

DS #:

4994

APN:

125-30-509-009

PROJECT:

Centennial / S. Fort Apache Residential Development

SUBMITTAL:

1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		June 13, 2018
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Centennial & Fort Apache Residential Development	Taney Engineering
Cross Streets:	SWQ Fort Apache Rd. & Centennial Blvd.	Adaven Homes
File Number:	F:\Depot\DSMemos\DS4994A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	125-30-502-009	CCPW
Zoning Action:	TMP-72410; VAC-72409; WVR-72408 & VAR-72407	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	5/17/2018	6/4/2018 & 6/13/2018	See Comments Below	\$400.00	496723: \$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 (**TMP-72410; VAC-72409; WVR-72408 & VAR-72407**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditionaⁿal 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. The site is adjacent to the jurisdiction of Clark County to the south and west. The engineer must coordinate with *Clark County Public Works Department* (CCPW) and incorporate any concerns for boundary conditions along the south and west borders. CCPW concurrence is required prior to final acceptance of the study.
3. The subject development accepts flows from *Centennial Parkway* through the onsite street onto *Regina Avenue*. This flow split at *Centennial* and the onsite street makes the DxV condition worse from the existing condition on *Regina Avenue* (DV>6 in 10-year and DV>8 in 100-year) and is negatively impacting the surrounding properties. A high point at the entrance to the neighborhood will need to be put into place in order to keep the flow from *Centennial Parkway* entering the subject development. Review and revise accordingly.

4. In the interim and ultimate condition the flow in *Regena Avenue* does not meet the criteria of $DxV < 6$ for 10-year storm event and a $DxV < 8$ for 100-year. This comment supplements the above Comment #3. Revise the proposed drainage pattern and all subsequent grading designs accordingly.
5. The development proposes three points to accept offsite flows along the west boundary. 5'-wide public drainage easements will be created at Lot 3, Lot 6 and Lot 9. These drainage easements will burden the individual property owners with maintenance and are not desirable.

The City's policy is to minimize public drainage easements. Every attempt should be made by the developer to eliminate the public drainage easement which may require engineering, coordination with the adjacent property owner(s) or by providing additional grading offsite. All attempts must be provided in writing and submitted as a part of drainage study for documentation.

6. Construction Notes 13 and 14 are shown on the plans, but are not described in the construction notes on sheets G1 and G2. Address in the next submittal.
7. Cross Sections F, G, H, I, J and K are not provided on *Sheet GD1*, however these cross sections are shown on the plans. Provide as such in the next submittal.
8. Cross Section A: Provide 3-course of solid grouted 8"-CMU above the adjacent grade in the landscape area.
9. Revise Cross Section E to show a concrete lined public drainage easement to be privately maintained.
10. Label the slopes in the cul-de-sac to show that the 1% minimum criteria is met.

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
WSP/AYS

T/R/S: T19S/R60E/30
AREA G-30

TRANSACTION REPORT

JUN/13/2018/WED 11:29 AM

FAX(TX)

#	DATE	START T.	RECEIVER	COM.TIME	PAGE	TYPE/NOTE	FILE
001	JUN/13	11:28AM	7023625233	0:01:03	2	MEMORY OK	G3 1473

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END OF REMARKS
WSP/AYS

T/R/S: T19S/R60E/30
AREA G-30



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

LOIS TARKANIAN
Mayor Pro Tem

STAVROS S. ANTHONY
BOB COFFIN

STEVEN G. SEROKA
MICHELE FIORE

SCOTT D. ADAMS
City Manager

March 22, 2018

Double Double, LLC
10789 West Twain Avenue, 2nd Floor
Las Vegas, Nevada 89135

**RE: VAR-72407 [PRJ-72355] - VARIANCE RELATED TO WVR-72408, VAC-72409 AND TMP-72410
CITY COUNCIL MEETING OF MARCH 21, 2018**

Dear Applicant:

The City Council at a regular meeting held on March 21, 2018 voted to **APPROVE** a request for a Variance TO ALLOW NO AMENITY ZONE WHERE SUCH IS REQUIRED FOR A PROPOSED RESIDENTIAL SUBDIVISION on 4.49 acres adjacent to the south side of Centennial Parkway, approximately 275 feet west of Fort Apache Road (APN 125-30-502-009), R-1 (Single Family Residential) Zone, Ward 6 (Fiore) [PRJ-72355].

This approval is subject to the following conditions:

Planning

1. Approval of and conformance to the Conditions of Approval for Waiver (WVR-72408, Vacation (VAC-72409) and Tentative Map (TMP-72410) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.
4. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
5. All City Code requirements and design standards of all City departments must be satisfied, except as modified herein.

CITY HALL

495 S. MAIN ST.
LAS VEGAS, NV 89101
702.229.6011 | VOICE
711 | TTY



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lasvegasnevada.gov

Public Works

6. Sign a Covenant Running with Land agreement for the possible future installation of half-street improvements per City Compete Street Standards (sidewalk) on Regena Avenue adjacent to this site. The Covenant agreement must be recorded with the County Recorder and a copy of the recorded document must be provided to the City prior to the approval of construction drawings for this site.

The Notice of Final Action was filed with the Las Vegas City Clerk on March 22, 2018.

Sincerely,

A handwritten signature in black ink that reads "Robert Summerfield". The signature is written in a cursive, flowing style.

Robert Summerfield, AICP[®]
Director
Department of Planning

RTS:PL:clb

cc: Mr. Andrew Acuna
Summit Homes of Nevada LLC
3425 Cliff Shadows Parkway
Las Vegas, Nevada 89129

Ms. Jana Felipe
Taney Engineering LLC
6030 South Jones Boulevard
Las Vegas, Nevada 89118



**LAS VEGAS
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March 22, 2018

Double Double LLC
10789 West Twain Avenue, 2nd Floor
Las Vegas, Nevada 89135

**RE: WVR-72408 [PRJ-72355] - WAIVER RELATED TO VAR-72407, VAC-72409 AND TMP-72410
CITY COUNCIL MEETING OF MARCH 21, 2018**

Dear Applicant:

The City Council at a regular meeting held on March 21, 2018 voted to **APPROVE** a request for a Waiver TO ALLOW NO STREETLIGHTS WHERE SUCH ARE REQUIRED FOR A PROPOSED RESIDENTIAL SUBDIVISION on 4.49 acres adjacent to the south side of Centennial Parkway, approximately 275 feet west of Fort Apache Road (APN 125-30-502-009), R-1 (Single Family Residential) Zone, Ward 6 (Fiore) [PRJ-72355].

This approval is subject to the following conditions:

Planning

1. Approval of and conformance to the Conditions of Approval for Variance (VAR-72407), Vacation (VAC-72409) and Tentative Map (TMP-72410) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.
4. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
5. All City Code requirements and design standards of all City departments must be satisfied, except as modified herein.

Public Works

6. The installation of streetlights on Regena Avenue and the internal public street shall be deferred. Public street lighting shall be stubbed out for later use, including all necessary underground improvements including conduit and pull boxes at each future streetlight location. Monies in lieu of such deferred streetlights and associated streetlight bases shall be contributed to the City. The contribution amount shall be based on the City's current bond schedules for all streetlights and associated bases deferred by this action adjacent to this site.

The Notice of Final Action was filed with the Las Vegas City Clerk on March 22, 2018.

Sincerely,

Handwritten signature of Robert Summerfield in black ink.

Robert Summerfield, AICP
Director
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RTS:PL:clb

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March 22, 2018

Double Double, LLC
10789 West Twain Avenue, 2nd Floor
Las Vegas, Nevada 89135

**RE: VAC-72409 [PRJ-72355] - VACATION RELATED TO WVR-72408,
VAR-72407 AND TMP-72410
CITY COUNCIL MEETING OF MARCH 21, 2018**

Dear Applicant:

The City Council at a regular meeting held on March 21, 2018 voted to **APPROVE** a request for a Petition to Vacate a 33-FOOT U.S. GOVERNMENT PATENT EASEMENT generally located on the south side of Centennial Parkway, approximately 275 feet west of Fort Apache Road, Ward 6 (Fiore) [PRJ-72355].

This approval is subject to the following conditions:

1. The limits of this Petition of Vacation shall be the south 3-feet and the east and west 33 feet of Assessor Parcel Number 125-30-502-009, generally located on the south side of Centennial Parkway, west of Fort Apache Road.
2. The Order of Relinquishment shall record immediately prior to (concurrent with) the Final Map for this site.
3. All public improvements, if any, adjacent to and in conflict with this vacation application are to be modified, as necessary, at the applicant's expense prior to the recordation of an Order of Vacation.
4. The Order of Relinquishment of Interest shall not be recorded until all of the conditions of approval have been met provided, however, the conditions requiring modification of public improvements may be fulfilled for purposes of recordation by providing sufficient security for the performance thereof in accordance with the Subdivision Ordinance of the City of Las Vegas. City Staff is empowered to modify this application if necessary because of technical concerns or because of other related review actions as long as current City right-of-way requirements are still complied with and the intent of the vacation application is not changed. If applicable, a five foot wide easement for public streetlight and fire hydrant purposes shall be retained on all vacation actions abutting public street corridors that will remain dedicated and available for public use. Also, if applicable and where needed, public easement corridors and sight visibility or other easements that would/should cross any right-of-way being vacated must be retained.

5. Reservation of easements for the facilities of the various utility companies together with reasonable ingress thereto and egress there from shall be provided if required.
6. All development shall be in conformance with code requirements and design standards of all City Departments.
7. If the Order of Vacation (or Order of Relinquishment of Interest if a Patent Reservation) is not recorded within one (1) year after approval by the City of Las Vegas or an Extension of Time is not granted by the Planning Director, then approval will terminate and a new petition must be submitted.

The Notice of Final Action was filed with the Las Vegas City Clerk on March 22, 2018.

Sincerely,

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Robert Summerfield, AICP
Director
Department of Planning

RTS:PL:clb

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City Manager

March 22, 2018

Double Double LLC
10789 West Twain Avenue, 2nd Floor
Las Vegas, Nevada 89135

**RE: TMP-72410 [PRJ-72355] - TENTATIVE MAP RELATED TO WVR-72408, VAR-72407 AND VAC-72409
CITY COUNCIL MEETING OF MARCH 21, 2018**

Dear Applicant:

The City Council at a regular meeting held on March 21, 2018 voted to **APPROVE** a request for a Tentative Map FOR A 18-LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION on 4.49 acres adjacent to the south side of Centennial Parkway, approximately 275 feet west of Fort Apache Road (APN 125-30-502-009), R-1 (Single Family Residential) Zone, Ward 6 (Fiore) [PRJ-72355].

This approval is subject to the following conditions:

Planning

1. A combination of six-foot solid decorative block wall and locking wrought iron fence shall be installed across the public utility and drainage easement at the southern alignment of the cul-de-sac.
2. 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.
3. Approval of Variance (VAR-72407), Waiver (WVR-72408) and Vacation (VAC-72409) shall be required, if approved.
4. Street names must be provided in accordance with the City's Street Naming Regulations.
5. 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.

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

Public Works

8. A Petition of Vacation, such as VAC-72409, shall record immediately prior to (concurrent with) the recordation of a Final Map for this site to eliminate the U.S. Government Patents Easements adjacent to this site.
9. Grant Public Pedestrian Access Easements for all public sidewalks located outside of the public right-of-way on Centennial Parkway on the Final Map for this site.
10. Grant a Public Pedestrian Access Easement, Public Utility Easements (P.U.E.), Public Sewer Easements, and Public Drainage Easements to be privately maintained by the Homeowner's Association across the Common Element between lots 9 and 10.

11. Construct complete half street improvements on Centennial Parkway and Regena Avenue meeting current City Standards adjacent to this site including widened paving to eliminate the "sawtooth" on Centennial Parkway concurrent with the development of this site. 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. Curb and gutter along Regena Avenue is allowed to be per Standard Drawing # 217.1. Sidewalk along Regena Avenue may be deferred through VAR-72407. Streetlights on Regena Avenue and the internal public street may be deferred through WVR-72408.
12. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections.
13. A working sanitary sewer connection shall be in place prior to final inspection of any units within this development. Full permanent improvements on all major access streets, including all required landscaped areas between the perimeter wall and adjacent public street, shall be constructed and accepted by the City prior to issuance of any building permits beyond 50% of all units within this development. All off-site improvements adjacent to this site, including all required landscaped areas between the perimeter walls and adjacent public streets, shall be constructed and accepted prior to issuance of building permits beyond 75%. The above thresholds notwithstanding, all required Improvements shall be constructed in accordance with Title 19.02.130.D.
14. 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 or grading permits or submittal of any construction drawings, 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.
15. As per Unified Development Code (UDC) 19.16.060.G, all requirements must be complied with or such future compliance must be guaranteed by an approved performance security method in accordance with UDC sections 19.02.130.C and 19.02.130.E.

16. 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.

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Sincerely,

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Robert Summerfield, AICP[®]
Director
Department of Planning

RTS:PL:clb

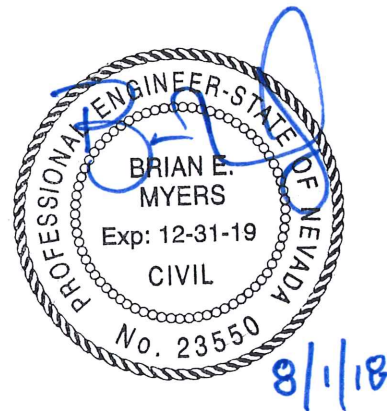
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TANEY ENGINEERING

ADDENDUM #1
FOR THE
TECHNICAL DRAINAGE STUDY
FOR
CENTENNIAL & FORT APACHE
Residential Development



**CLARK COUNTY
NEVADA**

July 2018

Prepared by:

Taney Engineering
6030 S. Jones
Las Vegas, Nevada 89118
Telephone: (702) 362-8844
Fax: (702) 362-5233

Prepared for:

Adaven Homes
3425 Cliff Shadows Pkwy.
Las Vegas, NV 89129
Telephone: (702) 365-8588
Fax: (800) 998-9885

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

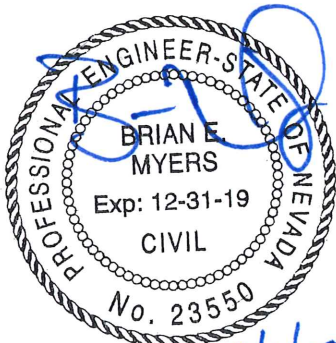
Name of Development: Centennial & Fort Apache Date: Jul 31, 2018
Location of Development: a) Descriptive (Cross Streets) North/South: Fort Apache
East/West: Centennial/Regena
b) Section: 30 Township: 19S Range: 60E
c) APN : 125-30-502-009
Name of Owner: Adaven Homes
Telephone No.: (702) 365-8558 Fax No.: (702) 998-9885 E-Mail Address: _____
Address: 3425 Cliff Shadows Pkwy, Las Vegas, NV 89129

Contact Person-Name: Brian Myers, P.E. Telephone No.: (702) 362-8844
* E-Mail Address: BrianM@taneycorp.com Fax No.: (702) 362-5233
Firm: Taney Engineering
Address: 6030 S. Jones, Suite 100, Las Vegas NV. 89118

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		

1. Total Owned Land Area: At Site: 4.62+/- acres Being Developed/Disturbed: 5.01+/- 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: 199+/- acres
6. Has the site drainage been evaluated in the past? ☐ YES ☒ NO If yes, please identify documentation: _____
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: The site will discharge to south to Regena then flow will be conveyed east away from the site.
8. Briefly describe your proposed schedule for the subject project: A.S.A.P



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.

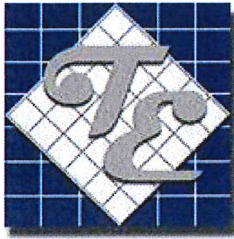
***New Required Field**

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

	Revision	Date
Local Entity File No. _____		

REFERENCE:

STANDARD FORM 1



TANEY ENGINEERING

6030 SOUTH JONES BLVD, SUITE 100

LAS VEGAS, NV 89118

TELEPHONE: 702-362-8844

Fax: 702-362-5233

July 31, 2018
Job No. ADV-17-086

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

Subject: Addendum #1 to the Technical Drainage Study for Fort Apache and Centennial DS4994

Dear Mr. Sung:

Taney Engineering is pleased to provide Addendum #1 to the Technical Drainage Study for **Fort Apache and Centennial**. This addendum includes a response to each comment from City of Las Vegas review memorandum dated on June 13, 2018. The comments have been reproduced and addressed as follows:

Comment 1: Provide a copy of the zoning/planning conditions associated with this site (TMP-72410; VAC-72409; WVR-72408 & VAR-72407) 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

Zoning and planning conditions that are associated with this project have been provided with this submittal as requested.

Comment 2: The site is adjacent to the jurisdiction of Clark County to the south and west. The engineer must coordinate with Clark County Public Works Department (CCPW) and incorporate any concerns for boundary conditions along the south and west borders. CCPW concurrence is required prior to final acceptance of the study.

Coordination with Clark County Public Works and any lingering concerns will be addressed for final approval of this study.



Comment 3: The subject development accepts flows from Centennial Parkway through the onsite Street onto Regina Avenue. This flow split at Centennial and the onsite street makes the DxV condition worse from the existing condition on Regina Avenue (DV>6 in 10-year and DV>8 in 100-year) and is negatively impacting the surrounding properties. A high point at the entrance to the neighborhood will need to be put into place in order to keep the flow from Centennial Parkway entering the subject development. Review and revise accordingly.

After further review of drainage studies and many site visits, It was determined that in the existing condition the flow on Centennial Parkway is not contained on Centennial but is conveyed south to Regena.

Although there is an increase in runoff from the onsite basins in the interim (7 cfs) the overall flow depth goes from .97 (original submittal) to .98. The results of the hydrologic models show that the discharge from the project site does not negatively impact the peak flows to Regena from the site.

According to the HTE: 14-14210 study the flow in Centennial was increased to 80/162 in the developed condition of this study. This flow begins to travel south immediately once it passes the residential subdivision Centennial and Tee Pee. The flow travels to Regena where it will be conveyed to Fort Apache Road at CP3 with a total of 195/309 cfs.

In the interim condition when the site is developed the flow in Centennial will continue to travel south towards Regena as it did in the existing condition. The flow then combines at CP3 with a total of 198/316 cfs, where it will be conveyed east and match existing drainage patterns.

Because the flow naturally travels south to Regena in the interim condition the flow on the south side of Centennial is reduced to <1/2 cfs at cross section D, see Appendix B on Figure 8. The overall flow in Centennial at CP1 will be 44/94 cfs.

In the developed condition the site and offsite basins will be considered fully developed. In this condition Centennial and Regena will have fully developed roads and will have worst case governing flows traveling east on both roads. It is assumed that when the developed condition occurs on parcel APN: 125-30-502-008 the flow will be directed south to Regena matching existing historical patterns.

In the ultimate condition flow that travels east on Centennial will be reduced with the installation of the Grand Canyon regional facility and the Centennial local facility. However; with this study it will be assumed the local and regional facility will not be installed yet.



Comment 4: In the interim and ultimate condition the flow in Regena Avenue does not meet the criteria of DxV <6 for 10-year storm event and a DxV <8 for 100-year. This comment supplements the above Comment.

In the existing condition the southern portion of Centennial conveys flow (40/81 cfs) south to Regena causing the dry lane criteria to not be met.

In the interim condition the flow still continues to travel south to Regena and does not meet the criteria of DxV for the 10 and 100 year storm event. However, a portion of the flows from XOF1 will be diverted to the subject site and routed through "A" Street reducing the peak flows affecting Regena in the interim and developed condition.

In the developed condition, it is assumed the flows from Centennial will be routed through the adjacent developed parcel south to Regena matching existing drainage patterns. This will also reduce peak flows on Regena.

In the ultimate condition flows on Centennial and Regena will be reduced with the installation of the Grand Canyon regional facility and the Centennial local facility. However, with this study it will be assumed the local and regional facility will not be installed yet.

Comment 5: Revise the proposed drainage pattern and all subsequent grading designs accordingly.

Proposed drainage patterns have been revised on the basin map to show the new drainage flows in Centennial and Regena as requested.

Comment 6: The development proposes three points to accept offsite flows along the west boundary. 5'-wide public drainage easements will be created at Lot 3, Lot 6 and Lot 9. These drainage easements will burden the individual property owners with maintenance and are not desirable.

The City's policy is to minimize public drainage easements. Every attempt should be made by the developer to eliminate the public drainage easement which may require engineering, coordination with the adjacent property owner(s) or by providing additional grading offsite. All attempts must be provided in writing and submitted as a part of drainage study for documentation.

Grading plans have not been updated to show the 3 drainage easements removed. They will be shown on the grading plans until permission to grade has been received by the adjacent owner.

However, permission to grade has been asked and is currently waiting for approval from the adjacent property owner. With approval, an updated TDS will be submitted to show the new changes.



Comment 7: Construction Notes 13 and 14 are shown on the plans, but are not described in the construction notes on sheets G1 and G2. Address in the next submittal.

Construction notes have been revised with the plans to reflect this change as requested.

Comment 8: Cross Sections F, G, H, I, J and K are not provided on Sheet GD1, however these cross sections are shown on the plans. Provide as such in the next submittal.

Cross sections have been updated on the grading plans to show the correct cross sections that are shown on GD1 as requested.

Comment 9: Cross Section A: Provide 3-course of solid grouted 8"-CMU above the adjacent grade in the landscape area.

Cross section A has been revised to show a 3 course solid grouted 8" CMU wall as requested.

Comment 10: Revise Cross Section E to show a concrete lined public drainage easement to be privately maintained.

Cross section E has been updated to show a concrete lined public drainage easement to be privately maintained as requested.

A copy of the City of Las Vegas Public Works comments has been provided directly following this letter. If you need any additional information, please do not hesitate to call our office.

Sincerely,

TANEY ENGINEERING

David Westpy
Designer I



APPENDICES

APPENDIX A

Comment Letter

APPENDIX B

Figures

APPENDIX C

Hydrologic Calculations

APPENDIX D

Hydraulic Calculations

APPENDIX E

Reference Material

APPENDIX F

Improvement Plans



APPENDIX A

Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

June 13, 2018

TO:

Land Development Services
Department of Building & Safety

FROM:

Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works

SUBJECT:

Drainage Study for:

Centennial & Fort Apache Residential Development

COPIES TO:

Taney Engineering

Cross Streets:

SWQ Fort Apache Rd. & Centennial Blvd.

Adaven Homes

File Number:

F:\Depot\DSMemos\DS4994A.doc

Bart Anderson, P.E., DevCo

Parcel Number:

125-30-502-009

CCPW

Zoning Action:

TMP-72410; VAC-72409; WVR-72408 &
VAR-72407

FEMA Flood Zone

YES

NO

X

Proposed Storm Drain

YES

NO

X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	5/17/2018	6/4/2018 & 6/13/2018	See Comments Below	\$400.00	496723: \$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 (**TMP-72410; VAC-72409; WVR-72408 & VAR-72407**) 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. The site is adjacent to the jurisdiction of Clark County to the south and west. The engineer must coordinate with *Clark County Public Works Department* (CCPW) and incorporate any concerns for boundary conditions along the south and west borders. CCPW concurrence is required prior to final acceptance of the study.
3. The subject development accepts flows from *Centennial Parkway* through the onsite street onto *Regina Avenue*. This flow split at *Centennial* and the onsite street makes the DxV condition worse from the existing condition on *Regina Avenue* (DV>6 in 10-year and DV>8 in 100-year) and is negatively impacting the surrounding properties. A high point at the entrance to the neighborhood will need to be put into place in order to keep the flow from *Centennial Parkway* entering the subject development. Review and revise accordingly.

4. In the interim and ultimate condition the flow in *Regena Avenue* does not meet the criteria of $DxV < 6$ for 10-year storm event and a $DxV < 8$ for 100-year. This comment supplements the above Comment #3. Revise the proposed drainage pattern and all subsequent grading designs accordingly.
5. The development proposes three points to accept offsite flows along the west boundary. 5'-wide public drainage easements will be created at Lot 3, Lot 6 and Lot 9. These drainage easements will burden the individual property owners with maintenance and are not desirable.

The City's policy is to minimize public drainage easements. Every attempt should be made by the developer to eliminate the public drainage easement which may require engineering, coordination with the adjacent property owner(s) or by providing additional grading offsite. All attempts must be provided in writing and submitted as a part of drainage study for documentation.
6. Construction Notes 13 and 14 are shown on the plans, but are not described in the construction notes on sheets G1 and G2. Address in the next submittal.
7. Cross Sections F, G, H, I, J and K are not provided on *Sheet GD1*, however these cross sections are shown on the plans. Provide as such in the next submittal.
8. Cross Section A: Provide 3-course of solid grouted 8"-CMU above the adjacent grade in the landscape area.
9. Revise Cross Section E to show a concrete lined public drainage easement to be privately maintained.
10. Label the slopes in the cul-de-sac to show that the 1% minimum criteria is met.

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
WSP/AYS

T/R/S: T19S/R60E/30
AREA G-30



APPENDIX B

Figures



LEGEND

— SUB-BASIN BOUNDARY

→ FLOW ARROW

250
500
500
300
800

BWJS → Basin-ID
(13 / 59) → Contributing flow
(10-Year / 100-Year
from the basin (cfs)

PHOTO DATE: APRIL 1996

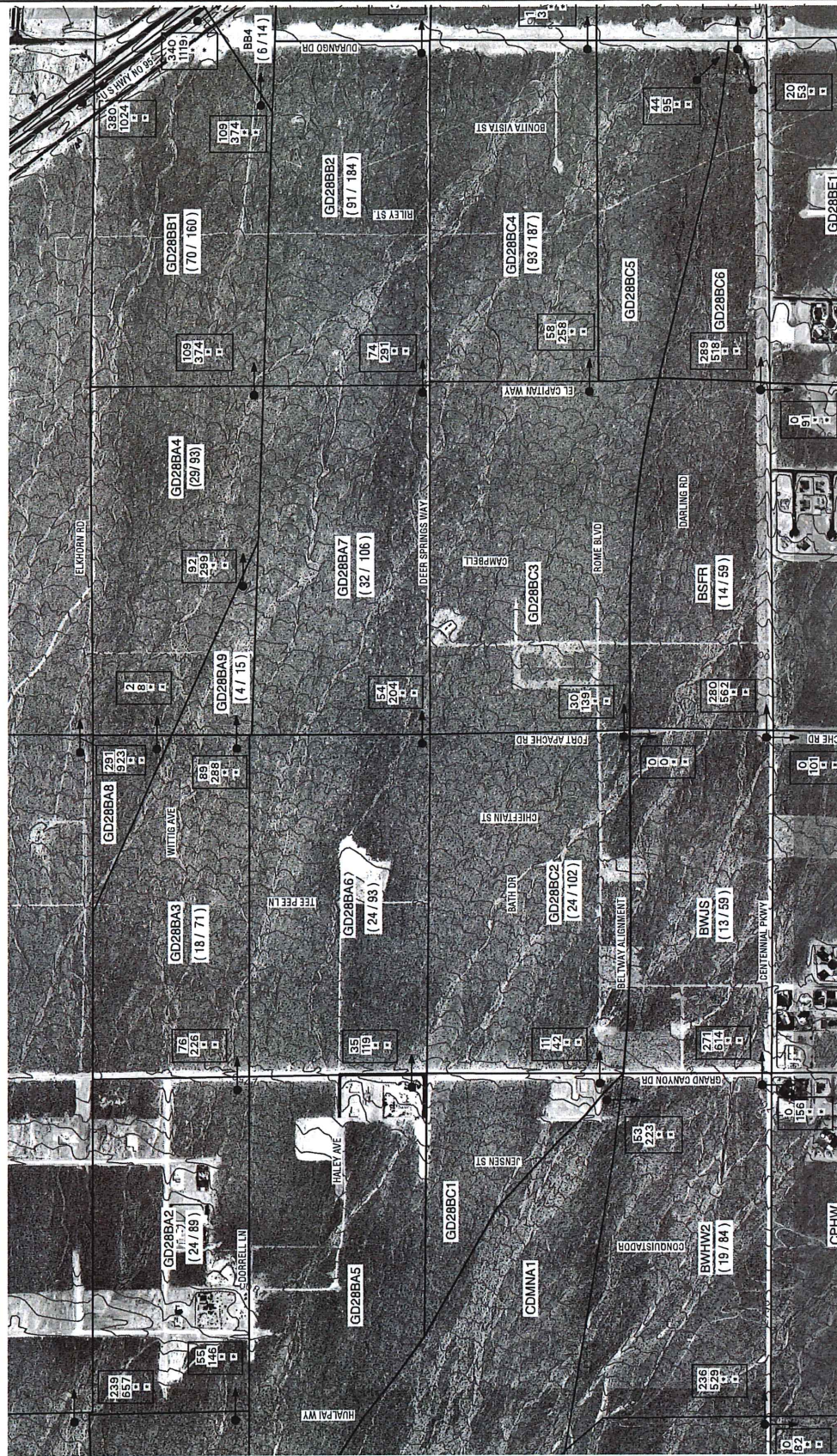


FIGURE E-1

EXISTING DRAINAGE CONDITIONS



**POST,
BUCKLEY,
SCHUH &
JERNIGAN, INC.**

ENGINEERING PLANNING SURVEYING GIS
901, N. Green Valley Pkwy., Ste 100, Henderson NV 89014
Phone: (702) 263-7275 Fax: (702) 263-7200

[illegible]

NOTE:
Existing conditions are based on future
CN values with only existing local and
CCR/CD facilities in place

REVISED SEPTEMBER 1999



SCALE: 1 INCH = 800 FEET



LEGEND

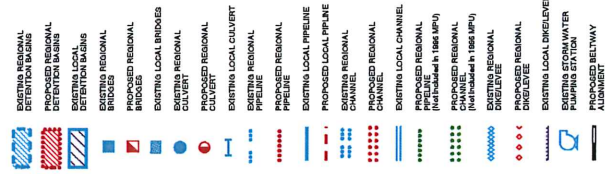


FIGURE F-1

FUTURE DRAINAGE CONDITIONS

FIGURE 6A



ENGINEERING PLANNING GIE SURVEYING CONSTRUCTION SERVICES

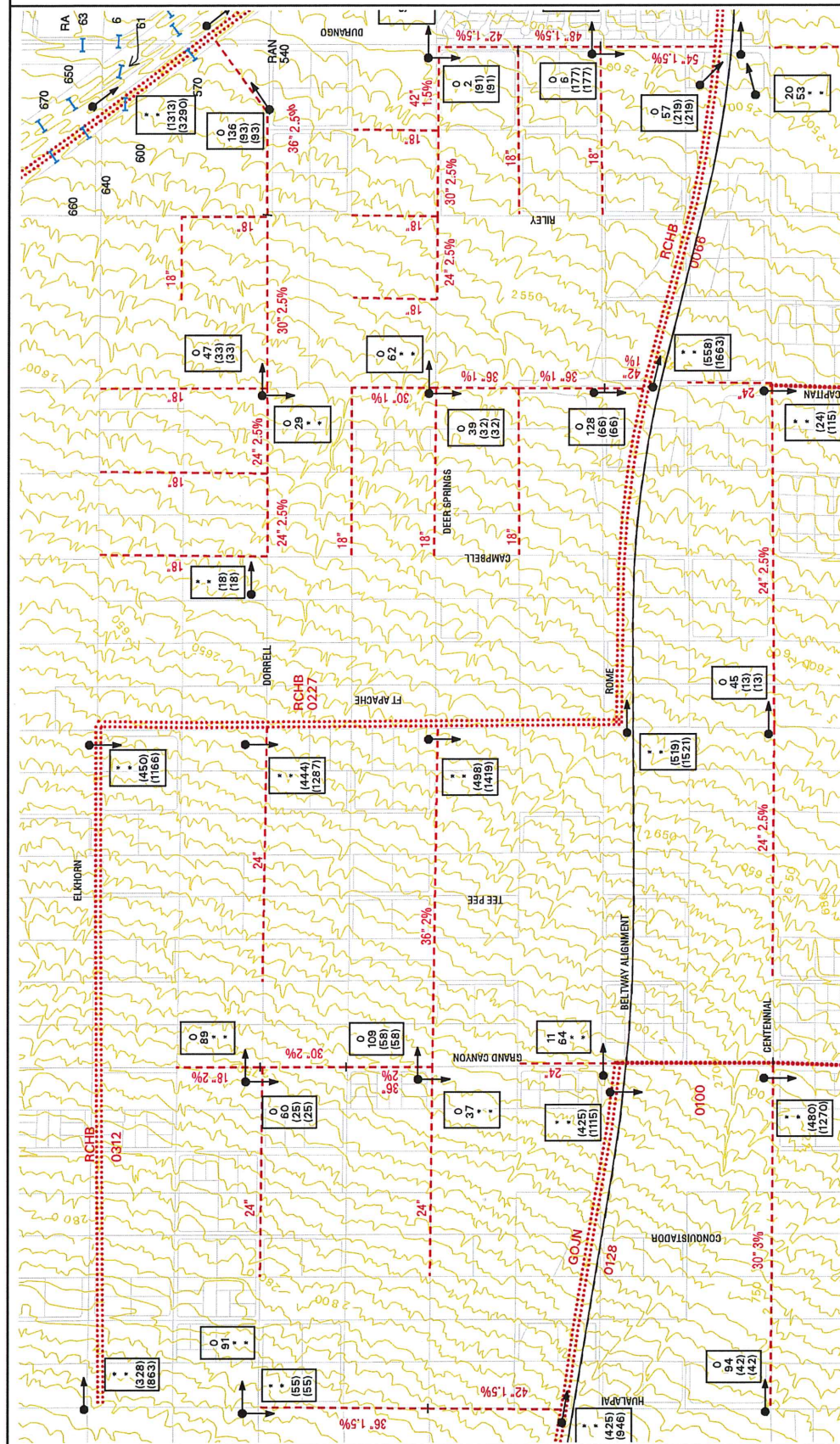
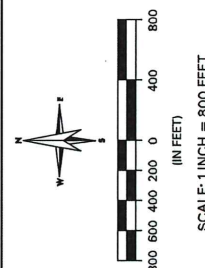
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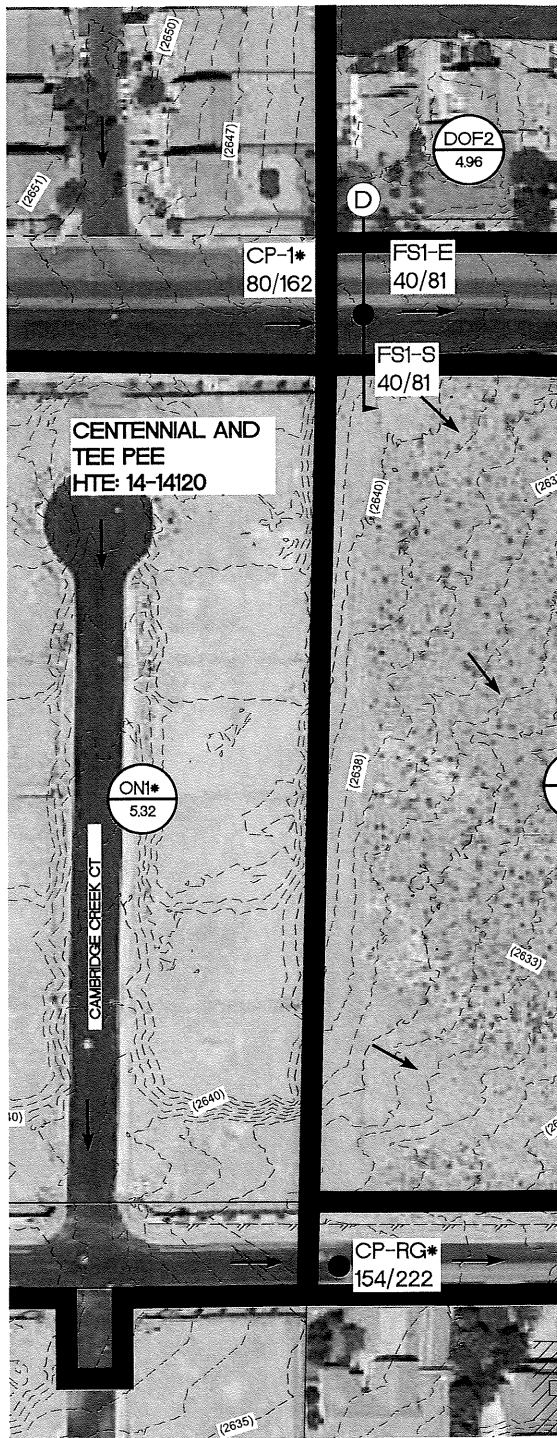
NOTE:

NOTE: Ultimate drainage conditions are based on future CN values with all flood control facilities in place

See the "September 1999 City of Las Vegas Northwest Neighborhood Study Phase 2" for proposed facilities in and north of Elkhorn.

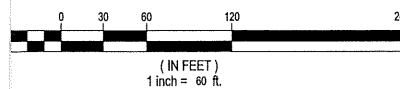
REVISED SEPTEMBER 1999





Existing Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
NT EX 10 YR	ST1	43	2	0.49	3.28	1.61
NT EX 100 YR	ST1	92	2	0.63	4.00	2.52
EG EX 10 YR	ST2	195	2	0.88	6.02	5.30
EG EX 100 YR	ST2	309	2	1.06	7.22	7.65

FILE NAME: BASIN FIGS.DWG

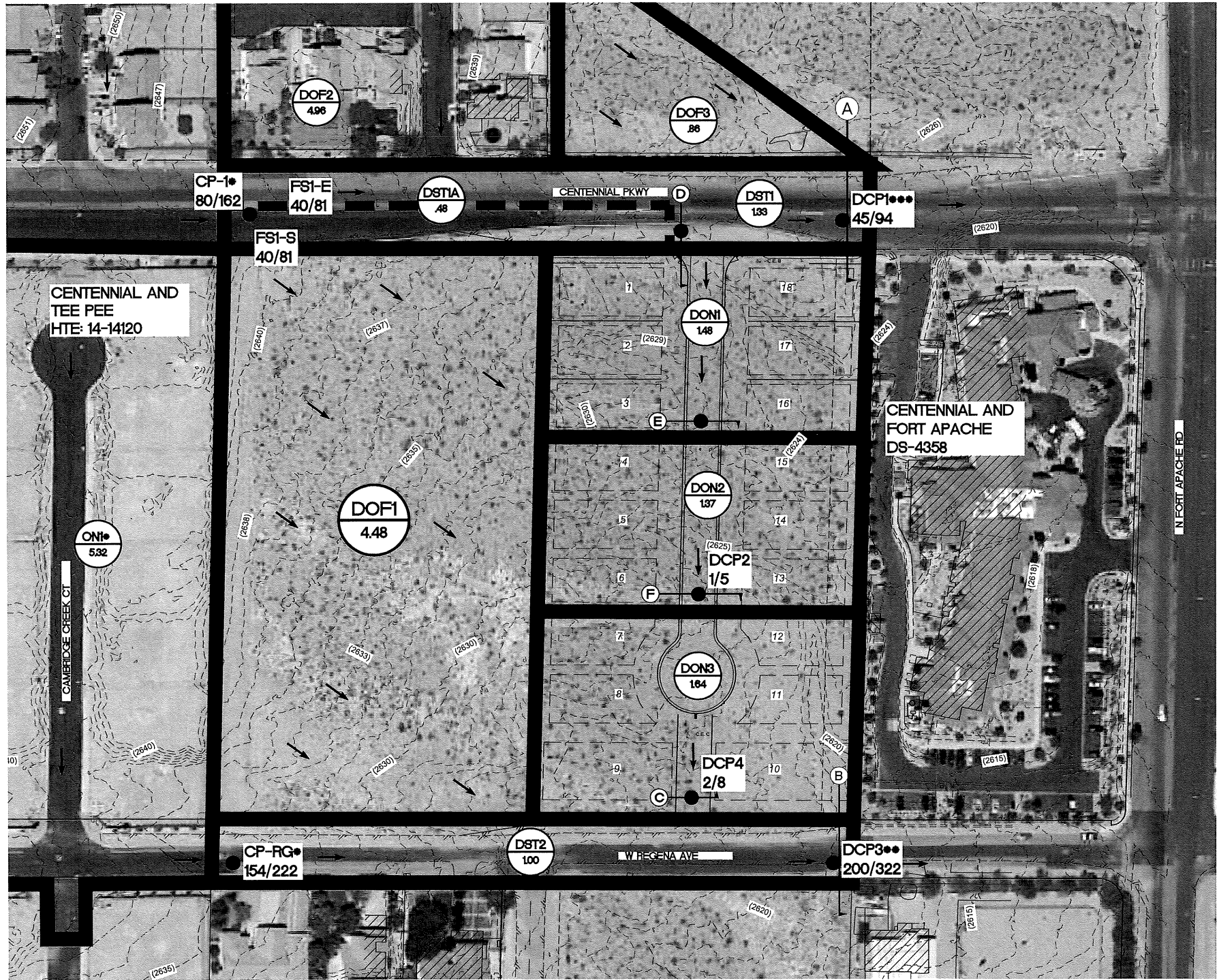


DRAINAGE LEGEND	
	BASIN IDENTIFICATION
	BASIN AREA (ACRES)
	BASIN BOUNDARY
	CONCENTRATION POINT
	FLOW PATH
	CROSS SECTION
	10-YR/100-YR FLOW (CFS)
	REFERENCE FLOW (CFS)



TANEY ENGINEERING
 6030 S. JONES BLVD STE#100
 LAS VEGAS, NV 89118
 (702) 362-8644 FAX: (702) 362-5233

FIGURE 7
EXISTING CONDITION
CENTENNIAL & FORT APACHE



Developed Condition			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
DOF1	4.48	2	8
DOF2	4.96	2	8
DOF3	0.86	<1	1
DON1	1.48	1	3
DON2	1.37	1	2
DON3	1.64	1	3
DST1	1.33	3	5
DST2	1.00	2	4
DCP1**	-	45	94
DCP2	-	1	5
DCP3***	-	200	322
DCP4	-	2	8
FUT-1*	148.58	153	246
DOF4*	45.42	60	122
DOF14*	13.98	20	41
ON1*	5.32	1	6
CP-1*	-	80	162
CP-RG*	-	154	222

Ultimate Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
A CENT ULT 10 YR	DST1	45	2	0.55	4.37	2.40
A CENT ULT 100 YR	DST1	94	2	0.66	5.22	3.45
B REG ULT 10 YR	DST2	200	2	0.84	7.72	6.48
B REG ULT 100 YR	DST2	322	2	0.99	9.32	9.23
C PRIV ULT 10 YR	DON3	2	2	0.22	2.35	0.52
C PRIV ULT 100 YR	DON3	8	2	0.32	3.18	1.02
D CENT ULT 10 YR	DST1	1	2	0.21	2.16	0.45
D CENT ULT 100 YR	DST1	2	2	0.25	2.45	0.61
E PRIV ULT 10 YR	DON1	1	2	0.18	2.08	0.37
E PRIV ULT 100 YR	DON1	3	2	0.25	2.54	0.64
F PRIV ULT 10 YR	DON2	1	2	0.18	2.08	0.37
F PRIV ULT 100 YR	DON2	5	2	0.28	2.85	0.80

PRORATE FLOWS			
Basin	Area (acres)	Q ₁₀ (cfs)	cfs/acre
DST1	1.33	3	2.26
DST1A	0.48	1.08	2.26

PRORATE FLOWS			
Basin	Area (acres)	Q ₁₀₀ (cfs)	cfs/acre
DST1	1.33	5	3.76
DST1A	0.48	1.80	3.76

- NOTES:
1. *REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
HTE: 14-1420
2. ** INCLUDES THE NORTHERN CENTENNIAL FLOW.
3. *** INCLUDES THE SOUTHERN CENTENNIAL FLOW.

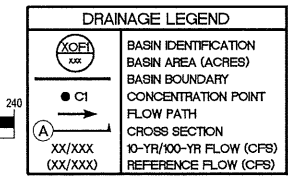
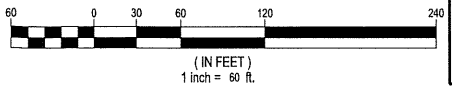
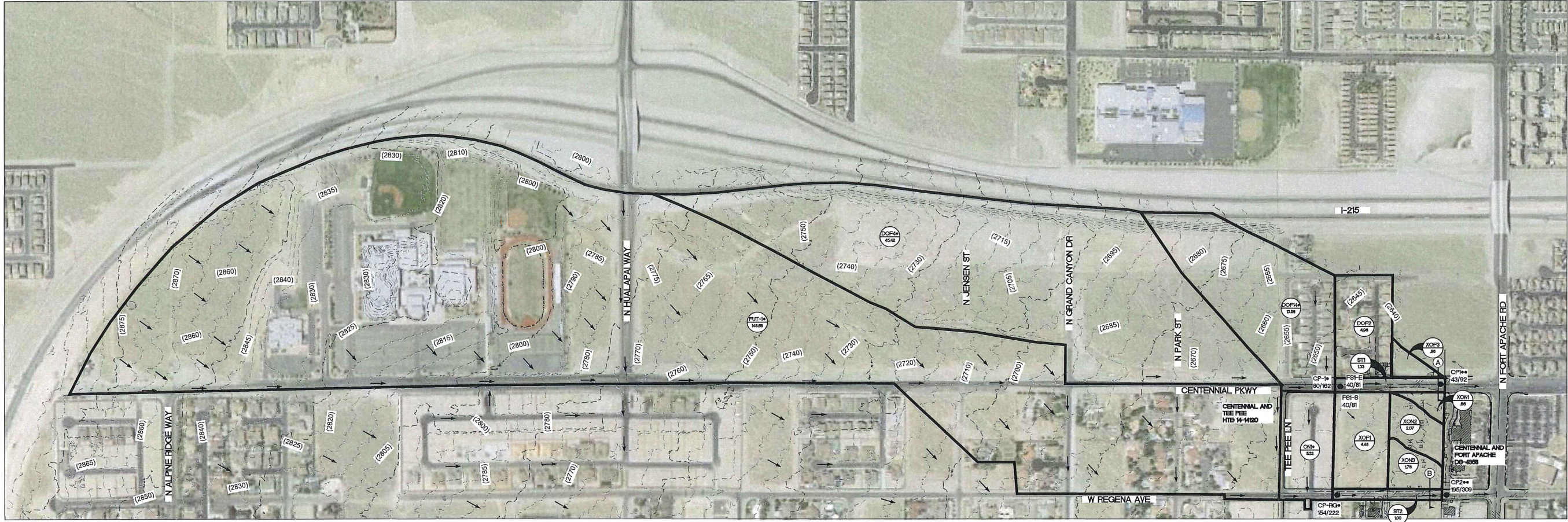


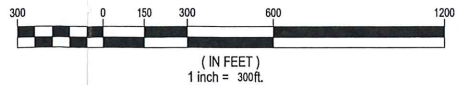
FIGURE 9
DEVELOPED CONDITION
CENTENNIAL & FORT APACHE



Existing Condition			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
XOF1	4.48	<1	2
XOF2	4.96	2	8
XOF3	0.86	<1	<1
XON1	0.66	<1	<1
XON2	2.07	<1	1
XON3	1.76	<1	1
ST1	1.33	1	3
ST2	1.00	1	2
CP1**	-	43	92
CP2***	-	195	309
FUT-1*	148.58	153	246
DOF4*	45.42	60	122
DOF14*	13.98	20	41
ON1*	5.32	1	6
CP-1*	-	80	162
CP-RG*	-	154	222

Existing Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
A CENT EX 10 YR	ST1	43	2	0.49	3.28	1.61
A CENT EX 100 YR	ST1	92	2	0.63	4.00	2.52
B REG EX 10 YR	ST2	195	2	0.88	6.02	5.30
B REG EX 100 YR	ST2	309	2	1.06	7.22	7.65

NOTES:
1. *REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
HTE: 14-1420
2. ** INCLUDES THE NORTHERN CENTENNIAL FLOW.
3. *** INCLUDES THE SOUTHERN CENTENNIAL FLOW.



DRAINAGE LEGEND	
	BASIN IDENTIFICATION
	BASIN AREA (ACRES)
	BASIN BOUNDARY
	CONCENTRATION POINT
	FLOW PATH
	CROSS SECTION
	10-YR/100-YR FLOW (CFS)
	REFERENCE FLOW (CFS)

TANEY ENGINEERING
6030 S. JONES BLVD STE#100
LAS VEGAS, NV 89118
(702) 362-8844 FAX: (702) 362-8233

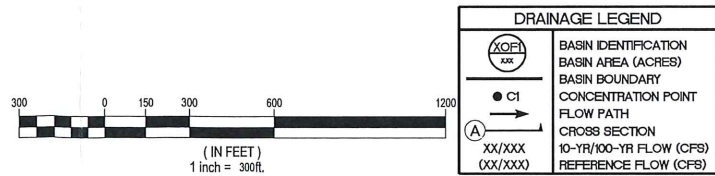
FIGURE 10
EXISTING OFFSITE BASIN
CENTENNIAL & FORT APACHE



Ultimate Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
A CENT ULT 10 YR	DST1	45	2	0.55	4.37	2.40
A CENT ULT 100 YR	DST1	94	2	0.66	5.22	3.45
B REG ULT 10 YR	DST2	200	2	0.84	7.72	6.48
B REG ULT 100 YR	DST2	322	2	0.99	9.32	9.23
C PRIV ULT 10 YR	DON3	2	2	0.22	2.35	0.52
C PRIV ULT 100 YR	DON3	8	2	0.32	3.18	1.02
D CENT ULT 10 YR	DST1	1	2	0.21	2.16	0.45
D CENT ULT 100 YR	DST1	2	2	0.25	2.45	0.61
E PRIV ULT 10 YR	DON1	1	2	0.18	2.08	0.37
E PRIV ULT 100 YR	DON1	3	2	0.25	2.54	0.64
F PRIV ULT 10 YR	DON2	1	2	0.18	2.08	0.37
F PRIV ULT 100 YR	DON2	5	2	0.28	2.85	0.80

NOTES:
1. *REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
HTE: 14-1420
2. ** INCLUDES THE NORTHERN CENTENNIAL FLOW.
3. *** INCLUDES THE SOUTHERN CENTENNIAL FLOW.

Developed Condition			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
DOF1	4.48	2	8
DOF2	4.96	2	8
DOF3	0.86	<1	1
DON1	1.48	1	3
DON2	1.37	1	2
DON3	1.64	1	3
DST1	1.33	3	5
DST2	1.00	2	4
DCP1**	-	45	94
DCP2	-	1	5
DCP3***	-	200	322
DCP4	-	2	8
FUT-1*	148.58	153	246
DOF4*	45.42	60	122
DOF14*	13.98	20	41
ON1*	5.32	1	6
CP-1*	-	80	162
CP-RG*	-	154	222



T ANEY E NGINEERING
6030 S. JONES BLVD STE#100
LAS VEGAS, NV 89118
(702) 362-8844 FAX: (702) 362-6233

FIGURE 11
DEVELOPED OFFSITE BASIN
CENTENNIAL & FORT APACHE



APPENDIX C

Hydrologic Calculations



EXISTING CONDITION

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

```

43      KK      CP1
44      KM COMBINE DOF2, ST1, XOF3
45      HC      3
      *

46      KK      XOF1
47      BA .0070
48      LS      0      63
49      UD .134
      *

50      KK      XON1
51      BA .0010
52      LS      0      63
53      UD .110
      *

54      KK      XON2
55      BA .0032
56      LS      0      63
57      UD .144
      *

58      KK      XON3
59      BA .0028
60      LS      0      63
61      UD .100
      *

62      KK      ST2
63      BA .0016
64      LS      0      83
65      UD .074
      *

66      KK      CP2
67      KM COMBINE XOF1, XON1, XON2, XON3, ST2
68      HC      5
      *
69      ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE (V) ROUTING      (--->) DIVERSION OR PUMP FLOW

NO.  (.) CONNECTOR    (<---) RETURN OF DIVERTED OR PUMPED FLOW

22      DOF2
      .
      .
35      .      ST1
      .      .
      .      .
39      .      .      XOF3
      .      .      .
      .      .      .
43      CP1.....
      .
      .
46      .      XOF1
      .      .
      .      .
50      .      .      XON1
      .      .      .
      .      .      .
54      .      .      .      XON2
      .      .      .      .
      .      .      .      .
58      .      .      .      .      XON3
      .      .      .      .      .
      .      .      .      .      .
62      .      .      .      .      .      ST2
      .      .      .      .      .      .
      .      .      .      .      .      .
66      .      CP2.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 30JUL18 TIME 11:58:40
*****

```

```

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

```


EX

<><><><><><><><><><><><><><><><>
FORT APACHE/CENTENNIAL
HYDROLOGIC MODEL

10-YR AND 100-YR STORM EVENT

TANEY ENGINEERING
EXISTING CONDITION
FILE: EX.DAT
PROJECT No: ADV-17-086
DATE: JULY 2018

---> 6-HOUR / SDN 3 <---

19 IO OUTPUT CONTROL VARIABLES

```
IPRNT      5  PRINT CONTROL
IPLOT      0  PLOT CONTROL
QSCAL     0.  HYDROGRAPH PLOT SCALE
```

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

```
COMPUTATION INTERVAL      .08 HOURS
TOTAL TIME BASE          24.92 HOURS
```

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

```

JP      MULTI-PLAN OPTION
        NPLAN      1  NUMBER OF PLANS

```

```

JR          MULTI-RATIO OPTION
              RATIOS OF PRECIPITATION
              .56      1.00

```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION		
				RATIO 1 .56	RATIO 2 1.00	
HYDROGRAPH AT +	DOF2	.01	1	FLOW TIME	2. 3.58	8. 3.58
HYDROGRAPH AT +	ST1	.00	1	FLOW TIME	1. 3.50	3. 3.50
HYDROGRAPH AT +	XOF3	.00	1	FLOW TIME	0. 4.92	0. 3.58
3 COMBINED AT +	CP1	.01	1	FLOW TIME	3. 3.58	11. 3.58
HYDROGRAPH AT +	XOF1	.01	1	FLOW TIME	0. 4.92	2. 3.58
HYDROGRAPH AT +	XON1	.00	1	FLOW TIME	0. 4.83	0. 3.58
HYDROGRAPH AT						

							EX
+	XON2	.00	1	FLOW TIME	0. 4.92	1. 3.58	
	HYDROGRAPH AT						
+	XON3	.00	1	FLOW TIME	0. 4.83	1. 3.58	
	HYDROGRAPH AT						
+	ST2	.00	1	FLOW TIME	1. 3.50	2. 3.50	
	5 COMBINED AT						
+	CP2	.02	1	FLOW TIME	1. 3.50	6. 3.58	

*** NORMAL END OF HEC-1 ***



INTERIM CONDITION

INT10

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
43	KK CP1
44	KM COMBINE DST1, DOF2, XOF3
45	HC 3
	*
46	KK CP-1
47	KM REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
48	BA .0001
49	BF 40
50	LS 0 63
51	UD .6
	*
52	KK RTCP-1
53	KM ROUTE CP-1 THROUGH CP3
54	RD 1021 .015 .030 TRAP
	*
55	KK XOF1
56	BA .0070
57	BF 0
58	LS 0 63
59	UD .134
	*
60	KK CP-RG
61	KM REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
62	BA .0001
63	BF 154
64	LS 0 63
65	UD .6
	*
66	KK DON1
67	BA .0023
68	BF 0
69	LS 0 80
70	UD .093
	*
71	KK DON2
72	BA .0021
73	LS 0 80
74	UD .092
	*
75	KK DCP2
76	KM COMBINE DON1, DON2
77	HC 2
	*

1

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
78	KK DON3
79	BA .0026
80	LS 0 80
81	UD .094
	*
82	KK DCP4
83	KM COMBINE DCP2, DON3
84	HC 2
	*
85	KK DST2
86	BA .0016
87	LS 0 98
88	UD .054
	*
89	KK CP3
90	KM COMBINE RTCP-1, XOF1, DST2, DCP4, CP-RG
91	HC 5
	*
92	ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT		
LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
22	DOF2	
	.	
	.	

35	.	DST1				
	.	.				
39	.	.	XOF3			
	.	.	.			
	.	.	.			
43	CP1.....					
	.					
46	.	CP-1				
	.	V				
	.	V				
52	.RTCP-1					
	.	.				
	.	.				
55	.	.	XOF1			
	.	.	.			
	.	.	.			
60	.	.	.	CP-RG		
	.	.	.	.		
	.	.	.	.		
66	.	.	.	.	DON1	
	.	.	.	.	.	
	.	.	.	.	.	
71	.	.	.	.	.	DON2
	.	.	.	.	.	.
	.	.	.	.	.	.
75	.	.	.	.	DCP2.....	
	.	.	.	.	.	
	.	.	.	.	.	
78	.	.	.	.	.	DON3
	.	.	.	.	.	.
	.	.	.	.	.	.
82	.	.	.	.	DCP4.....	
	.	.	.	.	.	
	.	.	.	.	.	
85	.	.	.	.	.	DST2
	.	.	.	.	.	.
	.	.	.	.	.	.
89	CP3.....					

```

1*****
*
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
*   RUN DATE   31JUL18   TIME   15:06:59
*
*****

```

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

--> 6-HOUR / SDN 3 <---

IT	HYDROGRAPH TIME DATA		
	NMIN	5	MINUTES IN COMPUTATION INTERVAL
	IDATE	1 0	STARTING DATE
	ITIME	0000	STARTING TIME
	NQ	300	NUMBER OF HYDROGRAPH ORDINATES
	NDDATE	2 0	ENDING DATE
	NDTIME	0055	ENDING TIME
	ICENT	19	CENTURY MARK

Page 3

INT10

ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-FEET
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 .56 1.00

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1 .56	RATIO 2 1.00
HYDROGRAPH AT					
+	DOF2	.01	1 FLOW	2.	8.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	DST1	.00	1 FLOW	3.	5.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	XOF3	.00	1 FLOW	0.	0.
			TIME	4.92	3.58
3 COMBINED AT					
+	CP1	.01	1 FLOW	4.	12.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	CP-1	.00	1 FLOW	40.	40.
			TIME	5.00	4.08
ROUTED TO					
+	RTCP-1	.00	1 FLOW	40.	40.
			TIME	5.00	4.25
HYDROGRAPH AT					
+	XOF1	.01	1 FLOW	0.	2.
			TIME	4.92	3.58
HYDROGRAPH AT					
+	CP-RG	.00	1 FLOW	154.	154.
			TIME	5.00	4.08
HYDROGRAPH AT					
+	DON1	.00	1 FLOW	1.	3.
			TIME	3.58	3.50
HYDROGRAPH AT					
+	DON2	.00	1 FLOW	1.	2.
			TIME	3.58	3.50
2 COMBINED AT					
+	DCP2	.00	1 FLOW	1.	5.
			TIME	3.58	3.50
HYDROGRAPH AT					
+	DON3	.00	1 FLOW	1.	3.
			TIME	3.58	3.50
2 COMBINED AT					
+	DCP4	.01	1 FLOW	2.	8.
			TIME	3.58	3.50
HYDROGRAPH AT					
+	DST2	.00	1 FLOW	2.	4.
			TIME	3.50	3.50
5 COMBINED AT					
+	CP3	.02	1 FLOW	198.	207.
			TIME	3.50	3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
 INTERPOLATED TO

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INT10	COMPUTATION PEAK	INTERVAL TIME TO PEAK	VOLUME
						DT			
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							
RTCP-1	MANE	2.20	40.00	316.96	15439.36	5.00	40.00	315.00	15444.30
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8247E+02 EXCESS= .0000E+00 OUTFLOW= .8247E+02 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RTCP-1	MANE	2.20	40.01	253.11	15439.30	5.00	40.01	255.00	15444.65
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8246E+02 EXCESS= .0000E+00 OUTFLOW= .8246E+02 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0									
*** NORMAL END OF HEC-1 ***									

INT100

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
43	KK CP1
44	KM COMBINE DST1, DOF2, XOF3
45	HC 3
	*
46	KK CP-1
47	KM REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
48	BA .0001
49	BF 81
50	LS 0 63
51	UD .6
	*
52	KK RTCP-1
53	KM ROUTE CP-1 THROUGH CP3
54	RD 1021 .015 .030 TRAP
	*
55	KK XOF1
56	BA .0070
57	BF 0
58	LS 0 63
59	UD .134
	*
60	KK CP-RG
61	KM REFERENCED FROM THE CENTENNIAL AND TEE PEE STUDY
62	BA .0001
63	BF 222
64	LS 0 63
65	UD .6
	*
66	KK DON1
67	BA .0023
68	BF 0
69	LS 0 80
70	UD .093
	*
71	KK DON2
72	BA .0021
73	LS 0 80
74	UD .092
	*
75	KK DCP2
76	KM COMBINE DON1, DON2
77	HC 2
	*

1

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
78	KK DON3
79	BA .0026
80	LS 0 80
81	UD .094
	*
82	KK DCP4
83	KM COMBINE DCP2, DON3
84	HC 2
	*
85	KK DST2
86	BA .0016
87	LS 0 98
88	UD .054
	*
89	KK CP3
90	KM COMBINE RTCP-1, XOF1, DST2, DCP4, CP-RG
91	HC 5
	*
92	ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT		
LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
22	DOF2	
	.	
	.	

[illegible]

```

1*****
*
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)
*           JUN   1998
*           VERSION 4.1
*
*   RUN DATE   31JUL18   TIME   15:07:07
*
*****

```

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

10-YR AND 100-YR STORM EVENT

TANEY ENGINEERING

INTERIM CONDITION

FILE: INT100.DAT

PROJECT No: ADV-17-086

DATE: JULY 2018

[illegible]

---> 6-HOUR / SDN 3 <---

IT	HYDROGRAPH TIME DATA		
	NMIN	5	MINUTES IN COMPUTATION INTERVAL
	IDATE	1 0	STARTING DATE
	ITIME	0000	STARTING TIME
	NQ	300	NUMBER OF HYDROGRAPH ORDINATES
	NDDATE	2 0	ENDING DATE
	NDTIME	0055	ENDING TIME
	ICENT	19	CENTURY MARK

Page 3

INT100

ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-Feet
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 .56 1.00

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1 .56	RATIO 2 1.00
HYDROGRAPH AT					
+	DOF2	.01	1 FLOW TIME	2. 3.58	8. 3.58
HYDROGRAPH AT					
+	DST1	.00	1 FLOW TIME	3. 3.50	5. 3.50
HYDROGRAPH AT					
+	XOF3	.00	1 FLOW TIME	0. 4.92	0. 3.58
3 COMBINED AT					
+	CP1	.01	1 FLOW TIME	4. 3.50	12. 3.50
HYDROGRAPH AT					
+	CP-1	.00	1 FLOW TIME	81. 5.00	81. 4.08
ROUTED TO					
+	RTCP-1	.00	1 FLOW TIME	81. 5.00	81. 4.08
HYDROGRAPH AT					
+	XOF1	.01	1 FLOW TIME	0. 4.92	2. 3.58
HYDROGRAPH AT					
+	CP-RG	.00	1 FLOW TIME	222. 5.00	222. 4.08
HYDROGRAPH AT					
+	DON1	.00	1 FLOW TIME	1. 3.58	3. 3.50
HYDROGRAPH AT					
+	DON2	.00	1 FLOW TIME	1. 3.58	2. 3.50
2 COMBINED AT					
+	DCP2	.00	1 FLOW TIME	1. 3.58	5. 3.50
HYDROGRAPH AT					
+	DON3	.00	1 FLOW TIME	1. 3.58	3. 3.50
2 COMBINED AT					
+	DCP4	.01	1 FLOW TIME	2. 3.58	8. 3.50
HYDROGRAPH AT					
+	DST2	.00	1 FLOW TIME	2. 3.50	4. 3.50
5 COMBINED AT					
+	CP3	.02	1 FLOW TIME	307. 3.50	316. 3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
 INTERPOLATED TO

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INT100			
						DT	COMPUTATION PEAK	INTERVAL TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RTCP-1	MANE	1.85	81.00	317.37	31265.79	5.00	81.00	315.00	31274.61
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1670E+03 EXCESS= .0000E+00 OUTFLOW= .1670E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RTCP-1	MANE	1.85	81.01	252.78	31265.69	5.00	81.01	255.00	31274.96
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1670E+03 EXCESS= .0000E+00 OUTFLOW= .1670E+03 BASIN STORAGE=-.2235E-07 PERCENT ERROR= .0									
*** NORMAL END OF HEC-1 ***									



DEVELOPED CONDITION

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10	DEV
43	KK DCP1	
44	KM COMBINE DOF2, DST1, DOF3	
45	HC 3	
	*	
46	KK DOF1	
47	BA .0070	
48	LS 0	80
49	UD .094	
	*	
50	KK DON1	
51	BA .0023	
52	LS 0	80
53	UD .093	
	*	
54	KK DON2	
55	BA .0021	
56	LS 0	80
57	UD .092	
	*	
58	KK DCP2	
59	KM COMBINE DON1, DON2	
60	HC 2	
	*	
61	KK DON3	
62	BA .0026	
63	LS 0	80
64	UD .094	
	*	
65	KK DCP4	
66	KM COMBINE DCP2, DON3	
67	HC 2	
	*	
68	KK DST2	
69	BA .0016	
70	LS 0	98
71	UD .054	
	*	
72	KK DCP3	
73	KM COMBINE DOF1, DST2, DCP4	
74	HC 3	
	*	
75	ZZ	

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
22	DOF2	
	.	
35	DST1	
	.	
39	DOF3	
	.	
43	DCP1.....	
	.	
46	DOF1	
	.	
50	DON1	
	.	
54	DON2	
	.	
58	DCP2.....	
	.	
61	DON3	
	.	
65	DCP4.....	
	.	
	.	

68 . . . DST2

 72 . . . DCP3

```
*****  
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *  
* JUN 1998 *  
* VERSION 4.1 *  
* *  
* RUN DATE 31JUL18 TIME 15:03:33 *  
* *  
*****
```

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

TANEY ENGINEERING
ULTIMATE CONDITION
FILE: ULT.DAT
PROJECT No: ADV-17-086
DATE: JULY 2018

---> 6-HOUR / SDN 3 <---

IT	HYDROGRAPH TIME DATA			
		NMIN	5	MINUTES IN COMPUTATION INTERVAL
		IDATE	1 0	STARTING DATE
		ITIME	0000	STARTING TIME
		NQ	300	NUMBER OF HYDROGRAPH ORDINATES
		NDDATE	2 0	ENDING DATE
		NDTIME	0055	ENDING TIME
		ICENT	19	CENTURY MARK

ENGLISH UNITS	
DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE- FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JR	MULTI-RATIO OPTION
	RATIOS OF PRECIPITATION
	.56 1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

Page 3

						DEV
+	DOF3	.00	1	FLOW TIME	0. 3.50	1. 3.50
3 COMBINED AT						
+	DCP1	.01	1	FLOW TIME	5. 3.50	13. 3.50
HYDROGRAPH AT						
+	DOF1	.01	1	FLOW TIME	2. 3.58	8. 3.50
HYDROGRAPH AT						
+	DON1	.00	1	FLOW TIME	1. 3.58	3. 3.50
HYDROGRAPH AT						
+	DON2	.00	1	FLOW TIME	1. 3.58	2. 3.50
2 COMBINED AT						
+	DCP2	.00	1	FLOW TIME	1. 3.58	5. 3.50
HYDROGRAPH AT						
+	DON3	.00	1	FLOW TIME	1. 3.58	3. 3.50
2 COMBINED AT						
+	DCP4	.01	1	FLOW TIME	2. 3.58	8. 3.50
HYDROGRAPH AT						
+	DST2	.00	1	FLOW TIME	2. 3.50	4. 3.50
3 COMBINED AT						
+	DCP3	.02	1	FLOW TIME	6. 3.50	19. 3.50

*** NORMAL END OF HEC-1 ***



APPENDIX D

Hydraulic Calculations



EXISTING CONDITION

Worksheet for A CENT EX 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 43.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.88
0+15.0	2630.38
0+30.0	2630.88
0+50.0	2631.08
0+70.0	2630.88
0+82.5	2630.38
0+95.0	2630.88

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.88)	(0+30.0, 2630.88)	0.025
(0+30.0, 2630.88)	(0+70.0, 2630.88)	0.016
(0+70.0, 2630.88)	(0+95.0, 2630.88)	0.025

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 0.49 ft
Elevation Range 2630.38 to 2631.08 ft
Flow Area 13.10 ft²
Wetted Perimeter 53.73 ft

Worksheet for A CENT EX 10 YR

Results

Hydraulic Radius	0.24	ft
Top Width	53.69	ft
Normal Depth	0.49	ft
Critical Depth	0.52	ft
Critical Slope	0.01443	ft/ft
Velocity	3.28	ft/s
Velocity Head	0.17	ft
Specific Energy	0.66	ft
Froude Number	1.17	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.52	ft
Channel Slope	2.00	%
Critical Slope	0.01443	ft/ft

Cross Section for A CENT EX 10 YR

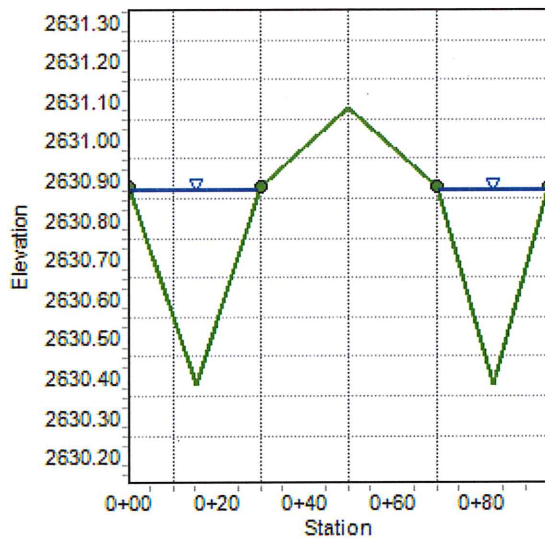
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.49 ft
Discharge 43.00 ft³/s

Cross Section Image



Worksheet for A CENT EX 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 92.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.88
0+15.0	2630.38
0+30.0	2630.88
0+50.0	2631.08
0+70.0	2630.88
0+82.5	2630.38
0+95.0	2630.88

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.88)	(0+30.0, 2630.88)	0.025
(0+30.0, 2630.88)	(0+70.0, 2630.88)	0.016
(0+70.0, 2630.88)	(0+95.0, 2630.88)	0.025

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 0.63 ft
Elevation Range 2630.38 to 2631.08 ft
Flow Area 22.99 ft²
Wetted Perimeter 82.29 ft

Worksheet for A CENT EX 100 YR

Results

Hydraulic Radius	0.28	ft
Top Width	81.98	ft
Normal Depth	0.63	ft
Critical Depth	0.71	ft
Critical Slope	0.01095	ft/ft
Velocity	4.00	ft/s
Velocity Head	0.25	ft
Specific Energy	0.88	ft
Froude Number	1.33	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.63	ft
Critical Depth	0.71	ft
Channel Slope	2.00	%
Critical Slope	0.01095	ft/ft

Project Description

Manning Formula

Normal Depth

92.00 ft³/s

Worksheet for B REG EX 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 195.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.60
0+11.0	0.00
0+22.0	0.47
0+30.0	0.63
0+38.0	0.47
0+49.0	0.00
0+60.0	0.60
0+60.0	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+22.0, 0.47)	0.025
(0+22.0, 0.47)	(0+38.0, 0.47)	0.016
(0+38.0, 0.47)	(0+60.0, 3.00)	0.025

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 0.88 ft
Elevation Range 0.00 to 3.00 ft

Worksheet for B REG EX 10 YR

Results

Flow Area	32.38	ft²
Wetted Perimeter	60.62	ft
Hydraulic Radius	0.53	ft
Top Width	60.00	ft
Normal Depth	0.88	ft
Critical Depth	1.03	ft
Critical Slope	0.00888	ft/ft
Velocity	6.02	ft/s
Velocity Head	0.56	ft
Specific Energy	1.45	ft
Froude Number	1.45	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.88	ft
Critical Depth	1.03	ft
Channel Slope	2.00	%
Critical Slope	0.00888	ft/ft

Cross Section for B REG EX 10 YR

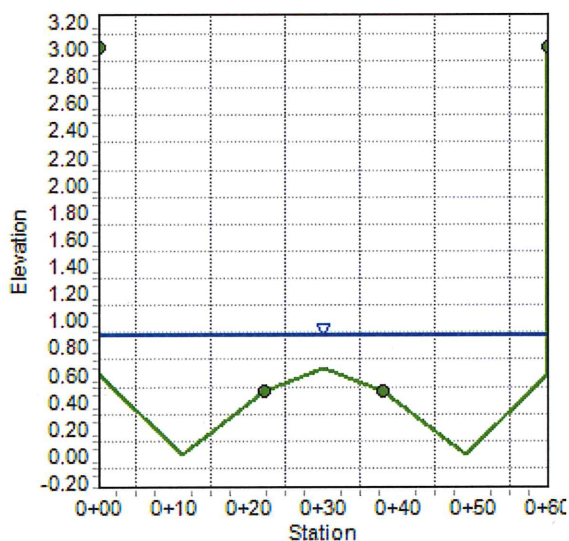
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.88 ft
Discharge 195.00 ft³/s

Cross Section Image



Worksheet for B REG EX 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 309.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.60
0+11.0	0.00
0+22.0	0.47
0+30.0	0.63
0+38.0	0.47
0+49.0	0.00
0+60.0	0.60
0+60.0	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+22.0, 0.47)	0.025
(0+22.0, 0.47)	(0+38.0, 0.47)	0.016
(0+38.0, 0.47)	(0+60.0, 3.00)	0.025

Options

Current Roughness Vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 1.06 ft
Elevation Range 0.00 to 3.00 ft

Worksheet for B REG EX 100 YR

Results

Flow Area	42.78	ft ²
Wetted Perimeter	60.97	ft
Hydraulic Radius	0.70	ft
Top Width	60.00	ft
Normal Depth	1.06	ft
Critical Depth	1.28	ft
Critical Slope	0.00811	ft/ft
Velocity	7.22	ft/s
Velocity Head	0.81	ft
Specific Energy	1.87	ft
Froude Number	1.51	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.06	ft
Critical Depth	1.28	ft
Channel Slope	2.00	%
Critical Slope	0.00811	ft/ft



INTERIM CONDITION

Worksheet for A CENT INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 44.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.013
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.016
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.013

Options

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

Worksheet for A CENT INT 10 YR

Results

Normal Depth	0.54	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	10.10	ft ²
Wetted Perimeter	55.33	ft
Hydraulic Radius	0.18	ft
Top Width	54.31	ft
Normal Depth	0.54	ft
Critical Depth	0.64	ft
Critical Slope	0.00588	ft/ft
Velocity	4.36	ft/s
Velocity Head	0.29	ft
Specific Energy	0.84	ft
Froude Number	1.78	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.54	ft
Critical Depth	0.64	ft
Channel Slope	2.00	%
Critical Slope	0.00588	ft/ft

Cross Section for A CENT INT 10 YR

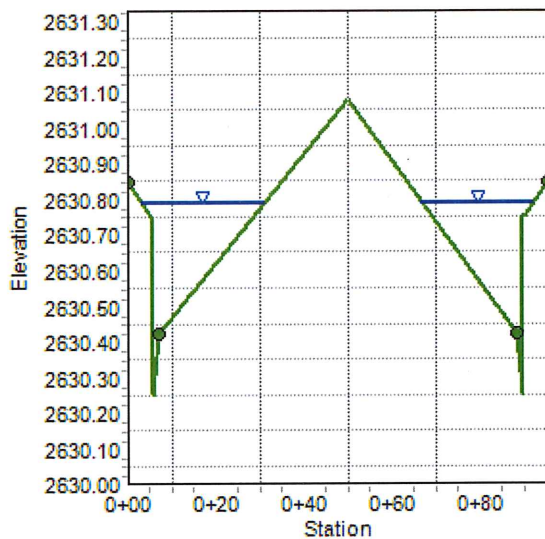
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.54 ft
Discharge 44.00 ft³/s

Cross Section Image



Worksheet for A CENT INT 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 94.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.013
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.016
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.013

Options

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

Worksheet for A CENT INT 100 YR

Results

Normal Depth	0.66	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	18.01	ft ²
Wetted Perimeter	75.77	ft
Hydraulic Radius	0.24	ft
Top Width	74.61	ft
Normal Depth	0.66	ft
Critical Depth	0.80	ft
Critical Slope	0.00519	ft/ft
Velocity	5.22	ft/s
Velocity Head	0.42	ft
Specific Energy	1.09	ft
Froude Number	1.87	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.66	ft
Critical Depth	0.80	ft
Channel Slope	2.00	%
Critical Slope	0.00519	ft/ft

Cross Section for A CENT INT 100 YR

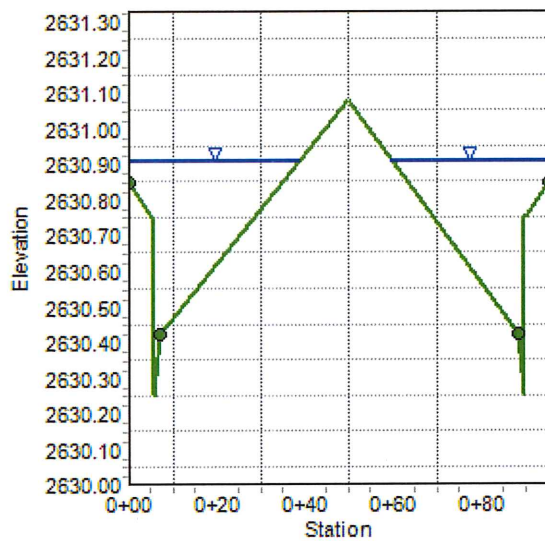
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.66 ft
Discharge 94.00 ft³/s

Cross Section Image



Worksheet for B REG INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 198.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+54.5	0.00
0+54.5	0.50
0+55.0	0.50
0+60.0	0.60
0+60.0	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+07.0, 0.17)	0.013
(0+07.0, 0.17)	(0+53.0, 0.17)	0.016
(0+53.0, 0.17)	(0+60.0, 3.00)	0.013

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Worksheet for B REG INT 10 YR

Results

Normal Depth	0.84	ft
Elevation Range	0.00 to 3.00	ft
Flow Area	25.76	ft ²
Wetted Perimeter	61.51	ft
Hydraulic Radius	0.42	ft
Top Width	60.00	ft
Normal Depth	0.84	ft
Critical Depth	1.11	ft
Critical Slope	0.00402	ft/ft
Velocity	7.69	ft/s
Velocity Head	0.92	ft
Specific Energy	1.76	ft
Froude Number	2.07	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.84	ft
Critical Depth	1.11	ft
Channel Slope	2.00	%
Critical Slope	0.00402	ft/ft

Project Description

Normal Depth

198.00 ft³/s

The graph displays the elevation of a road profile (blue line) and the ground surface (green line) over a station range from 0+00 to 0+60. The road profile shows a dip at station 0+05 and a rise at station 0+55. The ground surface is consistently higher than the road profile. A blue triangle points to the road profile at station 0+30.

Station	Road Profile Elevation	Ground Surface Elevation
0+00	0.60	3.00
0+05	0.00	0.20
0+10	0.20	0.40
0+20	0.40	0.60
0+30	0.60	0.80
0+40	0.40	0.60
0+50	0.20	0.40
0+55	0.50	0.50
0+60	0.60	3.00

Project Description

Input Data

Station (ft)	Elevation (ft)
--------------	----------------

Roughness Segment Definitions

Options

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Worksheet for B REG INT 100 YR

Results

Normal Depth	0.98	ft
Elevation Range	0.00 to 3.00	ft
Flow Area	34.13	ft ²
Wetted Perimeter	61.79	ft
Hydraulic Radius	0.55	ft
Top Width	60.00	ft
Normal Depth	0.98	ft
Critical Depth	1.36	ft
Critical Slope	0.00366	ft/ft
Velocity	9.26	ft/s
Velocity Head	1.33	ft
Specific Energy	2.31	ft
Froude Number	2.16	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.98	ft
Critical Depth	1.36	ft
Channel Slope	2.00	%
Critical Slope	0.00366	ft/ft

Project Description

Manning Formula

Normal Depth

Channel Slope	2.00	%
Normal Depth	0.98	ft
Discharge	316.00	ft ³ /s

Worksheet for C PRIV INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 2.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for C PRIV INT 10 YR

Results

Normal Depth	0.22	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	0.85	ft ²
Wetted Perimeter	12.17	ft
Hydraulic Radius	0.07	ft
Top Width	12.08	ft
Normal Depth	0.22	ft
Critical Depth	0.25	ft
Critical Slope	0.00784	ft/ft
Velocity	2.35	ft/s
Velocity Head	0.09	ft
Specific Energy	0.31	ft
Froude Number	1.56	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.22	ft
Critical Depth	0.25	ft
Channel Slope	2.00	%
Critical Slope	0.00784	ft/ft

Project Description

Manning Formula

Normal Depth

2.00 ft³/s

Worksheet for C PRIV INT 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 8.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Worksheet for C PRIV INT 100 YR

Results

Normal Depth	0.32	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	2.52	ft ²
Wetted Perimeter	22.25	ft
Hydraulic Radius	0.11	ft
Top Width	22.12	ft
Normal Depth	0.32	ft
Critical Depth	0.39	ft
Critical Slope	0.00740	ft/ft
Velocity	3.18	ft/s
Velocity Head	0.16	ft
Specific Energy	0.47	ft
Froude Number	1.66	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.39	ft
Channel Slope	2.00	%
Critical Slope	0.00740	ft/ft

Project Description

Normal Depth

8.00 ft³/s

Worksheet for D CENT INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.016
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.013
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.016

Options

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

Worksheet for D CENT INT 10 YR

Results

Normal Depth	0.21	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	0.46	ft ²
Wetted Perimeter	8.19	ft
Hydraulic Radius	0.06	ft
Top Width	7.76	ft
Normal Depth	0.21	ft
Critical Depth	0.23	ft
Critical Slope	0.00793	ft/ft
Velocity	2.16	ft/s
Velocity Head	0.07	ft
Specific Energy	0.28	ft
Froude Number	1.56	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.23	ft
Channel Slope	2.00	%
Critical Slope	0.00793	ft/ft

Project Description

Manning Formula

Normal Depth

1.00 ft³/s

Worksheet for D CENT INT 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 2.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.016
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.013
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.016

Options

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

Worksheet for D CENT INT 100 YR

Results

Normal Depth	0.24	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	0.82	ft ²
Wetted Perimeter	12.66	ft
Hydraulic Radius	0.06	ft
Top Width	12.15	ft
Normal Depth	0.24	ft
Critical Depth	0.28	ft
Critical Slope	0.00688	ft/ft
Velocity	2.44	ft/s
Velocity Head	0.09	ft
Specific Energy	0.34	ft
Froude Number	1.66	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.28	ft
Channel Slope	2.00	%
Critical Slope	0.00688	ft/ft

Cross Section for D CENT INT 100 YR

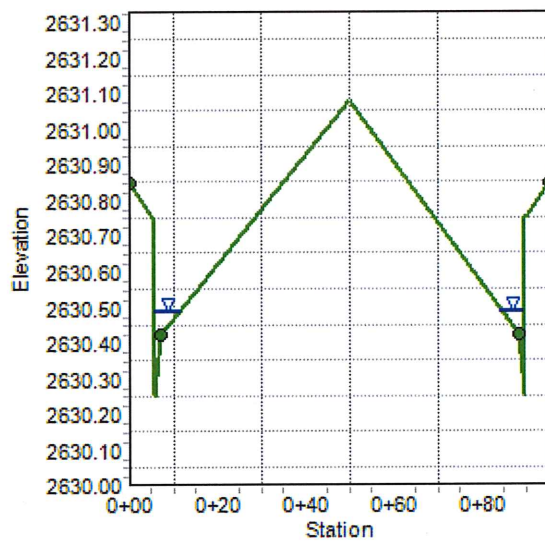
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.24 ft
Discharge 2.00 ft³/s

Cross Section Image



Worksheet for E PRIV INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Worksheet for E PRIV INT 10 YR

Results

Normal Depth	0.18	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	0.48	ft ²
Wetted Perimeter	8.44	ft
Hydraulic Radius	0.06	ft
Top Width	8.36	ft
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Critical Slope	0.00819	ft/ft
Velocity	2.08	ft/s
Velocity Head	0.07	ft
Specific Energy	0.25	ft
Froude Number	1.52	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Channel Slope	2.00	%
Critical Slope	0.00819	ft/ft

Project Description

Manning Formula

Normal Depth

1.00 ft³/s

The graph shows the vertical alignment of a road. The x-axis represents the stationing from 0+00 to 0+45, and the y-axis represents the elevation from -0.20 to 0.70. The green line represents the existing ground surface, and the blue line represents the proposed road grade. The road grade starts at an elevation of 0.38 at station 0+00, drops to 0.18 at station 0+05, rises to 0.48 at station 0+25, and then drops to 0.18 at station 0+40 before rising to 0.38 at station 0+45. Vertical curve points are marked with black dots at stations 0+05 and 0+40.

Project Description

Input Data

Station (ft)	Elevation (ft)
--------------	----------------

Roughness Segment Definitions

Options

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7/31/2018 4:16:19 PM 27 Siemens Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

Worksheet for E PRIV INT 100 YR

Results

Normal Depth	0.25	ft
Elevation Range	0.00 to 0.48 ft	
Flow Area	1.18	ft ²
Wetted Perimeter	14.72	ft
Hydraulic Radius	0.08	ft
Top Width	14.62	ft
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Critical Slope	0.00757	ft/ft
Velocity	2.54	ft/s
Velocity Head	0.10	ft
Specific Energy	0.35	ft
Froude Number	1.58	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Channel Slope	2.00	%
Critical Slope	0.00757	ft/ft

Project Description

Manning Formula

Normal Depth

3.00 ft³/s

Worksheet for F PRIV INT 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for F PRIV INT 10 YR

Results

Normal Depth	0.18	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	0.48	ft ²
Wetted Perimeter	8.44	ft
Hydraulic Radius	0.06	ft
Top Width	8.36	ft
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Critical Slope	0.00819	ft/ft
Velocity	2.08	ft/s
Velocity Head	0.07	ft
Specific Energy	0.25	ft
Froude Number	1.52	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Channel Slope	2.00	%
Critical Slope	0.00819	ft/ft

Project Description

Manning Formula

Normal Depth

Channel Slope

2.00 %

0.18 ft

1.00 ft³/s

The graph shows the vertical alignment of a road. The x-axis represents the stationing from 0+00 to 0+45, and the y-axis represents the elevation from -0.20 to 0.70. The green line represents the existing ground surface, and the blue line represents the proposed road grade. The road grade is a straight line from station 0+05 to 0+40, with a constant elevation of 0.18. The ground surface is higher than the road grade between stations 0+05 and 0+40, and lower than the road grade between stations 0+00 and 0+05, and between stations 0+40 and 0+45.

Station	Elevation (Ground)	Elevation (Proposed Road Grade)
0+00	0.38	-
0+05	0.00	0.18
0+10	0.15	0.18
0+25	0.48	0.18
0+40	0.00	0.18
0+45	0.38	-

Worksheet for F PRIV INT 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for F PRIV INT 100 YR

Results

Normal Depth	0.28	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	1.75	ft ²
Wetted Perimeter	18.32	ft
Hydraulic Radius	0.10	ft
Top Width	18.21	ft
Normal Depth	0.28	ft
Critical Depth	0.32	ft
Critical Slope	0.00718	ft/ft
Velocity	2.85	ft/s
Velocity Head	0.13	ft
Specific Energy	0.41	ft
Froude Number	1.62	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.32	ft
Channel Slope	2.00	%
Critical Slope	0.00718	ft/ft



DEVELOPED CONDITION

Worksheet for A CENT DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 45.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.013
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.016
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.013

Options

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

Worksheet for A CENT DEV 10 YR

Results

Normal Depth	0.55	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	10.29	ft ²
Wetted Perimeter	56.11	ft
Hydraulic Radius	0.18	ft
Top Width	55.08	ft
Normal Depth	0.55	ft
Critical Depth	0.64	ft
Critical Slope	0.00585	ft/ft
Velocity	4.37	ft/s
Velocity Head	0.30	ft
Specific Energy	0.84	ft
Froude Number	1.78	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.64	ft
Channel Slope	2.00	%
Critical Slope	0.00585	ft/ft

Project Description

Normal Depth

45.00 ft³/s

The profile view graph displays the vertical alignment of a road. The vertical axis represents Elevation in feet, ranging from 2630.00 to 2631.30. The horizontal axis represents Stationing, ranging from 0+00 to 0+80. The profile line is shown in green, and a blue line indicates a 1% grade. The profile shows a road with a peak at station 0+50 and a dip at station 0+05 and 0+85.

Station	Elevation (ft)
0+00	2630.85
0+05	2630.45
0+50	2631.10
0+85	2630.45
0+90	2630.85

Worksheet for A CENT DEV 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 94.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+05.5	2630.25
0+07.0	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.0, 2630.42)	0.013
(0+07.0, 2630.42)	(0+88.0, 2630.42)	0.016
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.013

Options

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

Worksheet for A CENT DEV 100 YR

Results

Normal Depth	0.66	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	18.01	ft ²
Wetted Perimeter	75.77	ft
Hydraulic Radius	0.24	ft
Top Width	74.61	ft
Normal Depth	0.66	ft
Critical Depth	0.80	ft
Critical Slope	0.00519	ft/ft
Velocity	5.22	ft/s
Velocity Head	0.42	ft
Specific Energy	1.09	ft
Froude Number	1.87	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.66	ft
Critical Depth	0.80	ft
Channel Slope	2.00	%
Critical Slope	0.00519	ft/ft

Project Description

Manning Formula

Normal Depth

94.00 ft³/s

The graph shows the vertical alignment of a road. The y-axis represents Elevation in feet, ranging from 2630.00 to 2631.30. The x-axis represents Stationing, ranging from 0+00 to 1+00. A green line represents the proposed road profile, which includes a vertical curve. A blue line represents the existing ground profile. Blue triangles indicate the vertical curve data points at stations 0+20 and 0+80.

Station	Proposed Elevation (ft)	Existing Elevation (ft)
0+00	2630.85	2630.90
0+05	2630.45	2630.90
0+10	2630.25	2630.90
0+20	2630.70	2630.90
0+30	2630.85	2630.90
0+40	2631.00	2630.90
0+50	2631.10	2630.90
0+60	2631.00	2630.90
0+70	2630.85	2630.90
0+80	2630.70	2630.90
0+90	2630.45	2630.90
0+95	2630.25	2630.90
1+00	2630.85	2630.90

Worksheet for B REG DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 200.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+54.5	0.00
0+54.5	0.50
0+55.0	0.50
0+60.0	0.60
0+60.0	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+07.0, 0.17)	0.013
(0+07.0, 0.17)	(0+53.0, 0.17)	0.016
(0+53.0, 0.17)	(0+60.0, 3.00)	0.013

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Worksheet for B REG DEV 10 YR

Results

Normal Depth	0.84	ft
Elevation Range	0.00 to 3.00	ft
Flow Area	25.91	ft ²
Wetted Perimeter	61.52	ft
Hydraulic Radius	0.42	ft
Top Width	60.00	ft
Normal Depth	0.84	ft
Critical Depth	1.11	ft
Critical Slope	0.00401	ft/ft
Velocity	7.72	ft/s
Velocity Head	0.93	ft
Specific Energy	1.77	ft
Froude Number	2.07	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.84	ft
Critical Depth	1.11	ft
Channel Slope	2.00	%
Critical Slope	0.00401	ft/ft

Project Description

Manning Formula

Normal Depth

200.00 ft³/s

Worksheet for B REG DEV 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 322.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+54.5	0.00
0+54.5	0.50
0+55.0	0.50
0+60.0	0.60
0+60.0	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+07.0, 0.17)	0.013
(0+07.0, 0.17)	(0+53.0, 0.17)	0.016
(0+53.0, 0.17)	(0+60.0, 3.00)	0.013

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Worksheet for B REG DEV 100 YR

Results

Normal Depth	0.99	ft
Elevation Range	0.00 to 3.00	ft
Flow Area	34.54	ft ²
Wetted Perimeter	61.80	ft
Hydraulic Radius	0.56	ft
Top Width	60.00	ft
Normal Depth	0.99	ft
Critical Depth	1.37	ft
Critical Slope	0.00365	ft/ft
Velocity	9.32	ft/s
Velocity Head	1.35	ft
Specific Energy	2.34	ft
Froude Number	2.17	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.99	ft
Critical Depth	1.37	ft
Channel Slope	2.00	%
Critical Slope	0.00365	ft/ft

Project Description

Manning Formula

Normal Depth

322.00 ft³/s

Worksheet for C PRIV DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 2.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for C PRIV DEV 10 YR

Results

Normal Depth	0.22	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	0.85	ft ²
Wetted Perimeter	12.17	ft
Hydraulic Radius	0.07	ft
Top Width	12.08	ft
Normal Depth	0.22	ft
Critical Depth	0.25	ft
Critical Slope	0.00784	ft/ft
Velocity	2.35	ft/s
Velocity Head	0.09	ft
Specific Energy	0.31	ft
Froude Number	1.56	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.22	ft
Critical Depth	0.25	ft
Channel Slope	2.00	%
Critical Slope	0.00784	ft/ft

Project Description

Manning Formula

Normal Depth

2.00 ft³/s

Project Description

Input Data

Station (ft)

Elevation (ft)

Roughness Segment Definitions

Start Station

Ending Station

Roughness Coefficient

Options

Bentley Systems, Inc. Haestad Methods SoBentley, Inc. Master V8i (SELECTseries 1) [08.11.01.03]

Worksheet for C PRIV DEV 100 YR

Results

Normal Depth	0.32	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	2.52	ft ²
Wetted Perimeter	22.25	ft
Hydraulic Radius	0.11	ft
Top Width	22.12	ft
Normal Depth	0.32	ft
Critical Depth	0.39	ft
Critical Slope	0.00740	ft/ft
Velocity	3.18	ft/s
Velocity Head	0.16	ft
Specific Energy	0.47	ft
Froude Number	1.66	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.39	ft
Channel Slope	2.00	%
Critical Slope	0.00740	ft/ft

Project Description

Manning Formula

Normal Depth

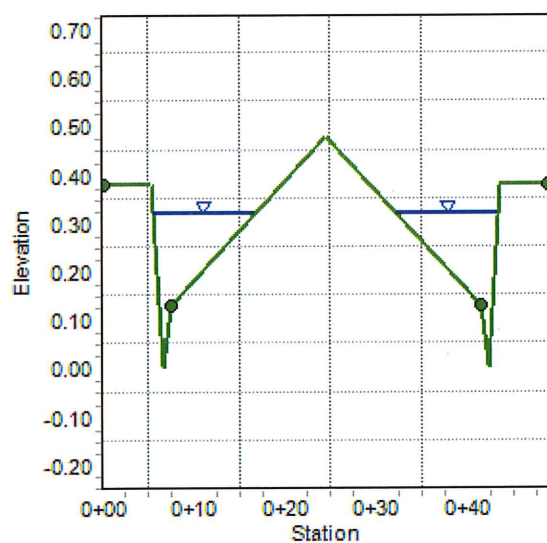
Input Data

2.00 %

0.32 ft

8.00 ft³/s

Cross Section Image



Worksheet for D CENT DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+06.5	2630.25
0+07.5	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.5, 2630.42)	0.016
(0+07.5, 2630.42)	(0+88.0, 2630.42)	0.013
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.016

Options

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

Worksheet for D CENT DEV 10 YR

Results

Normal Depth	0.21	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	0.46	ft ²
Wetted Perimeter	8.22	ft
Hydraulic Radius	0.06	ft
Top Width	7.93	ft
Normal Depth	0.21	ft
Critical Depth	0.24	ft
Critical Slope	0.00770	ft/ft
Velocity	2.16	ft/s
Velocity Head	0.07	ft
Specific Energy	0.28	ft
Froude Number	1.58	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.24	ft
Channel Slope	2.00	%
Critical Slope	0.00770	ft/ft

Worksheet for D CENT DEV 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 2.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	2630.85
0+05.0	2630.75
0+05.5	2630.75
0+06.5	2630.25
0+07.5	2630.42
0+50.0	2631.08
0+88.0	2630.42
0+89.5	2630.25
0+89.5	2630.75
0+90.0	2630.75
0+95.0	2630.85

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 2630.85)	(0+07.5, 2630.42)	0.016
(0+07.5, 2630.42)	(0+88.0, 2630.42)	0.013
(0+88.0, 2630.42)	(0+95.0, 2630.85)	0.016

Options

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

Worksheet for D CENT DEV 100 YR

Results

Normal Depth	0.25	ft
Elevation Range	2630.25 to 2631.08 ft	
Flow Area	0.82	ft ²
Wetted Perimeter	12.60	ft
Hydraulic Radius	0.06	ft
Top Width	12.27	ft
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Critical Slope	0.00674	ft/ft
Velocity	2.45	ft/s
Velocity Head	0.09	ft
Specific Energy	0.34	ft
Froude Number	1.67	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Channel Slope	2.00	%
Critical Slope	0.00674	ft/ft

Cross Section for D CENT DEV 100 YR

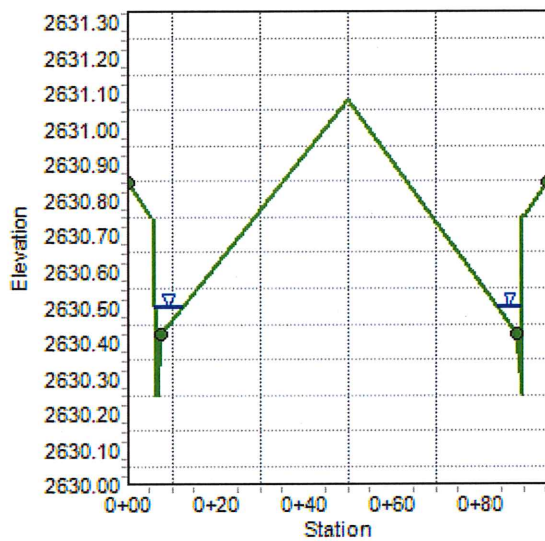
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.25 ft
Discharge 2.00 ft³/s

Cross Section Image



Worksheet for E PRIV DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for E PRIV DEV 10 YR

Results

Normal Depth	0.18	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	0.48	ft ²
Wetted Perimeter	8.44	ft
Hydraulic Radius	0.06	ft
Top Width	8.36	ft
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Critical Slope	0.00819	ft/ft
Velocity	2.08	ft/s
Velocity Head	0.07	ft
Specific Energy	0.25	ft
Froude Number	1.52	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

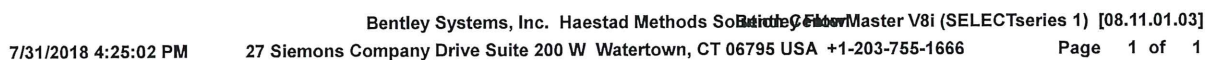
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Channel Slope	2.00	%
Critical Slope	0.00819	ft/ft

Project Description

Input Data

Cross Section Image



Worksheet for E PRIV DEV 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 3.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for E PRIV DEV 100 YR

Results

Normal Depth	0.25	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	1.18	ft ²
Wetted Perimeter	14.72	ft
Hydraulic Radius	0.08	ft
Top Width	14.62	ft
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Critical Slope	0.00757	ft/ft
Velocity	2.54	ft/s
Velocity Head	0.10	ft
Specific Energy	0.35	ft
Froude Number	1.58	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.28	ft
Channel Slope	2.00	%
Critical Slope	0.00757	ft/ft

Project Description

Manning Formula

Normal Depth

3.00 ft³/s

Worksheet for F PRIV DEV 10 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for F PRIV DEV 10 YR

Results

Normal Depth		0.18	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		0.48	ft ²
Wetted Perimeter		8.44	ft
Hydraulic Radius		0.06	ft
Top Width		8.36	ft
Normal Depth		0.18	ft
Critical Depth		0.21	ft
Critical Slope		0.00819	ft/ft
Velocity		2.08	ft/s
Velocity Head		0.07	ft
Specific Energy		0.25	ft
Froude Number		1.52	
Flow Type	Supercritical		

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.21	ft
Channel Slope	2.00	%
Critical Slope	0.00819	ft/ft

Worksheet for F PRIV DEV 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.38
0+05.0	0.38
0+05.4	0.38
0+06.5	0.00
0+07.5	0.13
0+24.5	0.48
0+41.5	0.13
0+42.5	0.00
0+43.6	0.38
0+44.0	0.38
0+49.0	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.38)	(0+07.5, 0.13)	0.013
(0+07.5, 0.13)	(0+41.5, 0.13)	0.016
(0+41.5, 0.13)	(0+49.0, 0.38)	0.013

Options

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

Worksheet for F PRIV DEV 100 YR

Results

Normal Depth	0.28	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	1.75	ft²
Wetted Perimeter	18.32	ft
Hydraulic Radius	0.10	ft
Top Width	18.21	ft
Normal Depth	0.28	ft
Critical Depth	0.32	ft
Critical Slope	0.00718	ft/ft
Velocity	2.85	ft/s
Velocity Head	0.13	ft
Specific Energy	0.41	ft
Froude Number	1.62	
Flow Type	Supercritical	

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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.32	ft
Channel Slope	2.00	%
Critical Slope	0.00718	ft/ft

Cross Section for F PRIV DEV 100 YR

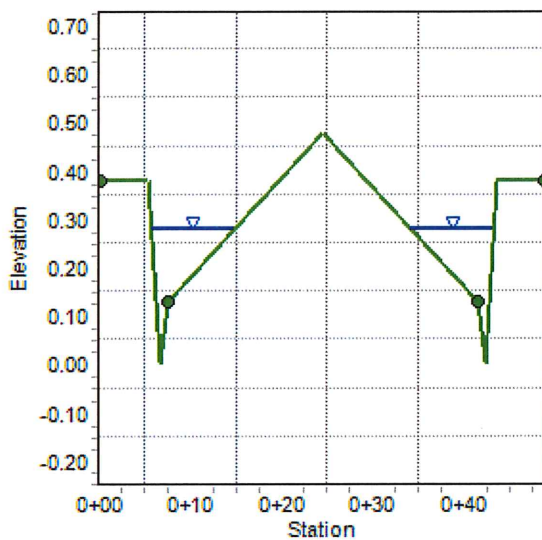
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.00 %
Normal Depth 0.28 ft
Discharge 5.00 ft³/s

Cross Section Image





APPENDIX E

Reference Material

Cross section locations for the normal depth calculations for developed conditions have been shown on Figure 6R. Offsite storm flows used for the developed condition have not been revised from the first submittal of this update. As is shown in the summary table for the 100-year storm hydraulic calculations, the $V \cdot D$ product is equal to or less than 8. Velocities are greater than 5 fps in Regina Avenue and in Azure Drive under developed conditions, therefore a 3-foot deep cutoff wall is proposed for erosion protection adjacent to the pavement in the rural streets. Normal depth calculations of cross sections that have been revised have been included in Appendix B. Asterisks have been added to the Hydraulic Summary Tables on Figure 6R for the normal depth calculations that have been revised from the first submittal to this update.

The normal depth calculation for Cross Sections 1F in Centennial Parkway were revised to show that the 100-year storm flow and 10-year storm flow will meet Clark County criteria with the storm flows split evenly in both sides of the street.

Cross Sections 3F, 4F, and 9F were cut in Regena Avenue for the revised cross sections using a 6-foot landscape strip with riprap. The $V \cdot D$ product is equal to or less than 8 in all cases. The normal depth calculation for Cross Section 9F was also revised with 222 cfs instead of 221 cfs which is an additional 100-year storm flow of 1 cfs more that will be generated in Subbasin ON1 due to hydrologic revisions. The normal depth calculation for Cross Section 6F in Azure Drive was also revised using the riprap in the landscape easement and with 174 cfs instead of 173 cfs which is an additional 100-year storm flow of 1 cfs more that will be generated in Subbasin ON3 due to hydrologic revisions.

storm event 10-year calculations were not required for those cross sections. Ten year storm flow calculations were conducted for Regena Avenue and Azure Drive since Manual criteria for a 10-year storm event is not met during a 100-year storm event ($D*V$ less than 6). Onsite streets will be constructed 39 feet wide with roll curb and gutter and a sidewalk on one side. Cross sections were cut for the flattest and steepest slopes for the interior streets. Additionally, future conditions storm flow calculations were conducted for the adjacent 60-foot streets assuming that curb, gutter and sidewalk may be required at some future date and to ensure that Manual criteria is met under those conditions.

TABLE 2 100-YEAR HYDRAULIC SECTIONS					
Location*	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (ft/sec)	$D*V_{100}$
Section 1E Centennial Parkway	2.70	45	1.02	5.54	N/A
Section 1F Centennial Parkway-North Half	2.65	162	0.95	8.62	8.2
Section 2E Tee Pee Lane West	1.25	24	0.88	3.62	N/A
Section 2E Tee Pee Lane East	1.25	1	0.28	1.76	N/A
Section 3F Regena Avenue	2.70	246	1.21	7.71	9.3
Section 4F Regena Avenue	2.93	216	1.16	7.54	8.7
Section 5F Tee Pee Lane	2.81	30	0.65	4.7	3.1
Section 6F Azure Drive	3.46	173	1.07	7.34	7.9
Section 7F Tee Pee Lane	1.22	30	0.78	3.14	2.4
Section 8F Bright Angel Way	2.07	52	0.84	4.45	3.7
Section 9F Regena Avenue	2.70	216	1.18	7.40	8.7
Section 10 Eagan Ranch Court (flattest)	1.29	5	0.28	2.57	0.7
Section 11 Flaxa Ranch Court (steepest)	1.52	18	0.40	3.61	1.4

*See Figure 6

In most cases the streets do meet the Manual 100-year criteria for a depth times velocity ($D*V$) product to be less than 8 except for the north half of Centennial Parkway and in Regena Avenue. The north half of Centennial Parkway is existing and was calculated as a check to show that the flow doesn't overtop the crown and affect the Project. Regena Avenue adjacent to the site is a nonurban street section without curb and gutter. Table 3 shows that at Sections 3F and 4F the $D*V$ product will be 9.3 and 8.7, respectively. The sections are based on offsite flows only that do not include any runoff from the site itself. The only runoff to Regena Avenue is the 5 cfs

Worksheet for SECT 1F 100-YR CENT PKWY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.65000 %
Discharge 162.00 ft³/s **DEVELOPED**
Section Definitions

Station (ft)	Elevation (ft)
--------------	----------------

1+00.0	2.00
1+00.0	0.60
1+05.0	0.50
1+05.5	0.48
1+05.5	0.00
1+07.0	0.13
1+07.0	0.17
1+50.0	1.03
1+93.0	0.17
1+93.0	0.13
1+94.5	0.00
1+94.5	0.48
1+95.0	0.50
2+00.0	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(1+00.0, 2.00)	(1+07.0, 0.17)	0.013
(1+07.0, 0.17)	(1+93.0, 0.17)	0.016
(1+93.0, 0.17)	(2+00.0, 0.60)	0.013

Results

Normal Depth 0.77 ft
Elevation Range 0.000 to 2.000 ft

Worksheet for SECT 1F 100-YR CENT PKWY FUTURE-new

Results

Flow Area	22.80	ft²
Wetted Perimeter	75.730	ft
Top Width	74.320	ft
Normal Depth	0.77	ft
Critical Depth	1.01	ft
Critical Slope	0.00459	ft/ft
Velocity	7.11	ft/s
Velocity Head	0.78	ft
Specific Energy	1.55	ft
Froude Number	2.26	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

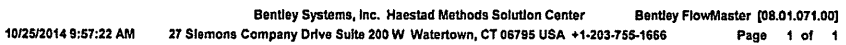
GVF Output Data

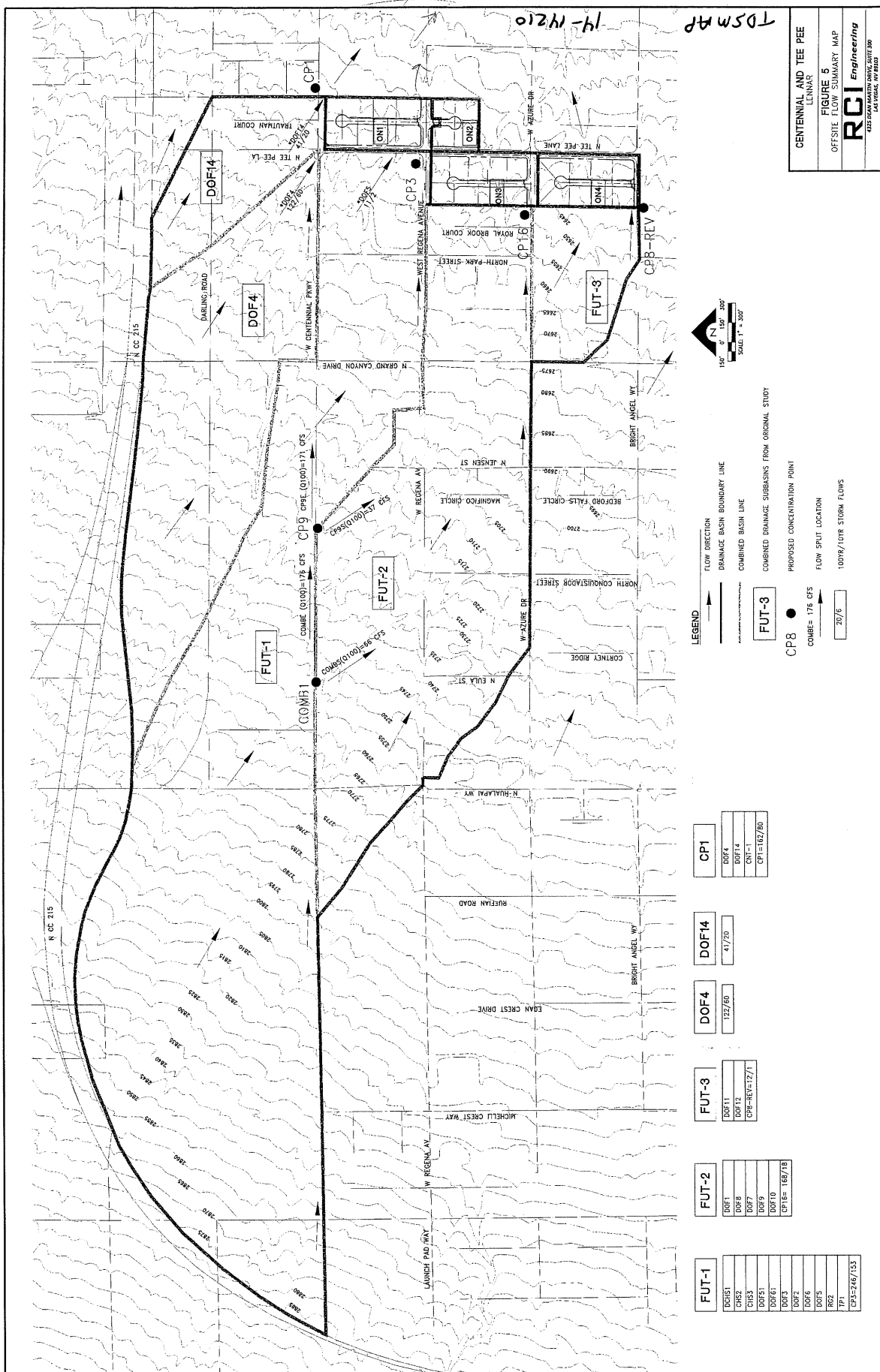
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.77	ft
Critical Depth	1.01	ft
Channel Slope	0.02650	ft/ft
Critical Slope	0.00459	ft/ft

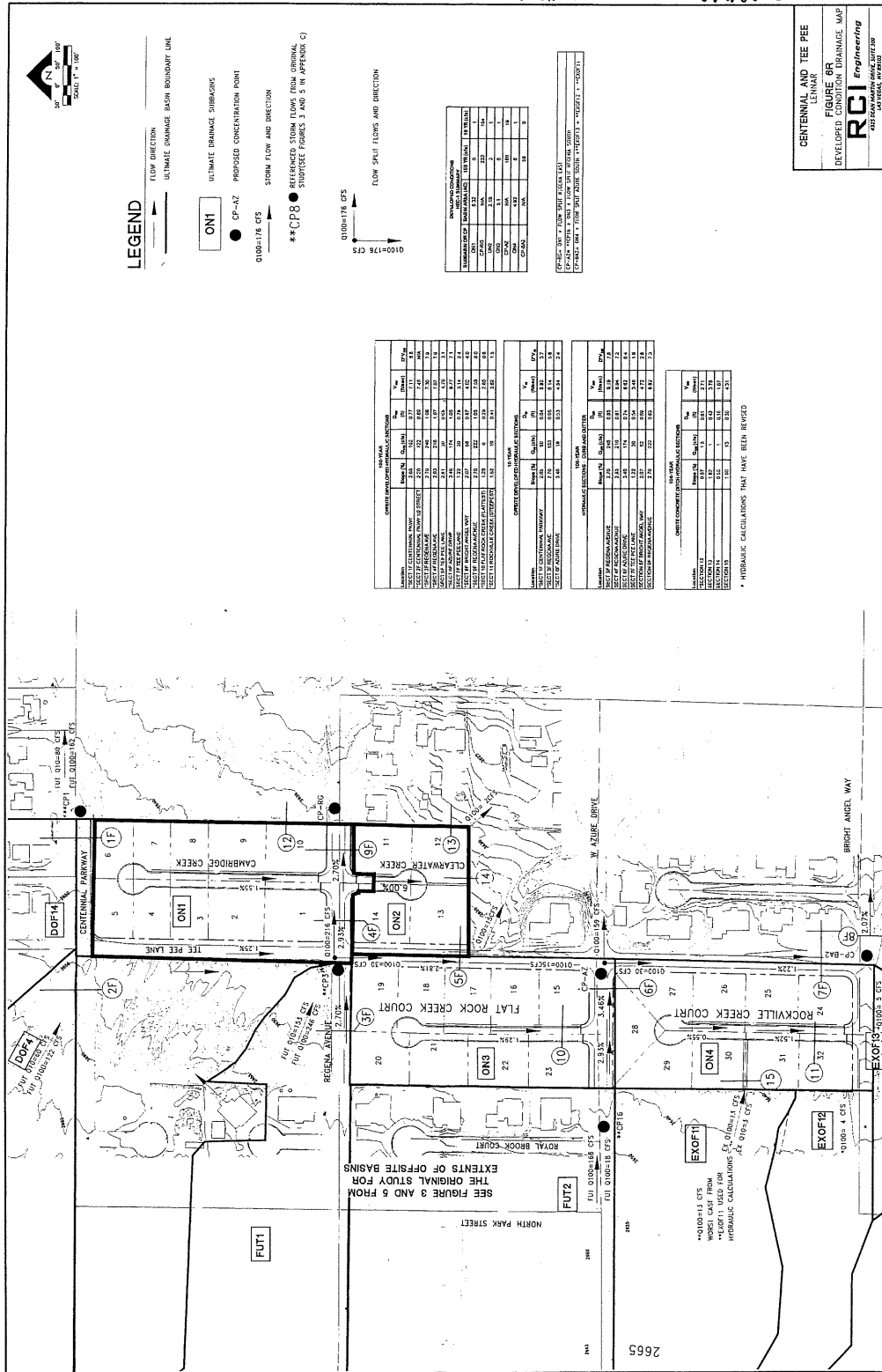
Project Description	The project is a research study on the impact of climate change on the environment. The study will focus on the effects of rising temperatures and changing precipitation patterns on various ecosystems. The research will involve data collection, analysis, and the development of a report. The project is expected to be completed by the end of the year.	The project is a research study on the impact of climate change on the environment. The study will focus on the effects of rising temperatures and changing precipitation patterns on various ecosystems. The research will involve data collection, analysis, and the development of a report. The project is expected to be completed by the end of the year.
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Input Data

Cross Section Image









APPENDIX F

Improvement Plans

APN: 125-30-502-009

Call before you Dig!
Avoid cutting underground utility lines. it's costly.

CALL

811

OR

1-800-227-2600

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

DATE:		7/26/2018	
SCALE:		N/A	
JOB NO:		ADV-17-086	
DESIGNED BY: BP		CHECKED BY: SJT	
SHEET NAME:		C1	
SHEET NUMBER:		1 OF 8	
CLV		00000000	

BEING A PART OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 30, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.

FILE NAME: S:\ACTIVITY\ADAVEN HOMES\47-286 - FORT APACHE & CENTENNIAL\ENG\PS\PRODUCTION\DWGS\DWG\17086_SHT_CD.DWG

CLV 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, NEVADA AREA", 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 SYMBOLS SHALL NOT BE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES 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 WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGN TO BE APPROVED BY THE CITY, PRIOR TO 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 OF EVERY 300' IN EXTRUDED-TYPE CURB.
 8. AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
 9. CURB AND GUTTER FLOW TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
 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 TRANSITIONS TO BE AS SHOWN ON PLANS.
 12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY, REPORT#, DATE) 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, 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 CLEANOUTS, 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 MDCOT 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. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION 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 SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTANTIES OF ± 0.08 METERS (± 0.3 FEET) HORIZONTALLY AND ± 0.04 METERS (± 0.1 FEET) VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
 22. 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 EDITION.
 23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CLV STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATION SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY, NEVADA AREA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY, NEVADA AREA", 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 CONSTRUCTION PROJECT REPRESENTATIVE. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 823.10.03 (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 OF EIGHTEEN INCHES (18") TO THE FACE OF STREET LIGHTING POLE ON ALL SIDES WHEN STREET LIGHT 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 DRAWINGS SHALL BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINTS SHALL BE COORDINATED WITH NEVADA POWER COMPANY, AND WHEREVER POSSIBLE, SHALL 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 STREET LIGHT 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 THE PLANS.

LEGAL DESCRIPTION

BEING A PART OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 30, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.

EARTHWORK

TOTAL FOR OVERALL DEVELOPMENT: 7,589.87 CY CUT / 7,249.62 CY FILL / 340 CY NET CUT

NOTE: THIS OPINION OF THE CUT AND FILL QUANTITIES IS PROVIDED AS REQUIRED BY THE GOVERNING ENTITY. THIS INFORMATION SHOULD NOT BE USED FOR BIDDING PURPOSES. ALL CONTRACTORS ARE RESPONSIBLE FOR THEIR OWN QUANTITIES. THESE TOTALS ARE RAW AND DO NOT ACCOUNT FOR SHRINKAGE AND SUBSIDENCE.

CLV TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONES. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENT INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCRoACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE FEET (5') OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGN POST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGN POST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO EQUIPMENT AND FLAG PERSONS NECESSARY TO ENSURE THE SAFETY OF THE PUBLIC IN AND AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR ATSSA WORK ZONE SAFETY SPECIALIST ON SITE TO SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHTS-OF-WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZEN AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET AND SHALL ARRANGE FOR TEMPORARY RELOCATION OF THE STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE NO. 228-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ALL WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

CLV GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. THE CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1"	±0.0" TO ±0.1"	SEE SOILS REPORT
B. ENGINEERED FILL	0.5"	±0.1" TO ±0.1"	SEE SOILS REPORT

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS, AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE, AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK, OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE, AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS, BARRICADES, ETC.

STORMWATER RUNOFF MANAGEMENT NOTES

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 ACCUMULATE 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 CLARK COUNTY TITLE 24.40 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 R 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 AND 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 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.

SOUTHERN NEVADA SOUTHWEST GAS CORP. GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-880-6020.
2. THERE SHALL BE A MINIMUM HORIZONTAL AND VERTICAL CLEARANCE OF 12-INCHES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRICAL.
3. FOR VALVE ADJUSTMENT CONTACT 702-688-6107 48 HOURS PRIOR TO CONSTRUCTION.
4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099.

SOUTHWEST GAS CORPORATION

DATE

CLV FIRE DEPARTMENT NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6326 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S 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 CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING WORK 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. 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 OF 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 THE 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 – 600 FT UNSPRINKLERED, 600 FT SPRINKLERED.
 - COMMERCIAL – 300 FT UNSPRINKLERED, 400 FT 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 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS, WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE 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 FT ON AN ALTERNATING BASIS. [IFC § C102.6]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, 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 FT, 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 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 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 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 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE, ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 62 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT 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 FT. [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 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS 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 FT, COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC § 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/REVERSE SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC § 503.6 AND IFC APPENDIX M.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
FIRST APPROVED DATE: PROJECT# 1220XX
LVVWD APPROVED FIRE FLOW: XXXX GPM AT 20 PSI RESIDUAL

CLV SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DESIGN & 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 CONTRACTORS TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTORS' RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEERS.
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-2034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES IN PAVED STREETS EIGHTY FEET (80') RW AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY FEET (80') WILL REQUIRE RETROFITTING 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 INCHES (12") IN DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN-LINE "Y" SHALL BE USED ON LINES TWELVE INCHES (12") IN DIAMETER AND ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A MAIN LINE OR THE SEWER IS LESS THAN EIGHTEEN INCHES (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "X" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH OF A FOOT (1") FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED AND 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 PVC C900 WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT NOTES

LVVWD PROJECT #XXXXXX

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 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT NUMBER 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 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 THE 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 INCHES (2") 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 AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO INCHES (2") AND 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 THE 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 AS LISTED ON THE LVVWD APPROVED PRODUCTS LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING PLACING OF NEW STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN 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 ADJUTING 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 PROSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

QUANTITIES

PAVING AND GRADING	PUBLIC	PRIVATE
2" ASPHALT	411 SY	2,005 SY
5.5" ASPHALT	1,300 SY	0 SY
TYPE II	262 CY	223 CY
L-TYPE CURB & GUTTER	564 LF	0 LF
MODIFIED ROLL CURB AND GUTTER	0 LF	959 LF
SIDEWALK	0 SF	6,450 SF
CROSS GUTTER	0 SF	939 SF
SIDEWALK RAMP	0 EA	2 EA

DRAINAGE	PUBLIC	PRIVATE
CONCRETE VALLEY GUTTER	3,865 SF	0 SF
NDS 12" SQUARE CATCH BASIN	3 EA	0 EA

REVISIONS	DESCRIPTION	NO.	BY	DATE

REVISIONS	DESCRIPTION	NO.	BY	DATE

REVISIONS	DESCRIPTION	NO.	BY	DATE

Avoid overhead power line contact. It's costly.

Call before you Dig

Avoid cutting underground utility lines. It's costly.

Call before you Dig

811

OR

1-800-227-2600

BASIS OF BEARING

NORTH 89°45'44" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 30, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN IN BOOK 152 PAGE 04 OF PLATS

BENCHMARK

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE MONUMENT, 50' NORTH AND 40' WEST OF CENTENNIAL PKWY AND FORT APACHE RD. STATION: 1630195E8
ELEVATION (FEET): 2618.96 (798.258 METERS)

UTILITY DISCLAIMER

EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO ANY CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR EXISTING LOCATIONS.

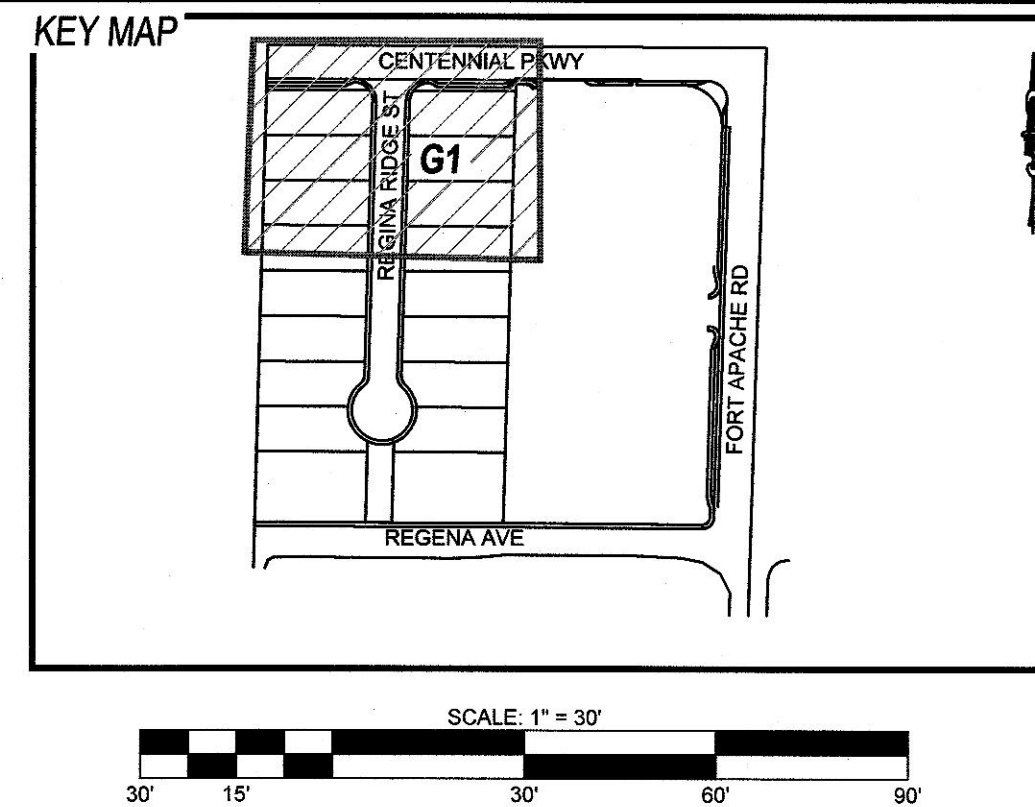
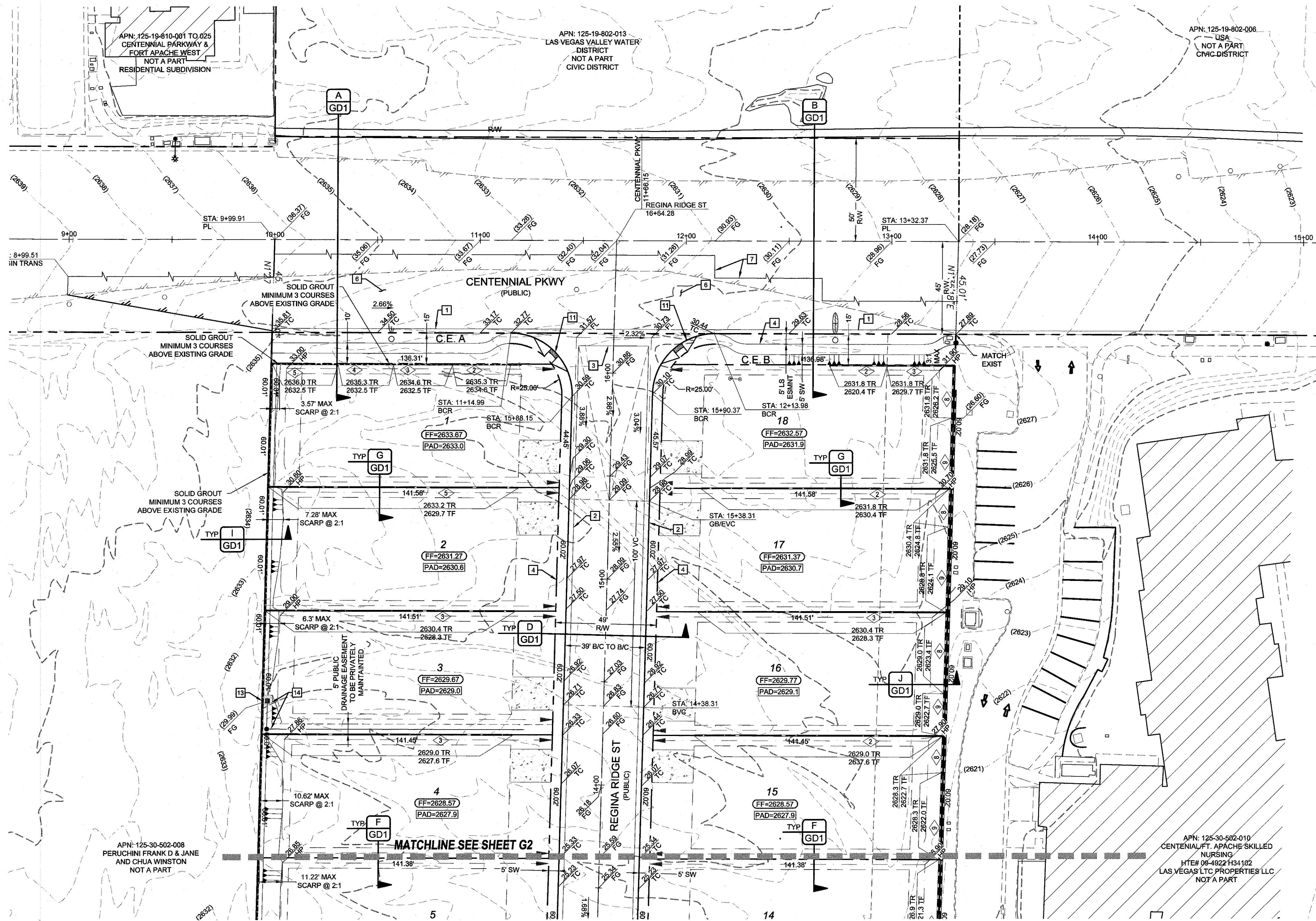
DEVIATIONS FROM STANDARDS

1. XX

ABBREVIATIONS

AC	ASPHALTIC CONCRETE	FG	FINISH GRADE	R
----	--------------------	----	--------------	---

FILE NAME: S:\ACTIVE\ADAVEN HOMES\ADV-17-086 - FORT APACHE & CENTENNIAL PKWY\PRODUCTION\DWG\SSHEET\DWG\ADV17086_SHT_G1.DWG



CONSTRUCTION NOTES

- 24" L-TYPE CURB & GUTTER (USD #216)
- INSTALL 30" MODIFIED ROLL CURB AND GUTTER (CCAUSD #217.1)
- 8" CROSS GUTTER (USD #228)
- 5.0' SIDEWALK (USD #234)
- 2" AC PAVEMENT OVER 4" TYPE II PER SOILS REPORT (HTE XXXX)
- 5.5" AC PAVEMENT OVER 6" TYPE II PER SOILS REPORT (HTE XXXX)
- SAWCUT & MATCH EXISTING AC PAVEMENT (USD #500.3)
- INSTALL CONCRETE VALLEY GUTTER (SEE E/GD1)
- INSTALL SIDEWALK UNDERDRAIN (CCAUSD #238)
- L-CURB CUT AND GUTTER (SEE M/GD1)
- SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235 CASE I) A=15', B=4.5'
- SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235 CASE A=8', B=8')
- INSTALL 16" X 48" BLOCK WALL OPENING (SEE K/GD1)
- INSTALL NDS 12" SQUARE CATCH BASIN AND 12" SQUARE POLYOLEFIN GRATE (L/GD1)

EARTHWORK

TOTAL FOR OVERALL DEVELOPMENT: 7,589.87 CY CUT / 7,249.62 CY FILL / 340 CY NET CUT

NOTE: THIS OPINION OF THE CUT AND FILL QUANTITIES IS PROVIDED AS REQUIRED BY THE GOVERNING ENTITY. THIS INFORMATION SHOULD NOT BE USED FOR BIDDING PURPOSES. ALL CONTRACTORS ARE RESPONSIBLE FOR THEIR OWN QUANTITIES. THESE TOTALS ARE RAW AND DO NOT ACCOUNT FOR SHRINKAGE AND SUBSIDENCE.

FLOOD ZONE

THIS PROJECT IS LOCATED IN FLOOD ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD PLAIN PER FIRM PANEL 32003C1745E, REVISED SEPTEMBER 27, 2002.

UTILITY DISCLAIMER

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GRADING NOTES

COMPLETION OF SECTION II OF DRAINAGE COMPLIANCE REPORT REQUIRED.

ADD 2600 FEET TO ALL GRADE TAGS TO GET ACTUAL ELEVATION.

THE ELEVATION DIFFERENCE BETWEEN THE PAD AND FINISH FLOOR IS DETERMINED FROM THE MINIMUM THICKNESS REQUIRED PER THE GEOTECHNICAL REPORT. FINISH FLOORS MAY INCREASE DEPENDING ON THE TYPE OF SOIL AND FOUNDATION PLAN USED. NOTE THAT THE STRUCTURAL PLANS & GEOTECHNICAL REPORT SHALL SUPERSEDE THE CIVIL IMPROVEMENT PLANS.

ALL PRIVATE STREETS AND DRAINAGE EASEMENTS ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION (H.O.A.).

ALL WORK TO BE PERFORMED OUTSIDE OF THE PROJECT BOUNDARY AND ON PRIVATE PROPERTY SHALL NOT BE PERFORMED UNTIL WRITTEN PERMISSION AND EASEMENTS HAVE BEEN OBTAINED FROM THE OFFSITE OWNER AND GIVEN TO THE GOVERNING ENTITY.

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

BENCHMARK

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE MONUMENT, 50' NORTH AND 40' WEST OF CENTENNIAL PKWY AND FORT APACHE RD. STATION: 1C9019SES ELEVATION (FEET): 2618.96 (798.258 METERS)

GRADING CERTIFICATION

I CERTIFY THIS GRADING PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY, HTE# XX-XXXXX, ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

S JUSTIN THORNE, PE DATE

ACCEPTANCE OF PLANS

SOUTHWEST GAS CORPORATION DATE

ACCEPTANCE OF PLANS FOR FILING

BY: DEVELOPMENT AND FLOOD CONTROL DATE

GEOTECHNICAL

FIRM NAME
FIRM ADDRESS
LAS VEGAS, NV 89000
(702) XXX-XXXX

REPORT NO: XXXXXX
DATE: XXXXXX

Avoid overhead power line contact, it's costly.

Call before you Overhead

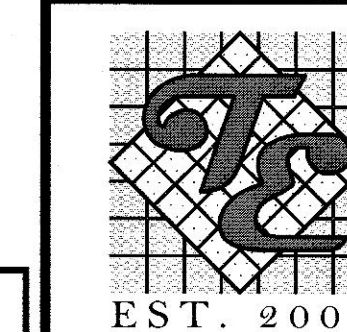
1-702-227-2929

Call before you Dig

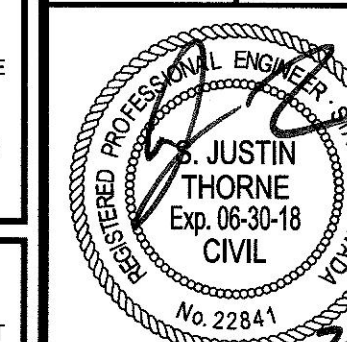
Avoid cutting underground utility lines, it's costly.

CALL 811 OR 1-800-227-2600

ADAVEN HOMES
3425 CLIFF SHADOWS PKWY
LAS VEGAS, NV 89129
(702) 365-5588 FAX:



CENTENNIAL & FORT APACHE
A RESIDENTIAL SUBDIVISION



DATE: 7/26/2018

SCALE: 1"=30'

JOB NO: ADV-17-086

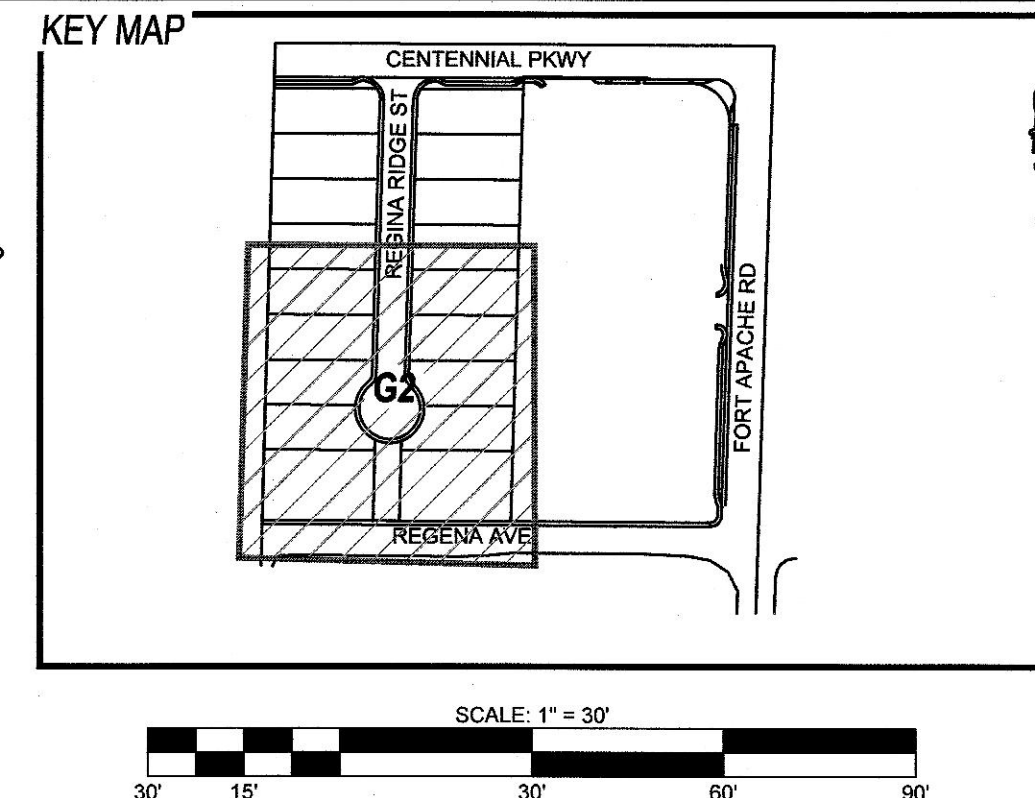
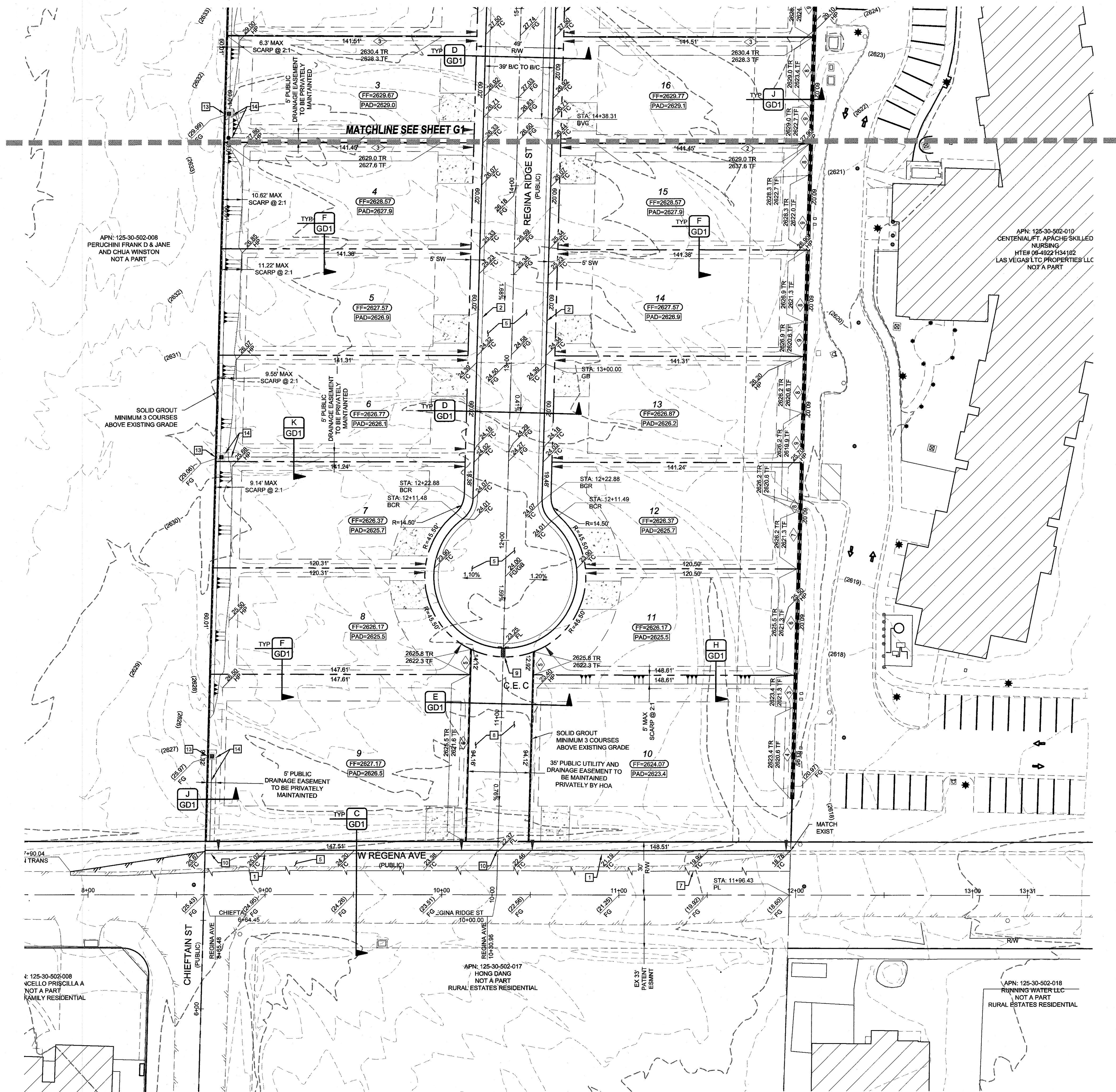
DESIGNED BY: BP CHECKED BY: SJT

SHEET NAME: G1

SHEET NUMBER: 3 OF 8

CLV 0000000

FILE NAME: S:\CTV\ADAVEN HOMES\ADV-17-086 - FORT APACHE & CENTENNIAL\ENGINEERING\PRODUCTION\DWG\ADV-17-086_SHT_G.DWG



CONSTRUCTION NOTES

1. 24" L-TYPE CURB & GUTTER (USD #216)
2. INSTALL 30" MODIFIED ROLL CURB AND GUTTER (CCAUUSD #217.1)
3. 8" CROSS GUTTER (USD #228)
4. 5" SIDEWALK (USD #234)
5. 2" AC PAVEMENT OVER 4" TYPE II PER SOILS REPORT (HTE XXXX)
6. 5.5" AC PAVEMENT OVER 6" TYPE II PER SOILS REPORT (HTE XXXX)
7. SAWCUT & MATCH EXISTING AC PAVEMENT (USD #500.3)
8. INSTALL CONCRETE VALLEY GUTTER (SEE E/GD1)
9. INSTALL SIDEWALK UNDERDRAIN (CCAUUSD #236)
10. L-CURB CUT AND GUTTER (SEE M/GD1)
11. SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235 CASE 1) A=12", B=4"
12. SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235) A=8", B=4"
13. INSTALL 16" X 48" BLOCK WALL OPENING (SEE K/GD1)
14. INSTALL NDS 12" SQUARE CATCH BASIN AND 12" SQUARE POLYOLEFIN GRATE (J/GD1)

EARTHWORK

TOTAL FOR OVERALL DEVELOPMENT: 7,589.87 CY CUT / 7,249.62 CY FILL / 340 CY NET CUT

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FLOOD ZONE

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GRADING NOTES

COMPLETION OF SECTION II OF DRAINAGE COMPLIANCE REPORT REQUIRED.
ADD 2600 FEET TO ALL GRADE TAGS TO GET ACTUAL ELEVATION.
THE ELEVATION DIFFERENCE BETWEEN THE PAD AND FINISH FLOOR IS DETERMINED FROM THE MINIMUM THICKNESS REQUIRED PER THE GEOTECHNICAL REPORT. FINISH FLOORS MAY INCREASE DEPENDING ON THE TYPE OF SOIL AND FOUNDATION PLAN USED. NOTE THAT THE STRUCTURAL PLANS & GEOTECHNICAL REPORT SHALL SUPERSEDE THE CIVIL IMPROVEMENT PLANS.

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CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

BENCHMARK

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE MONUMENT, 50' NORTH AND 40' WEST OF CENTENNIAL PKWY AND FORT APACHE RD. STATION: 1C9019SES
ELEVATION (FEET): 2618.96 (798.25 METERS)

GRADING CERTIFICATION

I CERTIFY THIS GRADING PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY, HTE# XX-XXXXX, ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

S. JUSTIN THORNE, PE DATE

ACCEPTANCE OF PLANS

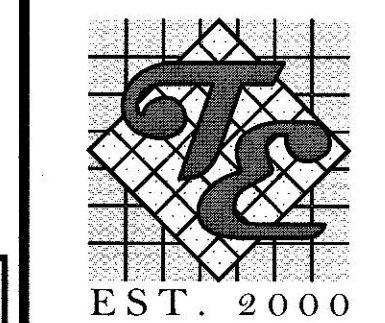
SOUTHWEST GAS CORPORATION DATE

ACCEPTANCE OF PLANS FOR FILING

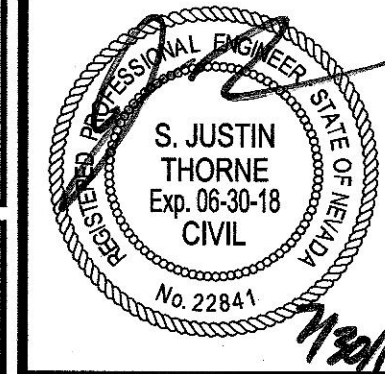
BY: DEVELOPMENT AND FLOOD CONTROL DATE

NO.	DESCRIPTION	BY	SHTS.	APPR.	DATE

ADAVEN HOMES
3425 CLIFF SHADOWS PKWY
LAS VEGAS, NV 89129
(702) 365-8888 FAX:
TANEY ENGINEERING
8600 S. JONES BOULEVARD
LAS VEGAS, NV 89123
(702) 365-8844 FAX: (702) 365-8333



CENTENNIAL & FORT APACHE
A RESIDENTIAL SUBDIVISION
GRADING PLAN 2



DATE: 7/26/2018

SCALE: 1"=30'

JOB NO: ADV-17-086

DESIGNED BY: BP CHECKED BY: SJT

SHEET NAME: G2

SHEET NUMBER: 4 OF 8

CLV 000000

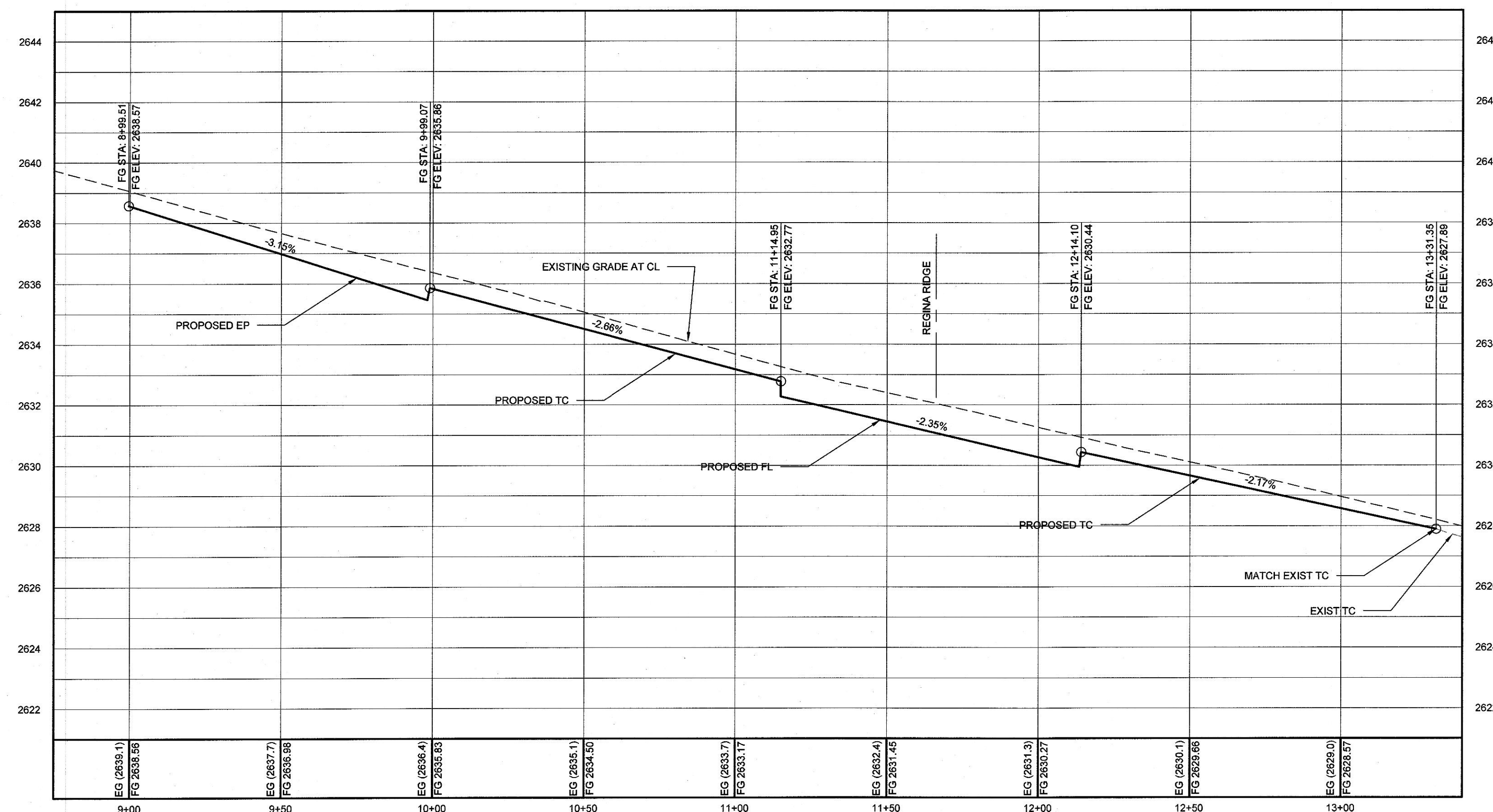
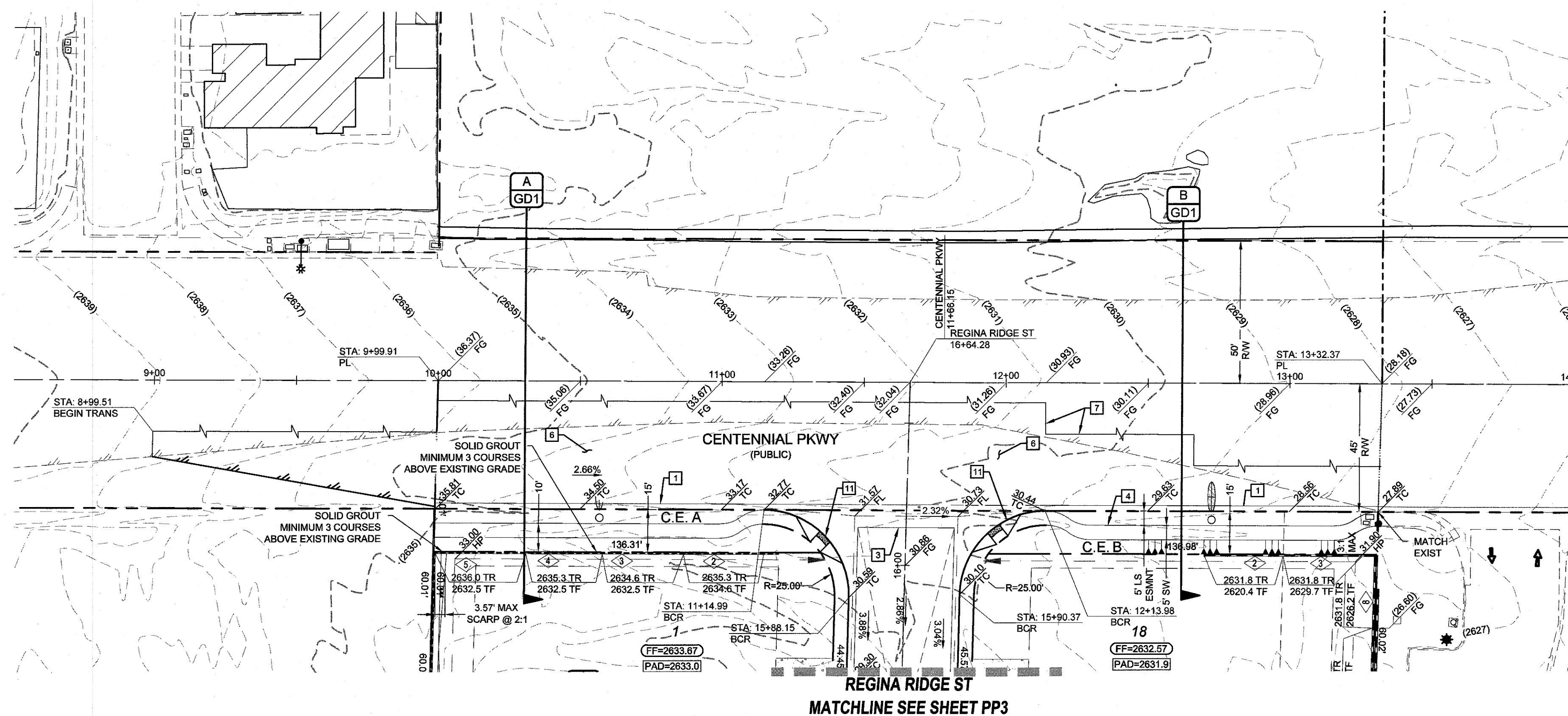
GEOTECHNICAL

FIRM NAME:
FIRM ADDRESS:
LAS VEGAS, NV 8900X
(702) XXX-XXXX

REPORT NO.: XXXXX
DATE: XXXXXX

Call before you Overhead
1-702-227-2929

Call before you Dig
Avoid cutting underground utility lines. It's costly.
CALL 811 OR 1-800-227-2600



FILE NAME: S:\ACTIVE\ADAVEN HOMES\ADV-17-086 - EORT APACHE & CENTENNIAL\ENGIPS\PRODUCTION\DWGSS\DWGSSHEET DWGSS\ADV17086 SHT PP DWG

DEPTH OF COVER DURING CONSTRUCTION
 MAINTAIN MINIMUM TWENTY-FOUR (24) INCH COVER PER UDACS SECTION
 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE
 INSTALLATION.

WATER MAIN JOINT DEFLECTION NOTE (PVC 4"-24")

PVC PIPE SHALL BE DEFLECTED AT THE JOINT ONLY. THE MAXIMUM ALLOWABLE DEFLECTION SHALL BE ONE (1) DEGREE PER JOINT WITH A MAXIMUM RADIUS OF CURVATURE OF 1,150 FEET, PER UDACS 2.07.01 AND 2.07.02.

FOR CHANGES IN DIRECTION EXCEEDING THE MAXIMUM ALLOWABLE JOINT DEFLECTION, FITTING SHALL BE USED.

Call before you Dig
Avoid cutting underground
utility lines. It's costly.

CALL

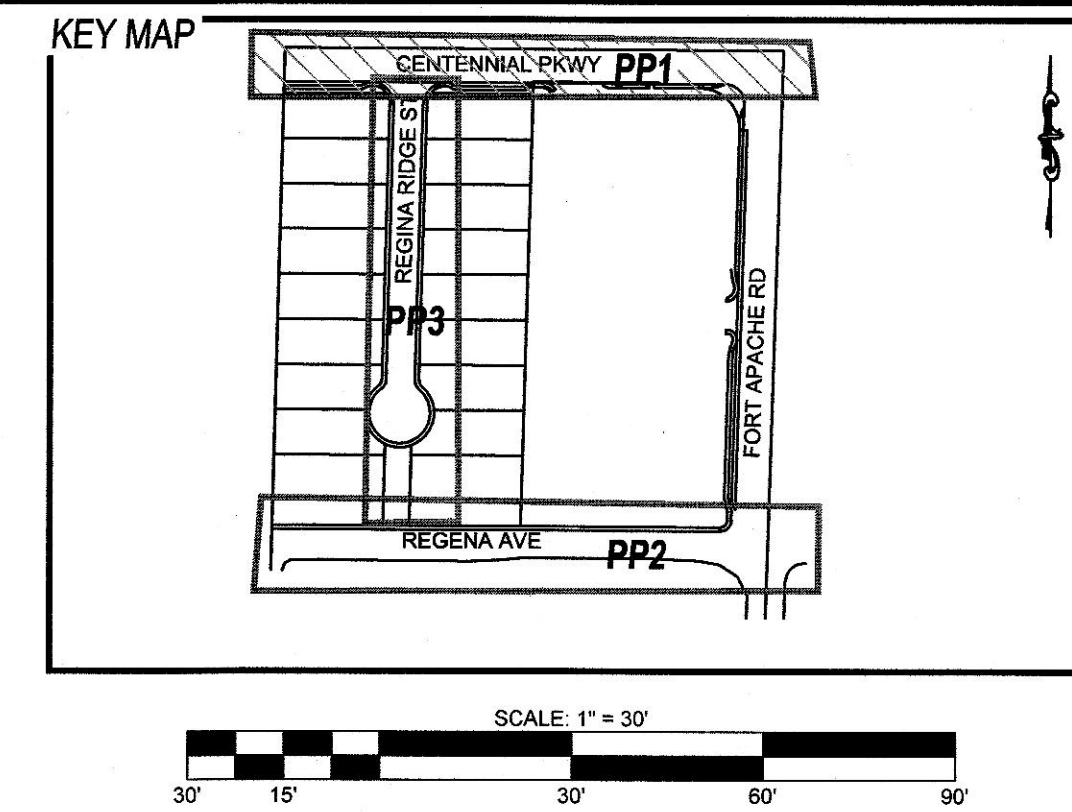
811

OR

1-800-227-2600

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Call
before you
Overhead
1-702-227-2929



GEOTECHNICAL

FIRM NAME
FIRM ADDRESS
LAS VEGAS, NV 89XXX
(702) XXX-XXXX

REPORT NO: XXXXX
DATE: XX/XX/XX

- ## CONSTRUCTION NOTES
- 1-24" L-TYPE CURB & GUTTER (USD #216)
 - 2-INSTALL 30" MODIFIED ROLL CURB AND GUTTER (CCAUSD #217.1)
 - 3-8.0" CROSS GUTTER (USD #228)
 - 4-5.0' SIDEWALK (USD #234)
 - 5-2" AC PAVEMENT OVER 4" TYPE II PER SOILS REPORT (HTE XXXX)
 - 6-5.5" AC PAVEMENT OVER 6" TYPE II PER SOILS REPORT (HTE XXXX)
 - 7-SAWCUT & MATCH EXISTING AC PAVEMENT (USD #500.3)
 - 8-INSTALL CONCRETE VALLEY GUTTER (SEE E/GD1)
 - 9-INSTALL SIDEWALK UNDERDRAIN (CCAUSD #236)
 - 10-L CURB CUT AND GUTTER (SEE MGD1)
 - 11-SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235 CASE 1) A=15', B=4.5'
 - 12-SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235) A=8',

UTILITY DISCLAIMER

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LINE AND CURVE DATA
FOR LINE AND CURVE DATA TABLES, SEE THE GRADING PLAN SHEETS FOR THIS PROJECT.

PROFILE NOTES

ADD XX00 FEET TO ALL GRADE TAGS TO GET ACTUAL ELEVATION.

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BENCHMARK

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE MONUMENT, 50' NORTH AND 40' WEST
OF CENTENNIAL PKWY AND FORT APACHE RD. STATION: 1C9019SES
ELEVATION (FEET): 2618.96 (798.258 METERS)

ACCEPTANCE OF PLANS

SOUTHWEST GAS CORPORATION

DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
FIRST APPROVED DATE _____ PROJECT# 122XXX
LVVWD APPROVED FIRE FLOW: XXXX GPM AT 20 PSI RESIDUAL _____

ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE _____

DEVELOPMENT AND FLOOD CONTROL

[illegible]

ADAVEN HOMES
3425 CLIFF SHADOWS PKWY
LAS VEGAS, NV 89129
(702) 365-9588 FAX:

TANEY & ENGINEERING
6030 S. JONES BOULEVARD
LAS VEGAS, NV 89118
(702) 362-8844 FAX: (702) 362-5233



**CENTENNIAL & FORT APACHE
A RESIDENTIAL SUBDIVISION
PLAN AND PROFILE
CENTENNIAL PKWY**

DATE: 7/26/2018

SCALE: 1"=30'

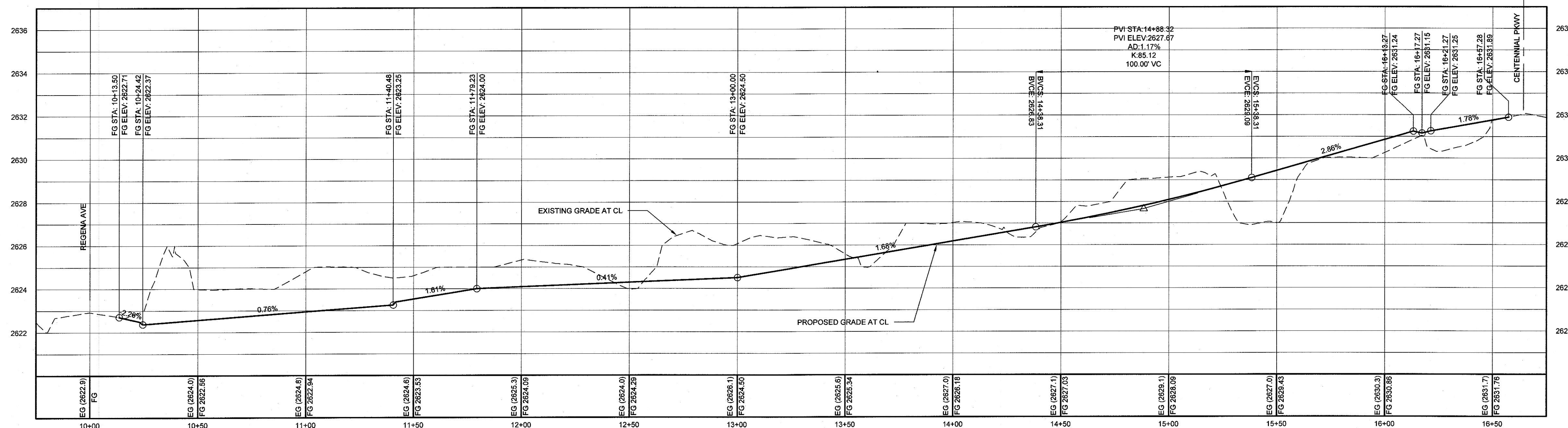
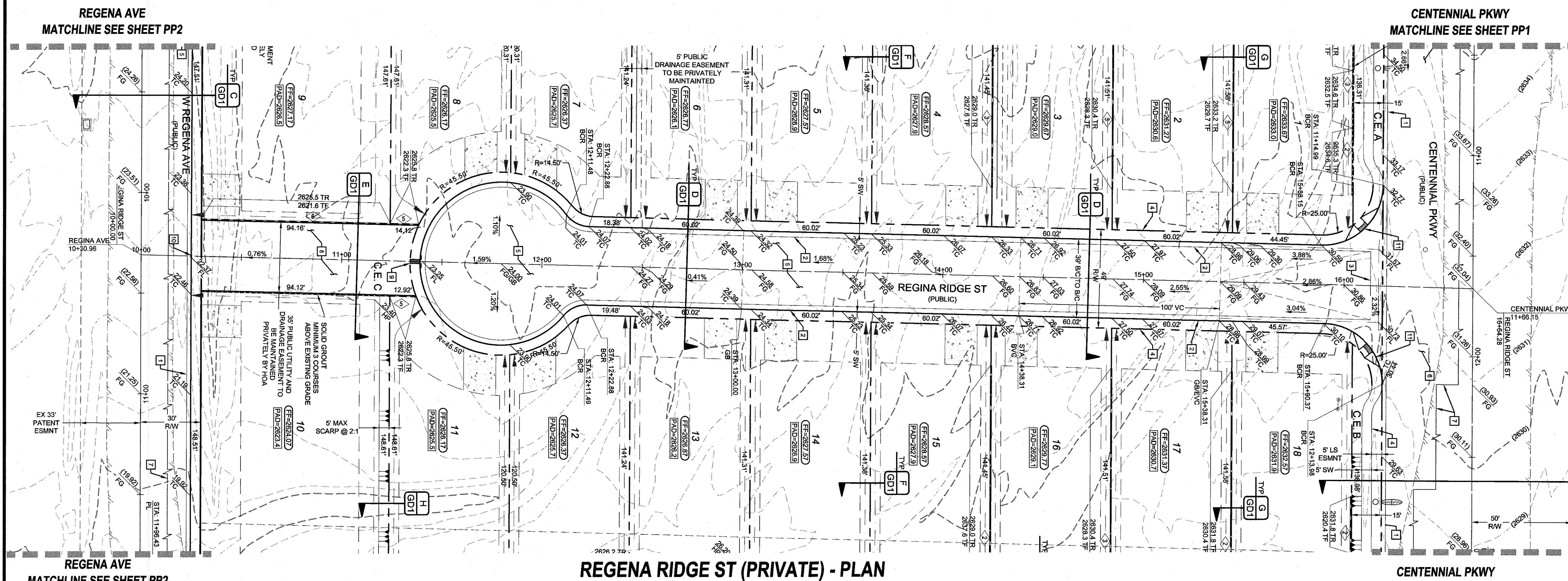
JOB NO: **ADV-17-086**

DESIGNED BY: BP	CHECKED BY: SJT
SHEET NAME:	

PP1

SHEET NUMBER:
6 OF 8

CLV 00000000



REGENA RIDGE ST (PRIVATE) - PROFILE

SCALE: 1"=30' HORIZONTAL; 1"=3' VERTICAL

DEPTH OF COVER DURING CONSTRUCTION
MAINTAIN MINIMUM TWENTY-FOUR (24) INCH COVER PER UDACS SECTION 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION.

WATER MAIN JOINT DEFLECTION NOTE (PVC 4"-24")

PVC PIPE SHALL BE DEFLECTED AT THE JOINT ONLY. THE MAXIMUM ALLOWABLE DEFLECTION SHALL BE ONE (1) DEGREE PER JOINT WITH A MAXIMUM RADIUS OF CURVATURE OF 1,150 FEET, PER UDACS 2.07.01 AND 2.07.02.

FOR CHANGES IN DIRECTION EXCEEDING THE MAXIMUM ALLOWABLE JOINT DEFLECTION, FITTING SHALL BE USED.

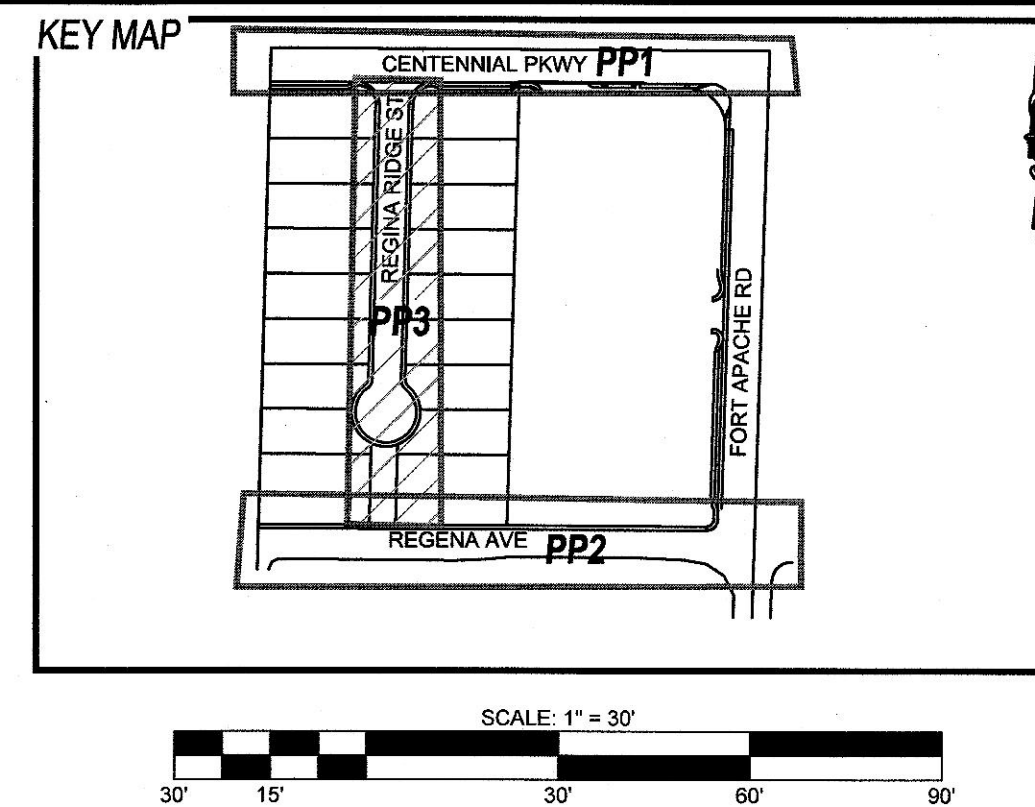
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utility lines. it's costly.

CALL
811
OR
1-800-227-2600

Avoid overhead power line contact. It's costly.

Call
before you
Overhead
1-702-227-2929

ACCEPTANCE OF PLANS	
SOUTHWEST GAS CORPORATION	DATE
APPROVED FOR CONSTRUCTION	
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES	
FIRST APPROVED DATE	PROJECT# 122XXXX
LVWVD APPROVED FIRE FLOW: XXXX GPM AT 20 PSI RESIDUAL	
ACCEPTANCE OF PLANS FOR FILING	
BY:	
DEVELOPMENT AND FLOOD CONTROL	DATE



GEOTECHNICAL

FIRM NAME
FIRM ADDRESS
LAS VEGAS, NV 89XXX
(702) XXX-XXXX

REPORT NO: XXXXX
DATE: XX/XX/XX

- ## CONSTRUCTION NOTES
- 1-24" L-TYPE CURB & GUTTER (USD #216)
 - 2-INSTALL 30" MODIFIED ROLL CURB AND GUTTER (CCAUSD #217.1)
 - 3-8.0' CROSS GUTTER (USD #228)
 - 4-5.0' SIDEWALK (USD #234)
 - 5-2" AC PAVEMENT OVER 4" TYPE II PER SOILS REPORT (HTE XXXX)
 - 6-5.5" AC PAVEMENT OVER 6" TYPE II PER SOILS REPORT (HTE XXXX)
 - 7-SAWCUT & MATCH EXISTING AC PAVEMENT (USD #500.3)
 - 8-INSTALL CONCRETE VALLEY GUTTER (SEE E/G01)
 - 9-INSTALL SIDEWALK UNDERDRAIN (CCAUSD #236)
 - 10-L-CURB CUT AND GUTTER (SEE MGD1)
 - 11-SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235 CASE I) A=15', B=4.5'
 - 12-SIDEWALK RAMP USING TRUNCATED DOMES OR EQUIVALENT (USD #235) A=B=

UTILITY DISCLAIMER

EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR EXISTING LOCATIONS.

LINE AND CURVE DATA

FOR LINE AND CURVE DATA TABLES, SEE THE GRADING PLAN SHEETS FOR THIS PROJECT.

PROFILE NOTES

ADD XX00 FEET TO ALL GRADE TAGS TO GET ACTUAL ELEVATION.

ALL PRIVATE STREETS AND DRAINAGE EASEMENTS ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION (H.O.A.).

ALL WORK TO BE PERFORMED OUTSIDE OF THE PROJECT BOUNDARY AND ON PRIVATE PROPERTY SHALL NOT BE PERFORMED UNTIL WRITTEN PERMISSION AND EASEMENTS HAVE BEEN OBTAINED FROM THE OFFSITE OWNER AND GIVEN TO GOVERNING ENTITY.

BENCHMARK

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE MONUMENT, 50' NORTH AND 40' WEST
OF CENTENNIAL PKWY AND FORT APACHE RD. STATION: 1C9019SES
ELEVATION (FEET): 2618.96 (798.258 METERS)

**CENTENNIAL & FORT APACHE
A RESIDENTIAL SUBDIVISION
PLAN AND PROFILE
REGENA RIDGE ST**

DATE:		7/26/2018	
SCALE:		1"=30'	
JOB NO:		ADV-17-086	
DESIGNED BY:	BP	CHECKED BY:	SJT
SHEET NAME:		PP3	
SHEET NUMBER:			
8	OF	8	
CLV		00000000	

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