-4B	6.0	SUMP	0.50	6.0	0.0	(1) 7.5' TYPE DM2
D-6A	2.0	0.70	0.31	1.5	0.5	(1) NEENAH R-3501-R
D-6B	3.0	2.50	0.29	3.0	0.0	(1) 5' TYPE DM2
D-7A1	17.5	3.25	0.37	10.0	7.5	(2) NEENAH R-3501-R
D-7A2	7.5	3.25	0.31	5.0	2.5	(2) NEENAH R-3501-R
D-7B1	4.0	0.70	0.40	2.0	2.0	(1) NEENAH R-3501-R
D-7B2	2.0	0.70	0.25	1.5	0.5	(1) NEENAH R-3501-R
D-7C1	2.5	0.70	0.34	1.8	0.7	(1) NEENAH R-3501-R
D-7C2	0.7	0.70	0.34	0.7	0.0	(1) NEENAH R-3501-R
D-8A1	7.0	3.25	0.30	5.0	2.0	(2) NEENAH R-3501-R
D-8A2	2.0	3.25	0.30	2.0	0.0	(2) NEENAH R-3501-R
D-9	6.0	3.25	0.28	5.0	1.0	(2) NEENAH R-3501-R
D-10	3.0	0.70	0.35	2.0	1.0	(1) NEENAH R-3501-R
D-11	3.5	0.70	0.35	2.0	1.5	(1) NEENAH R-3501-R

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6671 LAS VEGAS BLVD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

KHA PROJECT 092935006
DATE 5/5/2020
SCALE AS SHOWN
DESIGNED BY AD
DRAWN BY AD
CHECKED BY RRD

FACILITY MAP

SUNSTONE PARCEL D
PREPARED FOR
LENNAR HOMES
CITY OF LAS VEGAS NEVADA

FAC-1

Plotted By:Donovan, Autumlyn Sheet Set:Kha Layout:FAC-1 July 01, 2020 10:47:37am K:\LAV_Civil\092935006-Lennar Sunstone\Reports\DRAINAGE\Parcel D\02_ADD\Figures\CAD\ADD_Facility_Map.dwg

City of Las Vegas

AGENDA MEMO - PLANNING

PLANNING COMMISSION MEETING DATE: MARCH 10, 2020
DEPARTMENT: PLANNING
ITEM DESCRIPTION: APPLICANT: GREYSTONE NEVADA, LLC - OWNER: EASTLAND, LLC

** STAFF RECOMMENDATION(S) **

CASE NUMBER	*RECOMMENDATION*	*REQUIRED FOR APPROVAL*
TMP-78151	Staff recommends APPROVAL, subject to conditions:	

** NOTIFICATION **

NEIGHBORHOOD ASSOCIATIONS NOTIFIED N/A

NOTICES MAILED N/A

PROTESTS 0

APPROVALS 0

SS

**** CONDITIONS ****

TMP-78151 CONDITIONS

Planning

1. Approval of the Tentative Map shall be for no more than four (4) years. If a Final Map is not recorded on all or a portion of the area embraced by the Tentative Map within four (4) years of the approval of the Tentative Map, this action is void.

2. All development shall conform to the Sunstone Development Agreement and related exhibits as amended, including the Sunstone Design Guidelines and Sunstone Parks Agreement.

3. Street names must be provided in accordance with the City's Street Naming Regulations.

4. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.

5. In conjunction with creation, declaration and recordation of the subject common-interest community, and prior to recordation of the Covenants, Codes and Restrictions ("CC&R"), or conveyance of any unit within the community, the Developer is required to record a Declaration of Private Maintenance Requirements ("DPMR") as a covenant on all associated properties, and on behalf of all current and future property owners. The DPMR is to include a listing of all privately owned and/or maintained infrastructure improvements, along with assignment of maintenance responsibility for each to the common interest community or the respective individual property owners, and is to provide a brief description of the required level of maintenance for privately maintained components. The DPMR must be reviewed and approved by the City of Las Vegas Department of Field Operations prior to recordation, and must include a statement that all properties within the community are subject to assessment for all associated costs should private maintenance obligations not be met, and the City of Las Vegas be required to provide for said maintenance. Also, the CC&R are to include a statement of obligation of compliance with the DPMR. Following recordation, the Developer is to submit copies of the recorded DPMR and CC&R documents to the City of Las Vegas Department of Field Operations.

6. All development is subject to the conditions of City Departments and State Subdivision Statutes.

Public Works

7. Private streets must be granted and labeled on the Final Map for this site as Public Utility Easements (P.U.E.), Public Sewer Easements, and Public Drainage Easements with private surface maintenance by the Homeowner's Association.

8. In accordance with Condition #10 of TMP-76718 and Section 3.04 of the Sunstone Development Agreement, if not already constructed or guaranteed by the master developer, a minimum two lanes of asphalt pavement on village streets providing the main access to this site and a working sanitary sewer connection shall be provided prior to a final inspection of any dwelling units within this Tentative Map. Complete construction of Village streets shall conform to Section 3.04 of the Sunstone Development Agreement. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.

9. Common Element "N" shall be a minimum 40-foot wide Public Sewer, Public Drainage, and Public Utility Easement to Be Privately Maintained. The boundary between Lot 52 and Common Element "N" may need to move east to accommodate the proposed easement. No trees or landscaping over three feet tall shall be allowed within the public sewer easement.

10. Construct paved access to any proposed manholes not located within the private streets.

11. Prior to the recordation of a Final Map for this site, submit a pedestrian circulation plan to identify nearby pedestrian attractors and recommend measures to accommodate pedestrians, such as but not limited to pedestrian access, crosswalk, pedestrian activated flashers and temporary sidewalks.

12. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building, grading permits or the recordation of a Final Map, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

13. The approval of all Public Works related improvements shown on this Tentative Map is in concept only. Specific design and construction details relating to size, type and/or alignment of improvements, including but not limited to street, sewer and drainage improvements, shall be resolved prior to approval of the construction plans by the City. No deviations from adopted City Standards shall be allowed unless specific written approval for such is received from the City Engineer prior to the recordation of a Final Map or the approval of subdivision related construction plans, whichever may occur first. Approval of this Tentative Map does not constitute approval of any deviations. If such approval cannot be obtained, a revised Tentative Map must be submitted showing elimination of such deviations. Roadway locations and parcel entries are schematic and final studies and engineering improvements designs. Geometric design of Parcel entry points must be approved through the development review of each parcel.

14. Site development to comply with all applicable conditions of approval for the Sunstone master Tentative Map (TMP-76718) and any other site related actions.

** STAFF REPORT **

PROJECT DESCRIPTION

The applicant requests review of a Tentative Map for a 199-lot private gated single family residential subdivision on 30.74 acres of undeveloped land at the southeast corner of Log Cabin Way and N Skye Canyon Park Dr.

ISSUES

- The boundary between Lot 52 and Common Element "N" may need to move east to accommodate a 40-foot public sewer easement required by Public Works condition.
- The Tentative Map was reviewed and approved by the Master Developer of Sunstone on December 23, 2019 prior to submittal to the City for review.

ANALYSIS

The proposed subdivision is part of a 630-acre master planned development (Sunstone) generally located east of U.S. 95 and south of Moccasin Road. The Sunstone community is zoned T-D (Traditional Development), a district which was established to permit and encourage the development of comprehensively planned mixed-use communities with a minimum of 80 contiguous acres of land under one ownership or control that can generally exist as a self-contained community.

Development of the site is subject to the terms of an approved Development Agreement between the Master Developer and the City of Las Vegas, which includes the Sunstone Design Guidelines. The Development Agreement indicates that the proposed subdivision is part of Phase 2 of development. The developer has requested that Sunstone R-SL (Residential Small Lot) standards be used for this subdivision, which conforms to the L (Residential Low) Sunstone land use category designated for this parcel by the Development Agreement. The minimum lot size under the Sunstone R-SL standards is 2,800 square feet and the minimum lot width is 35 feet; this subdivision proposes lots with an average size of 4,343 square feet and 45 feet in width. Two-story units are planned with sizes ranging between 2,400 to 2,800 square feet. The density of this subdivision is 6.47 dwelling units per acre, which is below the maximum 15 dwelling units per acre required by the Sunstone Master Land Use Plan for L (Residential Low) designated parcels.

Access to the site is from Ohare Road, which was designed and recorded through a Parent Final Map (FMP-77750) on February 10, 2020. Interior streets, trails, open spaces and drainage corridors are private and will be maintained by a Homeowners' Association. Private streets are 49 feet wide with sidewalks on both sides as required by the Sunstone Development Agreement. A 50-foot paseo separates this parcel from another residential parcel to the west (Parcel F). A trail will be installed within the paseo and maintained by the Master Developer. Perimeter landscaping will be provided through the Master Developer along Ohare Road, N Skye Canyon Park Dr and Log Cabin Way and will conform to Sunstone Design Guidelines.

As this site is part of a master plan with specific offsite improvement standards and trail pathways, it is not subject to Title 19.04 street section and connectivity requirements. Stub street terminations are permitted by the Sunstone Development Agreement. The Tentative Map indicates a Connectivity Ratio of 1.18 and includes multiple bicycle and pedestrian connections. The site slopes down from west to east approximately 3% and from south to north less than 1%. Per Section 6.B.3 of the Sunstone Design Guidelines, the maximum retaining wall height is six feet. The submitted cross sections show tiered retaining walls of 3.5 feet and 5.5 feet along the west property line. No retaining walls over six feet in height are shown. Sunstone Design Guidelines allow up to 12 feet of exposure.

The Clark County School District (CCSD) has commented on the impact future development might have on the three levels of schools in the area. CCSD projects that approximately 86 additional primary and secondary school students will be generated by the proposed development on this site. According to CCSD, Bilbray and Scherkenback Elementary Schools and Ralph Cadwallader Middle School are slightly below capacity for the 2019-20 school year. Arbor View High School is 129% over program capacity. No new schools are planned in the area.

FINDINGS (TMP-78151)

The Tentative Map generally conforms to the terms of the Sunstone Development Agreement. The map also conforms to Nevada Revised Statutes as applicable for tentative maps. Staff recommends approval, subject to conditions.

BACKGROUND INFORMATION

Related Relevant City Actions by Planning, Fire, Bldg., etc.	
06/19/19	The City Council approved the First Amendment and Restatement of the Sunstone Development Agreement (thereby dissolving the Eastland Development Agreement) on approximately 628 acres at the southwest corner of Moccasin Road and N Skye Canyon Park Dr (DIR-76290). The Planning Commission and staff recommended approval.
	The City Council approved the First Amendment and Restatement of the Sunstone Parks Agreement (DIR-76291). The Planning Commission and staff recommended approval.
07/23/19	The Planning Commission approved a Parent Tentative Map (TMP-76718) for a 22-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr. Staff recommended approval.
02/10/20	A Parent Final Map (FMP-77750) for a 20-parcel master planned community (Sunstone) on 630.39 acres at the southwest corner of the Moccasin Road alignment and N Skye Canyon Park Dr was recorded.

Most Recent Change of Ownership	
11/07/13	A deed was recorded for a change in ownership.

Related Building Permits/Business Licenses
There are no related building permits or business licenses associated with the subject site.

Pre-Application Meeting	
12/23/19	Department of Planning staff met with the applicant to discuss submittal requirements for a Tentative Map application. The applicant was advised that a map could be submitted but would not be placed on an agenda until the parent final map for Sunstone recorded.

Neighborhood Meeting
A neighborhood meeting was not required, nor was one held.

Field Check	
01/30/20	The site is undeveloped with native desert vegetation. A staging area for a paving project is located at the corner of Log Cabin Way and N Skye Canyon Park Dr.

Details of Application Request	
Site Area	
Gross Acres	30.74

Surrounding Property	***Existing Land Use Per Title 19.12***	***Planned or Special Land Use Designation***	***Existing Zoning District***
Subject Property	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
North	Undeveloped	L (Residential Low) - Sunstone P (Park and Trail) - Sunstone	T-D (Traditional Development)
South	Undeveloped	L (Residential Low) - Sunstone	T-D (Traditional Development)
East	Single Family, Detached	PCD (Planned Community Development)	R-PD6 (Residential Planned Development – 6 Units per Acre)
West	Undeveloped	P (Park and Trail) - Sunstone	T-D (Traditional Development)

Master and Neighborhood Plan Areas	***Compliance***
Sunstone Development Agreement	Y
Special Area and Overlay Districts	***Compliance***
T-D (Traditional Development) District	Y
Other Plans or Special Requirements	***Compliance***
Trails (by others)	N/A
Las Vegas Redevelopment Plan Area	N/A
Interlocal Agreement	N/A
Project of Significant Impact (Development Impact Notification Assessment)	N/A
Project of Regional Significance	N/A

DEVELOPMENT STANDARDS

Pursuant to the Sunstone Design Guidelines for the R-SL (Residential Small Lot) density category, the following standards apply:

Standard	*Required/Allowed*	*Provided*	*Compliance*
Housing Type	Single Family Residential	Single Family Residential	Y
Min. Lot Size	2,800 SF	4,038 SF	Y
Min. Lot Width	35 Feet	45 Feet	Y
Min. Setbacks			
• Front (single story living element or porch)*	14 Feet	14 Feet	Y
• Front (to garage door)	18 Feet	18 Feet	Y
• Front (2nd story elements)	20 Feet	20 Feet	Y
• Side	5 Feet	5 Feet	Y
• Corner Side	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	8 Feet to ground level porch; 10 feet to 1st and 2nd story living element from sidewalk; 5 feet from CE	Y
• Rear	10 Feet to single story living element 15 Feet to 2nd story living element**	10 Feet to single story living element 15 Feet to 2nd story living element	Y
Max. Lot Coverage	60 %	60 %	Y
Max. Building Height	3 stories/35 Feet	1 story/35 Feet	Y

*May be reduced to 10 feet for single family living or porch elements for 30% of building width.
**May be reduced by 5 feet for 50% of building width.

Street Name	***Functional Classification of Street(s)***	***Governing Document***	***Actual Street Width (Feet)***	***Compliance with Street Section***
N Skye Canyon Park Dr	Primary Arterial	Planned Streets and Highways Map	43-70	N*
	Arterial with Trail	Sunstone DA		
Ohare Rd	Minor Collector with Bike Lanes	Sunstone DA	0	N*
Log Cabin Way	Arterial	Sunstone DA	0	N*

*Public perimeter streets will be improved according to the requirements of the Sunstone Development Agreement.

19.04.040 Connectivity		
Transportation Network Element	***# Links***	***# Nodes***
Internal Street	20	
Intersection – Internal		10
Cul-de-sac Terminus		5
Intersection – External Street or Stub Terminus		4
Intersection – Stub Terminus w/ Temporary Turn Around Easements		0
Non-Vehicular Path - Unrestricted	2.5	
Total	22.5	19
	Required	***Provided***
Connectivity Ratio (Links / Nodes):	**N/A**	**1.18**

Pursuant to Title 19.08 and 19.12, the following parking standards apply:

Parking Requirement							
Use	***Gross Floor Area or Number of Units***	***Required***			***Provided***		***Compliance***
		Parking Ratio	*Parking*		*Parking*		
			Regular	Handi-capped	Regular	Handi-capped	
Single Family, Detached	199 units	2 spaces per unit w/in enclosed garage	398				
TOTAL SPACES REQUIRED			398		398		Y
Regular and Handicap Spaces Required			398	0	398	0	Y

SS

Kimley»Horn

May 21, 2020

Department of Planning
City of Las Vegas
333 N Rancho Dr
Las Vegas, Nevada 89106

RE: ***Justification Letter for TMP-78141/PRJ-78003, Sunstone – Parcel D (Parcel 13 of Sunstone Final Map – FMP-77750) cut and fill more than two feet***

To Whom it May Concern:

We hereby submit the attached grading plans for review by the CLV Planning Department of Sunstone – Parcel F (Parcel 12 of Sunstone Final Map – FMP-77750), a single-family residential subdivision located within the 630+/- acre Sunstone master planned community at the SWC of the intersection of N. Skye Canyon Park Dr. and Log Cabin Way.

Due to the existing topography of the site, generally having an existing slope of 4% to 5% from west to east, the site will have areas of cut and fill of greater than two feet onsite. In addition, the 30+/- acre site's current natural topography contains ridges and valleys traversing through the site with height/depth greater than four feet requiring adequate cut or fill accordingly. The site is currently being designed to blend with the Sunstone infrastructure roadways, maintain drainage per the approved master technical drainage study, attain balanced earthworks, and reduce earthwork movement onsite to the greatest extent practicable.

On behalf of the owner, EASTLAND LLC, we'd like to respectfully request approval for the cut and fill heights exceeding two feet as shown in the grading plans included with this review. Thank you for your consideration, we look forward to working with the Planning Department for a favorable recommendation for this project. Please contact me at (702) 862-3632 or Mikal.Kintner@kimley-horn.com should you have any questions or concerns.

Sincerely,

Mikal Kintner

Mikal Kintner
cc: Lennar Homes

PLANS APPROVED
PLANNING
Dept of Planning
City of Las Vegas, Nevada
2 FOOT GRADE DIFFERENCE ONLY
LHM MAY 21 2020

Conforms to the minimum requirement of LVMC Title 19 applicable Master Plan Development standards and/or Conditions of Approval. Make No Change Without Approval. Plan is Not a Permit to Violate Any Ordinance.

FMP.

Appendix B – Hydraulic Calculations

- Hydraulic Sections – Onsites
- Hydraulic Sections – Swales
- Standard Form 6 Calculations
    - Mainline & Laterals
- Drop Inlet Calculations
- Finished Floor Elevation Check

Worksheet for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	4.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.29 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.1 ft²
Wetted Perimeter	10.37 ft
Hydraulic Radius	0.10 ft
Top Width	10.28 ft
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Critical Slope	0.73 %
Velocity	3.70 ft/s
Velocity Head	0.21 ft
Specific Energy	0.51 ft
Froude Number	2.012
Flow Type	Supercritical

Worksheet for D-1 (Half Street)

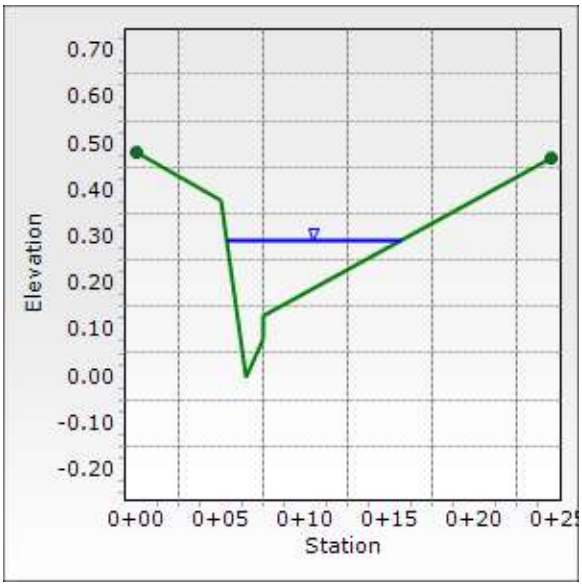
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.29 ft
Critical Depth	0.36 ft
Channel Slope	3.25 %
Critical Slope	0.73 %

Cross Section for D-1 (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.29 ft
Discharge	4.00 cfs



Worksheet for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Discharge	7.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.13
0+24.50	0.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+24.50, 0.47)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.35 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.7 ft²
Wetted Perimeter	13.42 ft
Hydraulic Radius	0.13 ft
Top Width	13.33 ft
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Critical Slope	0.70 %
Velocity	4.29 ft/s
Velocity Head	0.29 ft
Specific Energy	0.64 ft
Froude Number	2.089
Flow Type	Supercritical

Worksheet for D-3B (Half Street)

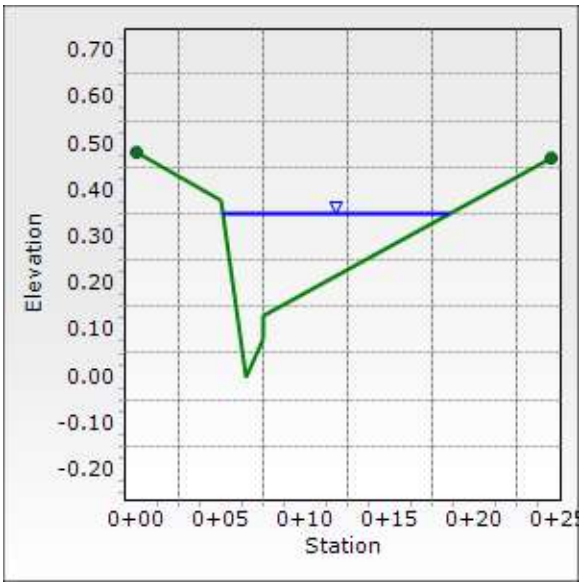
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.44 ft
Channel Slope	3.25 %
Critical Slope	0.70 %

Cross Section for D-3B (Half Street)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.25 %
Normal Depth	0.35 ft
Discharge	7.50 cfs



Worksheet for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	0.53 ft
Flow Area	0.8 ft²
Wetted Perimeter	3.35 ft
Hydraulic Radius	0.25 ft
Top Width	3.18 ft
Critical Depth	0.49 ft
Critical Slope	1.56 %
Velocity	2.37 ft/s
Velocity Head	0.09 ft
Specific Energy	0.62 ft
Froude Number	0.811
Flow Type	Subcritical

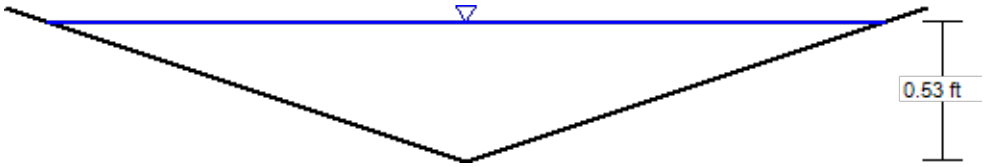
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

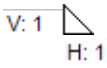
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.53 ft
Critical Depth	0.49 ft
Channel Slope	1.00 %
Critical Slope	1.56 %

Cross Section for SW-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.53 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	2.00 cfs





Worksheet for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs

Results	
Normal Depth	0.62 ft
Flow Area	1.1 ft²
Wetted Perimeter	3.91 ft
Hydraulic Radius	0.29 ft
Top Width	3.71 ft
Critical Depth	0.57 ft
Critical Slope	1.48 %
Velocity	2.62 ft/s
Velocity Head	0.11 ft
Specific Energy	0.72 ft
Froude Number	0.832
Flow Type	Subcritical

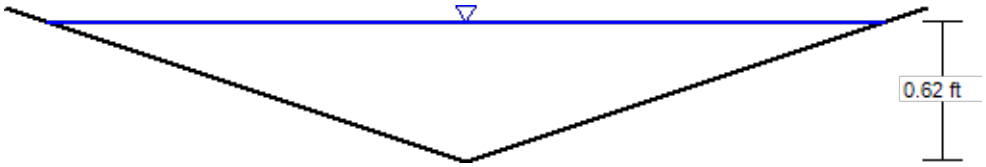
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

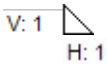
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.62 ft
Critical Depth	0.57 ft
Channel Slope	1.00 %
Critical Slope	1.48 %

Cross Section for SW-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.62 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	3.00 cfs





Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED MAINLINE - Connect to 42" RCP in Log Cabin Way to Street V to Street N

DATE: 06/30/20 FILE: SF6.xls

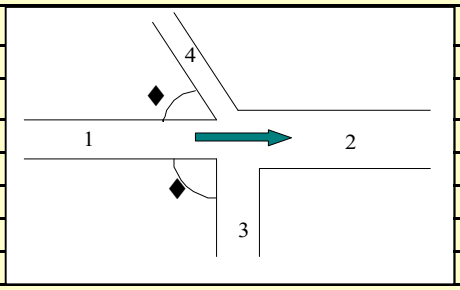
Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		42			54.11																					Outlet K_o=	1.0									62.16	61.45		
1000.00	1053.57	R	42	1	54.11	57.23	53.6	5.83%	9.62	0.0049	65.0	6.76	0.71	0.0042	0.0042	0.22																		0.00	62.38	61.67			FULL	U/S
1053.57	1058.57	T	42	1	57.23	57.40	5.0	3.29%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0038		0.02	30	0.22	0.16	45	0.50	0.42											0.59			62.97	62.39	FULL	U/S
1058.57	1150.00	R	42	1	57.40	58.04	91.4	0.70%	9.62	0.0049	59.0	6.13	0.58	0.0034	0.0034	0.31																		0.00	63.29	62.70			FULL	U/S
1150.00	1155.00	T	30	1	58.04	59.08	5.0	20.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0068		0.03	0	0.02	0.01	90	0.25	0.31											0.35			63.64	62.53	FULL	U/S
1155.00	1184.29	R	30	1	59.08	59.28	29.3	0.70%	4.91	0.0049	41.5	8.45	1.11	0.0102	0.0102	0.30																		0.00	63.94	62.83			FULL	U/S
1184.29	1189.29	T	30	1	59.28	59.32	5.0	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0092		0.05	0	0.02	0.02													0.43	0.50			64.44	63.55	FULL	U/S
1189.29	1375.21	R	30	1	59.32	60.62	185.9	0.70%	4.91	0.0049	37.0	7.54	0.88	0.0081	0.0081	1.51																		0.00	65.95	65.06			FULL	U/S
1375.21	1380.21	T	30	1	60.62	60.66	5.0	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0071		0.04	3	0.02	0.02	90	0.25	0.72											0.77			66.72	66.06	FULL	U/S
1380.21	1608.96	R	30	1	60.66	62.25	228.8	0.70%	4.91	0.0049	32.0	6.52	0.66	0.0061	0.0061	1.39																		0.00	68.10	67.44			FULL	U/S
1608.96	1613.96	T	30	1	62.25	62.29	5.0	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0049		0.02	0	0.02	0.01	90	0.25	0.56											0.60			68.70	68.30	FULL	U/S
1613.96	1646.18	R	30	1	62.29	62.51	32.2	0.70%	4.91	0.0049	25.0	5.09	0.40	0.0037	0.0037	0.12																		0.00	68.82	68.42			FULL	U/S
1646.18	1651.18	T	30	1	62.51	62.57	5.0	1.10%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0030		0.01	0	0.02	0.01													0.30	0.32			69.14	68.90	FULL	U/S
1651.18	1838.06	R	30	1	62.57	63.87	186.9	0.70%	4.91	0.0049	19.5	3.97	0.25	0.0023	0.0023	0.42																		0.00	69.56	69.32			FULL	U/S
1838.06	1843.06	T	24	1	63.87	64.41	5.0	10.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0033		0.02	90	1.33	0.33														0.34			69.91	69.55	FULL	U/S
1843.06	1892.02	R	24	1	64.41	64.75	49.0	0.70%	3.14	0.0049	15.0	4.77	0.35	0.0044	0.0044	0.21																		0.00	70.12	69.77			FULL	U/S
1892.02	1897.02	T	18	1	64.75	65.32	5.0	11.29%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0047		0.02	45	0.46	0.16	45	0.50	0.21											0.40			70.52	70.24	FULL	U/S
1897.02	1917.48	R	18	1	65.32	65.70	20.5	1.89%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.10																		0.00	70.63	70.35			FULL	U/S
1917.48	1922.48	T	18	1	65.70	66.08	5.0	7.44%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	0	0.02	0.01	45	0.50	0.22											0.24			70.87	70.74	FULL	U/S
1922.48	1923.98	R	18	1	66.08	66.27	1.5	13.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	70.87	70.75			FULL	U/S
1923.98	1923.98	R	18	1	66.27	66.27	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			70.98	70.98	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	37
Flow in Pipe 2 (cfs)	42
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	44
Angle of Pipe 4*	42



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77
Head Loss at Junction (ft)	**0.43**

Equation Used:

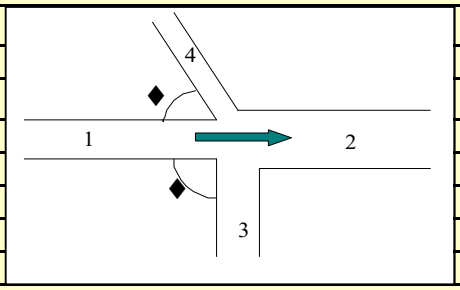
Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	30.0
Diameter of Pipe 2 (in)	30.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	19
Flow in Pipe 2 (cfs)	25
Flow in Pipe 3 (cfs)	2
Flow in Pipe 4 (cfs)*	4
Angle of Pipe 3	44
Angle of Pipe 4*	46



*Optional

Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	4.91
Area of Pipe 2 (ft^2)	4.91
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**0.30**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

Mainline - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	54.11	57.61	62.16	61.45	64.03	EXDI	OK	NO
1053.57	57.23	60.73	62.38	61.67	66.82	DI02	OK	NO
1058.57	57.40	60.90	62.97	62.39	66.82	DI02	OK	NO
1150.00	58.04	61.54	63.29	62.70	68.12	SDMH01	OK	NO
1155.00	59.08	61.58	63.64	62.53	68.12	SDMH01	OK	NO
1184.29	59.28	61.78	63.94	62.83	68.36	SDMH07	OK	NO
1189.29	59.32	61.82	64.44	63.55	68.36	SDMH07	OK	NO
1375.21	60.62	63.12	65.95	65.06	69.66	SDMH08	OK	NO
1380.21	60.66	63.16	66.72	66.06	69.66	SDMH08	OK	NO
1608.96	62.25	64.75	68.10	67.44	71.33	SDMH10	OK	NO
1613.96	62.29	64.79	68.70	68.30	71.33	SDMH10	OK	NO
1646.18	62.51	65.01	68.82	68.42	71.59	SDMH12	OK	NO
1651.18	62.57	65.07	69.14	68.90	71.59	SDMH12	OK	NO
1838.06	63.87	66.37	69.56	69.32	72.93	SDMH13	OK	NO
1843.06	64.41	66.41	69.91	69.55	72.93	SDMH13	OK	NO
1892.02	64.75	66.75	70.12	69.77	73.54	SDMH14	OK	NO
1897.02	65.32	66.82	70.52	70.24	73.54	SDMH14	OK	NO
1917.48	65.70	67.20	70.63	70.35	73.45	DI23	OK	NO
1922.48	66.08	67.58	70.87	70.74	73.45	DI23	OK	NO
1923.98	66.27	67.77	70.87	70.75	73.55	DI24	OK	NO
1923.98	66.27	67.77	70.98	70.98	73.55	DI24	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH 01 (Street S Mainline)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

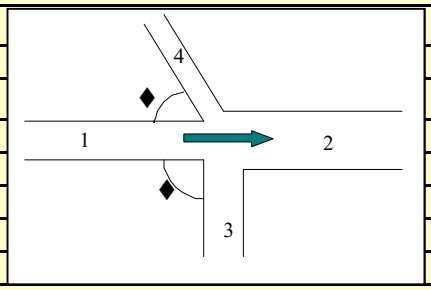
CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S										H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		24			59.27																					Outlet K_o=	1.0									63.18	62.70		
1000.00	1060.50	R	24	1	59.27	59.69	60.5	0.70%	3.14	0.0049	17.5	5.57	0.48	0.0060	0.0060	0.36																		0.00	63.54	63.06			FULL	U/S
1060.50	1065.50	T	18	1	59.69	60.30	5.0	12.06%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0090		0.04	0	0.02	0.01													1.60	1.66			65.20	64.54	FULL	U/S
1065.50	1376.74	R	18	1	60.30	70.98	311.2	3.43%	1.77	0.0049	11.5	6.51	0.66	0.0119	0.0119	3.72																		0.00	73.14	72.48			PART	D/S
1376.74	1381.74	T	18	1	70.98	71.15	5.0	3.22%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0092		0.05	0	0.02	0.01	47	0.50	0.48											0.54			73.68	73.32	FULL	U/S
1381.74	1466.74	R	18	1	71.15	73.70	85.0	3.01%	1.77	0.0049	8.5	4.81	0.36	0.0065	0.0065	0.55																		0.00	75.56	75.20			PART	D/S
1466.74	1471.74	T	18	1	73.70	73.86	5.0	3.01%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0040		0.02	0	0.02	0.01	45	0.50	0.32											0.35			75.91	75.83	FULL	U/S
1471.74	1624.74	R	18	1	73.86	78.45	153.0	3.00%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.22																		0.00	80.02	79.95			PART	D/S
1624.74	1629.74	T	18	1	78.45	78.54	5.0	1.85%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014		0.01	45	0.46	0.04														0.04			80.12	80.04	FULL	D/S
1629.74	1661.74	R	18	1	78.54	78.76	32.0	0.70%	1.77	0.0049	4.0	2.26	0.08	0.0014	0.0014	0.05																		0.00	80.34	80.26			FULL	D/S
1661.74	1666.74	T	18	1	78.76	78.81	5.0	0.86%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0009		0.00	88	1.33	0.11	0	0.85	0.06											0.17			80.52	80.50	FULL	U/S
1666.74	1690.62	R	18	1	78.81	79.05	23.9	1.02%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	80.57	80.55			FULL	D/S
1690.62	1690.62	R	18	1	79.05	79.05	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.59	80.59	FULL	U/S

Junction Head Loss Calculation

Known

Diameter of Pipe 1 (in)	18.0
Diameter of Pipe 2 (in)	18.0
Diameter of Pipe 3 (in)	18.0
Diameter of Pipe 4 (in)*	18.0
Flow in Pipe 1 (cfs)	12
Flow in Pipe 2 (cfs)	18
Flow in Pipe 3 (cfs)	3
Flow in Pipe 4 (cfs)*	3
Angle of Pipe 3	45
Angle of Pipe 4*	45

*Optional



Headloss is applied at Entrance to Junction

Insert Loss in Misc. Loss Column and leave Junction Loss Column Blank

Solve For

Area of Pipe 1 (ft^2)	1.77
Area of Pipe 2 (ft^2)	1.77
Area of Pipe 3 (ft^2)	1.77
Area of Pipe 4 (ft^2)	1.77

Head Loss at Junction (ft)	**1.60**

Equation Used:

Incorporates Pressure plus Momentum Laws

$$Hj=((Q_2^2/A_{2*g}-Q_1^2/A_{1*g}-Q_3^2*\cos(Ang3)/A_{3*g}-Q_4^2*\cos(Ang4)/A_{4*g})*2/(A_1+A_2)-D_1+D_2)$$

SDMH 01 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	59.27	61.27	63.18	62.70	68.12	SDMH01	OK	NO
1060.50	59.69	61.69	63.54	63.06	68.99	SDMH02	OK	NO
1065.50	60.30	61.80	65.20	64.54	68.99	SDMH02	OK	NO
1376.74	70.98	72.48	73.14	72.48	79.28	SDMH03	OK	NO
1381.74	71.15	72.65	73.68	73.32	79.28	SDMH03	OK	NO
1466.74	73.70	75.20	75.56	75.20	82.19	SDMH04	OK	NO
1471.74	73.86	75.36	75.91	75.83	82.19	SDMH04	OK	NO
1624.74	78.45	79.95	80.02	79.95	87.14	SDMH05	OK	NO
1629.74	78.54	80.04	80.12	80.04	87.14	SDMH05	OK	NO
1661.74	78.76	80.26	80.34	80.26	87.61	SDMH06	OK	NO
1666.74	78.81	80.31	80.52	80.50	87.61	SDMH06	OK	NO
1690.62	79.05	80.55	80.57	80.55	86.86	DI08	OK	NO
1690.62	79.05	80.55	80.59	80.59	86.86	DI08	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0											64.58	64.54		
1000.00	1025.89	R	18	1	60.21	60.47	25.9	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.61	64.56			FULL	U/S
1025.89	1025.89	R	18	1	60.47	60.47	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.65	64.65	FULL	U/S

SDMH 02 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.99	SDMH02	OK	NO
1025.89	60.47	61.97	64.61	64.56	68.87	DI03	OK	NO
1025.89	60.47	61.97	64.65	64.65	68.87	DI03	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH02 South

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.21																					Outlet K_o=	1.0									64.58	64.54		
1000.00	1021.46	R	18	1	60.21	60.53	21.5	1.50%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																		0.00	64.60	64.56			FULL	U/S
1021.46	1021.46	R	18	1	60.53	60.53	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			64.64	64.64	FULL	U/S

SDMH 02 South - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.21	61.71	64.58	64.54	68.32	SDMH02	OK	NO
1021.46	60.53	62.03	64.60	64.56	68.62	DI04	OK	NO
1021.46	60.53	62.03	64.64	64.64	68.62		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH03

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			71.07																					Outlet K_o=	1.0									73.36	73.32		
1000.00	1025.18	R	18	1	71.07	71.69	25.2	2.46%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.02																			0.00	73.39	73.34			FULL	U/S
1025.18	1025.18	R	18	1	71.69	71.69	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02								0.04			73.43	73.43	FULL	U/S

SDMH 03 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	71.07	72.57	73.36	73.32	79.28	SDMH03	OK	NO
1025.18	71.69	73.19	73.39	73.34	79.38	DI05	OK	NO
1025.18	71.69	73.19	73.43	73.43	79.38	DI05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH04

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			73.78																					Outlet K_o=	1.0										75.93	75.83		
1000.00	1024.63	R	18	1	73.78	74.82	24.6	4.22%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.05																		0.00	76.42	76.32			PART	D/S
1024.63	1024.63	R	18	1	74.82	74.82	0.0		1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.00					45	0.50	0.05	Ki=	0.4	0.04								0.09			76.51	76.51	FULL	U/S

SDMH 04 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	73.78	75.28	75.93	75.83	82.19	SDMH04		OK	NO
1024.63	74.82	76.32	76.42	76.32	81.93	DI06		OK	NO
1024.63	74.82	76.32	76.51	76.51	81.93	DI06		OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH06 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			78.78																					Outlet K_o=	1.0											80.52	80.50		
1000.00	1026.38	R	18	1	78.78	79.41	26.4	2.39%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																			0.00	80.93	80.91			PART	D/S
1026.38	1026.38	R	18	1	79.41	79.41	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			80.95	80.95	FULL	U/S

SDMH 06 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	78.78	80.28	80.52	80.50	87.61	SDMH06	OK	NO
1026.38	79.41	80.91	80.93	80.91	87.72	DI07	OK	NO
1026.38	79.41	80.91	80.95	80.95	87.72	DI07	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			60.30																					Outlet K_o=	1.0											63.57	63.55		
1000.00	1026.56	R	18	1	60.30	60.96	26.6	2.49%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	63.58	63.56			FULL	U/S
1026.56	1026.56	R	18	1	60.96	60.96	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			63.60	63.60	FULL	U/S

SDMH 07 East - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.57	63.55	68.36	SDMH07	OK	NO
1026.56	60.96	62.46	63.58	63.56	67.77	DI09	OK	NO
1026.56	60.96	62.46	63.60	63.60	67.77	DI09	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH07 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			60.30																					Outlet K_o=	1.0										63.58	63.55		
1000.00	1024.39	R	18	1	60.30	60.79	24.4	2.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	63.59	63.56			FULL	U/S
1024.39	1029.39	T	18	1	60.79	61.39	5.0	11.90%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0004		0.00	42	0.32	0.01	45	0.50	0.02											0.04			63.63	63.61	FULL	U/S
1029.39	1030.89	R	18	1	61.39	61.40	1.5	1.00%	1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00																	0.00	63.63	63.61			FULL	U/S
1030.89	1030.89	R	18	1	61.40	61.40	0.0		1.77	0.0049	1.8	1.02	0.02	0.0003	0.0003	0.00					45	0.50	0.01	Ki=	0.4	0.01							0.01			63.64	63.64	FULL	U/S

SDMH 07 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	60.30	61.80	63.58	63.55	68.36	SDMH07	OK	NO
1024.39	60.79	62.29	63.59	63.56	67.65	DI10	OK	NO
1029.39	61.39	62.89	63.63	63.61	67.65	DI10	OK	NO
1030.89	61.40	62.90	63.63	63.61	67.68	DI11	OK	NO
1030.89	61.40	62.90	63.64	63.64	67.68	DI11	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH08 (Street R)

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)=	0.013	Inlet Structure Type or K_i=	D	Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			61.64																					Outlet K_o=	1.0									66.18	66.06		
1000.00	1061.30	R	18	1	61.64	62.07	61.3	0.70%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.14																		0.00	66.32	66.20			FULL	U/S
1061.30	1066.30	T	18	1	62.07	62.32	5.0	5.01%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0014		0.01	45	0.46	0.06	45	0.50	0.11											0.17			66.50	66.46	FULL	U/S
1066.30	1089.25	R	18	1	62.32	64.45	23.0	9.31%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.01																		0.00	66.51	66.48			FULL	U/S
1089.25	1089.25	R	18	1	64.45	64.45	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 08 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	61.64	63.14	66.18	66.06	69.66	SDMH08	OK	NO
1061.30	62.07	63.57	66.32	66.20	70.59	SDMH09	OK	NO
1066.30	62.32	63.82	66.50	66.46	70.59	SDMH09	OK	NO
1089.25	64.45	65.95	66.51	66.48	70.33	DI13	OK	NO
1089.25	64.45	65.95	66.54	66.54	70.33	DI13	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH09 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc				CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			62.08																					Outlet K_o=	1.0									66.49	66.46		
1000.00	1028.34	R	18	1	62.08	62.47	28.3	1.35%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.02																		0.00	66.51	66.48			FULL	U/S
1028.34	1028.34	R	18	1	62.47	62.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01								0.03			66.54	66.54	FULL	U/S

SDMH 09 North- Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	62.08	63.58	66.49	66.46	70.59	SDMH09	OK	NO
1028.34	62.47	63.97	66.51	66.48	70.46	DI12	OK	NO
1028.34	62.47	63.97	66.54	66.54	70.46	DI12	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH10

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.27																					Outlet K_o=	1.0								68.54	68.30		
1000.00	1058.50	R	18	1	63.27	63.68	58.5	0.70%	1.77	0.0049	7.0	3.96	0.24	0.0044	0.0044	0.26																		0.00	68.80	68.56			FULL	U/S
1058.50	1063.50	T	18	1	63.68	63.72	5.0	0.78%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0028		0.01	0	0.02	0.00	45	0.50	0.21												0.23			69.03	68.97	FULL	U/S
1063.50	1083.50	R	18	1	63.72	63.89	20.0	0.84%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.06	69.00			FULL	U/S
1083.50	1088.50	T	18	1	63.89	64.46	5.0	11.32%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	47	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1088.50	1090.00	R	18	1	64.46	64.47	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1090.00	1090.00	R	18	1	64.47	64.47	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 10 - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.27	64.77	68.54	68.30	71.33	SDMH10	OK	NO
1058.50	63.68	65.18	68.80	68.56	72.15	SDMH11	OK	NO
1063.50	63.72	65.22	69.03	68.97	72.15	SDMH11	OK	NO
1083.50	63.89	65.39	69.06	69.00	71.89	DI16	OK	NO
1088.50	64.46	65.96	69.13	69.10	71.89	DI16	OK	NO
1090.00	64.47	65.97	69.13	69.10	72.02	DI7	OK	NO
1090.00	64.47	65.97	69.16	69.16	72.02	DI7	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH11 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
															PIPE	TRANSITION																										
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.70																					Outlet K_o=	1.0												
1000.00	1018.50	R	18	1	63.70	65.32	18.5	8.77%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.02																		0.00	69.05	68.99			FULL	U/S
1018.50	1023.50	T	18	1	65.32	65.57	5.0	4.84%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0008		0.00	51	0.46	0.03	45	0.50	0.05												0.08			69.13	69.10	FULL	U/S
1023.50	1025.00	R	18	1	65.57	65.58	1.5	1.00%	1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00																		0.00	69.13	69.10			FULL	U/S
1025.00	1025.00	R	18	1	65.58	65.58	0.0		1.77	0.0049	2.5	1.41	0.03	0.0006	0.0006	0.00					45	0.50	0.02	Ki=	0.4	0.01									0.03			69.16	69.16	FULL	U/S

SDMH 11 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.70	65.20	69.03	68.97	72.15	SDMH11	OK	NO
1018.50	65.32	66.82	69.05	68.99	71.68	DI14	OK	NO
1023.50	65.57	67.07	69.13	69.10	71.68	DI14	OK	NO
1025.00	65.58	67.08	69.13	69.10	71.80	DI15	OK	NO
1025.00	65.58	67.08	69.16	69.16	71.80	DI15	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 East

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_i	H_i	Inlet/	K_i	H_c	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
	1000.00		18			63.55																					Outlet K_o=	1.0									68.92	68.90		
1000.00	1026.16	R	18	1	63.55	64.20	26.2	2.48%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.01																		0.00	68.93	68.91			FULL	U/S
1026.16	1026.16	R	18	1	64.20	64.20	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01								0.02			68.95	68.95	FULL	U/S

SDMH 12 East - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	63.55	65.05	68.92	68.90	71.59	SDMH12	Connect to Mainline	OK	NO
1026.16	64.20	65.70	68.93	68.91	71.00	DI18	Eastern DI	OK	NO
1026.16	64.20	65.70	68.95	68.95	71.00	DI18	Eastern DI	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH12 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			63.55																					Outlet K_o=	1.0									68.96	68.90		
1000.00	1022.68	R	18	1	63.55	64.02	22.7	2.07%	1.77	0.0049	3.5	1.98	0.06	0.0011	0.0011	0.03																		0.00	68.99	68.93			FULL	U/S
1022.68	1027.68	T	18	1	64.02	64.62	5.0	11.93%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0007		0.00	46	0.46	0.03	45	0.50	0.05												0.08			69.07	69.05	FULL	U/S
1027.68	1029.18	R	18	1	64.62	64.63	1.5	1.00%	1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00																		0.00	69.07	69.05			FULL	U/S
1029.18	1029.18	R	18	1	64.63	64.63	0.0		1.77	0.0049	2.0	1.13	0.02	0.0004	0.0004	0.00					45	0.50	0.01	Ki=	0.4	0.01									0.02			69.09	69.09	FULL	U/S

SDMH 12 West - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	63.55	65.05	68.96	68.90	71.59	SDMH12	OK	NO
1022.68	64.02	65.52	68.99	68.93	70.87	DI19	OK	NO
1027.68	64.62	66.12	69.07	69.05	70.87	DI19	OK	NO
1029.18	64.63	66.13	69.07	69.05	70.89	DI20	OK	NO
1029.18	64.63	66.13	69.09	69.09	70.89	DI20	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH13

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
															PIPE	TRANSITION																								
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			64.89																															69.65	69.55		
																												Outlet K_o=		1.0										
1000.00	1166.50	R	18	1	64.89	66.05	166.5	0.70%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.30																		0.00	69.96	69.85			FULL	U/S
1166.50	1171.50	T	18	1	66.05	66.09	5.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0013		0.01	5	0.05	0.00	66	0.33	0.09											0.09			70.05	70.01	FULL	U/S
1171.50	1297.50	R	18	1	66.09	66.97	126.0	0.70%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.10																		0.00	70.15	70.11			FULL	U/S
1297.50	1302.50	T	18	1	66.97	67.02	5.0	0.85%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008		0.00	90	1.33	0.06														0.06			70.22	70.17	FULL	U/S
1302.50	1390.00	R	18	1	67.02	67.89	87.5	1.00%	1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.07																		0.00	70.29	70.24			FULL	U/S
1390.00	1390.00	R	18	1	67.89	67.89	0.0		1.77	0.0049	3.0	1.70	0.04	0.0008	0.0008	0.00					45	0.50	0.02	Ki=	0.4	0.02									0.04			70.33	70.33	FULL	U/S

SDMH 13 - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	64.89	66.39	69.65	69.55	72.93	SDMH13	C4.12	OK	NO
1166.50	66.05	67.55	69.96	69.85	74.12	SDMH15	C4.12	OK	NO
1171.50	66.09	67.59	70.05	70.01	74.12	SDMH15	C4.12	OK	NO
1297.50	66.97	68.47	70.15	70.11	75.21	SDMH16	C4.12	OK	NO
1302.50	67.02	68.52	70.22	70.17	75.21	SDMH16	C4.05	OK	NO
1390.00	67.89	69.39	70.29	70.24	72.56	DI27	C4.05	OK	NO
1390.00	67.89	69.39	70.33	70.33	72.56	DI27	C4.05	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH14 North

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA								ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
															PIPE	TRANSITION																													
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			65.27																					Outlet K_o=	1.0									70.52	70.24		
1000.00	1022.50	R	18	1	65.27	67.22	22.5	8.66%	1.77	0.0049	7.5	4.24	0.28	0.0051	0.0051	0.11																		0.00	70.63	70.35			FULL	U/S
1022.50	1027.50	T	18	1	67.22	67.46	5.0	4.74%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0037		0.02	52	0.46	0.13	45	0.50	0.22											0.36			71.00	70.87	FULL	U/S
1027.50	1029.00	R	18	1	67.46	67.47	1.5	1.00%	1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00																		0.00	71.00	70.88			FULL	U/S
1029.00	1029.00	R	18	1	67.47	67.47	0.0		1.77	0.0049	5.0	2.83	0.12	0.0023	0.0023	0.00					45	0.50	0.06	Ki=	0.4	0.05								0.11			71.11	71.11	FULL	U/S

SDMH 14 North - Summary of Results

					(Optional)		HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	to FG	Required?
1000.00	65.27	66.77	70.52	70.24	73.54	SDMH14	OK	NO
1022.50	67.22	68.72	70.63	70.35	73.37	DI21	OK	NO
1027.50	67.46	68.96	71.00	70.87	73.37	DI21	OK	NO
1029.00	67.47	68.97	71.00	70.88	73.49	DI22	OK	NO
1029.00	67.47	68.97	71.11	71.11	73.49	DI22	OK	NO

Storm Drain Hydraulics Calculations

Kimley»Horn

PROPOSED LATERAL - SDMH15 West

DATE: 06/30/20 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

CONDUIT DATA							FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																PIPE	TRANSITION																												
STATION			PIPE	#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
FROM (ft)	TO (ft)	T/R	D (in)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_i	H_i (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
	1000.00		18			66.07																					Outlet K_o=	1.0									70.02	70.01		
1000.00	1020.16	R	18	1	66.07	66.52	20.2	2.23%	1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00																		0.00	70.03	70.01			FULL	U/S
1020.16	1020.16	R	18	1	66.52	66.52	0.0		1.77	0.0049	1.5	0.85	0.01	0.0002	0.0002	0.00					45	0.50	0.01	Ki=	0.4	0.00								0.01			70.04	70.04	FULL	U/S

SDMH 15 West - Summary of Results

					(Optional)			HGL with respect	Pressure Gasket
STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1000.00	66.07	67.57	70.02	70.01	74.12	SDMH15	C5.1	OK	NO
1020.16	66.52	68.02	70.03	70.01	73.33	DI26	C5.1	OK	NO
1020.16	66.52	68.02	70.04	70.04	73.33	DI26	C5.1	OK	NO

Worksheet for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

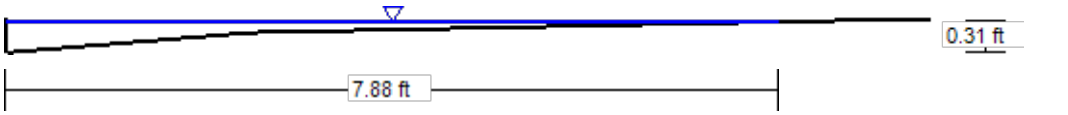
Options	
Grate Flow Option	Exclude None

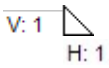
Results	
Efficiency	75.91 %
Intercepted Flow	3.04 cfs
Bypass Flow	0.96 cfs
Spread	7.88 ft
Depth	0.31 ft
Flow Area	0.8 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	4.95 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.038
Grate Flow Ratio	0.750
Active Grate Length	1.13 ft

Cross Section for DI D-1 Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	75.91 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

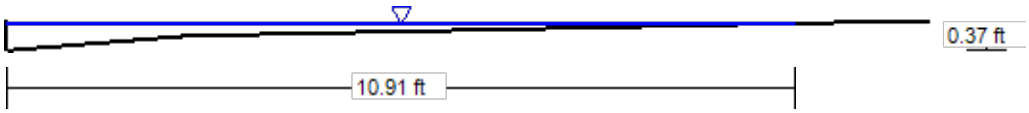
Options	
Grate Flow Option	Exclude None

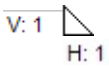
Results	
Efficiency	60.95 %
Intercepted Flow	4.57 cfs
Bypass Flow	2.93 cfs
Spread	10.91 ft
Depth	0.37 ft
Flow Area	1.4 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.44 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.032
Grate Flow Ratio	0.597
Active Grate Length	1.13 ft

Cross Section for DI D-3B Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	7.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	60.95 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

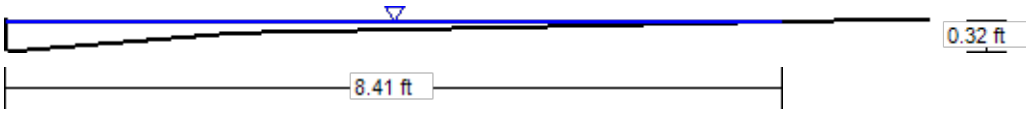


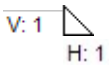


Cross Section for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Efficiency	73.03 %
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %





Worksheet for DI D-4A Roll Curb

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.50 cfs
Slope	3.25 %
Gutter Width	2.50 ft
Gutter Cross Slope	8.00 %
Road Cross Slope	2.00 %
Roughness Coefficient	0.016
Grate Width	2.25 ft
Grate Length	2.25 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	73.03 %
Intercepted Flow	3.29 cfs
Bypass Flow	1.21 cfs
Spread	8.41 ft
Depth	0.32 ft
Flow Area	0.9 ft²
Gutter Depression	1.8 in
Total Depression	1.8 in
Velocity	5.03 ft/s
Splash Over Velocity	6.01 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.037
Grate Flow Ratio	0.720
Active Grate Length	1.13 ft

Sunstone Parcel D - Technical Drainage Study								
LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
1	85.50	85.70	84.74	0.60	0.30	-0.42	D-7A2	Street L, 1 course solid grout
1	85.50	83.51	81.72	0.76	0.36	1.65	D-7A1	Street N
2	83.70	81.72	80.09	0.76	0.36	1.64	D-7A1	Street N
3	82.10	80.09	78.47	0.76	0.36	1.67	D-7A1	Street N
4	80.50	78.47	77.00	0.76	0.36	1.69	D-7A1	Street N
5	79.00	77.00	75.44	0.76	0.36	1.66	D-7A1	Street N
6	75.60	75.44	73.37	0.76	0.36	-0.18	D-7B	Street N, 1 course solid grout
6	75.60	73.49	73.13	0.76	0.36	1.77	D-7B	Street V
7	76.00	73.76	73.49	0.76	0.36	1.90	D-7B	Street V
8	76.30	74.09	73.76	0.76	0.36	1.87	D-7B	Street V
9	76.60	74.53	74.09	0.76	0.30	1.85	D-6A	Street V
10	76.90	75.35	74.53	0.76	0.30	1.33	D-6A	Street V
10	76.90	78.05	76.19	0.76	0.30	-1.37	D-6A	Street M, 3 course solid grout
11	81.50	79.27	78.05	0.76	0.30	2.01	D-6A	Street M
12	82.80	80.45	79.27	0.76	0.30	2.13	D-6A	Street M
13	84.00	81.96	80.45	0.76	0.30	1.82	D-6A	Street M
14	84.90	82.79	81.96	0.76	0.30	1.89	D-6A	Street M
15	85.90	83.26	82.79	0.76	0.30	2.42	D-6A	Street M
15	85.90	86.22	85.70	0.60	0.30	-0.54	D-7A2	Street L, 1 course solid grout
16	85.90	83.26	82.22	0.76	0.28	2.46	D-6B	Street M
16	85.90	86.64	86.22	0.60	0.30	-0.96	D-7A2	Street L, 2 course solid grout
16	85.90	83.64	80.21	0.98	0.49	1.66	OH3*	O'Hare Road
17	84.40	82.22	81.41	0.76	0.28	2.00	D-6B	Street M
17	84.40	82.00	80.21	0.98	0.49	1.80	OH3*	O'Hare Road
18	83.40	81.41	80.25	0.76	0.28	1.81	D-6B	Street M
18	83.40	80.21	76.45	0.98	0.49	2.59	OH3*	O'Hare Road
19	82.30	80.25	79.13	0.76	0.28	1.87	D-6B	Street M
19	82.30	80.21	76.45	0.98	0.49	1.49	OH3*	O'Hare Road
20	81.10	79.13	78.00	0.76	0.28	1.79	D-6B	Street M
20	81.10	76.45	73.96	0.98	0.49	4.05	OH3*	O'Hare Road
21	80.00	78.00	76.88	0.76	0.28	1.82	D-6B	Street M
21	80.00	76.45	73.96	0.98	0.49	2.95	OH3*	O'Hare Road
22	78.90	76.88	75.75	0.76	0.28	1.84	D-6B	Street M
22	78.90	73.96	72.76	0.98	0.49	4.34	OH3*	O'Hare Road
23	77.80	75.75	74.63	0.76	0.28	1.87	D-6B	Street M
23	77.80	72.76	70.09	0.98	0.49	4.44	OH3*	O'Hare Road
24	76.60	74.63	73.63	0.76	0.28	1.79	D-6B	Street M
24	76.60	72.76	70.09	0.98	0.49	3.24	OH3*	O'Hare Road
25	75.60	73.63	72.94	0.76	0.28	1.79	D-6B	Street M
25	75.60	70.09	69.24	0.98	0.49	4.91	OH3*	O'Hare Road
26	76.90	74.21	72.96	0.76	0.28	2.51	D-6B	Street M
26	76.90	74.69	74.46	0.76	0.33	1.93	D-10	Street V
27	76.60	74.46	74.15	0.76	0.33	1.86	D-10	Street V
28	76.30	74.15	73.83	0.76	0.33	1.87	D-10	Street V
29	76.00	73.83	73.53	0.76	0.33	1.89	D-10	Street V
30	75.70	73.53	73.21	0.76	0.33	1.89	D-10	Street V
31	75.40	73.21	72.90	0.76	0.33	1.91	D-10	Street V
32	75.00	72.90	72.58	0.76	0.33	1.82	D-10	Street V
33	74.70	72.58	72.26	0.76	0.33	1.84	D-10	Street V
34	74.40	72.26	71.95	0.76	0.33	1.86	D-10	Street V
35	74.10	71.95	71.63	0.76	0.33	1.87	D-10	Street V
36	73.80	71.63	71.32	0.76	0.35	1.85	D-11	Street V
37	73.50	71.32	71.00	0.76	0.35	1.86	D-11	Street V
38	73.10	71.00	70.69	0.76	0.35	1.78	D-11	Street V
39	72.80	70.69	70.37	0.76	0.35	1.79	D-11	Street V
40	72.50	70.37	70.06	0.76	0.35	1.81	D-11	Street V
41	72.20	70.06	69.74	0.76	0.35	1.82	D-11	Street V
42	71.90	69.74	69.44	0.76	0.35	1.84	D-11	Street V
43	71.60	69.44	69.13	0.76	0.35	1.84	D-11	Street V
44	71.30	69.13	68.81	0.76	0.35	1.85	D-11	Street V
45	71.00	68.81	68.50	0.76	0.35	1.87	D-11	Street V
46	70.60	68.50	68.18	0.76	0.33	1.82	D-4B	Street V
47	70.30	68.18	67.87	0.76	0.33	1.84	D-4B	Street V
48	70.00	67.87	67.55	0.76	0.33	1.85	D-4B	Street V

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
49	69.70	67.55	67.41	0.76	0.33	1.87	D-4B	Street V
49	69.70	64.41	64.13	0.70	0.35	4.97	LC7a*	Log Cabin Way
50	70.60	67.74	67.41	0.76	0.33	2.58	D-4B	Street V
50	70.60	69.50	68.35	0.76	0.30	0.88	D-4A	Street S
50	70.60	66.03	64.41	0.70	0.35	4.25	LC7a*	Log Cabin Way
51	73.00	68.25	66.03	0.70	0.35	4.43	LC7a*	Log Cabin Way
51	73.00	70.97	69.50	0.76	0.30	1.81	D-4A	Street S
52	74.40	68.25	66.03	0.70	0.35	5.83	LC7a*	Log Cabin Way
52	74.40	72.43	70.97	0.76	0.30	1.75	D-4A	Street S
53	75.90	73.08	69.21	0.70	0.35	2.50	LC7a*	Log Cabin Way
53	75.90	73.89	72.43	0.76	0.30	1.79	D-4A	Street S
54	76.40	73.08	69.21	0.70	0.35	3.00	LC7a*	Log Cabin Way
54	76.40	75.37	73.89	0.76	0.30	0.81	D-4A	Street S
55	78.90	76.92	73.08	0.70	0.35	1.66	LC7a*	Log Cabin Way
55	78.90	76.84	75.37	0.76	0.30	1.84	D-4A	Street S
56	80.30	76.92	73.08	0.70	0.35	3.06	LC7a*	Log Cabin Way
56	80.30	78.30	76.84	0.76	0.30	1.78	D-4A	Street S
57	81.80	76.92	73.08	0.70	0.35	4.56	LC7a*	Log Cabin Way
57	81.80	79.76	78.30	0.76	0.30	1.82	D-4A	Street S
58	83.20	80.79	76.92	0.70	0.35	2.09	LC7a*	Log Cabin Way
58	83.20	81.21	79.76	0.76	0.30	1.77	D-1	Street S
59	84.70	80.79	76.92	0.70	0.35	3.59	LC7a*	Log Cabin Way
59	84.70	82.67	81.21	0.76	0.30	1.81	D-1	Street S
60	86.10	84.62	80.79	0.70	0.35	1.16	LC7a*	Log Cabin Way
60	86.10	84.13	82.67	0.76	0.30	1.75	D-1	Street S
61	87.50	84.62	80.79	0.70	0.35	2.56	LC7a*	Log Cabin Way
61	87.50	85.52	84.13	0.76	0.30	1.76	D-1	Street S
62	88.90	86.00	84.62	0.70	0.35	2.58	LC7a*	Log Cabin Way
62	88.90	86.87	85.52	0.76	0.30	1.81	D-1	1 course solid grout along common element
63	91.30	89.00	87.00	0.74	0.37	1.94	LC6*	Log Cabin Way
63	91.30	89.27	87.92	0.76	0.30	1.81	D-1	Street S
64	92.60	91.00	88.45	0.74	0.37	1.24	LC6*	Log Cabin Way
64	92.60	90.62	89.27	0.76	0.30	1.76	D-1	Street S
65	94.00	92.28	90.00	1.00	0.37	1.36	LC6*	Log Cabin Way
65	94.00	91.97	90.62	0.76	0.30	1.81	D-1	Street S
66	95.30	94.50	92.28	0.74	0.37	0.44	LC6*	Log Cabin Way,
66	95.30	93.32	91.97	0.76	0.30	1.76	D-1	Street S
67	96.70	96.00	94.12	0.74	0.37	0.34	LC6*	Log Cabin Way
67	96.70	94.67	93.32	0.76	0.30	1.81	D-1	Street S
68	98.00	97.00	95.40	0.74	0.37	0.64	LC6*	Log Cabin Way
68	98.00	96.02	94.67	0.76	0.30	1.76	D-1	Street S
69	99.40	98.13	97.00	0.74	0.37	0.91	LC6*	Log Cabin Way
69	99.40	97.37	96.02	0.76	0.30	1.81	D-1	Street S
70	100.70	98.60	98.13	0.74	0.37	1.74	LC6*	Log Cabin Way
70	100.70	98.38	97.37	0.76	0.30	2.10	D-1	Street S
70	100.70	100.00	99.50	1.06	0.53	0.02	SW-1	Paseo, 3 course solid grout
71	98.20	98.09	96.37	0.76	0.35	-0.21	D-3B	Street S, 1 course solid grout
71	98.20	95.97	95.79	0.76	0.27	2.07	D-2	Street T
71	98.20	101.43	101.09	1.06	0.53	-3.91	SW-1	Paseo, 3 course solid grout
72	98.40	96.23	95.97	0.76	0.27	2.01	D-2	Street T
72	98.40	102.00	101.43	1.06	0.53	-4.28	SW-1	Paseo, 3 course solid grout
73	98.70	96.56	96.23	0.76	0.27	1.98	D-2	Street T
73	98.70	102.35	102.00	1.06	0.53	-4.33	SW-1	Paseo, 3 course solid grout
74	99.00	96.83	96.56	0.76	0.27	2.01	D-2	Street T
74	99.00	103.00	102.35	1.06	0.53	-4.68	SW-1	Paseo, 3 course solid grout
75	99.30	97.13	96.56	0.76	0.27	2.01	D-2	Street T
75	99.30	103.00	103.00	1.06	0.53	-4.38	SW-1	Paseo, 3 course solid grout
76	99.60	97.45	97.13	0.76	0.27	1.99	D-2	Street T
76	99.60	103.95	103.00	1.06	0.53	-5.03	SW-1	Paseo, 3 course solid grout
77	99.90	97.72	97.45	0.76	0.27	2.02	D-2	Street T
77	99.90	104.26	103.95	1.06	0.53	-5.04	SW-1	Paseo, 3 course solid grout
78	100.20	98.02	97.72	0.76	0.27	2.02	D-2	Street T
78	100.20	104.26	104.00	1.24	0.62	-4.92	SW-2	Paseo, 3 course solid grout
79	100.50	98.22	98.02	0.76	0.27	2.12	D-2	Street T
79	100.50	104.00	103.41	1.24	0.62	-4.36	SW-2	Paseo, 3 course solid grout

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
80	100.60	98.22	98.16	0.76	0.27	2.22	D-5A	Street T
80	100.60	103.41	103.00	1.24	0.62	-3.67	SW-2	Paseo, 3 course solid grout
81	100.40	98.16	97.89	0.76	0.27	2.08	D-5A	Street T
81	100.40	103.00	102.52	1.24	0.62	-3.46	SW-2	Paseo, 3 course solid grout
82	100.10	97.89	97.60	0.76	0.27	2.05	D-5A	Street T
82	100.10	102.52	102.00	1.24	0.62	-3.28	SW-2	Paseo, 3 course solid grout
83	99.80	97.60	97.31	0.76	0.27	2.04	D-5A	Street T
83	99.80	102.00	101.50	1.24	0.62	-3.06	SW-2	Paseo, 3 course solid grout
84	99.50	97.31	97.01	0.76	0.27	2.03	D-5A	Street T
84	99.50	101.50	100.95	1.24	0.62	-2.86	SW-2	Paseo, 3 course solid grout
85	101.70	99.61	98.33	0.76	0.32	1.83	D-5B	Street N
85	101.70	100.95	100.00	1.24	0.62	-0.11	SW-2	Paseo, 3 course solid grout
86	100.30	98.33	97.19	0.76	0.32	1.71	D-5B	Street N
86	100.30	97.01	96.55	0.76	0.27	3.13	D-5A	Street T
87	101.70	99.61	98.27	0.76	0.32	1.83	D-5B	Street N
87	101.70	99.48	100.00	1.24	0.62	1.36	SW-2	Paseo, 3 course solid grout
88	100.30	98.27	96.80	0.76	0.32	1.77	D-5B	Street N
89	98.80	96.80	95.34	0.76	0.32	1.74	D-5B	Street N
90	97.40	95.34	93.88	0.76	0.32	1.80	D-5B	Street N
91	95.90	93.88	92.24	0.76	0.32	1.76	D-5B	Street N
91	95.90	92.16	91.45	0.76	0.28	3.56	D-5C	Street Y
92	97.60	95.39	92.16	0.76	0.28	2.03	D-5C	Street Y
93	98.50	96.56	95.39	0.76	0.28	1.76	D-5C	Street Y
94	99.40	97.31	96.56	0.76	0.28	1.91	D-5C	Street Y
95	100.40	98.09	97.31	0.76	0.28	2.13	D-5C	Street Y
95	100.40	100.00	97.25	1.24	0.62	-0.46	SW-2	Paseo, 3 course solid grout
96	100.00	98.09	96.86	0.76	0.28	1.73	D-5C	Street Y
96	100.00	94.18	87.14	0.98	0.49	5.22	OH3*	O'Hare Road
96	100.00	96.77	95.00	1.24	0.62	2.37	SW-2	Paseo, 3 course solid grout
97	98.80	96.86	96.00	0.76	0.28	1.76	D-5C	Street Y
97	98.80	94.18	87.14	0.98	0.49	4.02	OH3*	O'Hare Road
98	97.90	96.00	95.38	0.76	0.28	1.72	D-5C	Street Y
98	97.90	94.18	87.14	0.98	0.49	3.12	OH3*	O'Hare Road
99	97.50	95.38	94.92	0.76	0.28	1.94	D-5C	Street Y
99	97.50	94.18	87.14	0.98	0.49	2.72	OH3*	O'Hare Road
100	97.20	94.92	94.49	0.76	0.28	2.10	D-5C	Street Y
100	97.20	87.72	86.56	0.76	0.30	9.26	D-7A2	Street L
100	97.20	94.18	87.14	0.98	0.49	2.42	OH3*	O'Hare Road
101	96.50	94.49	93.94	0.76	0.28	1.83	D-5C	Street Y
101	96.50	87.72	87.44	0.76	0.30	8.56	D-7A2	Street L
102	95.80	93.94	93.20	0.76	0.28	1.68	D-5C	Street Y
102	95.80	87.44	87.10	0.76	0.30	8.14	D-7A2	Street L
103	95.00	93.20	92.48	0.76	0.28	1.62	D-5C	Street Y
103	95.00	87.10	86.87	0.76	0.30	7.68	D-7A2	Street L
104	94.30	92.48	91.76	0.76	0.28	1.64	D-5C	Street Y
104	94.30	86.87	86.54	0.76	0.30	7.21	D-7A2	Street L
105	93.60	91.76	90.22	0.76	0.28	1.66	D-5C	Street Y
105	93.60	89.21	86.81	0.76	0.32	4.13	D-5B	Street N
105	93.60	86.48	86.37	0.76	0.30	6.90	D-7A2	Street L
106	91.60	89.50	88.15	0.76	0.32	1.84	D-5B	Street N
107	92.70	90.71	89.50	0.76	0.32	1.73	D-5B	Street N
108	94.10	92.05	90.71	0.76	0.32	1.79	D-5B	Street N
109	95.50	93.48	92.05	0.76	0.32	1.76	D-5B	Street N
110	97.20	94.62	93.48	0.76	0.32	2.32	D-5B	Street N
110	97.20	97.01	95.50	0.76	0.27	0.03	D-5A	Street T
111	99.50	97.32	97.01	0.76	0.27	2.02	D-5A	Street T
112	99.80	97.68	97.32	0.76	0.27	1.96	D-5A	Street T
113	100.20	97.98	97.68	0.76	0.27	2.06	D-5A	Street T
114	100.40	98.22	97.98	0.76	0.27	2.02	D-5A	Street T
115	100.60	98.22	98.17	0.76	0.27	2.22	D-2	Street T
116	100.30	98.17	97.87	0.76	0.27	1.97	D-2	Street T
117	100.00	97.87	97.55	0.76	0.27	1.97	D-2	Street T
118	99.70	97.55	97.24	0.76	0.27	1.99	D-2	Street T
119	99.40	97.24	96.92	0.76	0.27	2.00	D-2	Street T
120	99.10	96.92	96.60	0.76	0.27	2.02	D-2	Street T

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
121	98.70	96.60	96.22	0.76	0.27	1.94	D-2	Street T
122	96.10	96.22	94.86	0.76	0.27	-0.28	D-2	Street T, 1 course solid grout
122	96.10	94.00	92.78	0.76	0.35	1.78	D-3B	Street S
123	94.80	92.78	91.43	0.76	0.35	1.70	D-3B	Street S
124	93.40	91.43	90.08	0.76	0.35	1.65	D-3B	Street S
125	92.10	90.08	89.03	0.76	0.35	1.70	D-3B	Street S
125	92.10	88.93	88.44	0.76	0.28	2.99	D-3A	Street U
126	91.40	89.28	88.93	0.76	0.28	1.94	D-3A	Street U
127	91.70	89.62	89.28	0.76	0.28	1.90	D-3A	Street U
128	92.10	89.97	89.62	0.76	0.28	1.95	D-3A	Street U
129	92.50	90.32	89.97	0.76	0.28	2.00	D-3A	Street U
130	92.80	90.68	90.32	0.76	0.28	1.94	D-3A	Street U
131	93.10	91.03	90.68	0.76	0.28	1.89	D-3A	Street U
132	93.50	91.53	91.03	0.76	0.28	1.79	D-3A	Street U
133	94.00	91.97	91.53	0.76	0.28	1.85	D-3A	Street U
134	94.50	92.26	91.97	0.76	0.28	2.06	D-3A	Street U
135	95.50	92.61	92.26	0.76	0.28	2.71	D-3A	Street U
136	93.40	91.48	90.93	0.76	0.28	1.74	D-3A	Street U
137	93.00	90.93	90.55	0.76	0.28	1.89	D-3A	Street U
138	92.60	90.55	90.17	0.76	0.28	1.87	D-3A	Street U
139	92.20	90.17	89.77	0.76	0.28	1.85	D-3A	Street U
140	91.70	89.77	89.29	0.76	0.28	1.75	D-3A	Street U
141	91.40	89.29	88.93	0.76	0.28	1.93	D-3A	Street U
142	88.80	88.93	87.48	0.76	0.28	-0.31	D-3A	Street U, 1 course solid grout
142	88.80	86.66	85.61	0.76	0.35	1.82	D-3B	Street S
143	87.60	85.61	84.23	0.76	0.35	1.67	D-3B	Street S
144	86.20	84.23	82.74	0.76	0.35	1.65	D-3B	Street S
145	84.80	82.74	81.11	0.76	0.30	1.84	D-4A	Street S
146	83.10	81.11	79.47	0.76	0.30	1.77	D-4A	Street S
147	81.50	79.47	78.00	0.76	0.30	1.81	D-4A	Street S
148	80.00	78.00	76.54	0.76	0.30	1.78	D-4A	Street S
149	78.60	76.54	75.09	0.76	0.30	1.84	D-4A	Street S
150	77.10	75.09	73.64	0.76	0.30	1.79	D-4A	Street S
151	75.70	73.64	72.17	0.76	0.30	1.84	D-4A	Street S
152	74.20	72.17	70.71	0.76	0.30	1.81	D-4A	Street S
153	72.70	70.71	69.25	0.76	0.30	1.77	D-4A	Street S
154	71.30	69.25	68.44	0.76	0.30	1.83	D-4A	Street S
154	71.30	68.82	68.29	0.76	0.32	2.22	D-7C	Street V
155	73.20	69.34	68.82	0.76	0.32	3.60	D-7C	Street V
155	73.20	71.21	69.96	0.76	0.27	1.83	D-9	Street R
156	74.70	72.68	71.21	0.76	0.27	1.86	D-9	Street R
157	76.20	74.14	72.68	0.76	0.27	1.90	D-9	Street R
158	77.60	75.60	74.14	0.76	0.27	1.84	D-9	Street R
159	79.10	77.06	75.60	0.76	0.27	1.88	D-9	Street R
160	80.50	78.53	77.06	0.76	0.27	1.81	D-9	Street R
161	82.00	79.09	78.53	0.76	0.27	2.75	D-9	Street R
162	83.50	81.45	79.09	0.76	0.27	1.89	D-9	Street R
163	85.10	83.08	81.45	0.76	0.27	1.86	D-9	Street R
164	86.60	84.45	83.08	0.76	0.27	1.99	D-9	Street R
165	88.20	86.18	84.45	0.76	0.27	1.86	D-9	Street R
166	83.30	81.32	79.86	0.76	0.27	1.82	D-9	Street R
167	81.90	79.86	78.40	0.76	0.27	1.88	D-9	Street R
168	80.40	78.40	76.94	0.76	0.27	1.84	D-9	Street R
169	79.00	76.94	75.47	0.76	0.27	1.90	D-9	Street R
170	77.50	75.47	74.01	0.76	0.27	1.87	D-9	Street R
171	76.00	74.01	72.55	0.76	0.27	1.83	D-9	Street R
172	74.60	72.55	71.09	0.76	0.27	1.89	D-9	Street R
173	73.10	71.09	70.12	0.76	0.27	1.85	D-9	Street R
173	73.10	70.44	70.12	0.76	0.32	2.40	D-7C	Street V
174	74.50	70.97	70.44	0.76	0.32	3.27	D-7C	Street V
174	74.50	72.49	71.14	0.76	0.28	1.83	D-8	Street P
175	76.00	73.95	72.49	0.76	0.28	1.87	D-8	Street P
176	77.40	75.42	73.95	0.76	0.28	1.80	D-8	Street P
177	78.90	76.88	75.42	0.76	0.28	1.84	D-8	Street P
178	80.40	78.34	76.88	0.76	0.28	1.88	D-8	Street P

LOT #	FFE	High	Low	Criteria	Depth	Freeboard	Section #	Remarks
179	81.80	79.81	78.34	0.76	0.28	1.81	D-8	Street P
180	83.30	81.27	79.81	0.76	0.28	1.85	D-8	Street P
181	84.80	82.79	81.27	0.76	0.28	1.83	D-8	Street P
182	86.80	84.82	82.79	0.76	0.28	1.80	D-8	Street P
183	88.10	85.93	84.82	0.76	0.28	1.99	D-8	1 course solid grout along common element
184	85.00	82.95	81.49	0.76	0.28	1.87	D-8	1 course solid grout along common element
185	83.50	81.49	80.03	0.76	0.28	1.83	D-8	Street P
186	82.00	80.03	78.56	0.76	0.28	1.79	D-8	Street P
187	80.60	78.56	77.10	0.76	0.28	1.86	D-8	Street P
188	79.10	77.10	75.64	0.76	0.28	1.82	D-8	Street P
189	77.60	75.64	74.17	0.76	0.28	1.78	D-8	Street P
190	76.20	74.17	72.71	0.76	0.28	1.85	D-8	Street P
191	74.70	72.71	71.71	0.76	0.28	1.81	D-8	Street P
191	74.70	72.05	71.52	0.76	0.33	2.37	D-10	Street V
192	76.20	72.57	72.05	0.76	0.33	3.35	D-10	Street V
192	76.20	74.18	73.13	0.76	0.36	1.68	D-7A1	Street N
193	77.60	75.56	74.18	0.76	0.36	1.70	D-7A1	Street N
194	79.00	77.02	75.56	0.76	0.36	1.64	D-7A1	Street N
195	80.50	78.48	77.02	0.76	0.36	1.68	D-7A1	Street N
196	82.00	79.95	78.48	0.76	0.36	1.71	D-7A1	Street N
197	83.40	81.41	79.95	0.76	0.36	1.65	D-7A1	Street N
198	84.90	82.87	81.41	0.76	0.36	1.69	D-7A1	Street N
199	86.30	84.33	82.87	0.76	0.36	1.63	D-7A1	1 course solid grout along common element

Lots adjacent to Skye Canyon Park Drive are significantly elevated above the adjacent TC's

Appendix C – Reference Materials

- *Update #5 to the Master Drainage Study for Skye Canyon (Development East of US-95); December 2018*

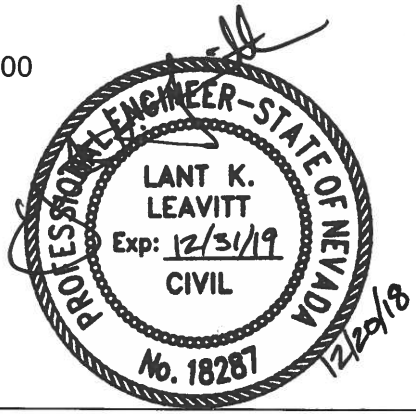
MASTER DRAINAGE STUDY
UPDATE #5
(for Development East of US-95)

Skye Canyon
City of Las Vegas, Nevada

Job No.: EST1801.000
Date: December 2018

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Eastland Co., LLC
2490 Paseo Verde Pkwy, Suite 120
Henderson, NV 89074
Phone: 702-736-9100 ▪ Fax: 702-736-9200



Lant Leavitt, P.E.
NV Professional Engineer No. 18287

Assisted By: Cameron Bencini, P.E.
Jonathan Rocha, E.I.

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: January 28, 2019
TO: **Land Development Services** Department of Public Works				FROM: Oh Sang Kwon, P.E. Flood Control Section Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Master Drainage Study – SUNSTONE (Formally Update #5 to Skye Canyon Master)				Slater Hanifan Group
Cross Streets:	Fort Apache Road & Moccasin Road			Eastland Co., LLC
File Number:	F:\Depot\DSMemos\DS5081A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-501-001			CCRFCD
Zoning Action:	Eastland Development Agreement			CCPW
FEMA Flood Zone	YES	NO **X**		NDOT
Proposed Storm Drain	YES **X**	NO		NV Energy

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	12/26/2018	1/28/2019	Conditionally Approved	$400.00	502000: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS: **1st Submittal: Master Study for Development split off from Skye Canyon. SUNSTONE is the Development east of US-95 that was previously incorporated into the Skye Canyon Master Study.**

The Skye Canyon East (SUNSTONE) / Skye Canyon Master Plan MPU Facilities are being incorporated into the 2018 CCRFCD Master Plan. A separate MPA is not required at this time. Further changes to the MPU Facilities within SUNSTONE Master Drainage Study shall require an MPA that must be submitted to *City of Las Vegas* and *CCRFCD* for approval and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject Overall Master Study.

This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy. Permits for development within Designated Builder Parcels shall not be issued if the associated Master Plan facilities are not under construction.

The Master Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Department of Public Works concurrence.
X	is conditionally approved subject to Nevada Department of Transportation concurrence.
	is conditionally approved subject to BLM concurrence/approval.

The Master Drainage Study for SUNSTONE (Update #5 to Skye Canyon Master Drainage Study) provides additional information that addresses the design parameters used as the basis for the Development east of US-95. **This Master Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy**. The ultimate condition infrastructure drainage facilities that are assumed to be in place include:

- The Moccasin Master Plan Regional Facility – Upper Las Vegas Wash to west of US-95. This includes the Interim Collection Facility west of US-95.
- Skye Canyon Detention Basin #2.
- Skye Canyon Phase 3A regional Facility – Skye Canyon Park Dr. to Iron Mountain Rd.
- The US-95 Local Facility – Brent Lane to Kyle Canyon Interchange. This connects into the existing MPU Facility along US-95.

The construction of these Ultimate Facilities will make US 95 a 100-yr cutoff through the reach south of the Moccasin Master Plan Regional Facility crossing, thereby meeting the full intent of the CCRFCD Master Plan.

Changes and timing of the corresponding infrastructure improvements that protect the SUNSTONE Development shall require Updating the Master Drainage Study Phasing.

1. The overall concept presented in the Master Drainage Study for SUNSTONE appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the National Monument. This shall also include the extension of Local Facilities along the northern boundary (Moccasin Alignment) Between Brightstone Trail and Sun Park Drive (Skye Village Road to Fort Apache). Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed local facilities needed for each phase of development.

2. The Local Facility extension along the Moccasin alignment shall include 100-year local collection between EC19 to EC21 and shall be shown on Exhibit J of this Master Study. The Master Drainage Study for Skye Canyon – Update #4, Supplemental; Identified the 150 cfs increase to the proposed Moccasin Road MPU Facility from Skye Canyon Park Drive to the Upper Las Vegas Wash (due to removal of an upstream diversion across Moccasin Road to the north). This Local Facility extension shall be addressed with the Specific Technical Drainage Studies for development that specifically address the impacts of development and storm discharge along the Moccasin corridor prior to the City removing the requirement of BLM and National Park Service concurrence

3. The implementation of the CCRFCD Master Plan facilities along US-95, south of Kyle Canyon Interchange, has been completed by NDOT. With the ultimate condition infrastructure drainage facilities noted above the development west of US-95 will no longer have flows crossing US-95 as per the CCRFCD Master Plan and also noted within the NDOT concurrence for the Skye Canyon Master Drainage Study dated March 8, 2018. The required Technical Drainage Study necessary for the US-95 Local Facility shall address the removal of the culverts allowing flows to cross to the east side of US-95.

4. The ***Master Land Use Plan*** has been submitted as a part of the (SUNSTONE) Eastland DA, any changes to the flows shown in this Master Drainage Study due to the Master Land Use Plan shall require a complete update to the Master Drainage Study.

5. High velocity flows within the future MPU facilities is a critical concern of the City and Regional Flood. Where velocities exceed 25 fps the City is considering 6,000 psi concrete with 2-inches of sacrificial concrete on the invert. Where velocities exceed 35 fps, additional design mitigation shall be reviewed on a case by case basis. The engineer shall review the velocity impacts and recommend a course of action for City approval with each technical drainage study for the corresponding facilities.

6. CCRFCD concurrence has previously been provided for Skye Canyon Master Drainage Study Update #4. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from CCRFCD after Conditional Approval by the City of Las Vegas.

7. CCPW concurrence was provided covering Skye Canyon Master Drainage Study Update #4. New County concurrence is not required for the SUNSTONE Master Drainage Study.

8. NDOT concurrence was provided covering Skye Canyon Master Drainage Study Update #4. NDOT concurrence for Skye Canyon Master Drainage Study Update #4 supports the proposed MPU facilities and the elimination of the flows crossing US-95 per the Master Plan and shown on Exhibit J. A new concurrence for the SUNSTONE Master Drainage Study shall be provided from NDOT after Conditional Approval by the City of Las Vegas.

9. Please note that the Traffic Study must be approved prior to final approval of the Master Drainage Study. If the street layout does not match the Master Drainage Study, an update to the Master Drainage Study must be submitted to address the changes.

10. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (ie. Changes in pods, infrastructure, flows etc.) will require an update to the Master Drainage Study and this update must be approved by the *City of Las Vegas Flood Control Section* prior to final approval of technical drainage study.

11. Please note that the proposed 100-year flood protection facilities identified on Exhibit J must be constructed by the Master Developer as a part of the master planned infrastructure. Technical drainage studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.

12. Technical drainage studies are required for each of the Pod's. The technical drainage studies for the Pod's may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted Pod drainage studies.

13. Building permits for the homes within the individual Pod's will not be issued until construction of the street and flood control infrastructure around the Pod is substantially complete or interim protection is provided per the approved technical drainage study.

14. Please note that all proposed interim facilities must be maintained by the master developer.

15. Provide a legal description of the proposed drainage facilities located outside of dedicated public right-of-way prior to recordation of the parent final map.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved master drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section.* Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
Osk/pbj

T/R/S: T19S/R60E/6 & 7
AREA G-6 & 7

REGIONAL FLOOD CONTROL DISTRICT

Steven C. Parrish, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

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City of Las Vegas

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City of Boulder City

March 6, 2019

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

DISTRICT CONCURRENCE: SUNSTONE (FORMALLY UPDATE# 5 SKYE CANYON MASTER)
(DS5081A) (RFCD No. 19-11214)

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated December 26, 2018 for above-mentioned project as submitted by SLATER HANIFAN GROUP. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated January 28, 2019.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works with the following conditions:

> Per District's Uniform Regulations for the Control of Drainage, Section VIII.D.13, the Lead Entity shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by SLATER HANIFAN GROUP may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 685-0000 • FAX: (702) 685-0001
Website: http://www.regionalflood.org

REGIONAL FLOOD CONTROL DISTRICT

STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY:
Ching C. Wang, P.E.
Senior Civil Engineer

CCW:dd

c: Lant K. Leavitt, P.E, Slater Hanifan Group

P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\L-19-11214as_built doc

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
1263 S. Stewart Street
Carson City, Nevada 89712

BRIAN SANDOVAL
Governor

RUDY MALFABON, P.E., *Director*

February 20, 2019

In Reply, Refer to:

Lant K. Leavitt, P.E.
5740 S. Arville St, Suite 216
Las Vegas, NV 89118

TECHNICAL DRAINAGE STUDY
Sunstone Master Drainage Study, Update #5
Clark County

Dear Mr. Leavitt:

The Nevada Department of Transportation (NDOT) Hydraulics Section has received and reviewed the following document(s) for the above-referenced project.

Document:	**Dated:**
Transmittal Letter from Lant K. Leavitt, P.E., SHG	Feb. 4, 2019
Executive Summary for Master Drainage Study Update #5 for Skye Canyon Development East of US 95 - Sunstone	Feb. 1, 2019
Master Drainage Study Update #5 for Skye Canyon Development (for Development East of US 95) Skye Canyon	Dec. 20, 2018
Drainage Information Form tamped by Lant K. Leavitt, P.E., SHG	Feb. 1, 2019

The drainage design information presented in the reviewed document(s):

X	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project.
	is acceptable in concept. Final Hydraulic Section approval will be based on review of final design documents submitted with the NDOT Right-Of-Way Occupancy Permit application that must be submitted for this project. The following comments should be addressed with the permit application:
	must be supplemented or modified to satisfy the following comment(s) before preliminary Hydraulic Section approval can be granted:

All submittals regarding this project must be forwarded through (or copied to) the local NDOT District permitting office. All pertinent drainage design documents (including those previously submitted for preliminary review) must be submitted to the local NDOT District permitting office with the Right-Of-Way Occupancy Permit Application. All plans and reports must be signed and stamped by a Nevada registered civil engineer.

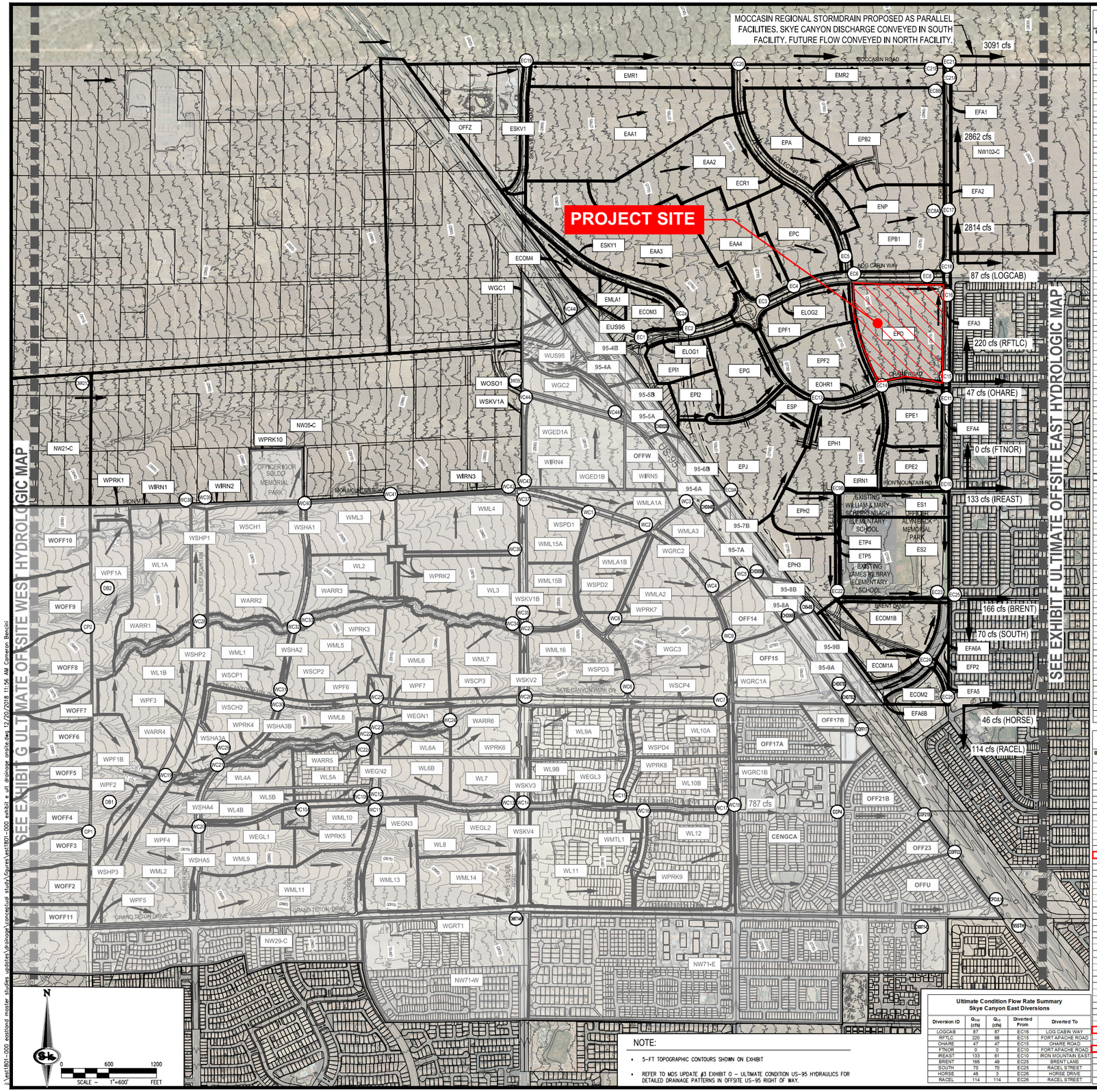
No liability is assumed by the Department in performing this review. Verification and acceptance of all background information, design data and conclusions is the responsibility of the consulting engineer.

Please call me at (775) 888-7621 should you have any questions.

Sincerely,

Brian A. Matthews, P.E.
Professional Engineering Specialist

c: Mary Martini, P.E., District 1 Engineer
Michael Yates, District 1 Assistant Engineer, Permit Coordinator
Charles Molisee, District 1 Permit Coordinator
Charles Pratt, HQ Permit Coordinator
Mario Gomez, District 1 Assistant Engineer



NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- REFER TO MDS UPDATE #3 EXHIBIT O – ULTIMATE CONDITION US-95 HYDRAULICS FOR DETAILED DRAINAGE PATTERNS IN OFFSITE US-95 RIGHT OF WAY.

Ultimate Condition Flow Rate Summary Skye Canyon East Diversions

Diversion ID	Q_{100} (cfs)	Q_{10} (cfs)	Diverted From	Diverted To
LOGCAB	87	87	EC16	LOG CABIN WAY
RFTLC	220	68	EC15	FORT APACHE ROAD
OHARE	47	47	EC15	OHARE ROAD
FTNOR	0	0	EC10	FORT APACHE ROAD
IREAST	133	61	EC10	IRON MOUNTAIN EAST
BRENT	166	49	EC25	BRENT LANE
SOUTH	70	70	EC25	RACEL STREET
HORSE	46	3	EC26	HORSE DRIVE
RACEL	114	114	EC26	RACEL STREET

Ultimate Condition Flow Rate Summary Skye Canyon West Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
WARR1	3.6	9	4
WARR2	2.8	7	3
WARR3	7.1	17	7
WARR4	1.3	3	1
WARR5	8.0	18	8
WARR6	2.4	6	2
WGC1	8.3	24	11
WGC2	8.3	23	10
WGC3	30.4	95	47
WGED1A	28.4	77	35
WGED1B	11.5	33	16
WL10A	17.1	46	21
WL10B	18.3	49	22
WL11	36.7	99	46
WL12	31.4	84	38
WL1A	29.8	81	38
WL1B	28.0	79	36
WL2	15.7	45	21
WL3	24.9	69	32
WL4A	8.0	23	10
WL4B	8.9	27	12
WL5A	10.9	32	15
WL5B	3.8	12	5
WL6A	6.2	19	9
WL6B	10.6	30	14
WL7	11.5	34	16
WL8	17.4	48	22
WL9A	18.2	49	22
WL9B	14.4	39	18
WML1	18.0	52	24
WML10	11.6	38	19
WML11	16.0	48	23
WML12	15.1	44	20
WML13	16.4	49	25
WML14	19.2	59	29
WML15A	12.3	40	20
WML15B	11.2	34	17
WML16	22.2	64	32
WML2	27.4	78	38
WML3	17.3	56	28
WML4	25.1	77	38
WML5	27.3	82	41
WML6	20.5	64	32
WML7	18.6	59	30
WML8	10.3	34	17
WML9	16.4	55	28
WMLA1A	6.5	20	10
WMLA1B	12.0	37	18
WMLA2	30.4	88	44
WMLA3	11.6	35	17
WPF1A	20.2	59	29
WPF1B	18.9	63	31
WPF2	3.1	10	5
WPF3	4.6	17	8
WPF4	5.7	19	9
WPF5	0.4	1	0
WPF6	1.0	4	2
WPF7	4.5	14	7
WPRK1	2.4	6	2
WPRK10	10.0	19	8
WPRK2	3.2	7	2
WPRK3	1.8	4	2
WPRK4	1.0	3	1
WPRK5	2.0	5	2
WPRK6	13.2	28	10
WPRK7	3.0	6	2
WPRK8	1.7	4	1
WPRK9	0.5	1	0
WSCH1	39.4	106	48
WSCH2	11.6	37	16
WEST ROADWAY BASINS			
WEGL1	3.4	12	6
WEGL2	3.3	12	7
WEGL3	4.8	16	9
WEGN1	0.5	2	1
WEGN2	2.1	7	1
WEGN3	3.3	10	6
WGRC1A	1.3	4	2
WGRC1B	3.2	10	5
WGRC2	2.7	9	5
WGRT1	11.7	30	16
WIRN1	0.6	2	1
WIRN2	2.2	7	4
WIRN3	1.3	5	3
WIRN4	2.7	9	5
WIRN5	0.7	3	2
WMTL1	1.3	5	2
WOSO1	2.2	8	4
WSCP1	1.5	6	3
WSCP2	3.0	11	6
WSCP3	3.5	13	7
WSCP4	7.8	25	14
WSHA1	2.3	6	2
WSHA2	1.5	5	2
WSHA3A	0.7	3	1
WSHA3B	1.6	6	3
WSHA4	1.4	6	3
WSHA5	2.4	8	5
WSHP1	6.4	19	9
WSHP2	9.3	27	13
WSHP3	10.4	31	15
WSKV1A	1.4	5	3
WSKV1B	3.5	11	6
WSKV2	2.0	19	8
WSKV3	4.2	14	7
WSKV4	4.5	15	8
WSPD1	0.7	3	1
WSPD2	2.1	3	2
WSPD3	0.9	3	2
WSPD4	2.3	8	4
WUS95	8.5	28	16

Ultimate Condition Flow Rate Summary Skye Canyon East Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
EAA1	55.0	114	49
EAA2	35.4	82	36
EAA3	51.2	102	45
EAA4	21.0	45	20
ECOM1A	9.9	30	15
ECOM1B	13.7	42	21
ECOM3	6.4	17	7
ECOM4	5.5	15	7
EMLA1	3.2	10	4
ENP	3.5	0	0
EPA	17.1	40	18
EPB1	31.6	50	16
EPB2	46.4	67	22
EPC	20.2	48	21
EPD	28.9	65	28
EPE1	12.5	29	13
EPE2	9.1	22	10
EPF1	13.5	32	14
EPF2	19.1	57	26
EPG	15.9	36	16
EPH1	23.9	56	25
EPH2	8.9	27	13
EPH3	15.4	44	22
EPI1	8.6	23	10
EPI2	7.4	20	9
EPJ	31.7	55	19
ES1	10.4	20	8
ES2	32.1	85	41
ESP	3.5	0	0
OFFZ	30.8	39	10
EAST ROADWAY BASINS			
EBRT1	1.8	6	3
ECR1	7.8	22	12
EFA1	2.7	8	4
EFA2	2.4	7	4
EFA3	2.5	7	4
EFA4	2.8	8	5
EFA5	0.9	3	2
EFA6A	2.5	9	5
EFA6B	5.7	18	10
EIRN1	1.9	6	3
ELOG1	4.3	15	8
ELOG2	12.1	35	19
EMR1	17.4	22	7
EMR2	19.2	26	8
EOHR1	10.1	29	16
ESKV1	3.9	11	6
ESKY1	8.2	23	13
ETP4	0.8	3	2
ETP5	0.9	3	2
EUS95	9.4	34	19

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	139
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.1	152	71
ES1	0.0	29	14
ES2	0.1	84	43
NW1-C	0.3	302	93
NW7-C	0.5	512	201
NW21-C	0.2	190	81
NW29-C	0.1	200	93
NW35-C	0.3	428	177
NW50-C	0.2	228	87
NW71-E	0.2	259	106
NW71-W	0.1	156	74
OFF4-1	0.3	273	56
OFF4-2	0.4	541	128
OFF5-1	0.3	336	90
OFF5-2	0.4	493	182
OFF14	0.0	26	13
OFF15	0.0	62	32
OFF17A	0.0	51	24
OFF17B	0.0	15	7
OFF21B	0.0	75	39
OFF23	0.0	17	9
OFFU	0.0	74	37
OFFW	0.0	22	10
OFFZ	0.1	69	27
WOFF1	0.4	403	153
WOFF10	0.3	292	110
WOFF11	0.0	55	29
WOFF2	0.0	48	17
WOFF3	0.0	38	15
WOFF4	0.1	84	32
WOFF5	0.3	236	89
WOFF6	0.0	59	23
WOFF7	0.0	10	4
WOFF8	0.2	198	74
WOFF9	0.1	144	55
US95 BASINS			
95-4A	0.0	14	7
95-4B	0.0	13	6
95-5A	0.0	12	6
95-5B	0.0	11	5
95-6A	0.0	19	9
95-6B	0.0	12	5
95-7A	0.0	14	7
95-7B	0.0	16	8
95-8A	0.0	11	6
95-8B	<0.01	7	4
95-9A	0.0	21	10
95-9B	0.0	22	10
EAST BASINS			
NW102-C	0.2	269	129
NW157	0.3	92	20

Ultimate Condition Flow Rate Summary Skye Canyon East Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
EC1 Q = WC44B + RETC02 + EU595 + 95-4A + 95-4B	4.96	2054	886
EC2 Q = EC1 + EC2a + ELOG1 + EPI	5.20	2330	1001
EC2A Q = WCAVAC + EC2A1 + EC2A4 + EBLK1 + EBLK1 + EBLK1	0.22	286	121
EC3 Q = EC2 + EBA3	5.28	2420	1038
EC4 Q = EC3 + EBA4	5.31	2460	1055
EC5 Q = EPC + EBA2 + ECR1	0.10	152	69
EC6 Q = EC4 + EC5	5.43	2622	1127
EC8 Q = EC6 + ELOG2	5.45	2654	1145
EC8A Q = EMP + EPE1	0.05	50	16
EC8B Q = EPA + EPE2	0.10	108	39
EC9A Q = 95-5A + 95-5B + 95-6A + 95-6B	0.03	57	27
EC9B Q = EC8A + EPH2 + ETP4	0.05	87	42
EC10 Q = EC8B + ERN1 + ES1	0.08	133	61
EC11 Q = EC10 + EPH4 + EPE1	0.10	37	18
EC13 Q = ESP + EPG + EPC + EPJ + ESP + ECHR1	0.11	136	58
EC14 Q = EC13 + EPF2 + EPH1	0.17	232	99
EC15 Q = EC11 + EC14	0.28	267	115
EC16 Q = EC14+EPA3 + EPD	0.33	287	148
EC17 Q = EC8 + EC8A	5.84	2862	1200
EC18 Q = EC8 + EC16	5.78	2814	1184
EC19 Q = OFFZ + EBKV1	0.05	50	16
EC20 Q = EC19 + EAA1 + EMR1	0.17	187	71
EC21A Q = EC17 + EFA1 + EOBB	5.94	2955	1232
EC21B Q = EC21 + EMR2	0.20	212	79
EC21 Q = EC21A + EC21B	6.14	3091	1276
EC22 Q = OBC4B + ETP5	0.05	94	48
EC23 Q = EC22 + EC2 + EBRT1	0.10	186	93
EC24 Q = 95-9B + EC2B1A + EFA6B	0.04	68	35
EC25 Q = EC23 + EC2B1B + EFA5A	0.13	236	119
EC26 Q = SOUTH + EC24 + EC2A2 + EFP2	0.18	160	117

Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WC1 Q = WML15A + WXPD1	0.02	43	21
WC2 Q = WC1 + WRN4 + WMLA1A	0.03	73	37
WC3 Q = WC2 + WGED1B + WRN5	0.05	109	54
WC4 Q = WRK7 + WMLA1B + WMLA2 + WGRC2	0.08	135	67
WC5 Q = WC4 + WML3	0.09	170	83
WC6 Q = WML16 + WXPD3	0.04	68	33
WC7 Q = WC6 + WL9A + WL10A + WSCP4	0.10	186	89
WC8 Q = WML15B + WXPD2	0.02	37	19
WC9 Q = WC7 + WGC3 + WGRC1A + WC8	0.17	322	155
WC10A Q = WML8 + WPR6	0.03	60	30
WC10B Q = WC10A + WL4B + WEGL1	0.05	99	48
WC11 Q = WML10 + WEGN3	0.07	127	61
WC12 Q = WC10B + WC11	0.11	226	109
WC13 Q = WC12 + WL6B + WL7 + WML13 + WEGL2	0.17	332	170
WC14 Q = WC13 + WML14 + WL8 + WSKV3 + WSKV4	0.24	485	236
WC15 Q = WL9B + WXPD4	0.03	46	21
WC16 Q = WL11 + WPR6B + WPR6D + WMTL1	0.06	106	48
WC17 Q = WC14 + WC15 + WC16 + WGEL3 + WL10B	0.37	695	331
WC18 Q = WC17 + WL12 + WGRC1B	0.42	787	372
WC19 Q = RDB3 + WSHP3 + WPF2	0.90	94	70
WC20 Q = WPF5 + WML2 + WSHA5	0.05	86	42
WC21 Q = WC19 + WC20 + WMR6 + WPF4 + WSHA4	0.96	201	121
WC22A Q = WL4A + WL5A + WL5B	0.05	67	43
WC22 Q = WC21 + WC22A + WPRK4 + WMR5	1.01	282	169
WC23 Q = WC22 + WL6 + WPR + WEGN1 + WEGN2	1.03	322	189
WC24 Q = WC23 + WMR6 + WPF7 + WL6A	1.05	359	194
WC25 Q = WC23 + WPR3	0.01	16	8
WC26 Q = WC24 + WC25 + WPR6 WSCP5	1.09	412	217
WC27 Q = WC26 + WML7 + WSKV2	1.12	487	253
WC28 Q = WL10 + WMR5 + WSHP2	0.06	113	53
WC29 Q = WPF4 + WSHA3A	0.01	19	10
WC30 Q = WC29 + WSCH2 + WSHA3B	0.04	62	29
WC31 Q = WC30 + WSCP1	0.04	68	33
WC32 Q = WC31 + WML1 + WSHA2	0.07	124	58
WC33 Q = WC28 + WC32 + WMR2	0.14	244	113
WC34 Q = WC33 + WMR5 + WML5 + WML6	0.23	404	191
WC35 Q = WC27 + WC34	1.34	876	436
WC36 Q = WL2 + WPR2	0.03	51	23
WC37 Q = WC35 + WC36 + WSKV1B + WL3	1.41	1000	492
WC38 Q = RDB2 + WPR1 + WMR1 + WL1A	0.62	139	84
WC39 Q = WC38 + WSHP1	0.63	157	93
WC40 Q = WC39 + WSHA1	0.07	112	50
WC41 Q = WC38 + WC39 + WPR2 + WC40 + WML3	0.72	321	170
WC42 Q = WC41 + WPR3 + WML4	0.77	398	209
WC43 Q = WL3T + WC42	2.18	1325	648
WC43A Q = WC43 + WSKV1A	2.19	1330	650
CNW2SC Q = RDNW01 + NW50-C + WPRK10	2.71	1201	347
CNW71F Q = RDNW01 + NW71-E	0.24	610	106
CNW71W Q = RNW29C + NW71-W	0.24	354	167
CP1FT Q = OFF17B + OFF17A	0.04	66	31
CP2FB Q = CON + OFF21B	0.55	990	469
CP2FZ Q = RDP23 + OFF23	0.01	19	9
CP4FZ Q = RDF41 + OFF4-2	0.72	871	245
CP5FS1 Q = RDF4T4 + OFF5-1	1.02	1182	352
DB1 Q = CP1 + WOFF4 + WOFF5 + WOFF6 + WFF1B	0.88	793	313
RDB1 (FROM DB1)	0.88	71	57
DB2 Q = CP2 + WOFF9 + WOFF10 + WPF1A	0.57	667	254
RDB2 (FROM DB2)	0.57	70	53
EAST CONCENTRATION POINTS			
EC2F Q = EC21 + NW102-C	6.34	3308	1338
EC2B Q = EC21 + NW130-W	6.52	3369	1346
US95 CONCENTRATION POINTS			
CHDD6B Q = EXDD2B + WC3 + OFFW	0.08	130	64
CHDD6B Q = CHDD6B + WC5	0.17	301	147
CHDD6B Q = CHDD6B + WC6 + OFF14	0.36	648	315
CHDD7B Q = CHDD6B + 95-9A	0.37	669	325
CHDD7B2 Q = CHDD7B + OFF15	0.40	731	357
95-9B Q = 95-7A + 95-7B + 95-8A + 95-8B	0.02	47	24
OFCULV Q = CHDTRIB + CCP1FT + CCP2FB + CCP2FZ3 + OFFU	1.05	1836	877
95STN Q = CPCULV + CBWT1E	1.54	2285	1070

LEGEND

- BASIN BOUNDARY (UNCHANGED BASIN)
- BASIN BOUNDARY
- MATCHLINE SEE EXHIBIT FOR MAP EXTENSION
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- ID — FLOW DIRECTION
- ID — FLOW SPLIT

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.	APP. DATE

EASTLAND COMPANY, LLC

SKYE CANYON - MASTER DRAINAGE STUDY UPDATE

ULTIMATE CONDITION ONSITE HYDROLOGIC MAP

DATE: DEC. 2018
DRAFTER: CWB
DESIGNER: CWB
CHECKED: LL
PROJECT NO.
EST1801-000

EXHIBIT E
SHEET 1 OF 1

J:\est\1801-000 eastland master studies updates\drainage\conceptual study\figures\est1801-000 exhibit e ult drainage onsite.dwg 12/20/2018 11:56 AM Cameron Benzel

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: Skye Canyon MDS UP5 - Eastland
Description:
By: CWB
Date: 12/17/2018

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EAA1	D	90.10	0.799	55.00	0.0859	105	1.00	5.55	3598	2.3	3.05	4.62	13.91	19.45	3703	30.572	0.195
EAA2	D	90.10	0.799	35.40	0.0553	105	1.00	5.55	2452	2.6	3.26	4.94	9.13	14.68	2557	24.206	0.147
EAA3	D	90.10	0.799	51.20	0.0800	105	1.00	5.55	3578	1.9	2.76	4.18	15.28	20.82	3683	30.461	0.208
EAA4	D	90.10	0.799	21.00	0.0328	358	3.07	7.05	1655	0.9	1.93	2.92	10.92	17.97	2013	21.183	0.180
EBRT1	D	98.00	0.904	1.80	0.0028	20	1.00	1.58	1361	3.1	3.55	5.38	5.01	6.60	1381	17.672	0.066
ECOM1A	D	95.00	0.864	9.90	0.0155	50	1.00	3.00	1317	2.1	2.95	4.47	5.88	8.88	1367	17.594	0.089
ECOM1B	D	95.00	0.864	13.70	0.0214	50	1.00	3.00	1286	2.2	2.98	4.52	5.69	8.70	1336	17.422	0.087
ECOM2	D	95.00	0.864	4.70	0.0073	50	1.00	3.00	575	2.4	3.15	4.77	2.91	5.91	625	13.472	0.059
ECOM3	D	90.10	0.799	6.40	0.0100	50	1.00	3.83	747	1.3	2.34	3.54	4.73	8.55	797	14.428	0.086
ECOM4	D	90.10	0.799	5.50	0.0086	50	1.00	3.83	874	2.3	3.06	4.63	4.07	7.90	924	15.133	0.079
ECR1	D	97.40	0.896	7.80	0.0122	33	2.00	1.68	2468	1.3	2.27	3.43	13.22	14.90	2501	23.894	0.149
EFA1	D	98.00	0.904	2.70	0.0042	37	2.00	1.71	1491	0.5	1.43	2.16	13.47	15.17	1528	18.489	0.152
EFA2	D	98.00	0.904	2.40	0.0038	51	2.00	2.00	981	0.5	1.43	2.16	9.54	11.54	1032	15.733	0.115
EFA3	D	98.00	0.904	2.50	0.0039	32	2.00	1.59	1116	0.5	1.43	2.16	10.58	12.17	1148	16.378	0.122
EFA4	D	98.00	0.904	2.80	0.0044	79	2.00	2.49	1220	0.5	1.43	2.16	11.38	13.87	1299	17.217	0.139
EFA5	D	98.00	0.904	0.90	0.0014	40	2.00	1.77	266	4.5	4.29	6.50	1.03	2.81	306	11.700	0.050
EFA6A	D	98.00	0.904	2.50	0.0039	83	2.00	2.56	671	1.8	2.70	4.09	3.78	6.34	754	14.189	0.063
EFA6B	D	98.00	0.904	5.70	0.0089	27	2.00	1.46	1852	2.3	3.04	4.61	7.63	9.08	1879	20.439	0.091
EFP2	D	95.00	0.864	1.00	0.0016	50	1.00	3.00	110	12.7	7.21	10.92	0.25	3.26	160	10.889	0.050
EIRN1	D	92.20	0.827	1.90	0.0030	14	2.00	1.46	1317	3.0	3.52	5.34	4.92	6.38	1331	17.394	0.064
ELOG1	D	98.00	0.904	4.30	0.0067	51	2.00	2.00	934	1.8	2.73	4.13	4.81	6.81	985	15.472	0.068
ELOG2	D	97.90	0.902	12.10	0.0189	45	2.00	1.89	2847	2.9	3.41	5.17	10.02	11.91	2892	26.067	0.119
EMLA1	D	90.10	0.799	3.20	0.0050	50	1.00	3.83	344	4.9	4.49	6.80	1.28	5.10	394	12.189	0.051
EMR1	D	79.90	0.665	17.40	0.0272	191	1.00	10.83	2364	3.0	3.48	5.26	8.30	19.13	2555	24.194	0.191
EMR2	D	81.70	0.688	19.20	0.0300	304	1.00	12.92	2237	2.5	3.19	4.84	8.59	21.51	2541	24.117	0.215
ENP	D	55.30	0.340	3.50	0.0055	79	1.00	12.16	620	1.3	2.29	3.48	4.21	16.37	699	13.883	0.139
EOHR1	D	97.50	0.897	10.10	0.0158	21	2.00	1.33	2845	2.3	3.05	4.62	11.19	12.52	2866	25.922	0.125
EPA	D	90.10	0.799	17.10	0.0267	107	1.00	5.60	1441	1.6	2.56	3.87	7.31	12.91	1548	18.600	0.129
EPB1	D	82.20	0.695	31.60	0.0494	110	1.00	7.65	1930	1.8	2.72	4.12	8.86	16.50	2040	21.333	0.165
EPB2	D	82.20	0.695	46.40	0.0725	100	1.00	7.29	2604	1.7	2.63	3.98	11.99	19.28	2704	25.022	0.193
EPC	D	90.10	0.799	20.20	0.0316	95	1.00	5.28	1389	1.7	2.66	4.02	6.82	12.09	1484	18.244	0.121
EPD	D	90.10	0.799	28.90	0.0452	152	1.00	6.67	1237	0.7	1.73	2.61	9.53	16.20	1389	17.717	0.162
EPE1	D	90.10	0.799	12.50	0.0195	133	1.00	6.24	1126	1.2	2.17	3.28	7.03	13.27	1259	16.994	0.133

Skye Canyon Update #5

EST1801-000 GIS Curve Number.xlsx

BASIN ID	Soil Survey	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
EAA1	LV	18	314	90.05	55.00	55.00	100.0%	100.0%	90.05	90.05	**90.1**
EAA2	LV	18	314	90.05	35.40	35.40	100.0%	100.0%	90.05	90.05	**90.1**
EAA3	LV	18	314	90.05	51.20	51.20	100.0%	100.0%	90.05	90.05	**90.1**
EAA4	LV	18	314	90.05	21.00	21.00	100.0%	100.0%	90.05	90.05	**90.1**
EBRT1	LV	4	400	98	1.80	1.80	100.0%	100.0%	98.00	98.00	**98.0**
ECOM1A	LV	10	400	95	9.90	9.90	100.0%	100.0%	95.00	95.00	**95.0**
ECOM1B	LV	10	400	95	13.70	13.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM2	LV	10	400	95	4.70	4.70	100.0%	100.0%	95.00	95.00	**95.0**
ECOM3	LV	10	314	90.05	6.40	6.40	100.0%	100.0%	90.05	90.05	**90.1**
ECOM4	LV	10	314	90.05	5.50	5.50	100.0%	100.0%	90.05	90.05	**90.1**
ECR1	LV	4	314	98	5.60	7.80	71.8%	71.8%	70.36	70.36	
ECR1	LV	9	314	96	0.60	7.80	7.7%	79.5%	7.38	77.74	
ECR1	LV	9	314	96	1.60	7.80	20.5%	100.0%	19.69	97.44	**97.4**
EFA1	LV	4	314	98	2.70	2.70	100.0%	100.0%	98.00	98.00	**98.0**
EFA2	LV	4	314	98	2.40	2.40	100.0%	100.0%	98.00	98.00	**98.0**
EFA3	LV	4	314	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA4	LV	4	314	98	2.80	2.80	100.0%	100.0%	98.00	98.00	**98.0**
EFA5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EFA6A	LV	4	400	98	2.50	2.50	100.0%	100.0%	98.00	98.00	**98.0**
EFA6B	LV	4	400	98	5.70	5.70	100.0%	100.0%	98.00	98.00	**98.0**
EIRN1	LV	4	314	98	1.20	1.90	63.2%	63.2%	61.89	61.89	
EIRN1	LV	9	314	96	0.60	1.90	31.6%	94.7%	30.32	92.21	**92.2**
ELOG1	LV	4	314	98	4.30	4.30	100.0%	100.0%	98.00	98.00	**98.0**
ELOG2	LV	4	314	98	11.50	12.10	95.0%	95.0%	93.14	93.14	
ELOG2	LV	9	314	96	0.60	12.10	5.0%	100.0%	4.76	97.90	**97.9**
EMLA1	LV	10	314	90.05	3.20	3.20	100.0%	100.0%	90.05	90.05	**90.1**
EMR1	LV	4	314	98	4.00	17.40	23.0%	23.0%	22.53	22.53	
EMR1	LV	13	314	67.45	10.10	17.40	58.0%	81.0%	39.15	61.68	
EMR1	LV	9	314	96	3.30	17.40	19.0%	100.0%	18.21	79.89	**79.9**
EMR2	LV	13	314	67.45	10.00	19.20	52.1%	52.1%	35.13	35.13	
EMR2	LV	9	314	96	2.60	19.20	13.5%	65.6%	13.00	48.13	
EMR2	LV	9	314	96	0.40	19.20	2.1%	67.7%	2.00	50.13	
EMR2	LV	9	314	96	0.70	19.20	3.6%	71.4%	3.50	53.63	
EMR2	LV	4	314	98	5.50	19.20	28.6%	100.0%	28.07	81.70	**81.7**
ENP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
EOHR1	LV	4	314	98	7.40	10.10	73.3%	73.3%	71.80	71.80	
EOHR1	LV	9	314	96	0.90	10.10	8.9%	82.2%	8.55	80.36	
EOHR1	LV	9	314	96	0.80	10.10	7.9%	90.1%	7.60	87.96	
EOHR1	LV	9	314	96	1.00	10.10	9.9%	100.0%	9.50	97.47	**97.5**
EPA	LV	18	314	90.05	17.10	17.10	100.0%	100.0%	90.05	90.05	**90.1**
EPB1	LV	19	314	82.15	31.60	31.60	100.0%	100.0%	82.15	82.15	**82.2**
EPB2	LV	19	314	82.15	46.40	46.40	100.0%	100.0%	82.15	82.15	**82.2**
EPC	LV	18	314	90.05	20.20	20.20	100.0%	100.0%	90.05	90.05	**90.1**
EPD	LV	18	314	90.05	28.90	28.90	100.0%	100.0%	90.05	90.05	**90.1**
EPE1	LV	18	314	90.05	12.50	12.50	100.0%	100.0%	90.05	90.05	**90.1**
EPE2	LV	18	314	90.05	9.10	9.10	100.0%	100.0%	90.05	90.05	**90.1**
EPF1	LV	18	314	90.05	13.50	13.50	100.0%	100.0%	90.05	90.05	**90.1**
EPF2	LV	18	314	90.05	19.10	19.10	100.0%	100.0%	90.05	90.05	**90.1**
EFP2	LV	10	400	95	1.00	1.00	100.0%	100.0%	95.00	95.00	**95.0**
EPG	LV	18	314	90.05	15.90	15.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH1	LV	18	314	90.05	23.90	23.90	100.0%	100.0%	90.05	90.05	**90.1**
EPH2	LV	18	314	90.05	1.90	8.90	21.3%	21.3%	19.22	19.22	
EPH2	LV	18	400	95	7.00	8.90	78.7%	100.0%	74.72	93.94	**93.9**
EPH3	LV	18	400	95	15.40	15.40	100.0%	100.0%	95.00	95.00	**95.0**
EPI1	LV	10	314	90.05	8.60	8.60	100.0%	100.0%	90.05	90.05	**90.1**
EPI2	LV	10	314	90.05	7.40	7.40	100.0%	100.0%	90.05	90.05	**90.1**
EPJ	LV	16	400	93	4.70	31.70	14.8%	14.8%	13.79	13.79	
EPJ	LV	16	314	83.15	27.00	31.70	85.2%	100.0%	70.82	84.61	**84.6**
ES1	LV	37	314	83.51	8.20	10.40	78.8%	78.8%	65.84	65.84	
ES1	LV	37	400	92.96	2.20	10.40	21.2%	100.0%	19.66	85.51	**85.5**
ES2	LV	37	400	92.96	32.10	32.10	100.0%	100.0%	92.96	92.96	**93.0**
ESKV1	LV	4	314	98	3.90	3.90	100.0%	100.0%	98.00	98.00	**98.0**
ESKY1	LV	4	314	98	8.20	8.20	100.0%	100.0%	98.00	98.00	**98.0**
ESP	LV	2	314	55.25	3.50	3.50	100.0%	100.0%	55.25	55.25	**55.3**
ETP4	LV	4	400	98	0.50	0.80	62.5%	62.5%	61.25	61.25	
ETP4	LV	4	314	98	0.30	0.80	37.5%	100.0%	36.75	98.00	**98.0**
ETP5	LV	4	400	98	0.90	0.90	100.0%	100.0%	98.00	98.00	**98.0**
EUS95	LV	4	314	98	9.40	9.40	100.0%	100.0%	98.00	98.00	**98.0**
OFFZ	LV	20	314	78.65	30.80	30.80	100.0%	100.0%	78.65	78.65	**78.7**
NW102-C	LV	48	314	93.4175	0.40	128.10	0.3%	0.3%	0.29	0.29	
NW102-C	LV	48	314	93.4175	5.40	128.10	4.2%	4.5%	3.94	4.23	
NW102-C	LV	47	314	86.478	7.70	128.10	6.0%	10.5%	5.20	9.43	
NW102-C	LV	48	314	93.4175	114.60	128.10	89.5%	100.0%	83.57	93.00	**93.0**
NW103-W	LV	47	314	86.478	0.10	99.80	0.1%	0.1%	0.09	0.09	
NW103-W	LV	44	630	88.9	0.10	99.80	0.1%	0.2%	0.09	0.18	
NW103-W	LV	46	630	92.68	0.10	99.80	0.1%	0.3%	0.09	0.27	
NW103-W	LV	47	630	94.08	0.20	99.80	0.2%	0.5%	0.19	0.46	
NW103-W	LV	46	630	92.68	0.20	99.80	0.2%	0.7%	0.19	0.64	
NW103-W	LV	44	630	88.9	0.30	99.80	0.3%	1.0%	0.27	0.91	

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   18DEC18  TIME  12:41:55  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE.INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     LENNAR HOMES
    3         ID     SKYE CANYON
    4         ID     MASTER DRAINAGE STUDY - UPDATE #5
    5         ID     ULTIMATE DRAINAGE CONDITION - REVISED EAST AREA
    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR   PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    2.77
   32         PC      0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC  0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC  0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC  0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC  0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC  0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC  0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC  0.998   0.999   1.000
   40         LS      0    98.0
   41         UD  0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

```
                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```

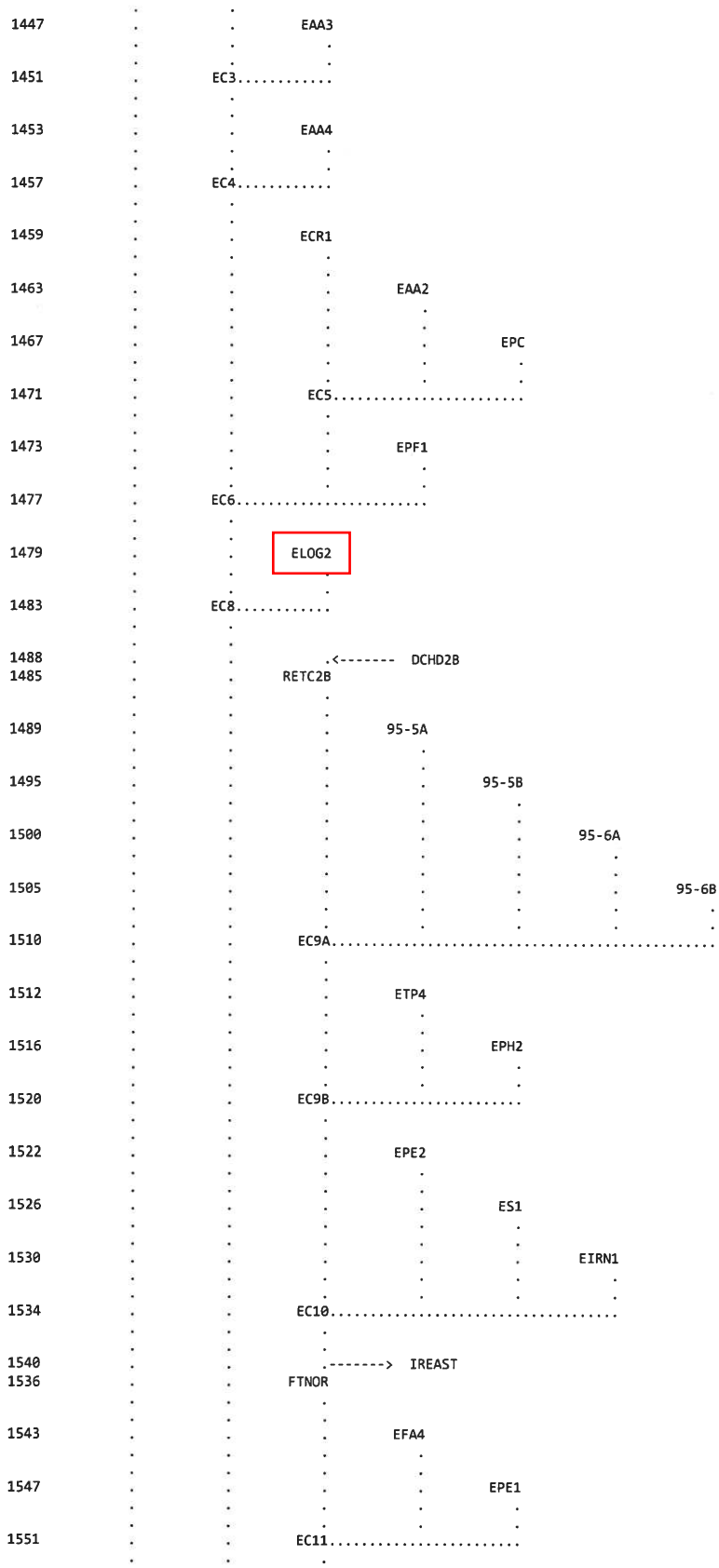


```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    2.77
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```

```
             *

1561         KK    EPI2
1562         BA  0.0116
1563         LS       0    90.1
1564         UD   0.081
             *

1565         KK   EOHR1
1566         BA  0.0158
1567         LS       0    97.5
1568         UD   0.125
             *

1569         KK     ESP
1570         BA  0.0055
1571         LS       0    55.3
1572         UD   0.128
             *

1573         KK    EC13
1574         HC       5
             *

1575         KK    EPF2
1576         BA  0.0298
1577         LS       0    90.1
1578         UD   0.050
             *

1579         KK    EPH1
1580         BA  0.0373
1581         LS       0    90.1
1582         UD   0.141
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1583         KK    EC14
1584         HC       3
             *

1585         KK    EC15
1586         HC       2
             *

1587         KK   RFTLC
1588         KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
1589         DT   OHARE
1590         DI       0     115    5000
1591         DQ       0      47      47
             *

1592         KK    EFA3
1593         BA  0.0039
1594         LS       0    98.0
1595         UD   0.122
             *

1596         KK     EPD
1597         BA  0.0452
1598         LS       0    90.1
1599         UD   0.162
             *

1600         KK    EC16
1601         HC       3
             *

1602         KK  R2FTLC
1603         KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
1604         DT  LOGCAB
1605         DI       0      87    5000
1606         DQ       0      87      87
             *

1607         KK    EC18
1608         HC       2
             *

1609         KK     ENP
1610         BA  0.0055
1611         LS       0    45.3
1612         UD   0.139
             *

1613         KK    EPB1
```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EPF1
1477
EC6
1479
ELOG2
1483
EC8
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1489
95-5A
1495
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95-6A
1505
95-6B
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ETP4
1516
EPH2
1520
EC9B
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EPE2
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ES1
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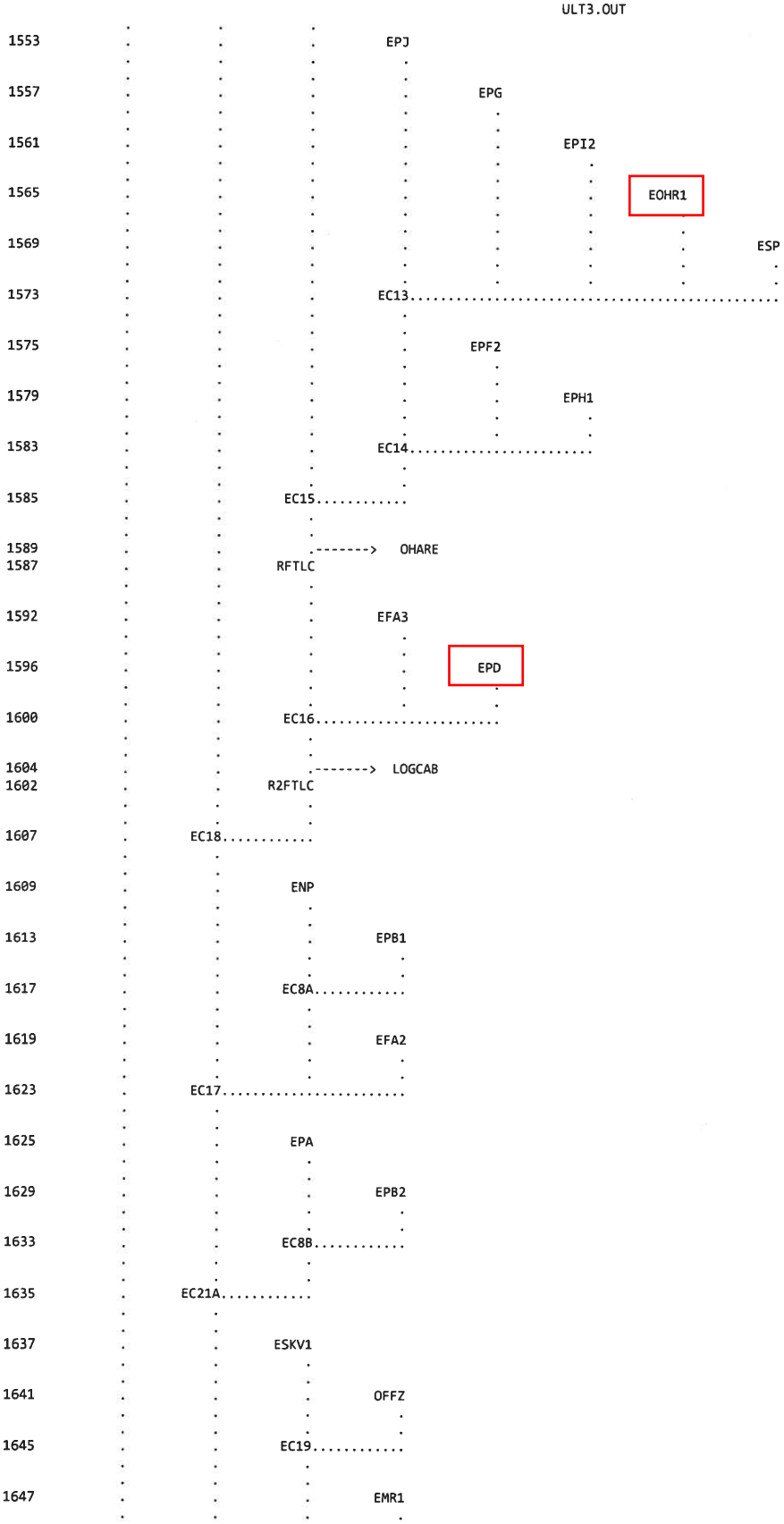
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EPH1
1583
EC14
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EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

HYDROGRAPH AT										
+	EPF1	.02	1	FLOW	32.	31.	31.	29.	28.	28.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC6	5.43	1	FLOW	2977.	2897.	2858.	2701.	2622.	2579.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	35.	34.	34.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC8	5.45	1	FLOW	3012.	2931.	2892.	2734.	2654.	2611.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	12.	12.	11.	11.	11.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	11.	11.	11.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	19.	18.	18.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	12.	12.	12.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	57.	55.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	27.	26.	26.	25.	24.	24.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	87.	85.	83.	79.	77.	76.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	22.	22.	21.	20.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	20.	20.	19.	18.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	133.	129.	128.	121.	117.	116.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	8.	8.	8.	8.	7.	7.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	29.	29.	28.	27.	26.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	37.	36.	36.	34.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	55.	53.	52.	49.	47.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	36.	35.	34.	32.	31.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	20.	19.	19.	18.	17.	17.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	29.	29.	28.	27.	26.	26.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	4.92	4.92	4.92
5 COMBINED AT										
+	EC13	.11	1	FLOW	136.	132.	130.	123.	119.	117.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	57.	56.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	56.	54.	53.	50.	49.	48.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	232.	225.	222.	209.	203.	200.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	267.	259.	256.	241.	234.	230.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	OHARE	.28	1	FLOW	47.	47.	47.	47.	47.	47.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	220.	212.	209.	194.	187.	183.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	65.	63.	62.	59.	57.	56.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	287.	278.	273.	255.	247.	242.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	200.	191.	186.	168.	160.	155.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	3211.	3122.	3078.	2902.	2814.	2766.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	4.92	4.92	4.92	5.00	5.00	5.08
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	50.	48.	47.	44.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18DEC18  TIME  12:39:20  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     LENNAR HOMES
    3         ID     SKYE CANYON
    4         ID     MASTER DRAINAGE STUDY - UPDATE #5
    5         ID     ULTIMATE DRAINAGE CONDITION - REVISED EAST AREA
    6         ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- EST1801-000
   11         ID     FILENAME ------------ ULT3 - 10yr.H1
   12         ID     DATE ---------------- December 2018
   13         ID     MODELED BY ---------- SMJ, updated by LKL
   14         ID
   15         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   16         ID        DRAINAGE AREA (MI^2)    DARF
   17         ID        0.0-0.49                1.00
   18         ID        0.5-0.99                0.98
   19         ID        1.0-1.99                0.97
   20         ID        2.0-3.99                0.93
   21         ID        4.0-5.99                0.91
   22         ID        6.0-7.99                0.90
   23         ID
   24         IT      5       0       0    2000
   25         IO      5       0       0
   26         IN      5       0       0
   27         JR    PREC    1.00    0.98    0.97    0.93    0.91    0.90
              *

   28         KK   WUS95
   29         KM   KYLE CANYON INTERCHANGE - WEST HALF
   30         BA   .0133
   31         PB    1.58
   32         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   33         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   34         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   35         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   36         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   37         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   38         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   39         PC   0.998   0.999   1.000
   40         LS       0    98.0
   41         UD   0.082
              *

   42         KK  DHD01B
   43         KM   FACILITY E-9
   44         KM   FLOW SPLIT AT VTN CULVERT 1
   45         KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
   46         KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
```

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                *

1453            KK    EAA4
1454            BA  0.0328
1455            LS       0    90.1
1456            UD   0.180
                *

1457            KK     EC4
1458            HC       2
                *

1459            KK    ECR1
1460            BA  0.0122
1461            LS       0    97.4
1462            UD   0.149
                *

1463            KK    EAA2
1464            BA  0.0553
1465            LS       0    90.1
1466            UD   0.147
                *

1467            KK     EPC
1468            BA  0.0316
1469            LS       0    90.1
1470            UD   0.121
                *

1471            KK     EC5
1472            HC       3
                *

1473            KK    EPF1
1474            BA  0.0211
1475            LS       0    90.1
1476            UD   0.109
                *

1477            KK     EC6
1478            HC       3
                *

1479            KK   ELOG2
1480            BA  0.0189
1481            LS       0    97.9
1482            UD   0.119
                *
```



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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1483            KK     EC8
1484            HC       2
                *

1485            KK  RETC2B
1486            KM   RETRIEVE FLOW FROM VTN CULVERT 2
1487            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1488            DR  DCHD2B
                *

1489            KK   95-5A
1490            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1491            BA   .0063
1492            PB    1.58
1493            LS       0    92.6
1494            UD   0.075
                *

1495            KK   95-5B
1496            KM   US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1497            BA   .0059
1498            LS       0    92.6
1499            UD   0.073
                *

1500            KK   95-6A
1501            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1502            BA   .0104
1503            LS       0    92.8
1504            UD   0.091
                *

1505            KK   95-6B
1506            KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
1507            BA   .0074
```
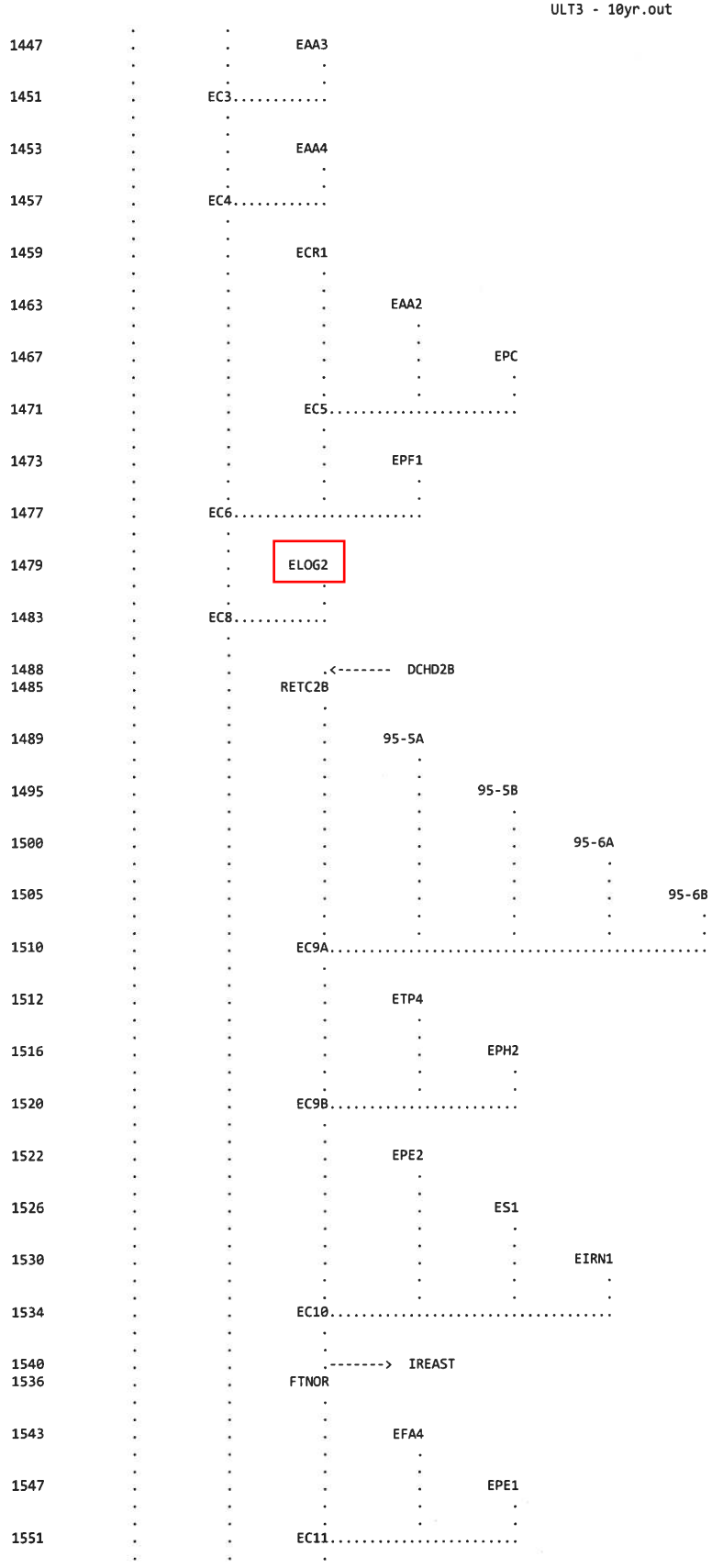

```
                *
     1561       KK    EPI2
     1562       BA  0.0116
     1563       LS       0    90.1
     1564       UD   0.081
                *
     1565       KK   EOHR1
     1566       BA  0.0158
     1567       LS       0    97.5
     1568       UD   0.125
                *
     1569       KK     ESP
     1570       BA  0.0055
     1571       LS       0    55.3
     1572       UD   0.128
                *
     1573       KK    EC13
     1574       HC       5
                *
     1575       KK    EPF2
     1576       BA  0.0298
     1577       LS       0    90.1
     1578       UD   0.050
                *
     1579       KK    EPH1
     1580       BA  0.0373
     1581       LS       0    90.1
     1582       UD   0.141
                *
1                                       HEC-1 INPUT                                          PAGE 44

     LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

     1583       KK    EC14
     1584       HC       3
                *
     1585       KK    EC15
     1586       HC       2
                *
     1587       KK   RFTLC
     1588       KM   DIVERT FLOW SPLIT INTO O'HARE ROAD
     1589       DT   OHARE
     1590       DI       0     115    5000
     1591       DQ       0       0      47
                *
     1592       KK    EFA3
     1593       BA  0.0039
     1594       LS       0    98.0
     1595       UD   0.122
                *
     1596       KK     EPD
     1597       BA  0.0452
     1598       LS       0    90.1
     1599       UD   0.162
                *
     1600       KK    EC16
     1601       HC       3
                *
     1602       KK  R2FTLC
     1603       KM   DIVERT FLOW SPLIT INTO LOG CABIN WAY
     1604       DT  LOGCAB
     1605       DI       0      87    5000
     1606       DQ       0      87      87
                *
     1607       KK    EC18
     1608       HC       2
                *
     1609       KK     ENP
     1610       BA  0.0055
     1611       LS       0    55.3
     1612       UD   0.139
                *
     1613       KK    EPB1
```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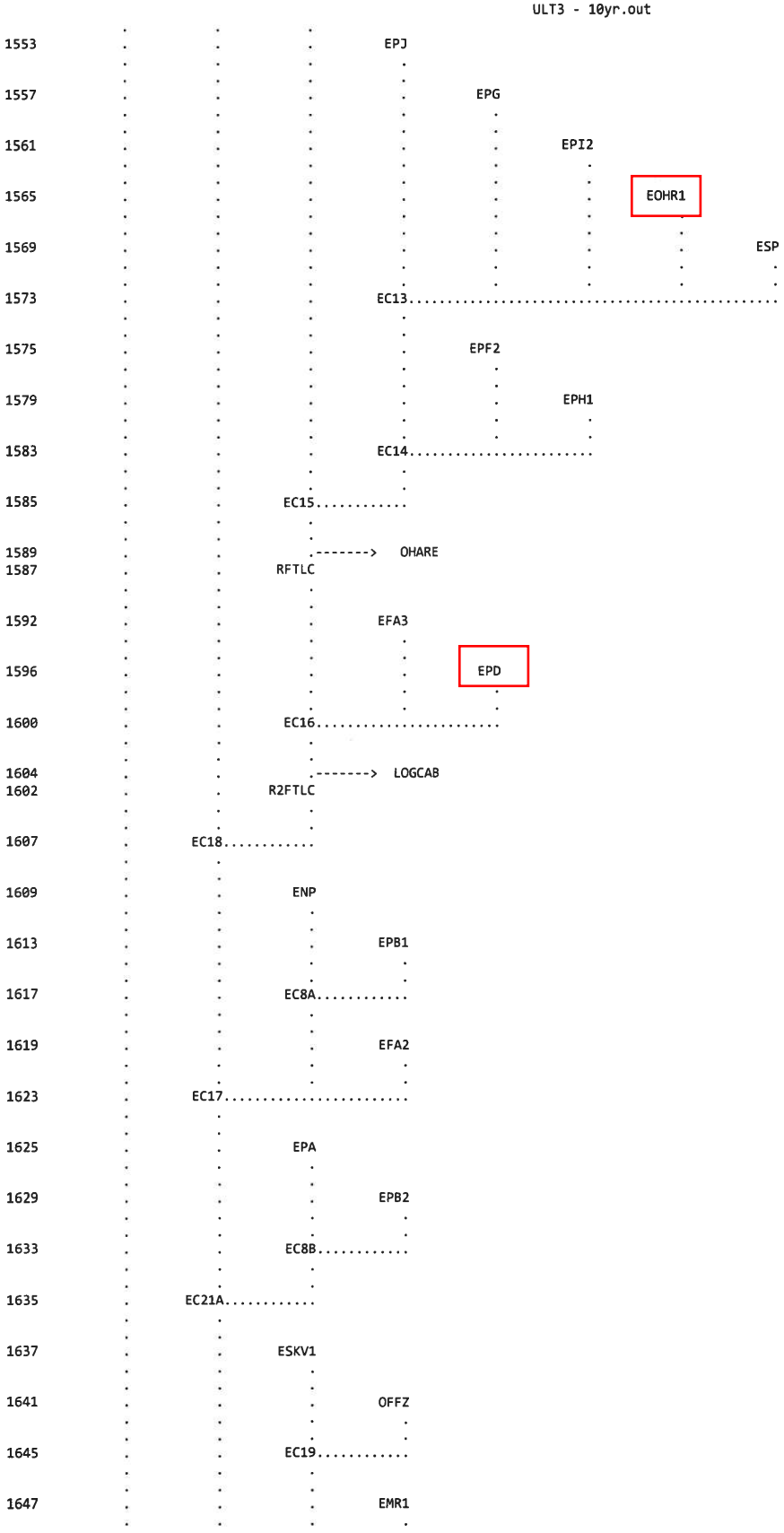
1457 EC4
1459 ECR1
1463 EAA2
1467 EPC
1471 EC5
1473 EPF1
1477 EC6
1479 ELOG2
1483 EC8
1488 DCHD2B
1485 RETC2B
1489 95-5A
1495 95-5B
1500 95-6A
1505 95-6B
1510 EC9A
1512 ETP4
1516 EPH2
1520 EC9B
1522 EPE2
1526 ES1
1530 EIRN1
1534 EC10
1540 IREAST
1536 FTNOR
1543 EFA4
1547 EPE1
1551 EC11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EPJ
1557
EPG
1561
EPI2
1565
EOHR1
1569
ESP
1573
EC13
1575
EPF2
1579
EPH1
1583
EC14
1585
EC15
1589
OHARE
1587
RFTLC
1592
EFA3
1596
EPD
1600
EC16
1604
LOGCAB
1602
R2FTLC
1607
EC18
1609
ENP
1613
EPB1
1617
EC8A
1619
EFA2
1623
EC17
1625
EPA
1629
EPB2
1633
EC8B
1635
EC21A
1637
ESKV1
1641
OFFZ
1645
EC19
1647
EMR1

+	EPF1	.02	1	FLOW	14.	14.	14.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC6	5.43	1	FLOW	1296.	1258.	1238.	1164.	1127.	1108.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ELOG2	.02	1	FLOW	19.	19.	19.	18.	18.	17.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58
2 COMBINED AT										
+	EC8	5.45	1	FLOW	1315.	1277.	1257.	1182.	1145.	1125.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	RETC2B	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5A	.01	1	FLOW	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-5B	.01	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	5.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	27.	26.	26.	24.	23.	23.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH2	.01	1	FLOW	13.	13.	13.	12.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.05	1	FLOW	42.	41.	40.	38.	37.	36.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPE2	.01	1	FLOW	10.	9.	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	8.	7.	7.	7.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	EC10	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	61.	59.	58.	54.	52.	52.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	5.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPE1	.02	1	FLOW	13.	13.	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC11	.10	1	FLOW	18.	17.	17.	16.	15.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPJ	.05	1	FLOW	19.	18.	18.	16.	16.	15.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPG	.02	1	FLOW	16.	15.	15.	14.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPI2	.01	1	FLOW	9.	8.	8.	8.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EOHR1	.02	1	FLOW	16.	16.	16.	15.	14.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ESP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
5 COMBINED AT										
+	EC13	.11	1	FLOW	58.	56.	55.	52.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPF2	.03	1	FLOW	26.	25.	25.	23.	22.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPH1	.04	1	FLOW	25.	24.	23.	22.	21.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC14	.17	1	FLOW	99.	96.	94.	88.	84.	83.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC15	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	OHARE	.28	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.58	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	RFTLC	.28	1	FLOW	115.	111.	110.	102.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EPD	.05	1	FLOW	28.	28.	27.	25.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	EC16	.33	1	FLOW	148.	143.	141.	131.	127.	124.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO										
+	LOGCAB	.33	1	FLOW	87.	87.	87.	87.	87.	87.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50
HYDROGRAPH AT										
+	R2FTLC	.33	1	FLOW	61.	56.	54.	44.	40.	37.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC18	5.78	1	FLOW	1376.	1333.	1311.	1226.	1184.	1163.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ENP	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EPB1	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	EC8A	.05	1	FLOW	16.	15.	15.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC17	5.84	1	FLOW	1396.	1352.	1329.	1243.	1200.	1178.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

Appendix D – Improvement Plans

CIVIL IMPROVEMENT PLANS

FOR

SUNSTONE - PARCEL D

APN: 125-06-710-003

LAS VEGAS, NEVADA

PROJECT CONTACTS

DEVELOPER/OWNER
LENNAR
9275 W RUSSELL RD, SUITE 400
LAS VEGAS, NEVADA 89148

CONTACT: ROBERT FLAXA
(702) 821-4651

MASTER PLAN SURVEYOR
VTN NEVADA
2727 S RAINBOW BLVD
LAS VEGAS, NEVADA 89146

CONTACT: RAYMOND JOHNSON
(720) 873-7550

CIVIL ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD SOUTH, SUITE 320
LAS VEGAS, NEVADA 89119

CONTACT: MIKAL KINTNER
(702) 862-3632

PROJECT INFORMATION

NUMBER OF LOTS: 199
ACREAGE: ±30.74 ACRES (GROSS)

EXISTING ZONING: T-D EXISTING
PROPOSED ZONING: T-D

ENTITLEMENTS: TMP-78151

DRAINAGE STUDY: DS5281A

TRAFFIC STUDY: TIA75571-1

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE 'X' PER FEMA FLOOD INSURANCE MAP NUMBERS 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE¼) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

LEGAL DESCRIPTION

PARCEL 13 OF THE PARENT FINAL MAP OF SUNSTONE (FMP-77750) BOOK 161, PAGE 40 OF PLATS ON FILE WITH CLARK COUNTY NEVADA, RECORDER.

UTILITY NOTE

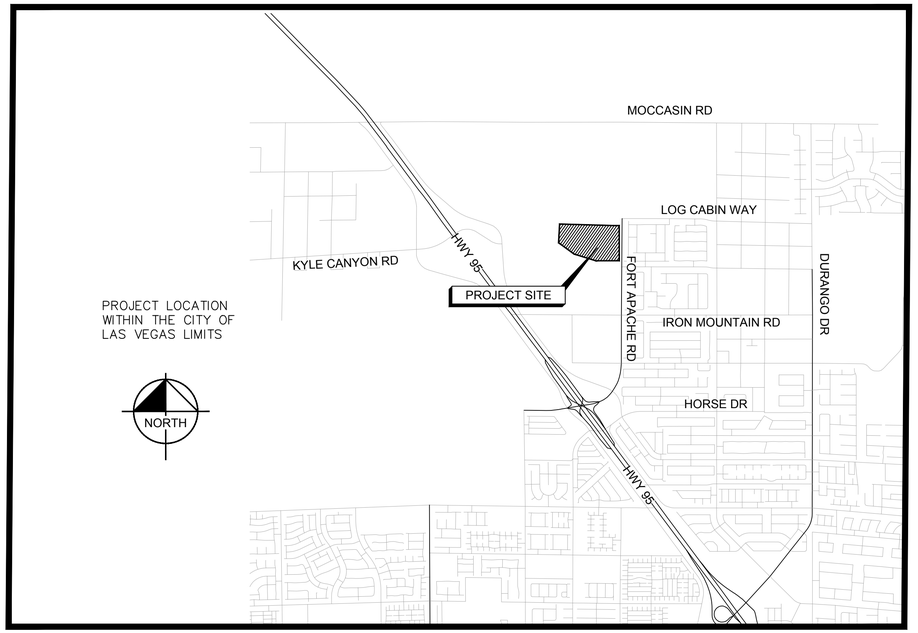
KIMLEY-HORN AND ASSOCIATES TAKES NO RESPONSIBILITY FOR EXISTING UTILITIES SHOWN HEREIN. THE EXISTING UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY-OTHER PARTIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND VERIFY THE LOCATIONS AND INVERTS OF THE EXISTING WITHIN THE VICINITY OF CONSTRUCTION ACTIVITIES. IF A CONFLICT IS FOUND TO EXIST, THE CONTRACTOR SHALL COORDINATE THE PROJECT ENGINEER, PROJECT ARCHITECT, AND THE OWNER IMMEDIATELY.

UTILITY PROVIDERS

WATER	LAS VEGAS VALLEY WATER DISTRICT
SEWER	CITY OF LAS VEGAS
ELECTRIC	NV ENERGY
SOLID WASTE DISPOSAL	REPUBLIC SERVICES
GAS	SOUTHWEST GAS
TELEPHONE	CENTURY LINK
COMMUNICATIONS	COX COMMUNICATIONS

GENERAL NOTES

1. THIS SUBDIVISION IS A PART OF THE SUNSTONE MASTER PLAN.
2. LANDSCAPING ON-SITE WILL BE MAINTAINED BY AN HOA
3. WATER POINT OF CONNECTION WILL COME OFF EXISTING WATER LINES STUBS IN O'HARE AVE & SKYE CANYON PARK DR.
4. SEWER POINT OF CONNECTION WILL COME OFF EXISTING SEWER LINES AT THE SOUTHEAST CORNER OF THE PARCEL
5. ABOVE GROUND UTILITY BOXES SHALL NOT BE PLACED WITHIN TRAIL CORRIDORS
6. ONSITE STREETS, TRAILS, OPEN SPACES, AND DRAINAGE CORRIDORS ARE TO BE PRIVATE AND MAINTAINED BY THE HOA
7. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA



LOCATION MAP
NTS

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER SOUTHWEST GEOTECHNICAL:
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

SHEET INDEX

SEE SHEET 3 FOR SHEET INDEX

APPROVALS

CITY OF LAS VEGAS

"APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY LISTED UNDER "DEVIATIONS FROM STANDARDS" THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATION FROM STANDARDS" IN FAVOR OF THE CITY OF LAS VEGAS IMPROVEMENT STANDARDS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA".

ALLEN PAVELKA, PE #09029
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

CITY OF LAS VEGAS PLANNING DEPARTMENT
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT

CITY OF LAS VEGAS FIRE DEPT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1625 GPM / ONSITE 1625 GPM

NV ENERGY* DATE

* NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK* DATE

* THE AFFIXED CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTIONS OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. DATE

SOUTHWEST GAS CORPORATION DATE

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MIKAL KINTNER EXPIRES 06/30/21 CIVIL No. 23006 — 07/01/2020

KHA PROJECT 092935006		DESIGNED BY	MK
DATE 07/01/2020		DRAWN BY	KJW
SCALE AS SHOWN		CHECKED BY	TLC

COVER SHEET

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

Plotted By:Kintner Mikal Sheet Set:092935006 - Lennar Sunstone Parcel D Layout:1 COVER SHEET July 02, 2020 11:27:52am K:\LAS_Civil\092935006-Lennar Sunstone\CAD\PlanSheets\Parcel D\092935006-Cv-D.dwg
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CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 'UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA', LATEST ISSUE; THE 'UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA', LATEST REVISED EDITION; THE 'SUMMERLIN IMPROVEMENT STANDARDS' FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS 'DEVIATIONS FROM STANDARDS'.
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STD STANDARD DRAWING 218.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY TERRACON CONSULTANTS INC. DATED DECEMBER 14, 2017 PROJECT NO. 64175087, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE A MINIMUM OF TWO (2) HORIZONTAL AND VERTICAL (INVERT) LOCATIONS OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER MAIN AND LATERALS TO THE HORIZONTAL SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
22. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC/ELECTRICAL FIELD OPERATIONS DIVISION AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623.1.0.03 (E) OF THE SPECIFICATIONS.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION. 4. ALL EMPTY CONDUIT SHALL HAVE PULL STRINGS INSTALLED PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE OF EIGHTEEN INCHES (18") TO THE FACE OF STREET LIGHTING POLE ON ALL SIDES WHEN STREETLIGHT IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE. 6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE ELECTRICAL SERVICES SECTION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NEVADA POWER COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREETLIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

NOTE TO CONTRACTOR:

1. CONTRACTOR IS REQUIRED TO NOTIFY THE ARCHITECT, ENGINEER AND OWNER IN WRITING BY RFI OF ANY TYPED, HANDWRITTEN, STAMPED OR LABELLED PLAN CHECK COMMENTS ON THE PERMITTED PLANS WITHIN 7 DAYS OF RECEIPT OF THE PERMITTED PLANS. FAILURE TO PROVIDE WITHIN 7 DAYS INDICATES CONTRACTOR HAS INCLUDED ALL COSTS WITHIN HIS BASE BID TO COMPLY WITH FEDERAL, STATE AND LOCAL CODES AND SHALL PERFORM THE WORK AT NO ADDITIONAL COST.
2. GENERAL CONTRACTOR SHALL INCLUDE CONTACTING, COORDINATING PERMITS, SCHEDULING AND SUPERVISING ALL WORK TO BE PERFORMED BY NVE, SOUTHWEST GAS, CENTURYLINK, COX CABLE OR OTHER UTILITY PURVEYOR WORK PRIOR TO AND DURING CONSTRUCTION INCLUDING BARRICADING PLANS, BARRICADE DESIGNS, PERMITS AND BARRICADE WORK.
3. GENERAL CONTRACTOR SHALL CONTACT AND MEET ONSITE WITH ALL UTILITY PURVEYORS FOR SCHEDULING AND COORDINATION PURPOSES AT LEAST 30 DAYS PRIOR TO INSTALLATION OF UTILITY WORK.
4. GENERAL CONTRACTOR SHALL PROVIDE AND PAY FOR ALL BARRICADING PLANS, APPROVALS AND BARRICADING WITHIN THE RIGHT OF WAY AS WELL AS ANY CHANGES REQUIRED BY THE GOVERNING AUTHORITY IN THE PERFORMANCE OF CONTRACTOR'S WORK.
5. THE OWNER AND/OR HIS CONSULTANTS ARE NOT RESPONSIBLE FOR DELAYS CAUSED BY CONTRACTOR'S FAILURE TO PROVIDE NOTIFICATIONS IN A TIMELY MANNER.
6. PROJECT CONSULTANTS SHALL RESPOND TO RFIS OR OTHER CONTRACTOR QUERIES WITHIN 5 BUSINESS DAYS.

DEVIATION FROM STANDARDS

NONE

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # 137252

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF THE UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES OR SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS OF CONSTRUCTION MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDED THE PLACEMENT OF APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

   ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. NO LEAD COMPLIANCE NOTE: TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE INSTALLED OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO._____####_____ FIRST APPROVED DATE:_____

SWPPP NOTES

1. CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVED ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS AND CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTION MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS FIRE & RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS-APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND FIRE HYDRANT MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 3310 & 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES OR CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC 507.2.1, NFPA 24]
8. PAINTING CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC 507.5.7.1]
10. PRIOR TO FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    RESIDENTIAL-500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED
    COMMERCIAL-300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FEET SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN ISLANDS, FIRE HYDRANTS SHALL BE PROVIDED ON TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC C102.1]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET. [IFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE FOUR (4) OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN TWO (2) FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 8% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FEET 6 INCHES. [IFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FEET FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD, NOT LESS THAN 24 FEET WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FEET. [IFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FEET IF THE BUILDING IS SPRINKLERED. [IFC 501.1.1]
25. APPROVED SECONDARY FIRE APPARATUS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FEET. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR E

MASTER LEGEND

- STREET CENTERLINE
- PROPERTY LINE / RIGHT OF WAY
- EASEMENT LINE
- EXISTING PATENT EASEMENT
- EXISTING WALL
- PROPOSED RETAINING OR STEM WALL
- PROPOSED SCREEN WALL
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED CONCRETE BARRIER RAIL
- EXISTING CURB & GUTTER
- PROPOSED CURB & GUTTER
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BOLLARD
- PROPOSED DOOR
- SCARP
- SLOPE
- EXISTING GRADE
- PROPOSED GRADE
- BACKWATER VALVE
- PRESSURE REDUCING VALVE

- EXISTING CONTOUR
- PROPOSED CONTOUR
- CUT FILL TRANSITION
- ADA ACCESS
- SAWCUT LIMITS
- GRADE BREAK
- FLOW LINE
- EXISTING STORM DRAIN
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- PROPOSED SEWER
- PROPOSED SEWER LATERAL
- PROPOSED WATER LINE
- PROPOSED STREET LIGHT / TRAFFIC CONDUIT
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN
- EXISTING HANDICAP PARKING
- PROPOSED HANDICAP PARKING
- EXISTING STORM DRAIN MANHOLE
- PROPOSED SIDEWALK DRAIN
- EXISTING DROP INLET
- PROPOSED DROP INLET
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE
- EXISTING FIRE HYDRANT
- PROPOSED CLEAN OUT
- PROPOSED FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- PROPOSED BLUE REFLECTIVE PAVEMENT MARKING
- EXISTING MISCELLANEOUS MANHOLE
- EXISTING POLE
- EXISTING STREET LIGHT
- EXISTING AREA LIGHT
- PROPOSED STREET LIGHT
- PROPOSED AREA LIGHT

ABBREVIATIONS

@	AT	LA	LANDSCAPE ARCHITECT
AB	AGGREGATE BASE	LF	LINEAR FEET
AC	ASPHALTIC CONCRETE	LP	LOW POINT
ADA	AMERICANS WITH DISABILITIES ACT	LS	LANDSCAPE
AVE	AVENUE	LT	LEFT
BC	BACK OF CURB	LVVWD	LAS VEGAS VALLEY WATER DISTRICT
BCR	BEGIN CURB RETURN	MAX	MAXIMUM
BLVD	BOULEVARD	ME	MATCH EXISTING
BM	BENCHMARK	MEP	MECHANICAL, ELECTRICAL AND PLUMBING
BVC	BEGIN VERTICAL CURVE		
BW	BOTTOM OF WALL	MH	MANHOLE
BWV	BACKWATER VALVE	MIN	MINIMUM
B/S	BACKSIDE	MUE	MUNICIPAL UTILITY EASEMENT
CALC	CALCULATED	N	NORTH
CC	CLARK COUNTY	NTS	NOT TO SCALE
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING	N/S	NORTH/SOUTH
		OC	ON CENTER
CL	CENTERLINE	P.A.E.	PUBLIC ACCESS EASEMENT
CJ	CONSTRUCTION JOINT	PC	POINT OF CURVATURE
COH	CITY OF HENDERSON	PCC	PORTLAND CEMENT CONCRETE
CUHBD	CITY OF HENDERSON BUILDING DEPARTMENT	PDE	PRIVATE DRAINAGE EASEMENT
		PR	PROPOSED
CO	CLEAN OUT	PRC	POINT OF REVERSE CURVATURE
CONN	CONNECTION	PROP	PROPOSED
CTV	CABLE TELEVISION	PRV	PRESSURE REDUCING VALVE
CY	CUBIC YARD	PT	POINT OF TANGENCY
Δ	DELTA (DIFFERENCE) / ANGLE	PVC	POLYVINYL CHLORIDE
D	DEPTH	PVI	POINT OF VERTICAL INFLECTION
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS	PUB	PUBLIC
		PVT	PRIVATE
		R	RADIUS
DG	DECOMPOSED GRANITE	RCB	REINFORCED CONCRETE BOX
DI	DUCTILE IRON	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	RT	RIGHT
E	EAST	R/W	RIGHT OF WAY
EA	EACH	S	SOUTH
EG	EXISTING GRADE	SD	STORM DRAIN
ESMT	EASEMENT	SDMH	STORM DRAIN MANHOLE
ECR	END CURB RETURN	SF	SQUARE FOOT OR FEET
ELEV	ELEVATION	SS	SANITARY SEWER
ELEC	ELECTRICAL	SSMH	SANITARY SEWER MANHOLE
EOP	EDGE OF PAVEMENT	ST	STREET
EVC	END VERTICAL CURVE	ST-LT	STREETLIGHT
EX.	EXISTING	STL	STEEL
E/W	EAST/WEST or EACH WAY	STD	STANDARD
FF	FINISHED FLOOR	SW	SIDEWALK
FFE	FINISHED FLOOR ELEVATION	SY	SQUARE YARDS
F-F	FACE OF CURB TO FACE OF CURB	TC	TOP OF CURB
FG	FINISHED GROUND	TF	TOP OF FOOTING
FH	FIRE HYDRANT	TG	TOP OF GRATE
FL	FLOWLINE	TRW	TOP OF RETAINING WALL
FT	FOOT or FEET	TYP	TYPICAL
GB	GRADE BREAK	TW	TOP OF WALL
GFE	GARAGE FACE ELEVATION	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
H	HEIGHT		
HDPE	HIGH-DENSITY POLYETHYLENE		
HP	HIGH POINT	VERT	VERTICAL
INT	INTERSECTION	W	WEST
INV	INVERT	WL	WATERLINE
L	LENGTH	WTR	WATER
		XFF	EXISTING FINISHED FLOOR ELEVATION
		±	PLUS OR MINUS

QUANTITIES ARE SHOWN FOR PERMIT PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN ESTIMATE FOR BIDDING AND SHALL BID A COMPLETE JOB. CONTRACTOR SHALL ADVISE OWNER & ENGINEER OF ANY APPARENT DISCREPANCIES IN ESTIMATE.

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No.	REVISIONS	DATE	BY

Kimley»Horn

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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA — TAMARA KAY WILLIAMS — No. 023519 — CIVIL — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

MASTER LEGEND & QUANTITIES

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

3
C0.3

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

Plotted By:Kintner, Mikol Sheet Set:092935006 - Lennar Sunstone\Parcel D Layout:3 MASTER LEGEND & QUANTITIES July 02, 2020 11:27:58am K:\LAV Civil\092935006-CVL-D.dwg
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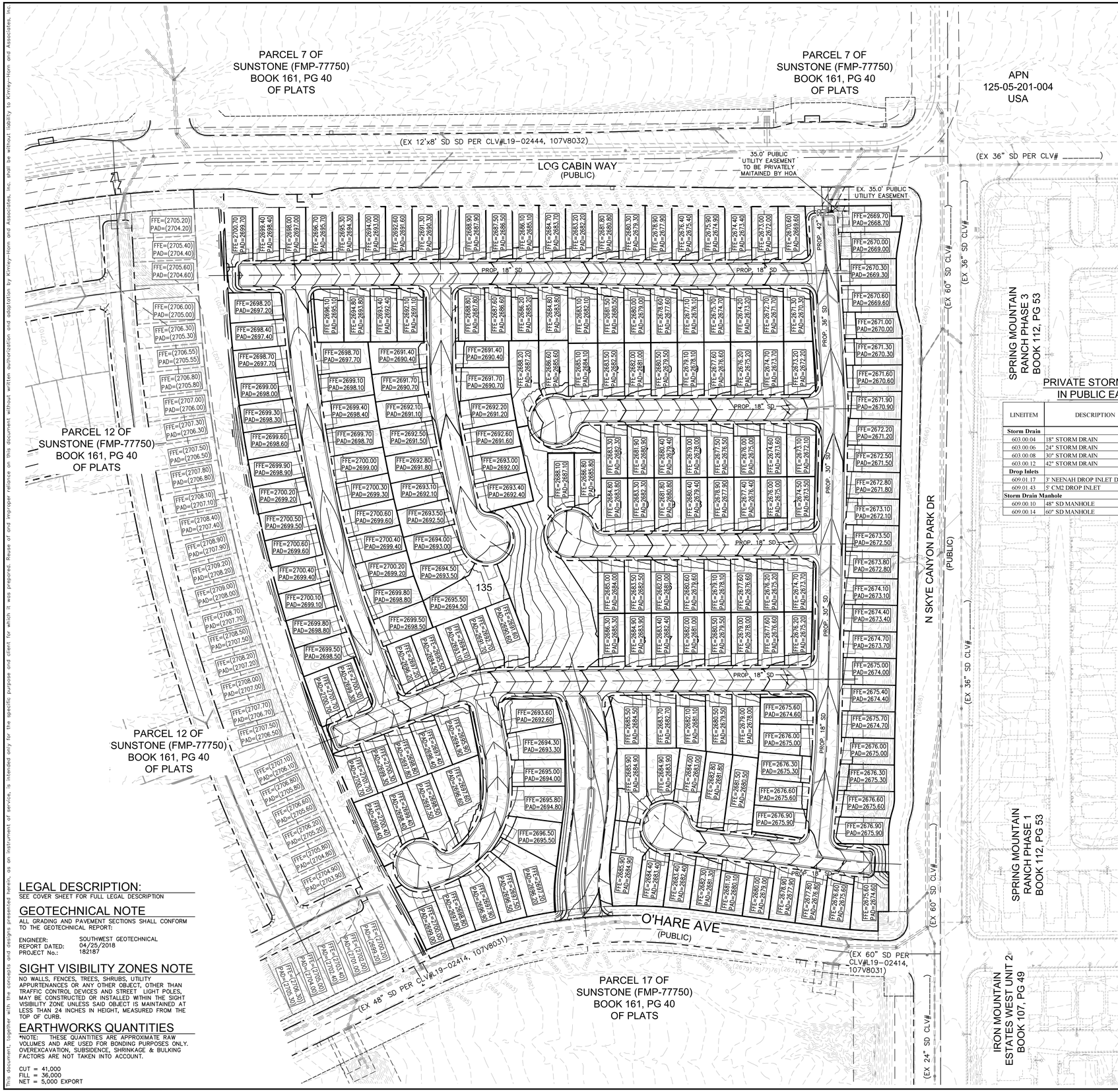

PRIVATE STORM QUANTITIES IN PUBLIC EASEMENTS:

LINEITEM	DESCRIPTION	Public Quantity	Private Quantity	Unit Type
Storm Drain				
603.00.04	18" STORM DRAIN		1566	LF
603.00.06	24" STORM DRAIN		177	LF
603.00.08	30" STORM DRAIN		688	LF
603.00.12	42" STORM DRAIN		153	LF
Drop Inlets				
609.01.17	3' NEENAH DROP INLET D=6' MAX		26	EA
609.01.43	5' CM2 DROP INLET		1	EA
Storm Drain Manhole				
609.00.10	48" SD MANHOLE		14	EA
609.00.14	60" SD MANHOLE		2	EA

ENGINEER'S NOTES

1. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.
3. ALL WORK SHALL CONFORM TO THE SOILS REPORT PREPARED BY SOUTHWEST GEOTECHNICAL, DATED 04/25/2018. PROJECT NO. 182187
4. ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST EDITION.
5. FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF INCH ABOVE THE TOP OF THE GUTTER (INCLUDING OPEN GRADE).
6. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION
7. THIS PLAN SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY ALL APPLICABLE GOVERNMENT AGENCIES.
8. ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
9. MATCH ELEVATIONS SHOWN TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.
10. PERIMETER SCREEN WALL AND RETAINING WALL PERMIT TO BE COMPLETED PER SEPARATE PLANS AND PERMIT BY OTHERS.
11. PER THE SOILS REPORT, POSITIVE DRAINAGE OF 5% MINIMUM SHALL BE MAINTAINED FOR AREAS ADJACENT TO STRUCTURES THAT ARE NOT COVERED BY CONCRETE OR ASPHALT. THE 5% SHOULD BE MAINTAINED FOR A DISTANCE OF 10'
12. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED
13. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION
14. THE CONTRACTOR SHALL VERIFY THE EX. GRADES PRIOR TO CONSTRUCTION. IF A CONFLICT EXISTS BETWEEN THE FIELD CONDITION AND THESE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
15. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE IS MAINTAINED.
16. ALL PAVEMENT SECTIONS SHOWN HEREIN ARE BASED ON THE RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER.
17. ONSITE STORMWATER CONVEYANCE SYSTEM IS TO BE PRIVATELY MAINTAINED.
18. ADD 2600' TO ALL 2-DIGIT ELEVATIONS UNLESS OTHERWISE NOTED.
19. REFER TO SHEET C0.3 FOR LEGEND AND ABBREVIATIONS.

STORMWATER MANAGEMENT NOTE

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CLARK COUNTY BUILDING ADMINISTRATIVE CODE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5274A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

SIGHT VISIBILITY ZONES NOTE

NO WALLS, FENCES, TREES, SHRUBS, UTILITY APPURTENANCES OR ANY OTHER OBJECT, OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES, MAY BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE UNLESS SAID OBJECT IS MAINTAINED AT LESS THAN 24 INCHES IN HEIGHT, MEASURED FROM THE TOP OF CURB.

EARTHWORKS QUANTITIES

*NOTE: THESE QUANTITIES ARE APPROXIMATE RAW VOLUMES AND ARE USED FOR BONDING PURPOSES ONLY. OVEREXCAVATION, SUBSIDENCE, SHRINKAGE & BULKING FACTORS ARE NOT TAKEN INTO ACCOUNT.

CUT = 41,000
FILL = 36,000
NET = 5,000 EXPORT

FAST Call before you UnderGround 1-702-432-5300 — FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig — AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

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No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-498-3600
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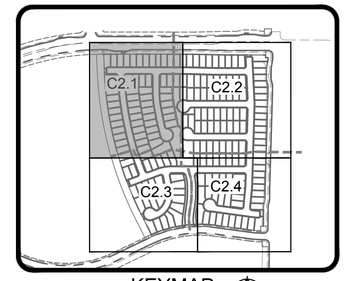
PROFESSIONAL ENGINEER — TAMARA CONNOLLY — STATE OF NEVADA — No. 025119 — EXPIRES 07/31/20 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

OVERALL GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

5 OF 22 SHEETS
C2.0



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
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11. CONSTRUCT RESIDENTIAL DRIVEWAY
13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
4. INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
8. CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.

ENGINEER'S NOTES

1. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

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No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER — STATE OF NEVADA — TAMARA CONNOLLY — No. 025119 — EXPIRES 12/31/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C2.1

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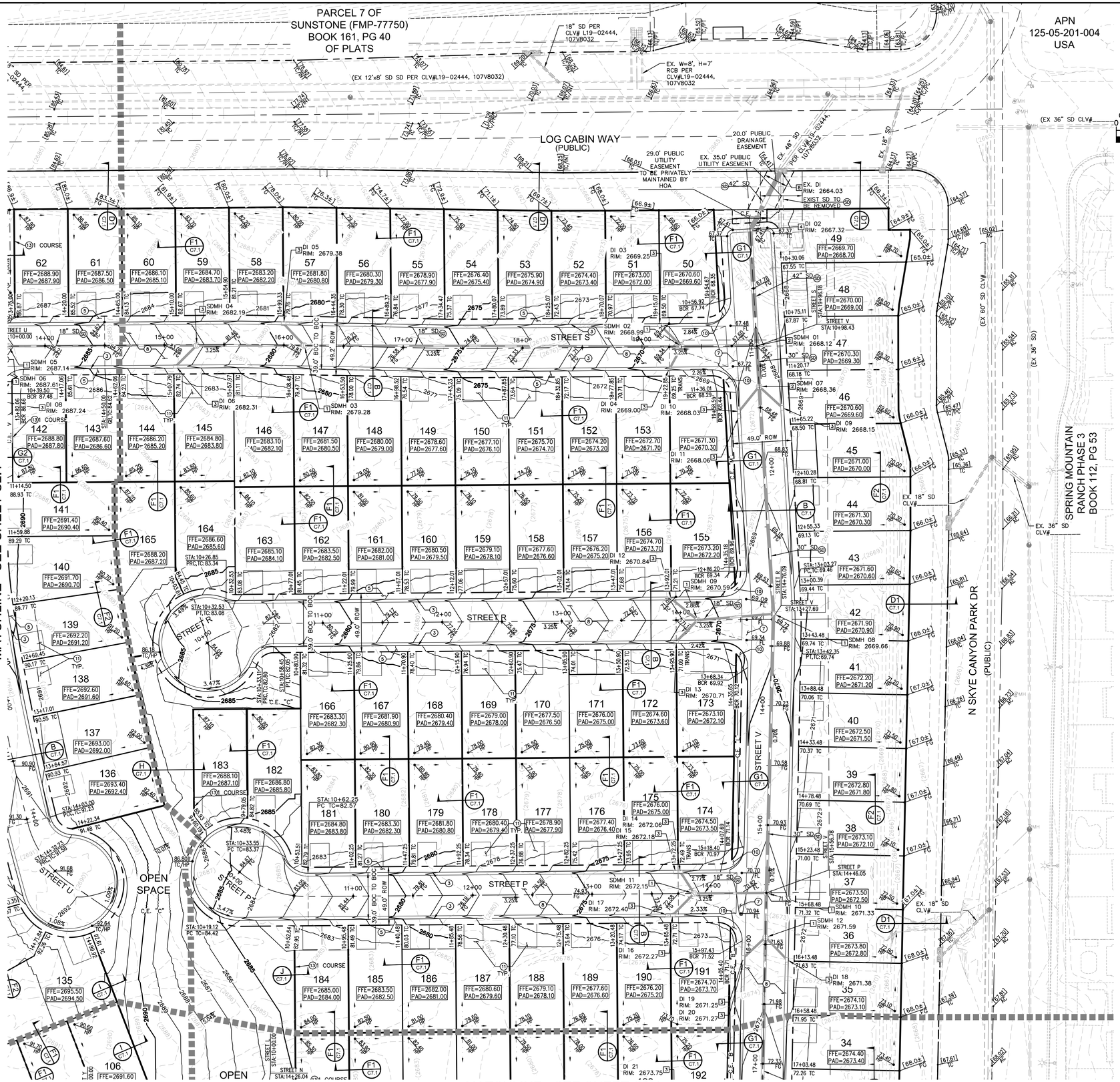

KEYMAP
N.T.S.

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
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13. CONSTRUCT SOLID GROUTED WALL, COURSES ABOVE FINISH GRADE PER PLAN
SD. STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
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3. INSTALL NEENAH TYPE R–3501 DROP INLET PER DETAIL 6 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.
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ENGINEER'S NOTES

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2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE

SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES

SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED IN ZONE X PER FEMA FLOOD INSURANCE MAP NUMBER 32003C1735E DATED SEPTEMBER 27, 2002. ZONE X IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

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BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS5281A ON FILE WITH THE CITY OF LAS VEGAS FOR THIS PROJECT.

TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

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No.	REVISIONS	DATE	BY

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PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — EXPIRES 07/31/2020 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

CONSTRUCTION NOTES

1. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
2. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
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STORMWATER QUANTITIES
SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE
SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

SIGHT VISIBILITY ZONES NOTE
SEE SHEET C2.0 FOR SIGHT VISIBILITY ZONE NOTE

GEOTECHNICAL NOTE
ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

EARTHWORKS QUANTITIES
SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES
SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:
SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

FLOOD ZONE NOTE
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BENCHMARK
MONUMENT ID: USDA (1934) 19

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TAMARA CONNOLLY, PE No. 025119 — DATE: 07/01/2020

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PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

TAMARA CONNOLLY — NEVADA — CIVIL — No. 025119 — PROFESSIONAL ENGINEER — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

8 OF 22 SHEETS
C2.3

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STORMWATER QUANTITIES

SEE SHEET C2.0 FOR STORMWATER QUANTITIES

STORMWATER MANAGEMENT NOTE

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SIGHT VISIBILITY ZONES NOTE

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REPORT DATED: 04/25/2018
PROJECT No.: 182187

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SEE SHEET C2.0 FOR EARTHWORK QUANTITIES

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

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BENCHMARK

MONUMENT ID: USDA (1934) 19

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PROFESSIONAL ENGINEER — TAMARA CONNOLLY — No. 025119 — 07/01/2020

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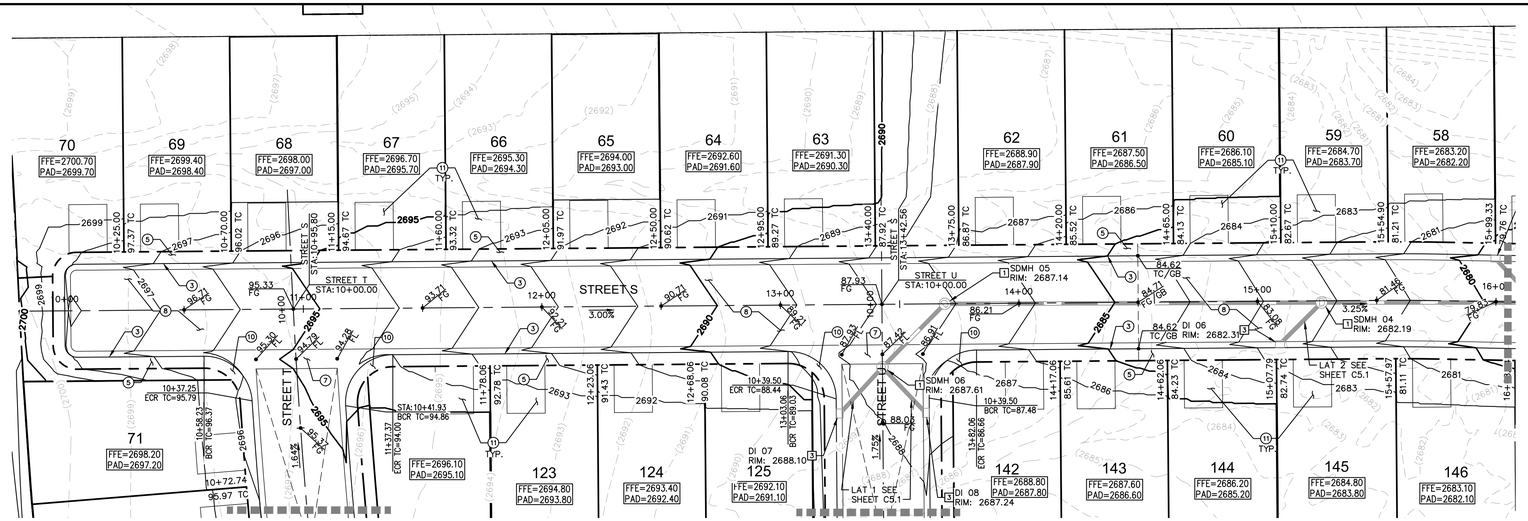
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

GRADING PLAN

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

9 OF 22 SHEETS
C2.4



STREET T
SEE SHEET C4.08

STREET U
SEE SHEET C4.10

STREET S (PRIVATE)
PLAN VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.02

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

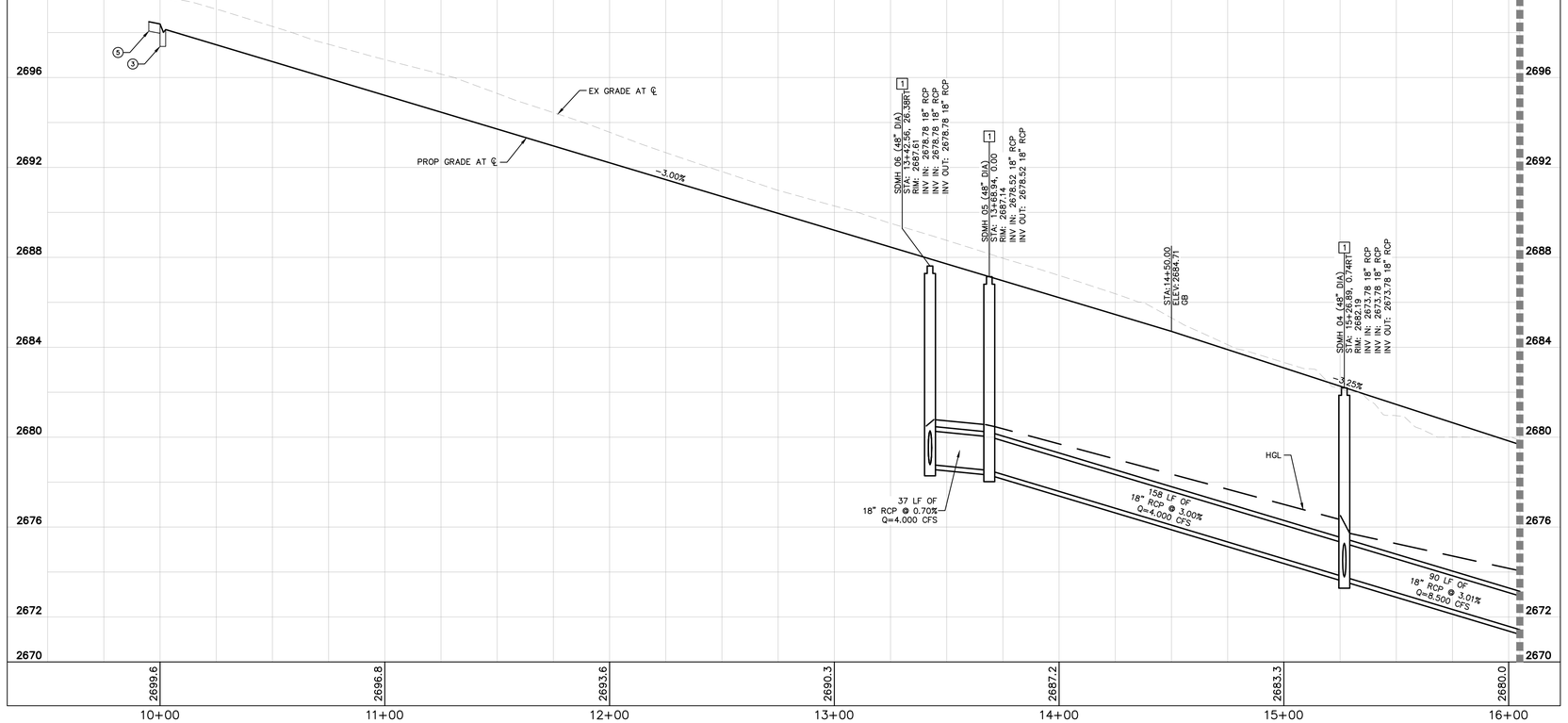
(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



MATCHLINE - SEE SHEET C4.02

STREET S (PRIVATE)
PROFILE VIEW - STA: 9+50 - 16+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

STATE OF NEVADA — JESSICA M. KRAMER — No. 23040 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET S PLAN & PROFILE STA 9+50 - 16+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

6 OF 22 SHEETS
C4.01

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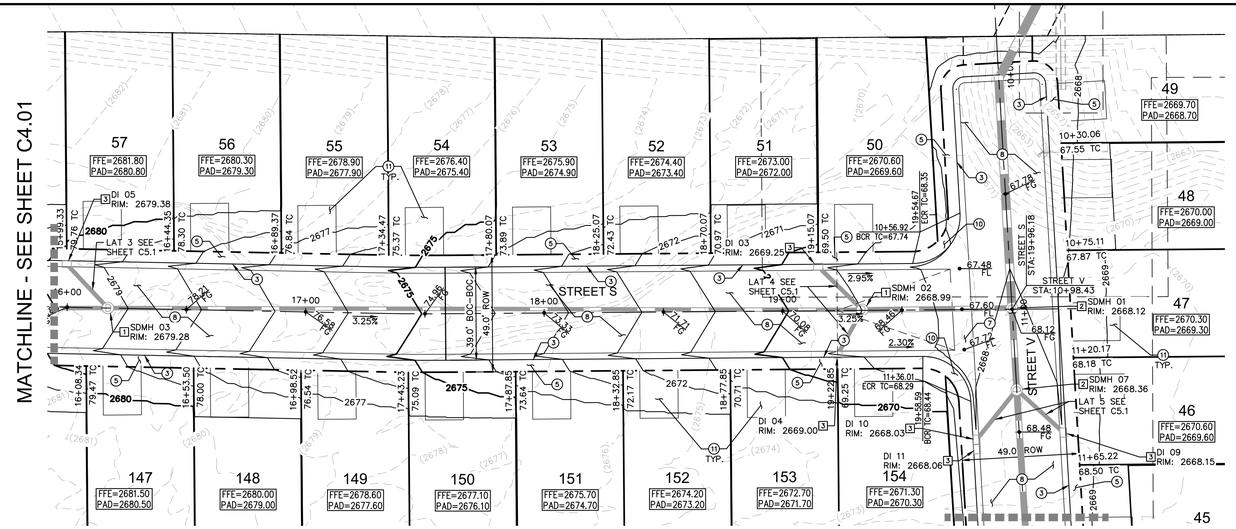


NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

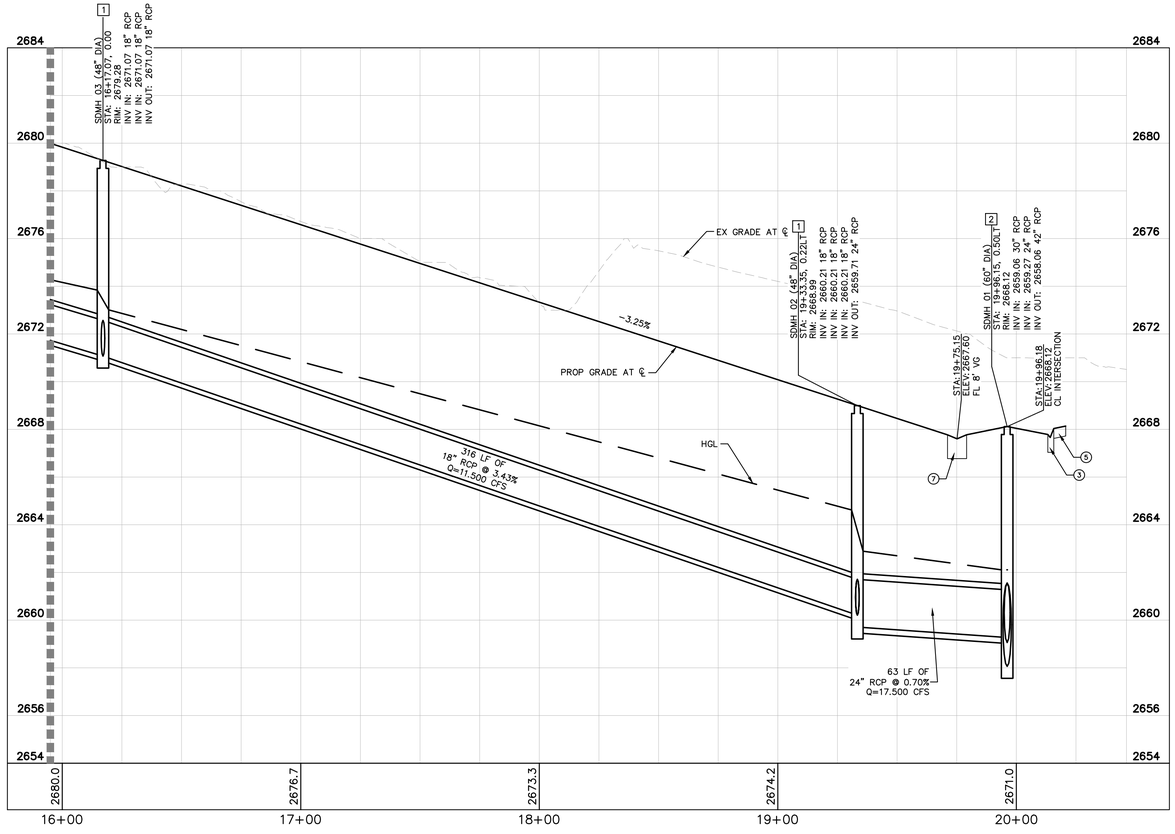
KEYMAP
N.T.S.

STREET S (PRIVATE)
PLAN VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'

STREET V
SEE SHEET C4.11

MATCHLINE - SEE SHEET C4.01



STREET S (PRIVATE)
PROFILE VIEW - STA: 16+00 - 20+50

HORIZ: 1" = 30'
VERT: 1" = 3'

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5" SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER NEVADA 19019 TIMOTHY L. CLARA 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET S PLAN & PROFILE STA 16+00 - 20+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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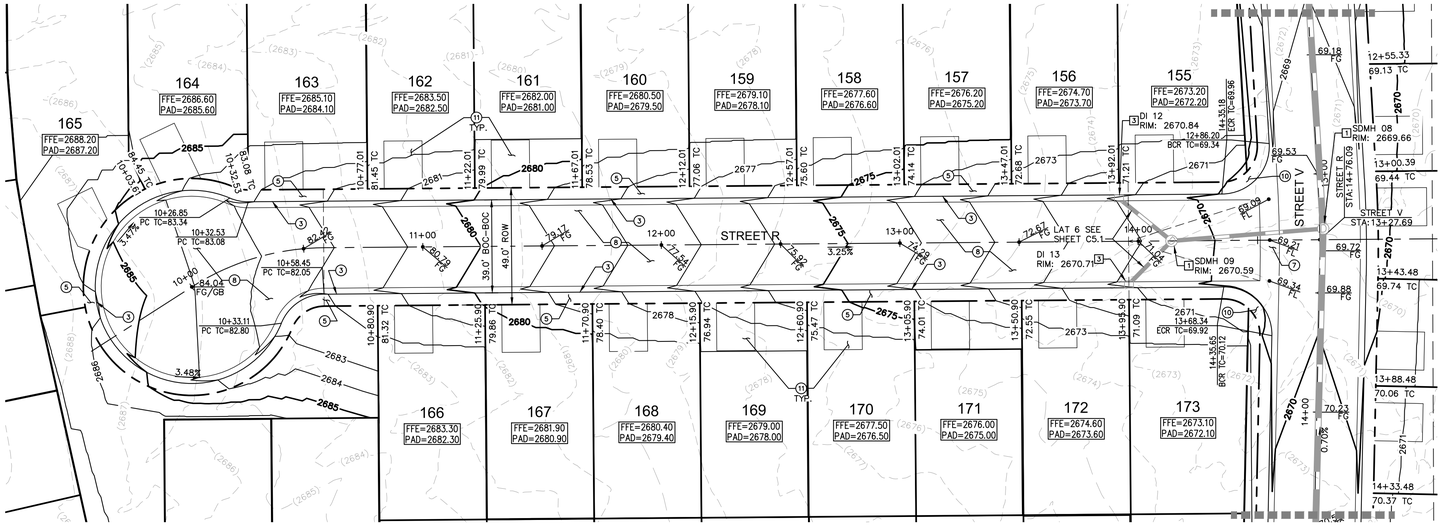
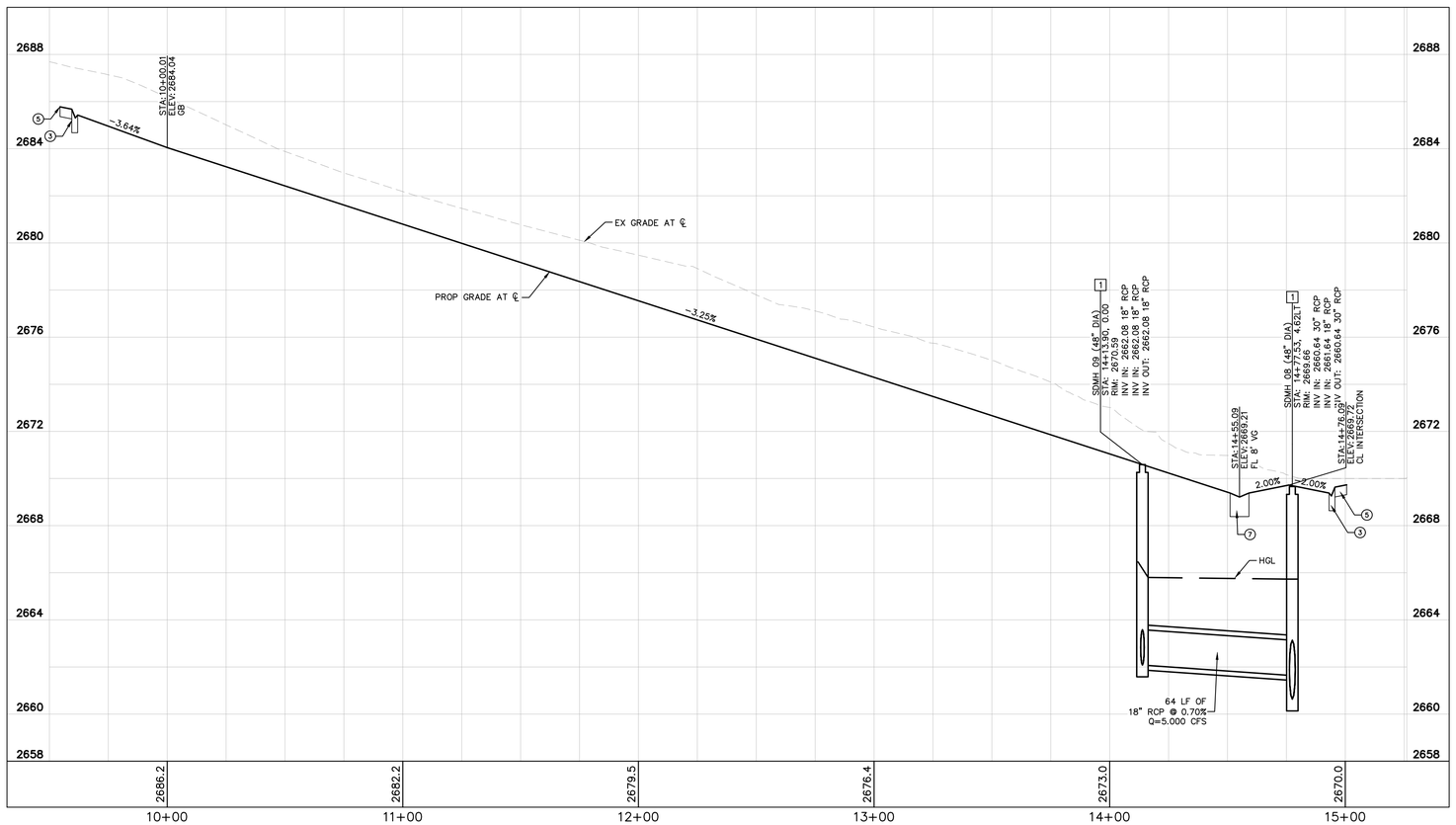


STREET R (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25
HORIZ: 1" = 30'



STREET R (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you DIG AND CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING AWYWHERE POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-562-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA 15673 CIVIL 07/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET R PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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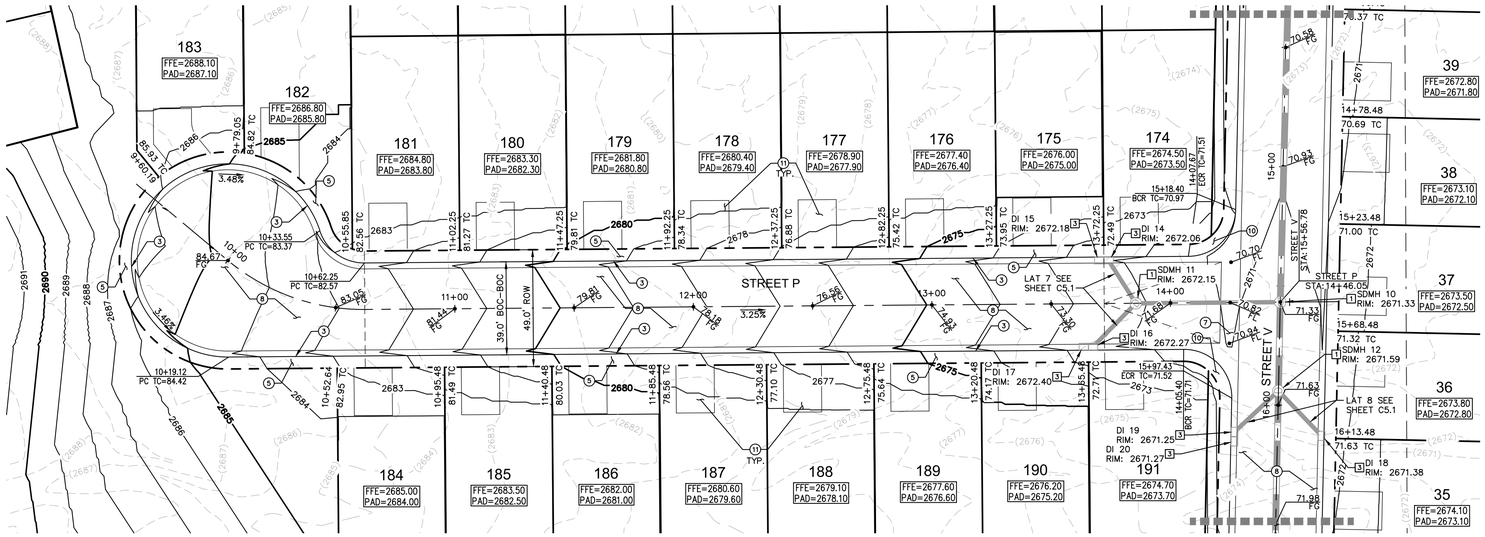

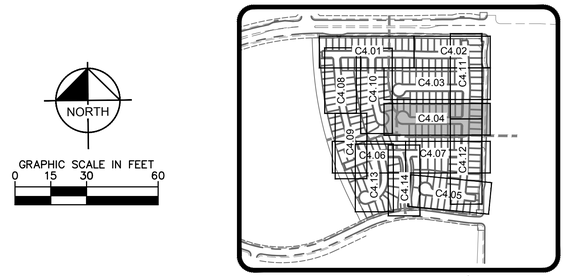

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.
5. CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234
7. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
8. CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT
10. CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235
11. CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

STREET P (PRIVATE)
PLAN VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'

STREET P (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E, PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

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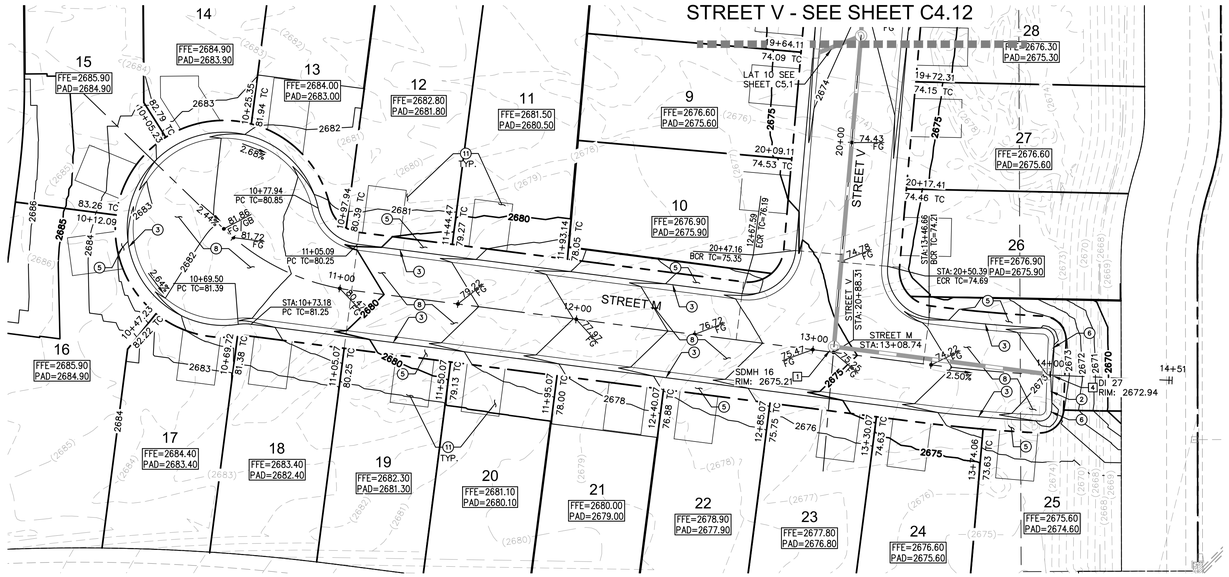
PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA MARA KAY JOHNSON No. 019 CIVIL
07/31/20
KJ SIGNATURE
07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

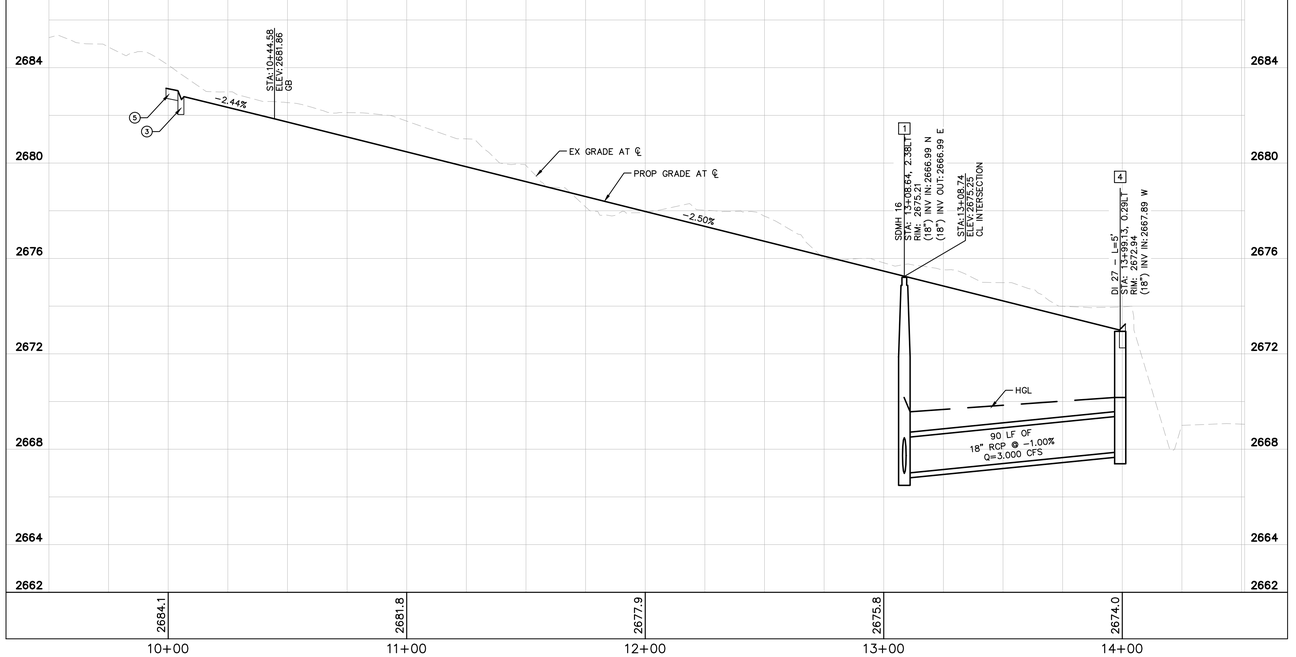
STREET P PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



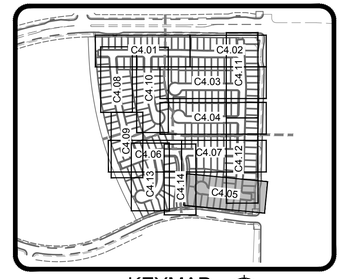
STREET M (PRIVATE)
PLAN VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'



STREET M (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(2) CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD NO. 216

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(6) TRANSITION FROM "L" CURB TO ROLL CURB

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
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STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

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AVOID CUTTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CASSIDY — No. 025119 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET M PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

10 OF 22 SHEETS
C4.05

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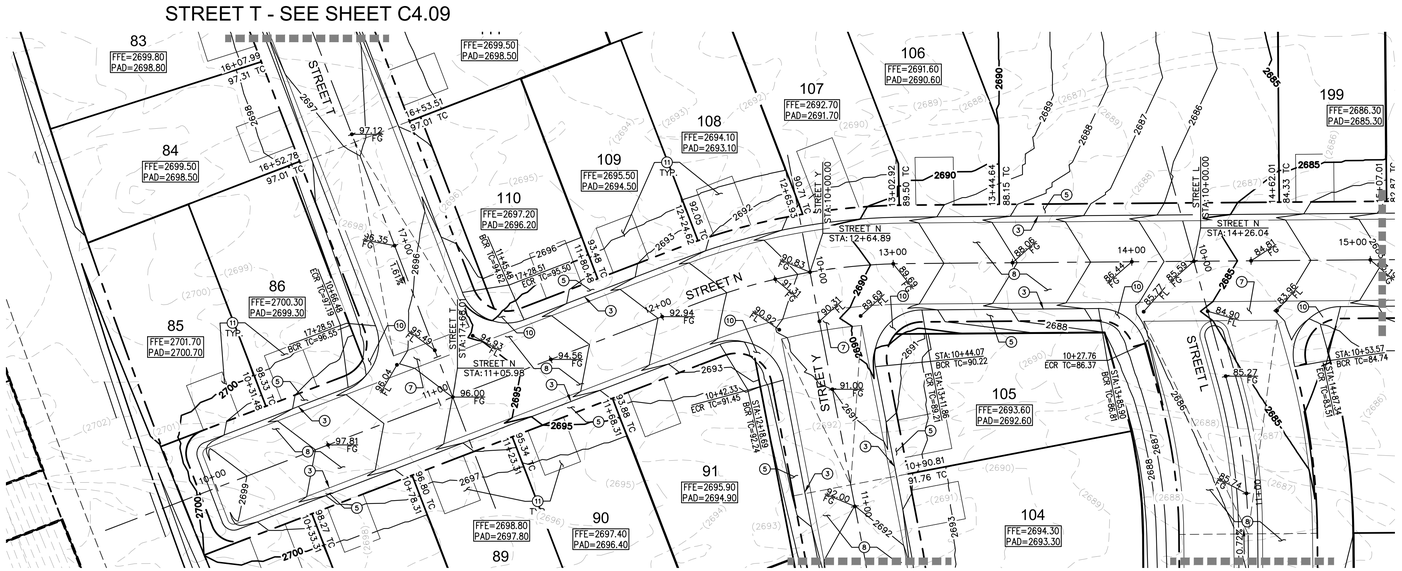

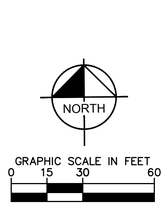

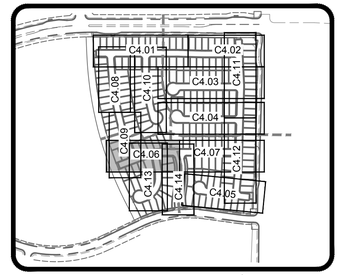

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET N (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+00

HORIZ: 1" = 30'

STREET N (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.07

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID LIFTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY A. HAMRA No. 13455 CIVIL 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 10+00 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

11 OF 22 SHEETS
C4.06

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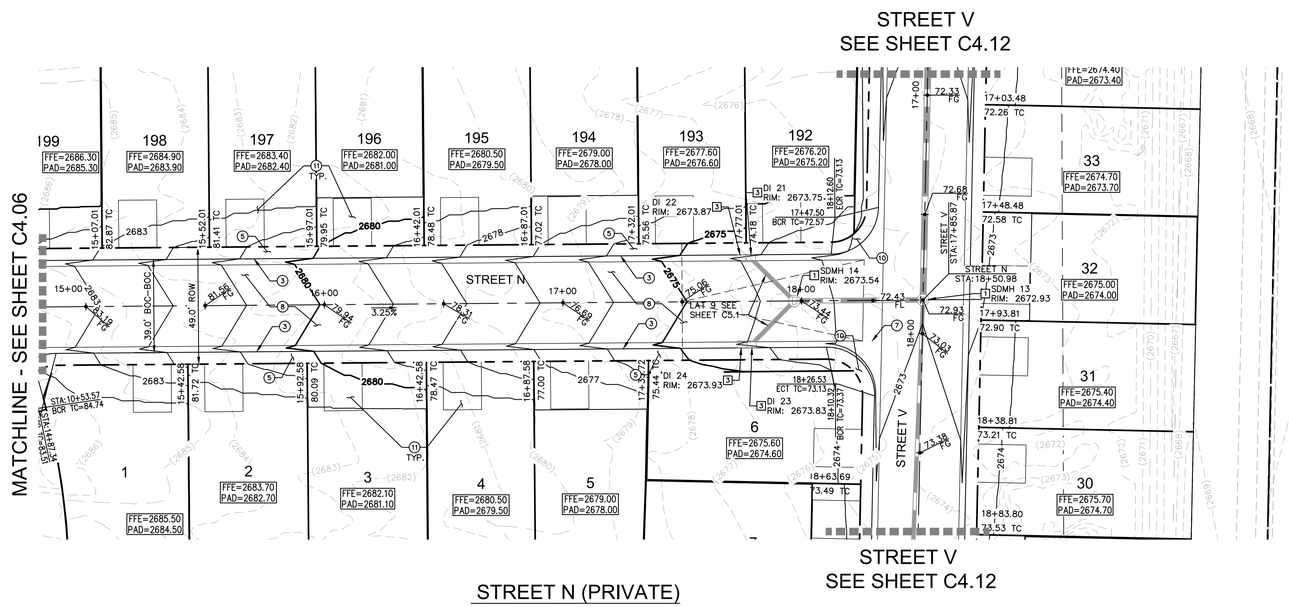
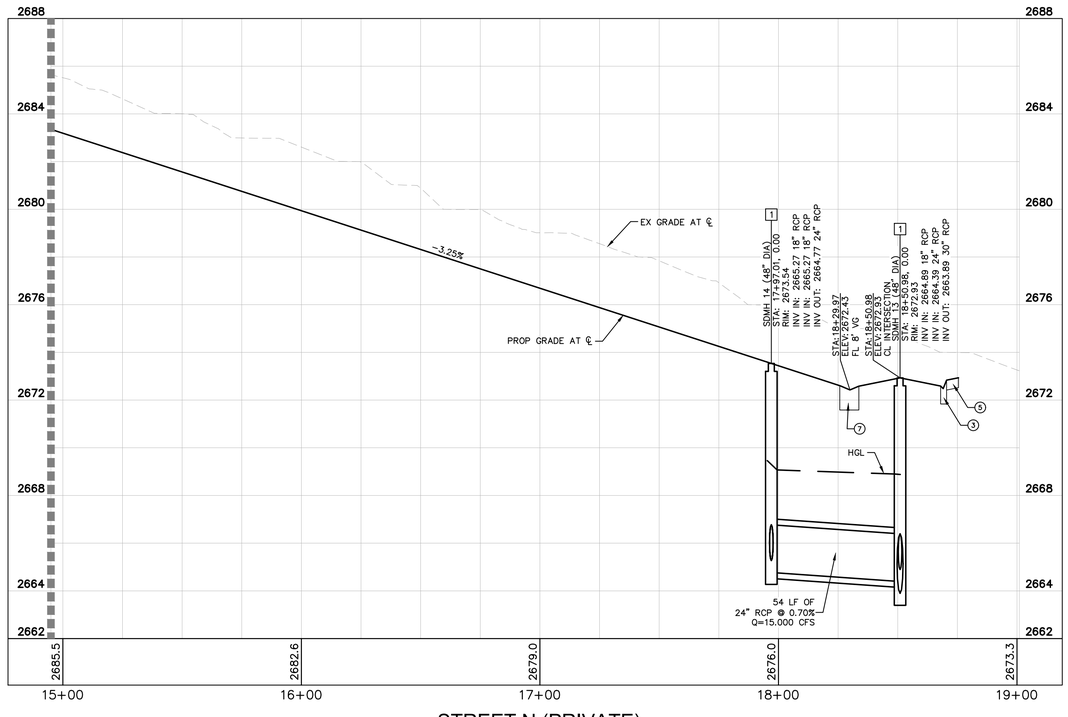
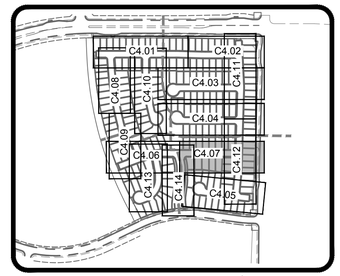


STREET N (PRIVATE)
PLAN VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'



STREET N (PRIVATE)
PROFILE VIEW - STA: 15+00 - 19+00
HORIZ: 1" = 30'
VERT: 1" = 3'



NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK-
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 CRITICAL PART OF REGIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AND OUTAGE UNDERGROUND UTILITY FACILITIES CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S DEADLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-862-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER STATE OF NEVADA TAMARA A. MARA EXPIRES: 12/31/20 CIVIL No. 23040 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET N PLAN & PROFILE STA 15+00 - 19+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

12 OF 22 SHEETS
C4.07

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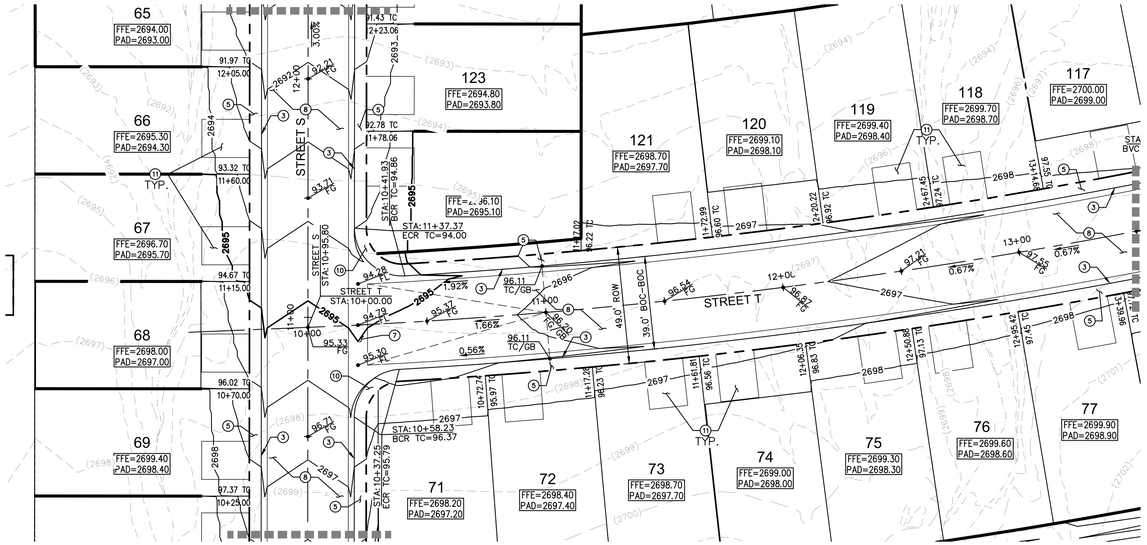
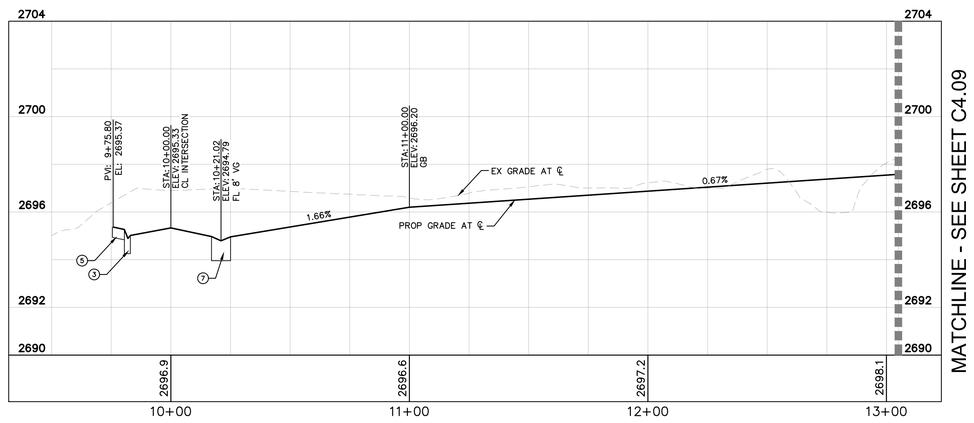


STREET T (PRIVATE)
PLAN VIEW - STA: 9+00 - 13+05
HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.09



MATCHLINE - SEE SHEET C4.09

STREET T (PRIVATE)
PROFILE VIEW - STA: 9+50 - 13+05
HORIZ: 1" = 30'
VERT: 1" = 3'

KEYMAP
N.T.S.

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 18218?

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600

AVOID CUTTING OVERHEAD POWER LINES. IT'S USEFUL. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-498-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARMAN — No. 023519 — CIVIL — EXPIRES 12/31/20 — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET T PLAN & PROFILE STA 9+50 - 13+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

17 OF 22 SHEETS
C4.08

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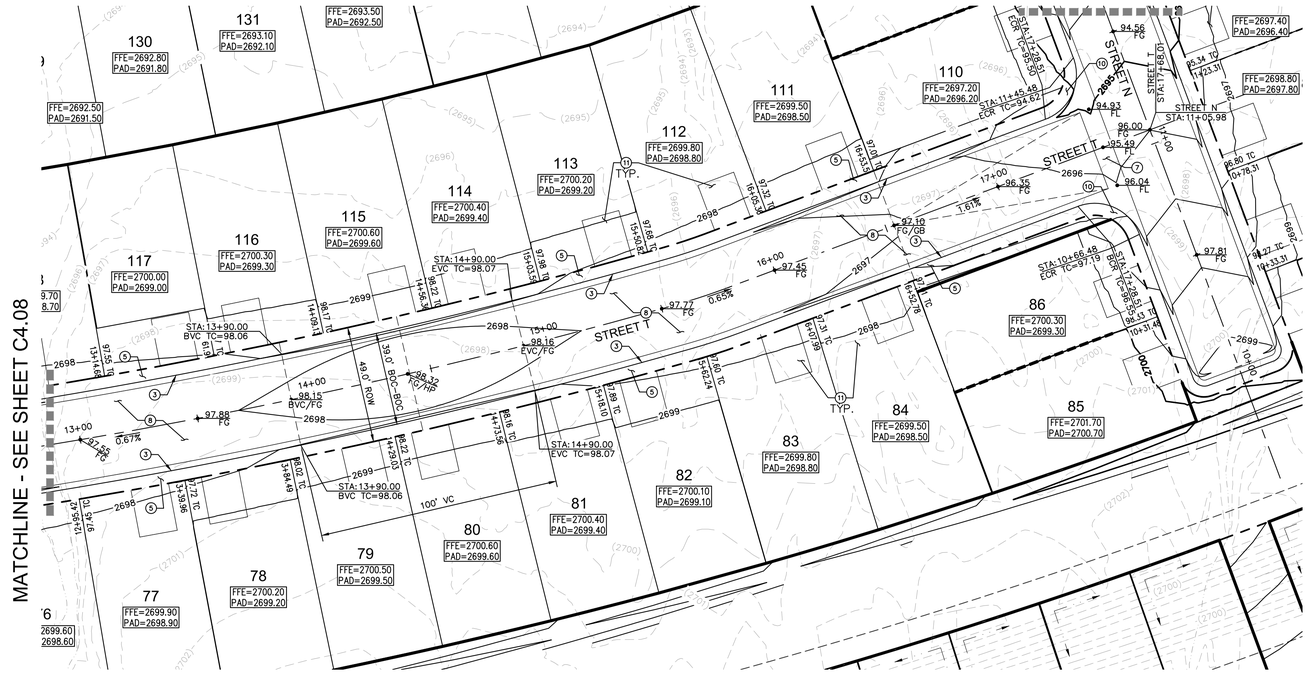


GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

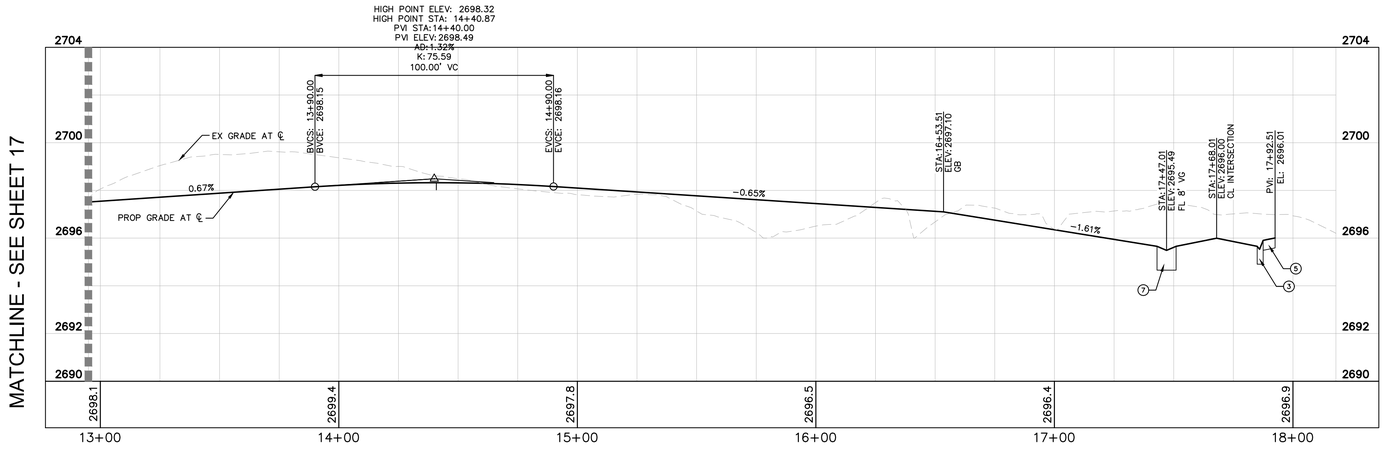
(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STREET T (PRIVATE)
PLAN VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'



STREET T (PRIVATE)
PROFILE VIEW - STA: 13+00 - 18+25

HORIZ: 1" = 30'
VERT: 1" = 3'

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK– 2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 702-589-3600
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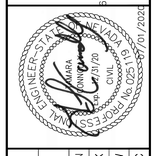

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET T PLAN & PROFILE STA 13+00 - 18+25

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

18 OF 22 SHEETS
C4.09

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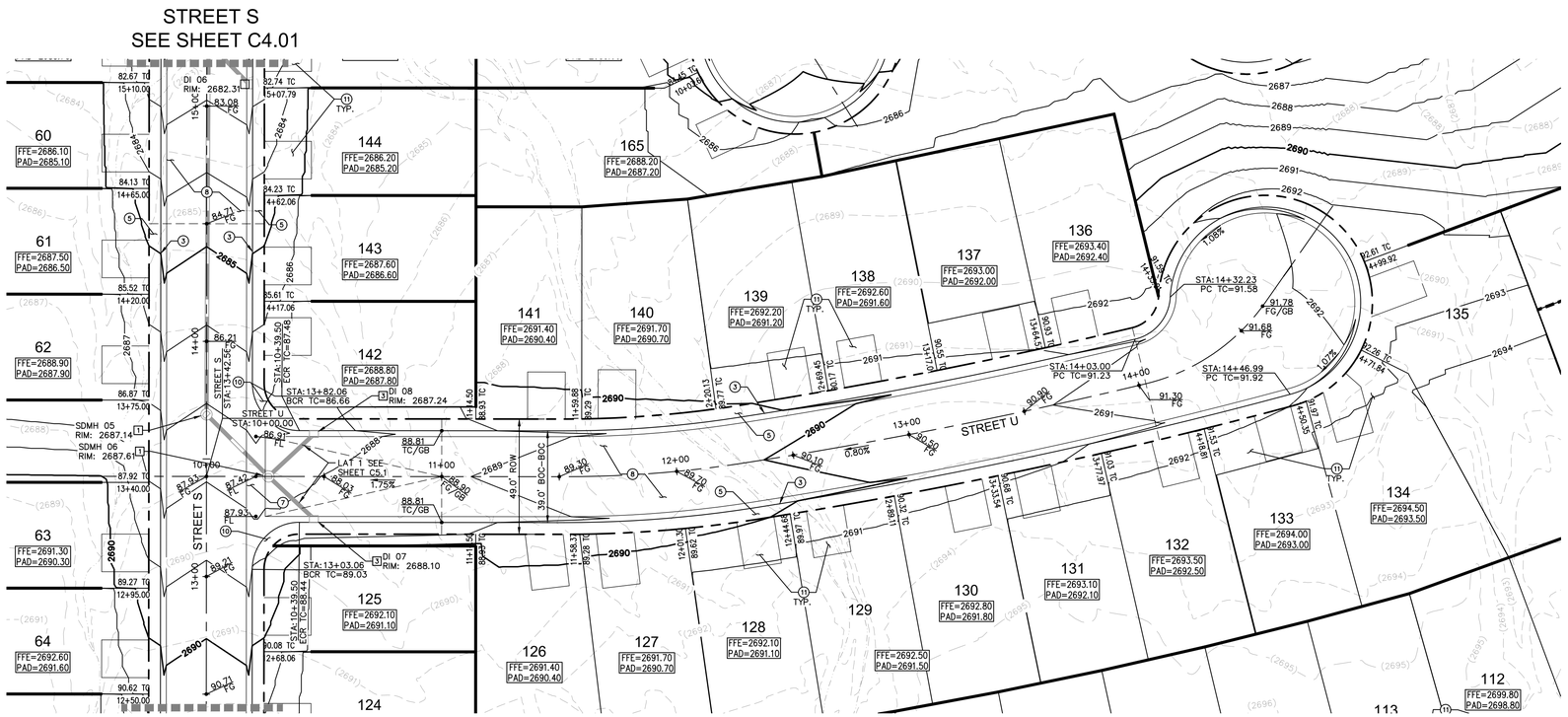
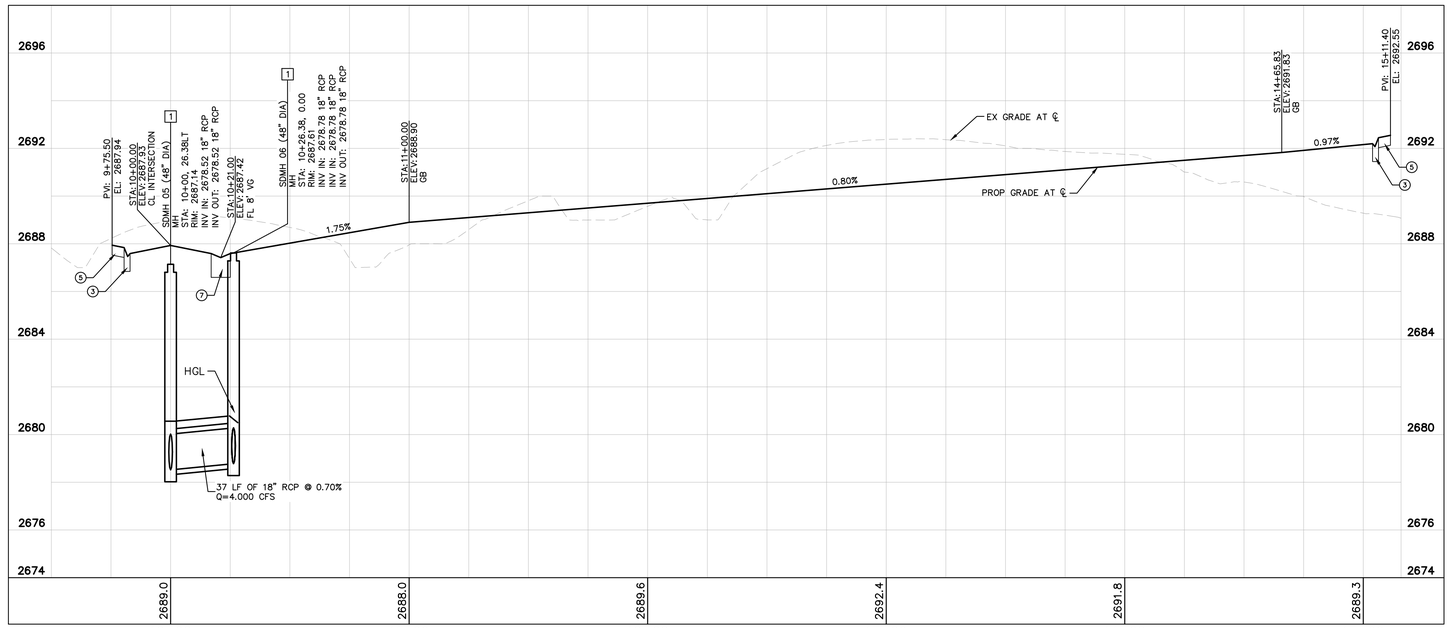


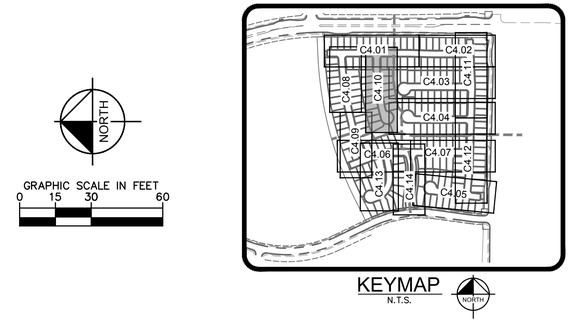
STREET U (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+25

HORIZ: 1" = 30'



STREET U (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+25

HORIZ: 1" = 30'
VERT: 1" = 3'



GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig CALL 811 OR 1-800-227-2600

AVOID LIFTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 702-589-3500
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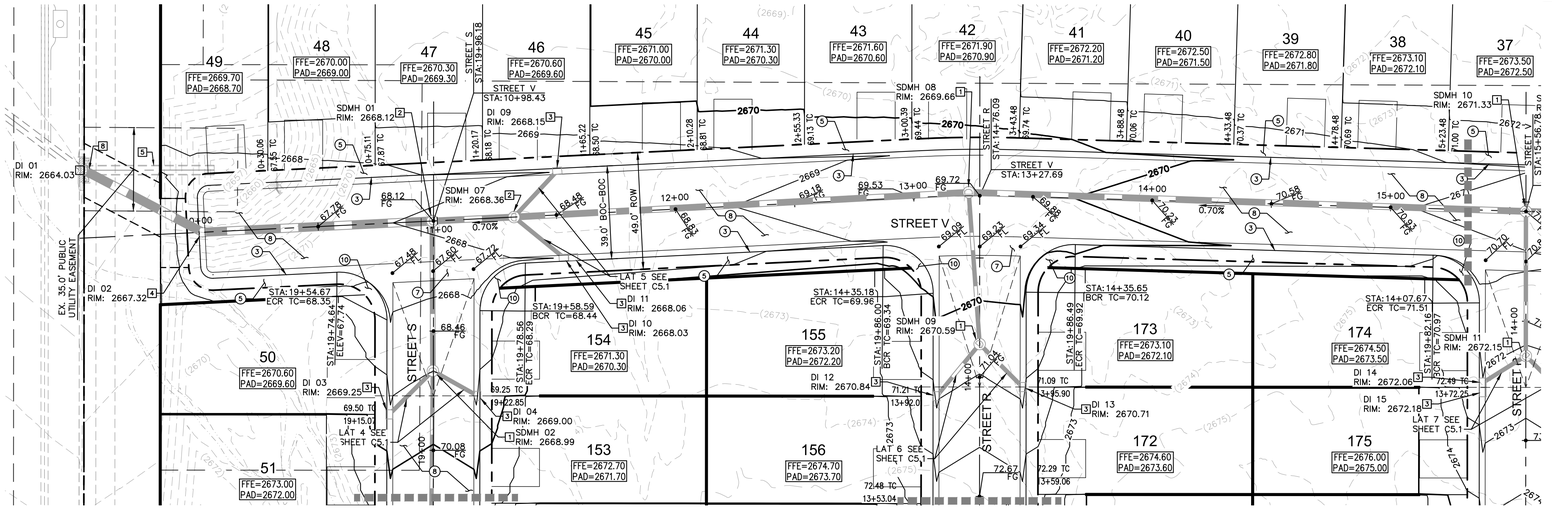
PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — CIVIL — No. 23903 — EXPIRES 06/30/2021 — 07/01/2020

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET U PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES



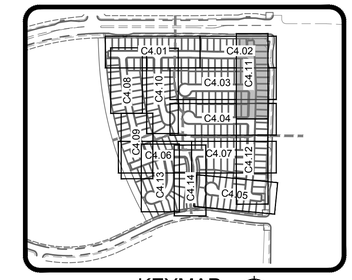
STREET S
SEE SHEET C4.02

STREET R
SEE SHEET C4.03

STREET V (PRIVATE)
PLAN VIEW - STA: 9+00 - 15+05

HORIZ: 1" = 30'

MATCHLINE - SEE SHEET C4.12



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

STORM DRAIN NOTES

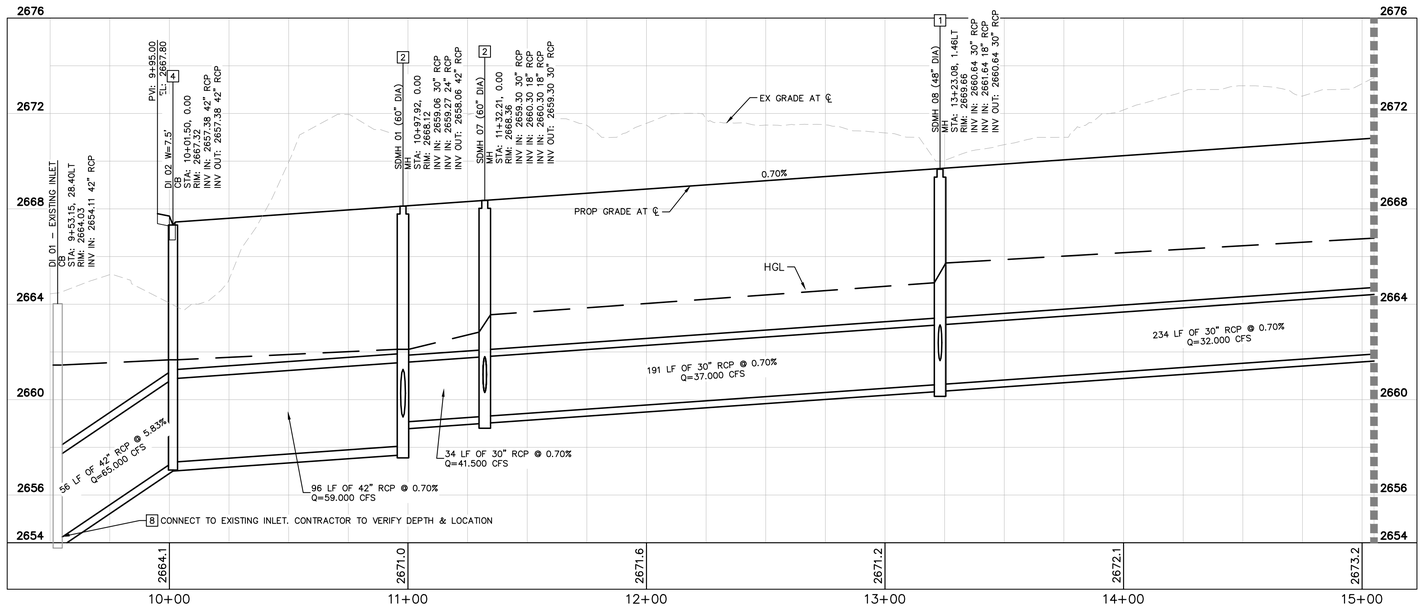
[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[2] INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403

[4] INSTALL TYPE DM2 DROP INLET PER DETAILS 5 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[5] EXIST STORM DRAIN TO BE REMOVED.

[8] CONSTRUCT PIPE PENETRATION INTO EXIST DROP INLET PER DETAIL 7 ON SHEET C7.2.



STREET V (PRIVATE)
PROFILE VIEW - STA: 9+50 - 15+00

HORIZ: 1" = 30'
VERT: 1" = 3'

MATCHLINE - SEE SHEET C4.12

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK–
2008 ADJUSTMENT (UPDATED 05/24/2010)

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING OR DAMAGING UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-589-3600
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CARTER — No. 23006 — CIVIL — 07/31/20

KHA PROJECT 092935006
DATE 07/01/2020
SCALE AS SHOWN
DESIGNED BY MK
DRAWN BY KJW
CHECKED BY TLC

STREET V PLAN & PROFILE 9+50 - 15+00

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

20 OF 22 SHEETS
C4.11

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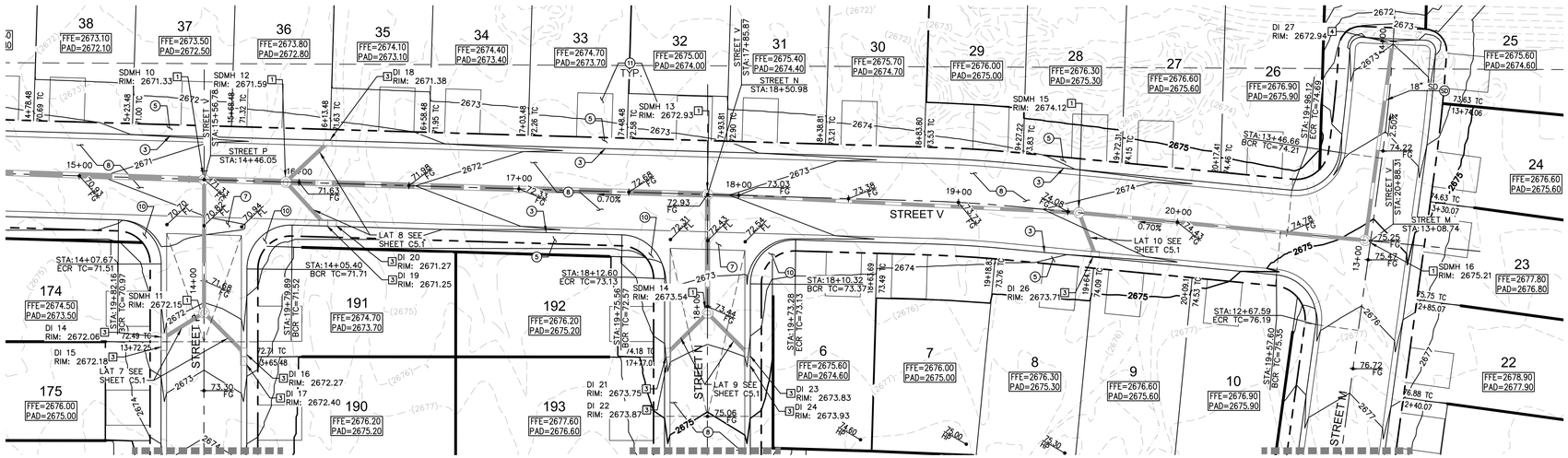


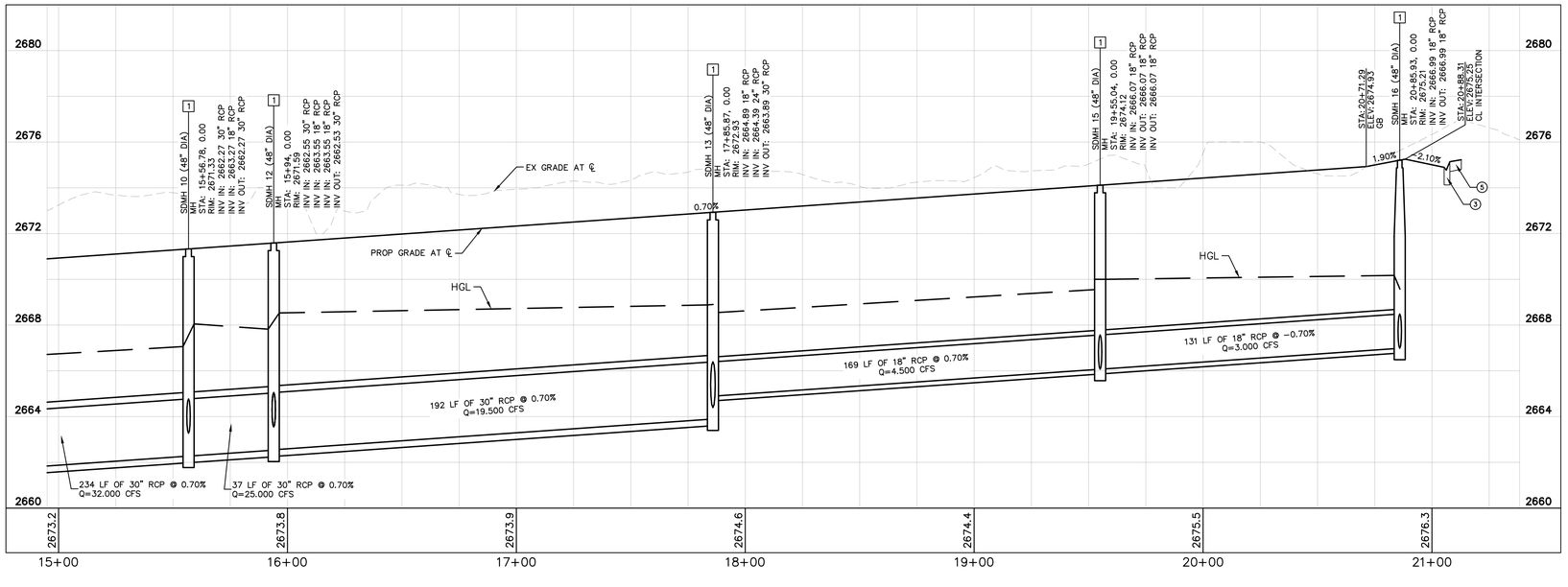
STREET P
SEE SHEET C4.04

STREET N
SEE SHEET C4.07

STREET M
SEE SHEET C4.05

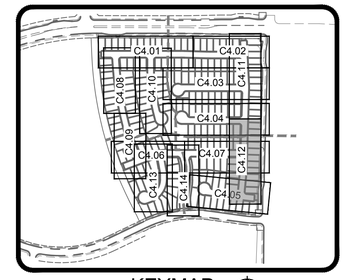
STREET V (PRIVATE)
PLAN VIEW - STA: 15+00 - 21+00

HORIZ: 1" = 30'



STREET V (PRIVATE)
PROFILE VIEW - STA: 15+00 - 21+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
N.T.S.

CONSTRUCTION NOTES

(3) CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1.

(5) CONSTRUCT 5' SIDEWALK PER CCAUSD NO. 234

(7) CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228

(8) CONSTRUCT ONSITE AC PAVEMENT PER SOILS REPORT

(10) CONSTRUCT SIDEWALK RAMP CASE I PER CCAUSD NO. 235

(11) CONSTRUCT RESIDENTIAL DRIVEWAY

(SD) STORMDRAIN – SEE SHEET C4.01 – C4.14 FOR STORMDRAIN DESIGN

STORM DRAIN NOTES

[1] INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403

[3] INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

[4] INSTALL TYPE DM2 DROP INLET PER PER CCAUSD NO. 412.1 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.

NOTE

1. ALL PRIVATE STREETS ARE P.U.E. PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.
2. ALL STORM DRAIN PIPES ARE CLASS III UNLESS NOTED ON PLANS.

STORMWATER MANAGEMENT NOTE

SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

ENGINEER'S NOTES

SEE SHEET C2.0 FOR ENGINEER NOTES

LEGAL DESCRIPTION:

SEE COVER SHEET FOR FULL LEGAL DESCRIPTION

GEOTECHNICAL NOTE

ALL GRADING AND PAVEMENT SECTIONS SHALL CONFORM TO THE GEOTECHNICAL REPORT:

ENGINEER: SOUTHWEST GEOTECHNICAL
REPORT DATED: 04/25/2018
PROJECT No.: 182187

BASIS OF BEARINGS

NORTH 00°01'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

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MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METER
NAVD 88 DATUM

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No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
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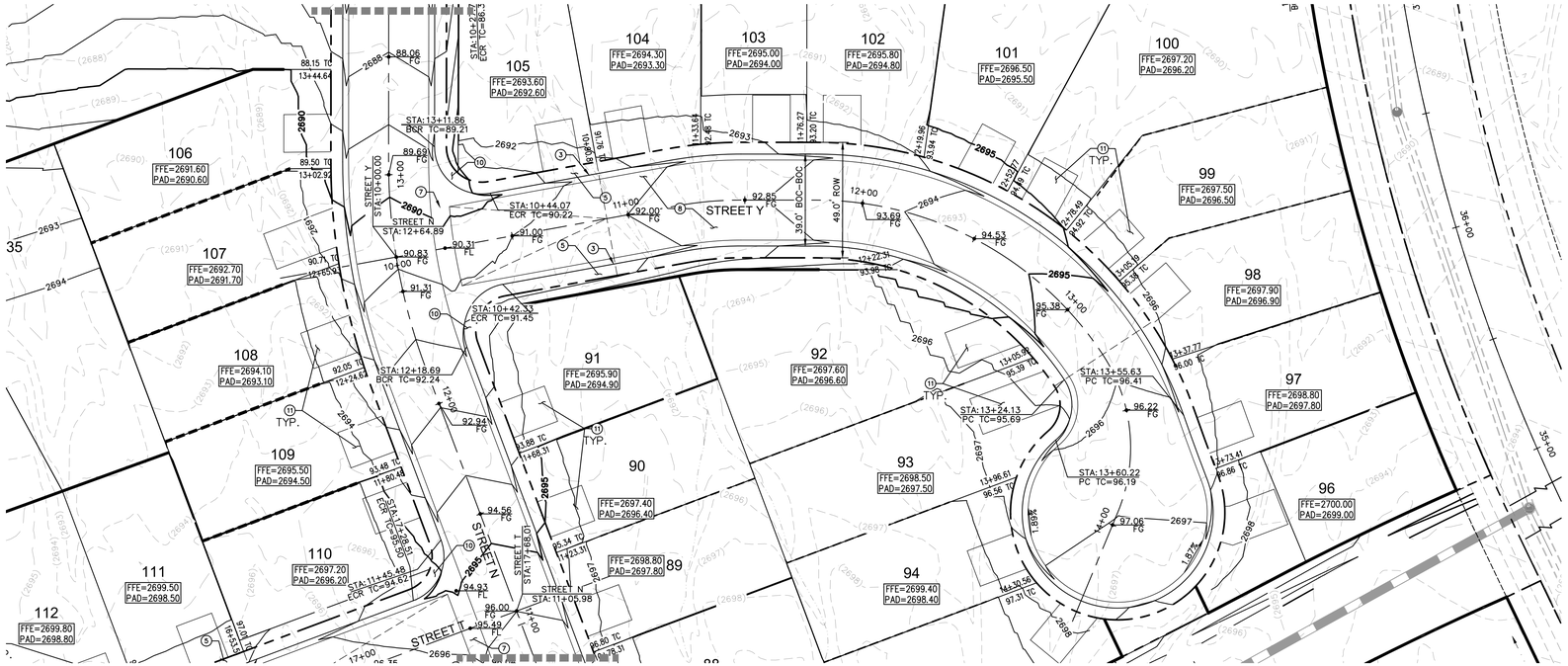
PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY L. CAMARA No. 23806 CIVIL 07/31/20 RENEWAL: 12/31/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET V PLAN & PROFILE 15+00 - 21+50

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

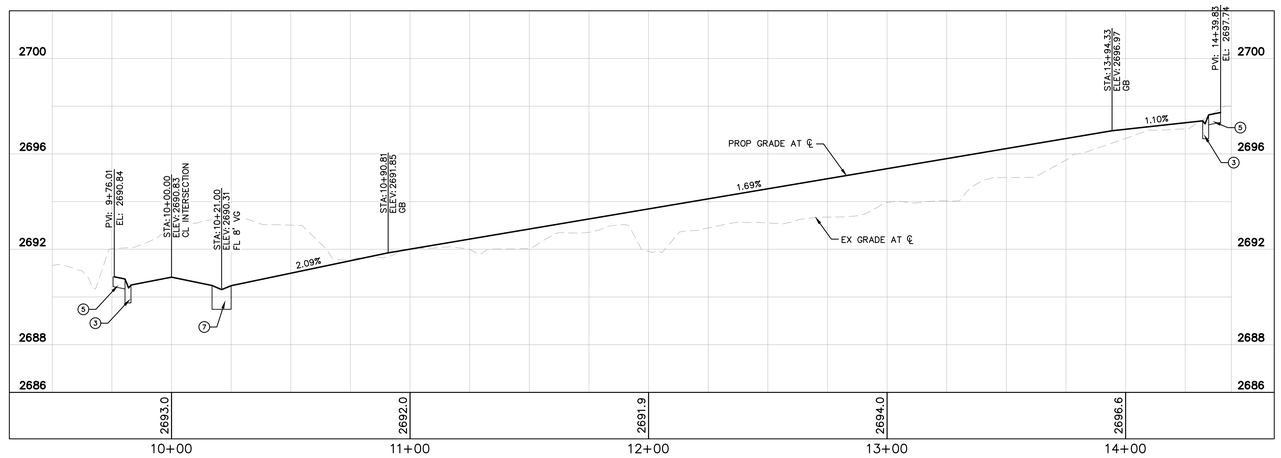
21 OF 22 SHEETS
C4.12



STREET N
SEE SHEET C4.06

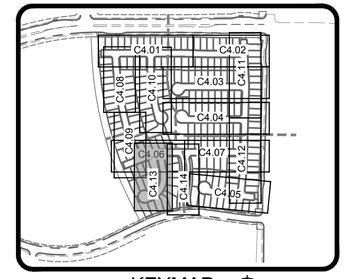
STREET Y (PRIVATE)
PLAN VIEW - STA: 10+00 - 14+00

HORIZ: 1" = 30'



STREET Y (PRIVATE)
PROFILE VIEW - STA: 9+50 - 14+50

HORIZ: 1" = 30'
VERT: 1" = 3'



KEYMAP
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SEE SHEET C2.0 FOR STORMWATER MANAGEMENT NOTE

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No.	REVISIONS	DATE	BY

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REGISTERED PROFESSIONAL ENGINEER — TRACY L. CLEMENS — No. 13500 — CIVIL — STATE OF NEVADA — 07/31/20

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STREET Y PLAN & PROFILE

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

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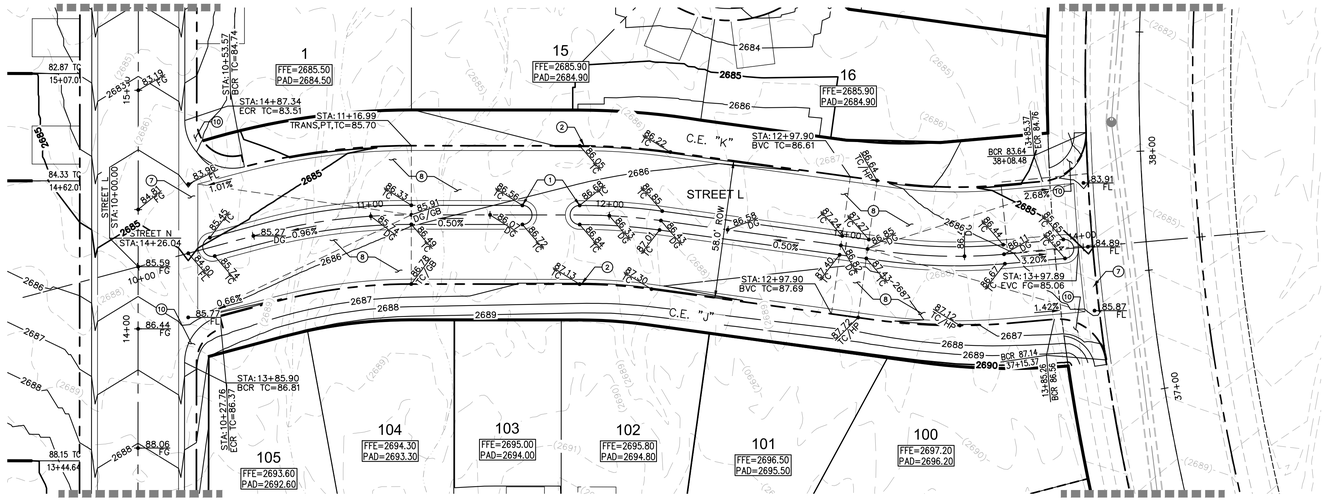
STREET N
SEE SHEET C4.07
O'HARE AVE
STREET N
SEE SHEET C4.06
O'HARE AVE
STREET L
C.E. "K"
C.E. "J"
STA:12+97.90
BVC TC=86.61
STA:12+97.90
BVC TC=87.69
STA:13+97.89
EVC FG=85.06
STA:14+87.34
ECR TC=83.51
STA:11+16.99
TRANS,PT,TC=85.70
STA:13+85.90
BCR TC=86.81
STA:10+27.79
ECR TC=86.35
STA:10+53.57
BCR TC=84.74
STA:14+26.04
STREET N
STREET
STA:10+00.00
1
FFE=2685.50
PAD=2684.50
15
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82.87 TC
15+07.01
84.33 TC
14+62.01
88.15 TC
13+44.64
BCR 83.64
38+08.48
ECR 84.76
38+00
37+00
37+15.37
BCR 87.14
37+15.37
ECR 86.55
BCR 86.55
83.91 FL
84.89 FL
85.87 FL
85.77 FL
84.90 FL
88.06 FC
86.44 FC
84.56 FC
85.59 FC
85.27 FC
86.33 FC
85.91 FC
86.56 FC
86.02 FC
86.72 FC
86.68 FC
86.64 FC
86.60 FC
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86.85 FC
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87.73 FC

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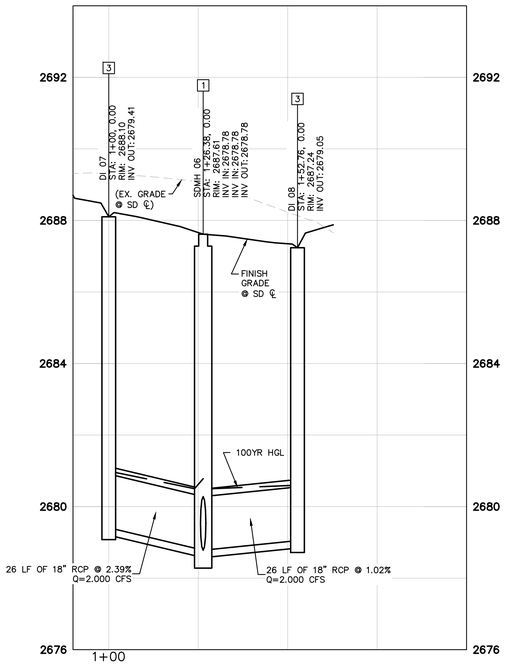
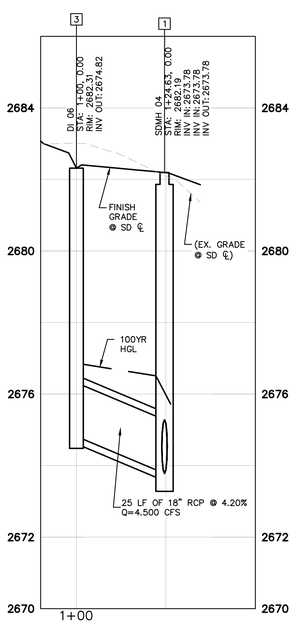
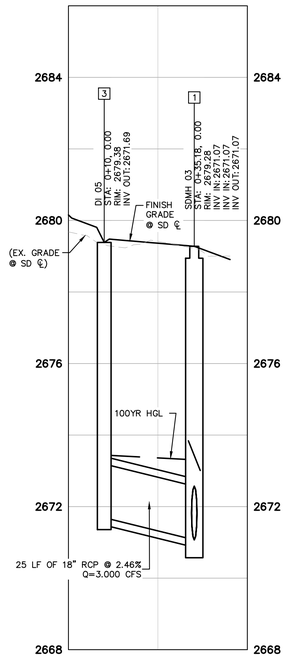


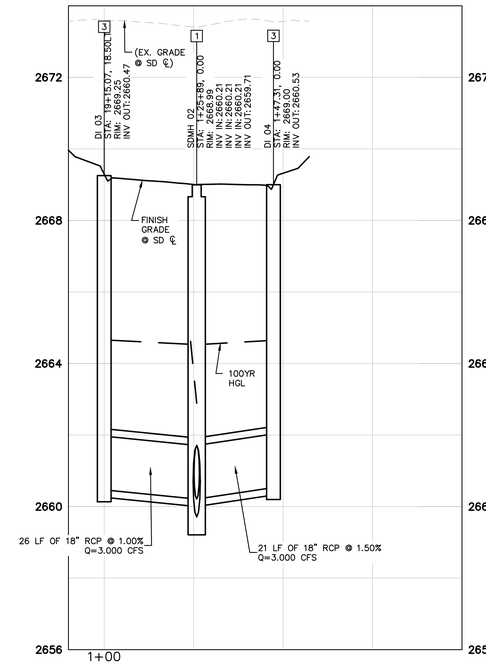
LAT 1 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



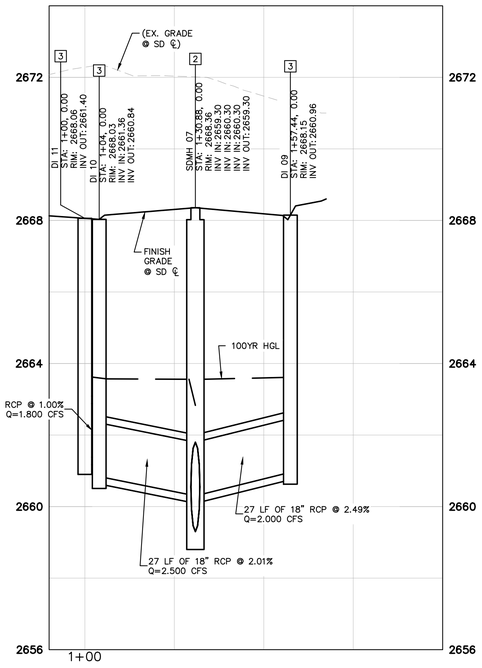
LAT 2 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 3 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



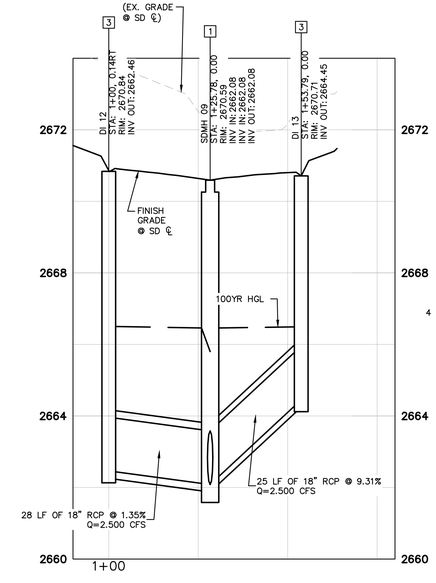
LAT 4 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



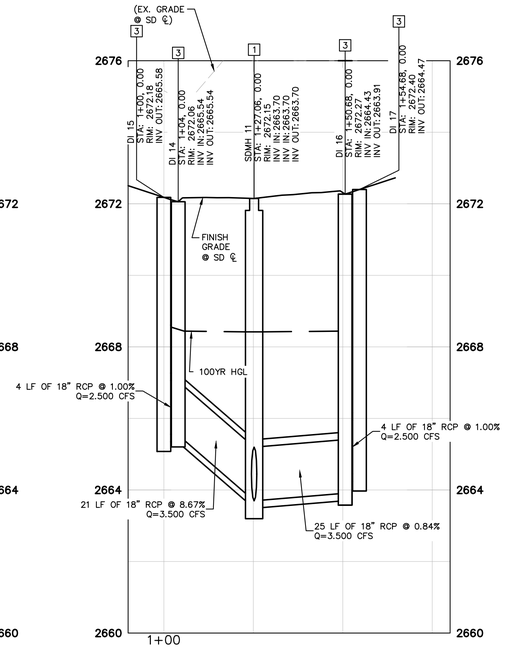
LAT 5 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

STORM DRAIN NOTES

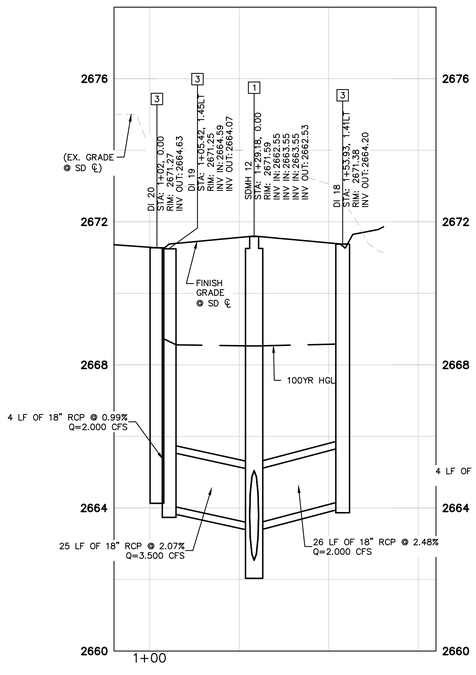
1. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403
2. INSTALL 60" TYPE III SDMH PER CCAUSD NO. 403
3. INSTALL NEENAH TYPE R-3501 DROP INLET PER DETAIL 3 ON SHEET C7.2 WITH STORM WATER QUALITY MANAGEMENT STAMP AND SIGN PER CCAUSD NO. 421.



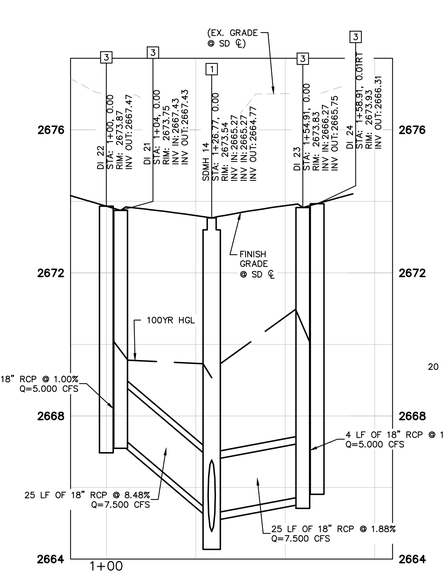
LAT 6 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



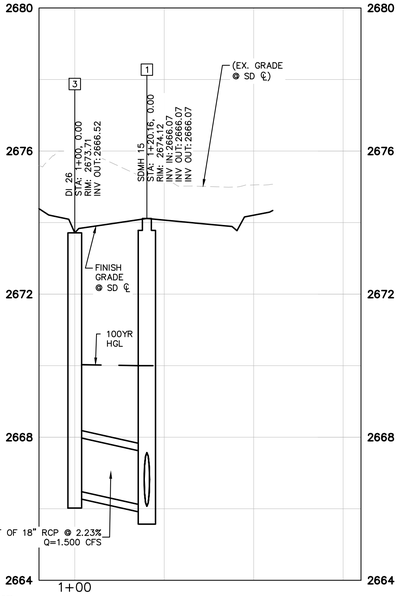
LAT 7 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 8 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 9 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'



LAT 10 (PRIVATE)
HORIZ: 1" = 20'
VERT: 1" = 2'

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No.	REVISIONS	DATE	BY

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PHONE: 702-589-3500
WWW.KIMLEY-HORN.COM

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY L. CAMARA — EXPIRATION DATE: 12/31/20 — CIVIL — No. 23036 — 07/01/2020

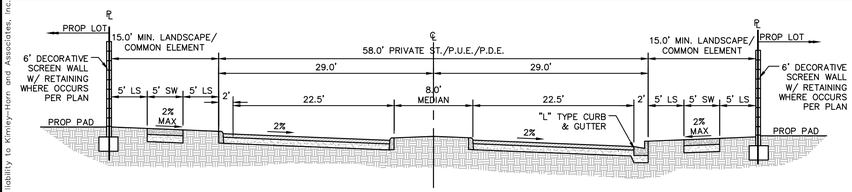
KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

STORM DRAIN LATERALS

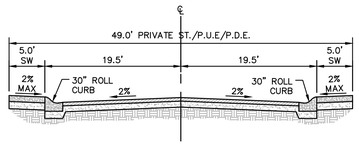
SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

24 OF 32 SHEETS

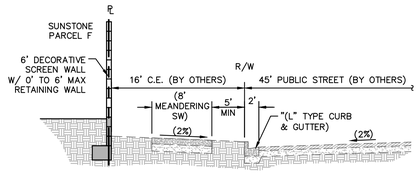
C5.1



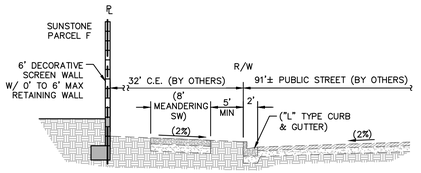
A C7.1 PRIVATE ENTRY SECTION NTS



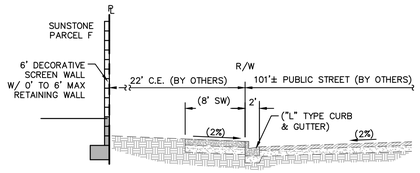
B C7.1 TYPICAL PRIVATE STREET SECTION (PARKING BOTH SIDES) NTS



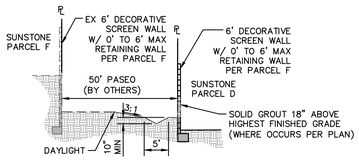
C C7.1 O'HARE AVE LANDSCAPE ESMT. NTS



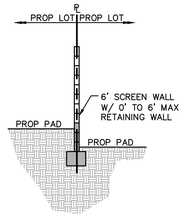
D1 C7.1 LOG CABIN WAY AND N SKYE CANYON PARK DRIVE LANDSCAPE ESMT. NTS



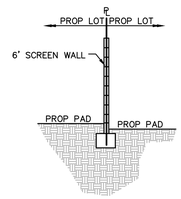
D2 C7.1 LOG CABIN WAY LANDSCAPE ESMT. NTS



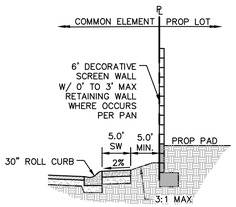
E C7.1 WEST BOUNDARY PASEO NTS



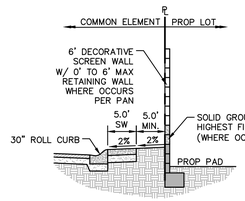
F1 C7.1 TYPICAL YARD SECTION NTS



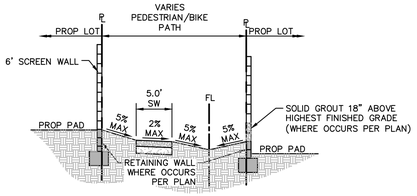
F2 C7.1 TYPICAL YARD SECTION NTS



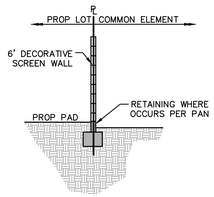
G1 C7.1 TYPICAL CORNER LOT SECTION NTS



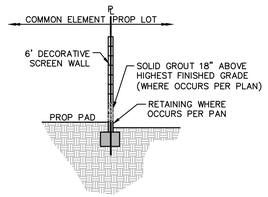
G2 C7.1 TYPICAL CORNER LOT SECTION NTS



H C7.1 TYPICAL COMMON ELEMENT SECTION NTS



I C7.1 TYPICAL YARD SECTION NTS



J C7.1 TYPICAL YARD SECTION NTS

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No.	REVISIONS	DATE	BY

Kimley»Horn
© 2018 KIMLEY-HORN AND ASSOCIATES, INC.
6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-489-2500
WWW.KIMLEY-HORN.COM

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL SECTIONS

SUNSTONE - PARCEL D
PREPARED FOR
LENNAR HOMES

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION
Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. CALL 811 OR 1-800-227-2600
AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU OVERHEAD 1-702-227-2929

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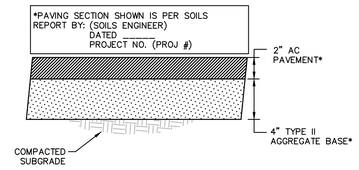
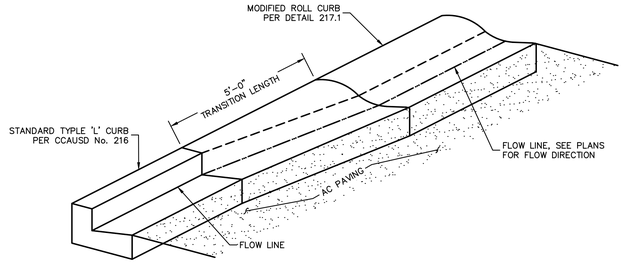
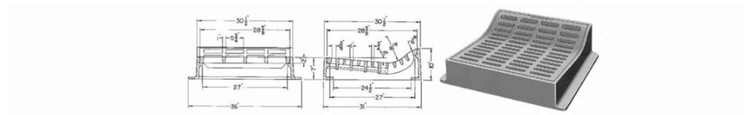


1 C7.2 ONSITE PAVEMENT SECTION
NTS

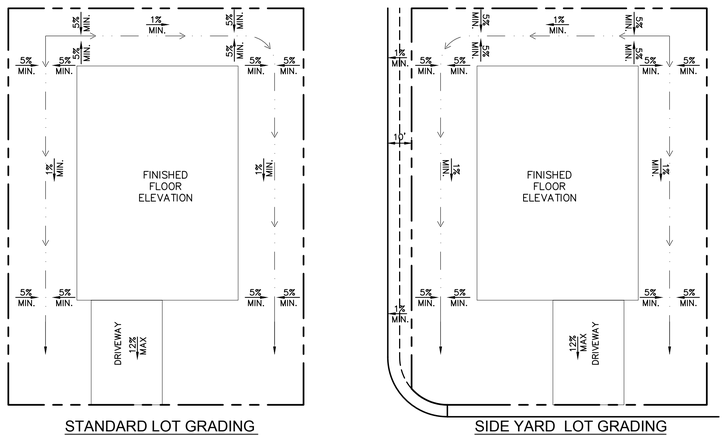


2 C7.2 MODIFIED ROLL CURB TRANSITION TO 6" CURB OR 'L' TYPE CURB
NTS

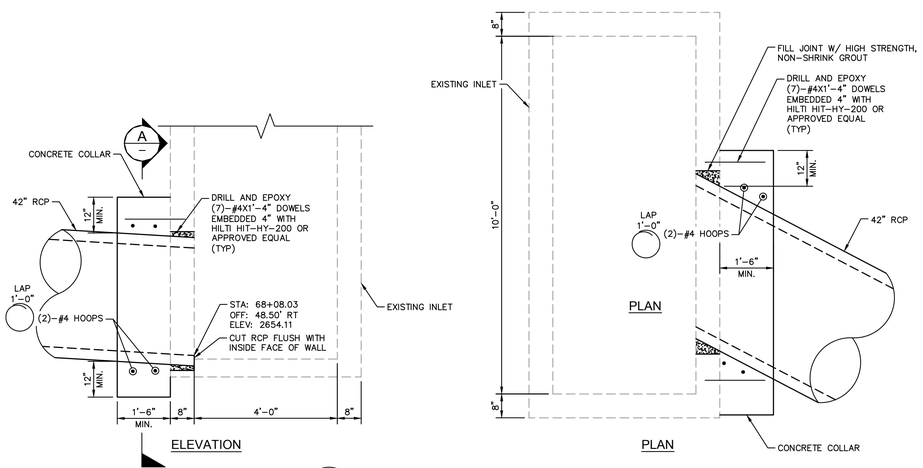


A-Grate Dimensions	B-Grate Thickness	C-Clear Opening	E-Base Flange	F-Frame Height	Grate Type	Square Feet Open	Weir Perimeter Lineal Feet
28-5/8 x 28-5/8	2	24-1/2 x 27	31 x 36	7 to 10	C	2.6	5.5

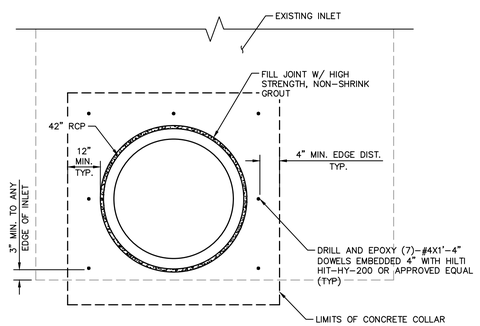
3 C7.2 R-3501-R DROP INLET (NEENAH)
NTS



4 C7.2 TYPICAL LOT GRADING
NTS



5 C7.2 PIPE PENETRATION DETAIL
SCALE: ½" = 1'-0"



SECTION A
SCALE: ½" = 1'-0"

PIPE PENETRATION NOTES:

1. CONCRETE SHALL BE CLASS AA MODIFIED (TYPE V CEMENT), f'c = 4500 PSI MIN.
2. REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, fy = 60,000 PSI.
3. ALL REINFORCING SHALL HAVE 2" CLEAR COVER UNLESS NOTED OTHERWISE.
4. CUT HOLE IN WALL OF BOX CULVERT TO A MINIMUM ½" TO MAXIMUM 2" LARGER THAN THE OUTSIDE DIAMETER OF THE 42" RCP.
5. CUT RCP FLUSH WITH INSIDE FACE OF CULVERT WALL.
6. FILL OPENING WITH HIGH STRENGTH, NON-SHRINK GROUT.
7. POUR MINIMUM 12" THICK CONCRETE COLLAR AROUND RCP.

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION
Call before you DIG AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S USEFUL. CALL 811 OR 1-800-227-2600
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No.	REVISIONS	DATE	BY

Kimley»Horn
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6671 LAS VEGAS BOULEVARD S., SUITE 320, LAS VEGAS, NV 89119
PHONE: 702-862-3500
WWW.KIMLEY-HORN.COM

NEVADA — ENGINEER — KRISTA L. MARA — 12/31/20 — CIVIL — No. 023019 — STATE OF NEVADA — 07/01/2020

KHA PROJECT	092935006
DATE	07/01/2020
SCALE	AS SHOWN
DESIGNED BY	MK
DRAWN BY	KJW
CHECKED BY	TLC

TYPICAL DETAILS

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PREPARED FOR
LENNAR HOMES