

DS #:

4853

APN:

125-20-610-004

PROJECT:

Centennial Hills Hospital, Update for Phase 2

SUBMITTAL:

1st Submittal

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		December 21, 2016
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 Hills Hospital – Update for Phase 2 Parking Lot Expansion	
Cross Streets:	NEC of Durango Drive & Deer Springs Way	COPIES TO:
File Number:	F:\Depot\DSMemos\DS4853A.doc	MHP Limited, LLC
Parcel Number:	125-20-610-004	Valley Health System, LLC
Zoning Action:	SDR-xxxxx	Bart Anderson, P.E., DevCo
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	12/7/2016	12/21/2016	See Comments Below	\$400.00	467949: \$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 (**SDR-xxxxx**) 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 overall parking lot improvement area is larger than 1 acre. Per **Section 1500** of the *Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual*, the subject improvements must provide for Low Impact Development (LID) measures. Please review and address the issue in the next submittal.
3. **Construction Note #5** called for a 5'-wide depressed curb. However, hydraulic calculation provided in the last submittal shows that the depressed curb is 9'-wide. Review and revise accordingly.
4. Provide a note on the grading plan: " All Onsite Storm Drains and the associated facilities are Privately Owned and to be Privately Maintained".
5. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

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

ays

T/R/S: T19S/R60E/20

AREA G-20



November 15, 2016

Mr. Albert Sung, P.E., CFM
Flood Control Project Engineer
Department of Public Works
City of Las Vegas
333 N. Rancho Dr.
Las Vegas, NV 89106

RE: Update #2 for Technical Drainage Study for Centennial Hills Hospital (CLV DS #3822).

Dear Mr. Sung:

The enclosed letter serves as update #2 to the previously approved Centennial Hills Hospital Drainage Study (CLV DS #3822) dated July 27, 2006. The purpose of this update is to address the phase 2 parking lot expansion being proposed within onsite basin ON2 from the original approved study. The proposed expansion will include 2 drive entrances and approximately 177 paved parking spaces with landscape islands. Additional improvements will include redirection of the existing 24" storm drain south. The redirected flow will be discharged to a proposed swale that will flow south then east into historical discharge point C1. Ripraps are being proposed at the outlet of the proposed 24" storm drain and the outlet of the proposed depressed curb section at the southeast corner of the proposed parking expansion.

The hydrology for basin ON2 will remain the same as the previously approved study. The runoff coefficient (C) used in the future condition rational method analysis for this basin had already assumed future development. The C value used is 0.90 for 10 year and 0.93 for 100 year respectively; which represent paved streets/parking lot. As such, the flow quantified for ON2 and on Deer Springs Way from the previous study remains unchanged.

In conclusion, the proposed parking lot expansion will not increase storm flow to Deer Springs Way and should not negatively impact downstream areas. Reference materials from the previously approved drainage study, normal depth & riprap calculations are included in the Appendix.

Should you have additional questions regarding this updated, please feel free to contact us. Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Thomas Regenhard', followed by a long horizontal flourish.

Thomas Regenhard, P.E.

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: CENTENNIAL HILL HOSPITAL (UPDATE #2) Date: 11/4/2016

Location of Development: a) Descriptive (Cross Streets) North/South: DURANGO DRIVE

East/West: DEER SPRINGS WAY

b) Section: 20 Township: 19S Range: 60E

c) APN : 125-20-610-004

Name of Owner: VALLEY HEALTH SYSTEM, LLC

Telephone No.: _____ Fax No.: _____ E-Mail Address: _____

Address: 1440 METCALF AVENUE, OVERLAND PARK, KS 66223

Contact Person-Name: THOMAS REGENHARD Telephone No.: 7026728586 702-803-6223

* E-Mail Address: info@mhplimited.com Fax No.: _____

Firm: MHP LIMITED, LLC

Address: 6440 SKY POINTE DRIVE #140-385

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: 3.6 Being Developed/Disturbed: 2.6

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.): COMMERCIAL (PARKING LOT EXPANSION)

5. Approximate upstream land area which drains to the subject site: 0 ACRES

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: RANCHO DRIVE/US95 LOMR

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: TECHNICAL DRAINAGE STUDY FOR CENTENNIAL HILLS HOSPITAL (DS# 3822)

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.

Local Entity File No.	Revision	Date

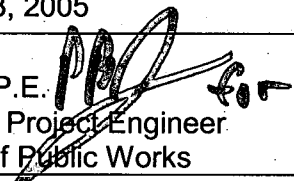
REFERENCE:

STANDARD FORM 1

APPENDIX

REFERENCE MATERIALS

TDS FOR CENTENNIAL HILLS HOSPITAL (DS 3822)

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		September 13, 2005
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E.  Flood Control Project Engineer Department of Public Works
SUBJECT:	Technical Drainage Study for:	
	Centennial Hills Hospital	
Cross Streets:	Durango and Deer Springs	
File Number:	F:\Depot\DSMemos\DS3822B.doc	
Parcel Number:	125-20-610-003	
	SDR-3267	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
COPIES TO:		Nevada By Design
		UHS Delaware Inc, C/O Pyskacek, Universal Health Services Inc.
		LOPEZGARCIA GROUP
		Bart Anderson, P.E., DevCo

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn . No.
1 st Submittal	5/26/2005	6/17/2005	Not Approved	\$400.00	Trn: 22395
2 nd Submittal & Supplemental	8/8/2005 & 8/24/2005	9/12/2005	See Comments Below	\$400.00	Trn: 27251
TOTAL FEES (LDDRS):				\$800.00	

REMARKS:

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

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

- The developer is responsible for the continued coordination of the access road and drainage improvements along the vacated Dorrell alignment between the Hospital and the Montecito North (Montecito Marketplace) project between Durango and Grand Montecito Parkway. The ultimate improvements will be constructed by the Montecito North (Montecito Marketplace) project. These improvements are required to protect the Hospital site. Once the ultimate improvements are constructed the Hospital site plans will be required to show the revision to the plans to reflect these improvements.
- The City of Las Vegas understands that in the interim the development of the Hospital site proposes drainage improvements along the northern boundary of the site (along the Dorrell alignment) to provide interim protection. The access road shown must have rip-rap protection. Provide a detail of the access road section with the required rip-rap shown. Provide D50 for the rip-rap, overall thickness, Geotextile fabric and the minimum 6-inches of base material per manual requirements. These interim improvements must be bonded and inspected.
- The proposed East Drainage Channel shown on Sheet C5.21 must also be shown on the Grading plans. The rip-rap sections must label the D50 and the depth of the rip-rap section. Include the Geotextile fabric and the minimum 6-inches of base material per the manual requirements. These channel improvements must be bonded and inspected.

4. Provide additional storm drain manholes for Line "A" at the terminus Station 7+11.68 and at Station 5+77.74 where the pipe size changes from 18-inch to 24-inch pipe.
5. Provide a connection detail between the RCP flared-end section and the ADS N-12 plastic pipe or provide for a single pipe material.
6. The storm drain system must be labeled as Privately Maintained on both the plan and the profile sheets. The profiles must also include the water and sewer crossings and show the minimum separation between these pipe systems.
7. Show the storm drain outlet structure and graded outfall with flared-end section and rip-rap on the storm drain profiles.
8. Provide a maintenance access opening (24-inch minimum) for Outlet Structure #2 as shown on Sheet C5.4.
9. The grading plan sheets need additional design elevations to adequately construct the proposed site improvements. At a minimum grades need to be added at curb returns, low points, grade breaks, point of curvature, concrete islands, valley gutters, sidewalk underdrains, etc.
10. The proposed grading and flow channel near the southwest corner of the site shown on Sheet C3.C and Sheet C5.C do not match. Revise the plans accordingly.
11. The cross gutters shown on the grading plans need to be labeled with a construction note.
12. The existing sewer line along the east property line has a 12-foot access road that must be perpetuated. The sewer manholes are shown within downstream slope of the East Drainage Channel section. Adjust the manhole elevations to the new grade and provide a revised access road section to maintain manhole accessibility.
13. Sheet C3.1: Revise Section. 1 to show the proposed access road and rip-rap section.
14. Sheet C3.D & C5.6: Label the sidewalk underdrains and revise the sidewalk drain detail to show the multiple opening sidewalk underdrains.
15. A Drainage Study Update will be required for the future expansion of the site.

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.

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

END OF REMARKS
B&H/PBJ

T/R/S: 19/60/20
AREA G-21

TECHNICAL DRAINAGE STUDY

For

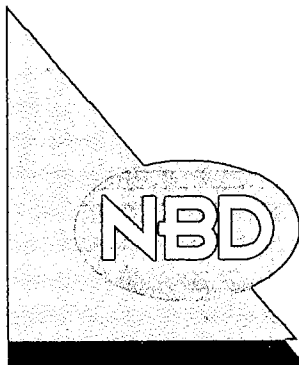
CENTENNIAL HILLS HOSPITAL

NBD Project No. CE04324

May 20, 2005

DS 3822
400
G-20
5-26-05
B. J. H.

Prepared For
Lopez-Garcia Group
1825 Market Center Boulevard
Suite 500
Dallas, TX 75207



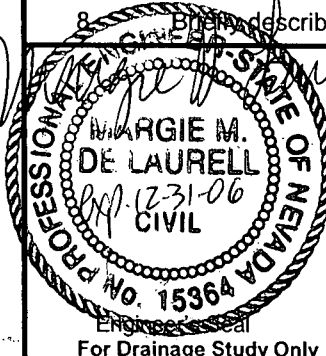
Prepared By

Nevada By Design, LLC
3515 E. Harmon Avenue
Las Vegas, NV 89121

DRAINAGE STUDY INFORMATION FORMName of Development: Centennial Hills HospitalDate: May 2005Location of Development: a) Descriptive Northeast corner of Durango Dr. and Deer Springs Way
b) Sect. 20 Twn 19S Rng 60EName of Owner UHS Delaware Inc, C/O Pyskacek, Universal Health Services Inc.Assessors Parcel No: 125-20-610-003Telephone No.: (610) 768-3300Facsimile No.: (610) 768-3301Address: PO Box 61558King of Prussia, Pennsylvania 19406Contact Person - Name: Margie De Laurell, P.E.Telephone No.: (702) 938-1525Firm: Nevada By DesignAddress: 3515 E. Harmon Avenue Las Vegas, NV 89121

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: 36 acres ± Being Developed/Disturbed: 36 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.)? Commercial (Hospital)5. Approximate upstream land area which drains to the subject site? 0 acres ±6. Has the site drainage been evaluated in the past? (YES) NO If yes, please identify
documentation:Montecito Town Center North Conceptual Drainage Study7. If known, please briefly identify the proposed discharge point (s) of runoff from the site:
A portion to historical discharge point east of the site and a portion to Deer Springs.8. Briefly describe your proposed schedule for the subject project: A.S.A.P.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.

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

Local Entity File No.

Revision	Date

REFERENCE: Centennial Hills Hospital

STANDARD FORM 1

EXISTING ONSITE DRAINAGE DESCRIPTION

Rational Method Analyses were performed for the existing condition drainage condition so that the onsite proposed condition runoff released towards the easterly adjacent property would not be increased. Figure 6 shows the two onsite Basins EX1 ($Q_{10}=5/Q_{100}=17$) and EX2 ($Q_{10}=6/Q_{100}=20$). EX1 flows toward Deer Springs Way and EX2 flows towards the adjacent easterly property, respectively.

PROPOSED ONSITE DRAINAGE DESCRIPTION

Figure 7 contains the Future Drainage Conditions Map from the Northwest Neighborhood Study for the area. As seen in the figure, two onsite 10-Year storm drains are depicted, as is a 10-Year storm drain in Deer Springs Way. Due to unforeseeable conditions and agreements between adjacent developers and CLV, the 10-Year storm drain in Deer Springs will not be constructed in the near future. Therefore there will not be any 10-Year storm drains onsite.

See Figure 8 (Map Pocket 9) for Developed Condition Drainage Map depicted for the site in the interim condition. Onsite drainage is conveyed across the site as sheet flow, shallow concentrated flow via surface gutters, and concentrated flow via storm drain. Concentration points, as shown on Figure 8 (Map Pocket 9) are located at Deer Springs Way and at the northeast corner of the site.

There are 12 onsite drainage Basins (ON1-ON12) that total 35.55 acres. Basins ON1 thru ON8 discharge into Deer Springs at various locations. The remaining four basins follow the historic path and discharge east of the project.

Basin ON1 drains over the surface to two storm drain drop inlets located on the west side of the hospital. The storm drain pipe carries the 100-Year flow to Basin ON2, opens to a dirt swale and then combines with flows from ON2 and ON4 at an inlet structure. The inlet structure empties through five pipes and then a riprap channel that discharges into Deer Springs through the first driveway east of Durango.

Basins ON3 and ON5 discharge into Deer Springs at the second driveway east of Durango. These two basins consist of building roofs and pavement. All of the flow is conveyed on the surface as sheet flow and shallow concentrated flow. Basin ON3 drains through Basin ON5 before discharging into Deer Springs.

Basins ON6, ON7, and ON8 discharge into Deer Springs at the southeast corner of the site. Basin ON6 consists entirely of the building's roof. This basin drains into a storm drain pipe east of the hospital. That pipe goes south and connects to the storm drain pipe for Basin ON7. Basin ON7 consists of a small landscaped area adjacent to the medical office building. These flows then continue through the storm drain system to the southeast corner of the site where the pipe dumps into an outfall structure and then daylights to a riprap channel. Basin ON8 drains to the southeast corner of the project as surface flow, combines with Basins ON6 and ON7 at the outfall structure, and then discharges in the riprap channel that flows through sidewalk under-drains into Deer Springs.

Basins ON9, ON10, and ON11 drain to the northeast corner of the site. Basin ON9 collects its flow at the low point where it is conveyed in a pipe to Basin ON10. The ON9 flow combines with ON10 flow as it is routed through Basin ON10 via open channels and storm drain pipe. These two basins then drain into Basin ON11 and are conveyed across it through an open channel and storm drain pipe.

Basin ON11 combines with ON9 and ON10 and all three basins discharge onto the undeveloped parcel to the east of the site. This follows the historic drainage pattern.

SECTION III: HYDROLOGIC ANALYSES AND RESULTS

HYDROLOGIC METHODOLOGY AND CRITERIA

The Clark County Regional Flood Control District have adapted for smaller contributing basins the *Modified Rational Formula Method*. This modification assures the formula matches the HEC-1 Flood Hydrograph Package and is used to determine the peak runoff generated by the 100 and 10-Year, 6-Hour storm event.

The modified Rational Formula is $Q = KCIA$ where “Q” is defined as the maximum peak flow of runoff in cubic feet per second (cfs). “C” is a runoff coefficient and represents the condition and land use of the area of concern. “T” is the intensity of rainfall in inches per hour for duration equal to the time of concentration. “A” is the area in acres being evaluated. “K” is the factor that adjusts the formula to the local vicinity; in Clark County this number is 0.5.

The Rational Formula makes the following assumptions:

1. The computed maximum runoff at the point of interest is directly related to the average and is a function of the rainfall rate during the time of concentration.
2. The maximum rate of rainfall occurs during the time of concentration and the design rainfall depth during the time of concentration is converted to the average rainfall intensity for the time of concentration.
3. The maximum runoff occurs when the entire area is contributing flow. However, this assumption has been modified from time to time when local rainfall/runoff data was used to improve calculated results.

Both CCRFCD’s Drainage Design Management System (DDMS) was utilized to obtain the 10-Year and 100-Year flood discharge quantities.

HYDROLOGIC PARAMETERS

Basin Area

The proposed onsite areas were determined from the onsite grading plans produced by Lopez-Garcia Group. The Drainage Basin Map (Figure 8) for the proposed onsite conditions is included in Map Pocket 2. These areas were delineated in order to determine the discharge resulting from the 10- and 100-Year storm events at various points throughout the site.

Runoff Coefficients

The Rational Method Runoff Coefficients (C) for the proposed conditions have been calculated by DDMS. For each sub-basin a land use was input into the program. For most of the CHH project the land use inputted was COMM1 (Neighborhood Commercial). See the “LAND USE DEFAULTS” and “RATIONAL METHOD LAND USE” tables included in the Appendix.

Time of Concentration

Time of concentration, T_c , consists of two component times; the initial overland flow time, t_i , and the gutter or channel flow time, t_f . The equation for the time of concentration is: $T_c = t_i + t_f$

The DDMS default values for overland flow times for neighborhood commercial drainage basin areas are 50 feet at two percent (2%) slope; see "RATIONAL METHOD LAND USE" table in the Appendix. The gutter or channel flow length and slopes were inputted into DDMS according to the unique drainage basin; see "RATIONAL METHOD SUB BASINS" table in the Appendix for T_c calculations.

Rainfall

The rainfall intensity was calculated by DDMS (see DDMS "RAINFALL DATA" table in the Appendix), which uses certain NOAA depths inputted by Nevada By Design. Since the project site is outside the McCarran Airport rainfall area Figures 501, 506, 507, and 512 of the Drainage Design Manual was used to obtain the rainfall depths (the Figures are included in the Appendix). The depths in inches inputted into DDMS were as follows:

- 2-year, 6-hour: 0.9
- 100-year, 6-hour: 2.1
- 2-year, 24-hour: 1.2
- 100-year, 24-hour: 3.0

RESULTS OF PROPOSED CONDITION HYDROLOGIC ANALYSES

The Modified Rational Formula flow rates for the developed condition are summarized in Table 2. Developed Drainage Basin Map also lists the 6-Hour, 10-Year and 100-Year peak flow rates (see Map Pocket 2). The total 100-Year runoff produced is 59 cfs in the proposed condition.

City of Las Vegas
 Drainage Design Management System
 RATIONAL METHOD LAND USE
 Project Reference: 04324-P-REVISED

Sub Basin	Land Use Code	Area (acres)	Area (%)	Overland Flow		Runoff Coefficient C					
				Length (ft)	Slope	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin 01											
ON1	OPEN	0.84	19.4	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
	PAVED	3.48	80.6	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		4.320	100.0								
ON10	OPEN	1.63	67.1	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
	PAVED	0.80	32.9	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		2.430	100.0								
ON11	OPEN	1.62	50.6	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
	PAVED	1.58	49.4	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		3.200	100.0								
ON12	NATURAL	2.19	100.0	200	0.020	0.25	0.25	0.25	0.35	0.45	0.50
		2.190	100.0								
ON2	PAVED	3.63	100.0	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		3.630	100.0								
ON3	PAVED	2.64	100.0	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		2.640	100.0								
ON4	OPEN	0.45	11.9	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
	PAVED	3.33	88.1	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		3.780	100.0								
ON5	PAVED	4.89	100.0	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		4.890	100.0								
ON6	PAVED	1.39	100.0	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		1.390	100.0								

* Non default value

(stLuDatRat.rpt)

City of Las Vegas
 Drainage Design Management System
 RATIONAL METHOD LAND USE
 Project Reference: 04324-P-REVISED

Sub Basin	Land Use Code	Area (acres)	Area (%)	Overland Flow		Runoff Coefficient C					
				Length (ft)	Slope						
						2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin 01											
ON7	OPEN	0.36	100.0	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
		0.360	100.0								
ON8	PAVED	6.41	100.0	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		6.410	100.0								
ON9	OPEN	0.22	73.3	200	0.020	0.10	0.10	0.10	0.18	0.26	0.30
		0.08	26.7	50	0.020	0.90	0.90	0.90	0.91	0.92	0.93
		0.300	100.0								

* Non default value

(sluDatRat.rpt)

City of Las Vegas
Drainage Design Management System
RATIONAL METHOD SUB BASINS
Project Reference: 04324-P-REVISED

Page 1

8/2/2005

Sub Basin Hydrology Summary													
Overland Flow								Travel Parameters					
Sub Basin ID	Area (acres)	Length (ft)	Slope (ft/ft)	Length (ft)	Slope (ft/ft)	Velocity Coef C	Tc (min)	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin: 01													
ON1	4.3	79	0.0200	353	0.0250	20.2	6.4	Q (cfs) C	4 0.74	6 0.74	8 0.74	10 0.77	13 0.79
								CA (ac) i (in/hr)	3.20 2.40	3.20 3.80	3.20 4.80	3.33 6.20	3.41 7.30
													15 8.30
ON10	2.4	151	0.0200	477	0.0500	14.8	15.4	Q (cfs) C	1 0.36	1 0.36	1 0.36	2 0.42	3 0.48
								CA (ac) i (in/hr)	0.88 1.60	0.88 2.50	0.88 3.20	1.02 4.20	1.17 5.00
													5.80
ON11	3.2	126	0.0200	498	0.0400	20.2	11.7	Q (cfs) C	1 0.50	2 0.50	3 0.50	4 0.54	5 0.59
								CA (ac) i (in/hr)	1.60 1.80	1.60 2.80	1.60 3.60	1.72 4.60	1.88 5.50
													6.40
ON12	2.2	200	0.0200	67	0.0650	14.8	17.5	Q (cfs) C	- 0.25	1 0.25	1 0.25	2 0.35	2 0.45
								CA (ac) i (in/hr)	0.55 1.40	0.55 2.30	0.55 3.00	0.77 3.90	0.99 4.60
													5.30
ON2	3.6	50	0.0200	612	0.0250		6.4	Q (cfs) C	4 0.90	6 0.90	8 0.90	10 0.91	12 0.92
								CA (ac) i (in/hr)	3.27 2.40	3.27 3.80	3.27 4.80	3.30 6.20	3.34 7.30
													8.30
ON3	2.7	50	0.0200	688	0.0350	20.2	5.1	Q (cfs) C	3 0.90	5 0.90	6 0.90	8 0.91	9 0.92
								CA (ac) i (in/hr)	2.39 2.50	2.39 4.10	2.39 5.00	2.41 6.60	2.44 7.70
													8.80
ON4	3.8	68	0.0200	642	0.0250		6.9	Q (cfs) C	4 0.80	6 0.80	7 0.80	9 0.82	11 0.84
								CA (ac) i (in/hr)	3.03 3.03	3.03 3.03	3.03 3.03	3.11 3.11	3.18 3.18
													3.26

* Non default value

(stSubBasRat.rpt)

City of Las Vegas
 Drainage Design Management System
 RATIONAL METHOD SUB BASINS
 Project Reference: 04324-P-REVISED

8/2/2005

Page 2

Sub Basin Hydrology Summary									
Overland Flow					Travel Parameters				
Sub Basin ID	Area (acres)	Length (ft)	Slope (ft/ft)	Length (ft)	Slope (ft/ft)	Velocity Coef C	Tc (min)		
ON5	4.9	50	0.0200	668	0.0200		5.9	i (in/hr)	2.30
								Q (cfs)	5
								C	0.90
								CA (ac)	4.41
								i (in/hr)	2.40
ON6	1.4	50	0.0200	461	0.0100		5.8	Q (cfs)	2
								C	0.90
								CA (ac)	1.25
								i (in/hr)	2.40
ON7	0.4	200	0.0200	110	0.0150	14.8	21.2	Q (cfs)	-
								C	0.10
								CA (ac)	0.04
								i (in/hr)	1.30
ON8	6.4	50	0.0200	920	0.0200	20.2	7.4	Q (cfs)	7
								C	0.90
								CA (ac)	5.77
								i (in/hr)	2.30
ON9	0.3	160	0.0200	143	0.0700	14.8	14.9	Q (cfs)	-
								C	0.31
								CA (ac)	0.09
								i (in/hr)	1.60

* Non default value

(stSubBasRat.rpt)

City of Las Vegas
Drainage Design Management System
RATIONAL METHOD FLOW SUMMARY
Return Period: 10 Years

8/2/2005

Page 1

Type	Model ID	Size	Area (acres)	Length (feet)	Velocity (ft/sec)	Time in Drain (min)	CA (acres)	Tc (min)	I (in/hr)	Q (cfs)
Major Basin: 01										
Basin	ON1		4.3				3.20	6.4	4.8	7.7
Convey	RK1	1-18" Dia	4.3	134	0.3	7.4	3.20	14.0	3.3	5.3
Convey	RK2	1-24" Dia	4.3	578	0.3	32.1	3.20	46.0	1.7	5.3
Convey	RK3	1.00'H x 1.00'W	4.3	288	3.3	1.5	3.20	48.0	1.6	5.3
Basin	ON2		3.6				3.27	6.4	4.8	7.8
Combine			8.0				6.47	48.0	1.6	5.2
Basin	ON4		3.8				3.03	6.9	4.5	6.8
Combine			11.7				9.50	48.0	1.6	7.6
Basin	ON3		2.7				2.39	5.1	5.0	6.0
Basin	ON5		4.9				4.41	5.9	4.8	10.6
Combine			7.6				6.80	5.9	4.8	16.3
Basin	ON6		1.4				1.25	5.8	4.8	3.0
Convey	RK5	1-12" Dia	1.4	168	0.7	4.0	1.25	10.0	3.8	2.4
Convey	RK6	1-15" Dia	1.4	220	0.7	5.2	1.25	15.0	3.2	2.4
Basin	ON7		0.4				0.04	21.2	2.8	0.1
Combine			1.8				1.29	21.2	2.8	1.8
Convey	RK7	1-18" Dia	1.8	722	0.4	30.1	1.29	51.0	1.5	1.0
Basin	ON8		6.4				5.77	7.4	4.5	13.0
Combine			8.2				7.06	51.0	1.5	5.3
Convey	RK16	0.50'H x 10.00'	8.2	47	3.4	0.2	7.06	51.0	1.5	5.3
Basin	ON9		0.3				0.09	14.9	3.2	0.1
Convey	RK8	1-12" Dia	0.3	37	0.4	1.5	0.09	16.0	3.2	0.1
Convey	RK9	0.70'H x 20.00'	0.3	22	4.2	0.1	0.09	16.0	3.2	0.1
Convey	RK10	1-18" Dia	0.3	32	0.5	1.1	0.09	17.0	3.1	0.1
Convey	RK11	4.00'H x 20.00'	0.3	203	9.0	0.4	0.09	17.0	3.1	0.1
Basin	ON10		2.4				0.88	15.4	3.2	1.4
Combine			2.7				0.97	17.0	3.1	1.5
Convey	RK12	1-18" Dia	2.7	64	0.4	2.7	0.97	20.0	2.8	1.4
Convey	RK13	1.50'H x 20.00'	2.7	205	7.7	0.4	0.97	20.0	2.8	1.4
Basin	ON11		3.2				1.60	11.7	3.6	2.9
Combine			5.9				2.57	20.0	2.8	3.6
Convey	RK14	1-18" Dia	5.9	117	0.5	3.9	2.57	24.0	2.5	3.2
Basin	ON12		2.2				0.55	17.5	3.0	0.8

(s:\Ra\Na\l.rpt)

City of Las Vegas
Drainage Design Management System
RATIONAL METHOD FLOW SUMMARY
Return Period: 100 Years

Type	Model ID	Size	Area (acres)	Length (feet)	Velocity (ft/sec)	Time in Drain (min)	CA (acres)	Tc (min)	I (in/hr)	Q (cfs)
Major Basin: 01										
Basin	ON1		4.3				3.50	6.4	8.3	14.5
Convey	RK1	1-18" Dia	4.3	134	0.3	7.4	3.50	14.0	6.0	10.5
Convey	RK2	1-24" Dia	4.3	578	0.3	32.1	3.50	46.0	3.1	10.5
Convey	RK3	1.00'H x 1.00'W	4.3	288	3.3	1.5	3.50	48.0	3.0	10.5
Basin	ON2		3.6				3.38	6.4	8.3	14.0
Combine			8.0				6.88	48.0	3.0	10.3
Basin	ON4		3.8				3.26	6.9	7.9	12.9
Combine			11.7				10.14	48.0	3.0	15.2
Basin	ON3		2.7				2.46	5.1	8.8	10.8
Basin	ON5		4.9				4.56	5.9	8.3	18.9
Combine			7.6				7.02	5.9	8.3	29.1
Basin	ON6		1.4				1.29	5.8	8.3	5.4
Convey	RK5	1-12" Dia	1.4	168	0.7	4.0	1.29	10.0	6.8	4.4
Convey	RK6	1-15" Dia	1.4	220	0.7	5.2	1.29	15.0	5.8	4.4
Basin	ON7		0.4				0.11	21.2	4.9	0.3
Combine			1.8				1.40	21.2	4.9	3.4
Convey	RK7	1-18" Dia	1.8	722	0.4	30.1	1.40	51.0	2.8	2.0
Basin	ON8		6.4				5.96	7.4	7.9	23.5
Combine			8.2				7.36	51.0	2.8	10.3
Convey	RK16	0.50'H x 10.00'	8.2	47	3.4	0.2	7.36	51.0	2.8	10.3
Basin	ON9		0.3				0.14	14.9	5.8	0.4
Convey	RK8	1-12" Dia	0.3	37	0.4	1.5	0.14	16.0	5.6	0.4
Convey	RK9	0.70'H x 20.00'	0.3	22	4.2	0.1	0.14	16.0	5.6	0.4
Convey	RK10	1-18" Dia	0.3	32	0.5	1.1	0.14	17.0	5.5	0.4
Convey	RK11	4.00'H x 20.00'	0.3	203	9.0	0.4	0.14	17.0	5.5	0.4
Basin	ON10		2.4				1.24	15.4	5.8	3.6
Combine			2.7				1.38	17.0	5.5	3.8
Convey	RK12	1-18" Dia	2.7	64	0.4	2.7	1.38	20.0	5.1	3.5
Convey	RK13	1.50'H x 20.00'	2.7	205	7.7	0.4	1.38	20.0	5.1	3.5
Basin	ON11		3.2				1.95	11.7	6.4	6.2
Combine			5.9				3.33	20.0	5.1	8.5
Convey	RK14	1-18" Dia	5.9	117	0.5	3.9	3.33	24.0	4.6	7.7
Basin	ON12		2.2				1.10	17.5	5.3	2.9

**NORMAL DEPTH, RIPRAP CALCULATIONS, DRAINAGE MAP &
GRADING PLAN**

Worksheet for Prop. Swale

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	1.00	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	29.00	ft³/s

Results

Normal Depth	1.64	ft
Flow Area	8.07	ft²
Wetted Perimeter	10.38	ft
Top Width	9.84	ft
Critical Depth	1.42	ft
Critical Slope	0.02146	ft/ft
Velocity	3.59	ft/s
Velocity Head	0.20	ft
Specific Energy	1.84	ft
Froude Number	0.70	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.64	ft
Critical Depth	1.42	ft
Channel Slope	1.00	%
Critical Slope	0.02146	ft/ft

Worksheet for Prop. Swale

Messages

Notes	*100 yr flow from ON1& ON2 per reference study
-------	---

Cross Section for Prop. Swale

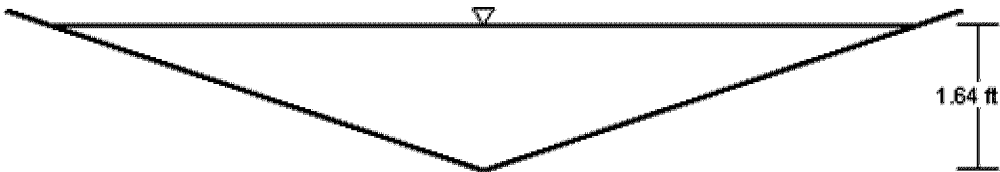
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.035
Channel Slope	1.00 %
Normal Depth	1.64 ft
Left Side Slope	3.00 ft/ft (H:V)
Right Side Slope	3.00 ft/ft (H:V)
Discharge	29.00 ft³/s

Cross Section Image



V: 1 
H: 1

Worksheet for Prop. 24 in. SD

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.00	%
Diameter	24.00	in
Discharge	15.00	ft³/s

Results

Normal Depth	1.19	ft
Flow Area	1.95	ft²
Wetted Perimeter	3.52	ft
Top Width	1.96	ft
Critical Depth	1.40	ft
Percent Full	59.5	%
Critical Slope	0.00632	ft/ft
Velocity	7.70	ft/s
Velocity Head	0.92	ft
Specific Energy	2.11	ft
Froude Number	1.36	
Maximum Discharge	24.33	ft³/s
Discharge Full	22.62	ft³/s
Slope Full	0.00440	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	59.50	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s

Worksheet for Prop. 24 in. SD

GVF Output Data

Normal Depth	1.19	ft
Critical Depth	1.40	ft
Channel Slope	1.00	%
Critical Slope	0.00632	ft/ft

Messages

Notes	*100 yr flow from ON1 per reference study
-------	---

Cross Section for Prop. 24 in. SD

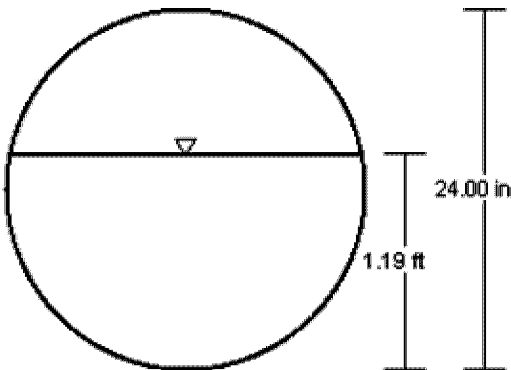
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	1.00 %
Normal Depth	1.19 ft
Diameter	24.00 in
Discharge	15.00 ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Prop. Depress Curb Section

Results

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	0.47	ft
Critical Depth	0.66	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00343	ft/ft

Cross Section for Prop. Depress Curb Section

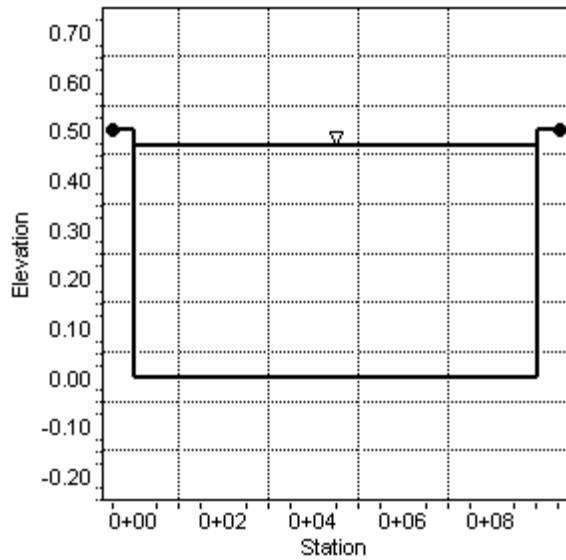
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.47	ft
Discharge	27.00	ft³/s

Cross Section Image



Rip Rap Calculation
at 24" RCP Outlet
CENTENNIAL HILLS PARKING LOT EXPANSION

$$(d_{50} / D) (Y_t / D)^{1.2} / (Q / D^{2.5}) = 0.023 \quad \text{Eqn. 760 of the Manual}$$

$Y_t / D = 0.4$ Based on assumptions as outlined in section 707.4.2 (b)*

$Q = 15$ Flow at outlet of pipe (cfs)

$D = 2$ Diameter of pipe (ft)

$Q / D^{2.5} = 2.65165$ Solution must be less than 6 for the following equation to be valid

$$d_{50} = 0.023 * D * (Q / D^{2.5}) / (Y_t / D) \quad \text{Equation 733* solved for rock size}$$

$$d_{50} = 0.30494 \text{ ft.}$$

Therefore rip rap size $d_{50} =$ 0.3 ft. or 4 in.

Blanket thickness $= 2 * d_{50} =$ 0.6 7 in.

Rip Rap Calculation
at Depressed Curb Section
CENTENNIAL HILLS PARKING LOT EXPANSION

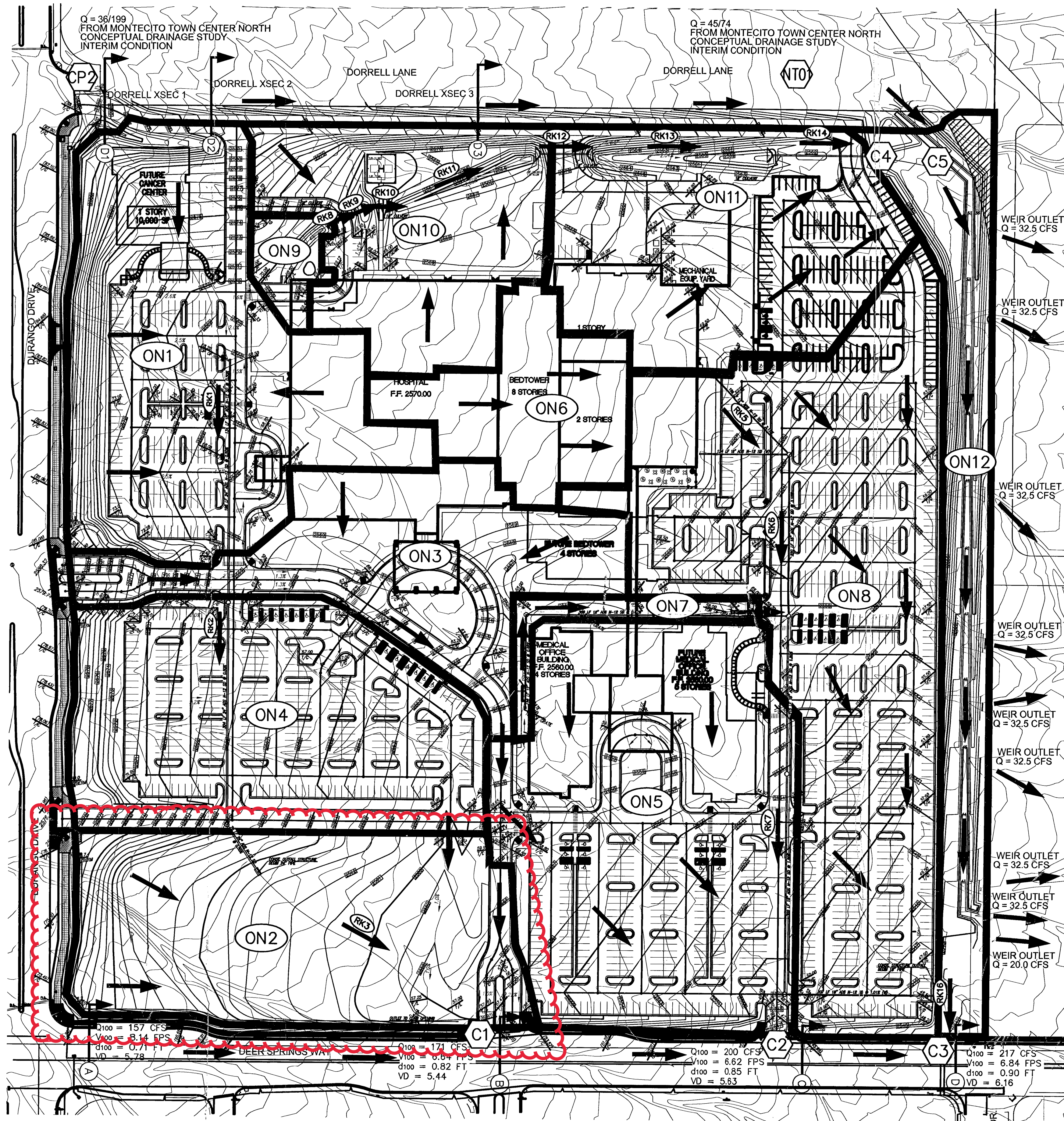
$$V = 3 (d_{50}^{0.5}) (S_s - 1) / S^{0.17} \quad \text{Eq. 734 of the Manual}$$

V = 6.44 Mean channel velocity in feet per second
per Normal Depth Section A
S = 0.01 Longitudinal channel slope in feet per foot
S_s = 2.5 Specific gravity of rock (minimum S_s = 2.50)
d₅₀ = Rocksize in ft for which 50 % of the riprap by weight is smaller

$$d_{50} = 0.4279 \quad \text{Equation 733* solved for rock size}$$

Therefore rip rap size d₅₀ = 0.4 ft. or 5 in.

Blanket thickness = 2*d₅₀ = 0.9 ft. or 10 in.



PROPOSED CONDITION			
BASIN	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)
ON1	4.3	8	15
RK1	N/A	7	14
RK2	N/A	7	14
RK3	N/A	7	14
ON2	3.6	8	14
ON3	N/A	12	23
ON4	3.8	7	13
ON5	N/A	18	34
ON6	2.7	6	11
ON7	4.9	11	19
ON8	N/A	16	29
ON9	1.4	3	5
RK5	N/A	3	5
RK6	N/A	3	5
ON7	0.4	<1	<1
RK7	N/A	2	3
ON8	N/A	2	3
ON9	6.4	13	24
ON10	N/A	9	17
ON11	N/A	9	17
ON12	0.3	<1	<1
RK8	N/A	<1	<1
RK9	N/A	<1	<1
RK10	N/A	<1	<1
RK11	N/A	<1	<1
ON10	2.4	1	4
ON11	N/A	2	4
ON12	N/A	2	4
ON13	N/A	2	4
ON14	3.2	3	6
ON15	N/A	4	9
ON16	N/A	4	9
ON17	N/A	4	9
ON18	N/A	85	282
ON19	2.2	1	3

LEGEND	
ON1	BASIN LABEL / ROUTING LABEL
→	FLOW DIRECTION
---	BASIN BOUNDARY
C1	CONCENTRATION POINT
Q100/Q10	100 YEAR/10 YEAR FLOW RATES



GRAPHIC SCALE

This grading plan is a part of drainage study #3802 which was received on 8/24/05 and approved on 9/13/05. Page 1 of 22.

DATE: _____

BY: _____

DESCRIPTION: _____

DESIGNED BY: JDA JOB NUMBER: 04324

CHECK BY: CLN DATE: 08/02/05

SCALE: 1"=80'

DRAWN BY: JDA

CENTENNIAL HILLS HOSPITAL

DEVELOPED CONDITION

BASIN MAP

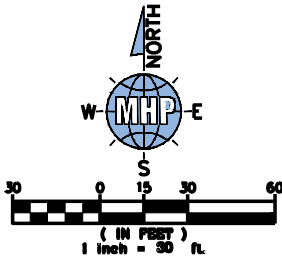
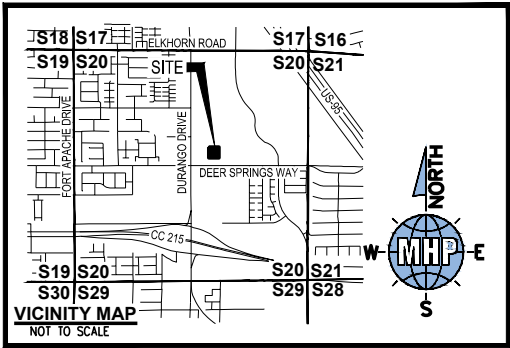
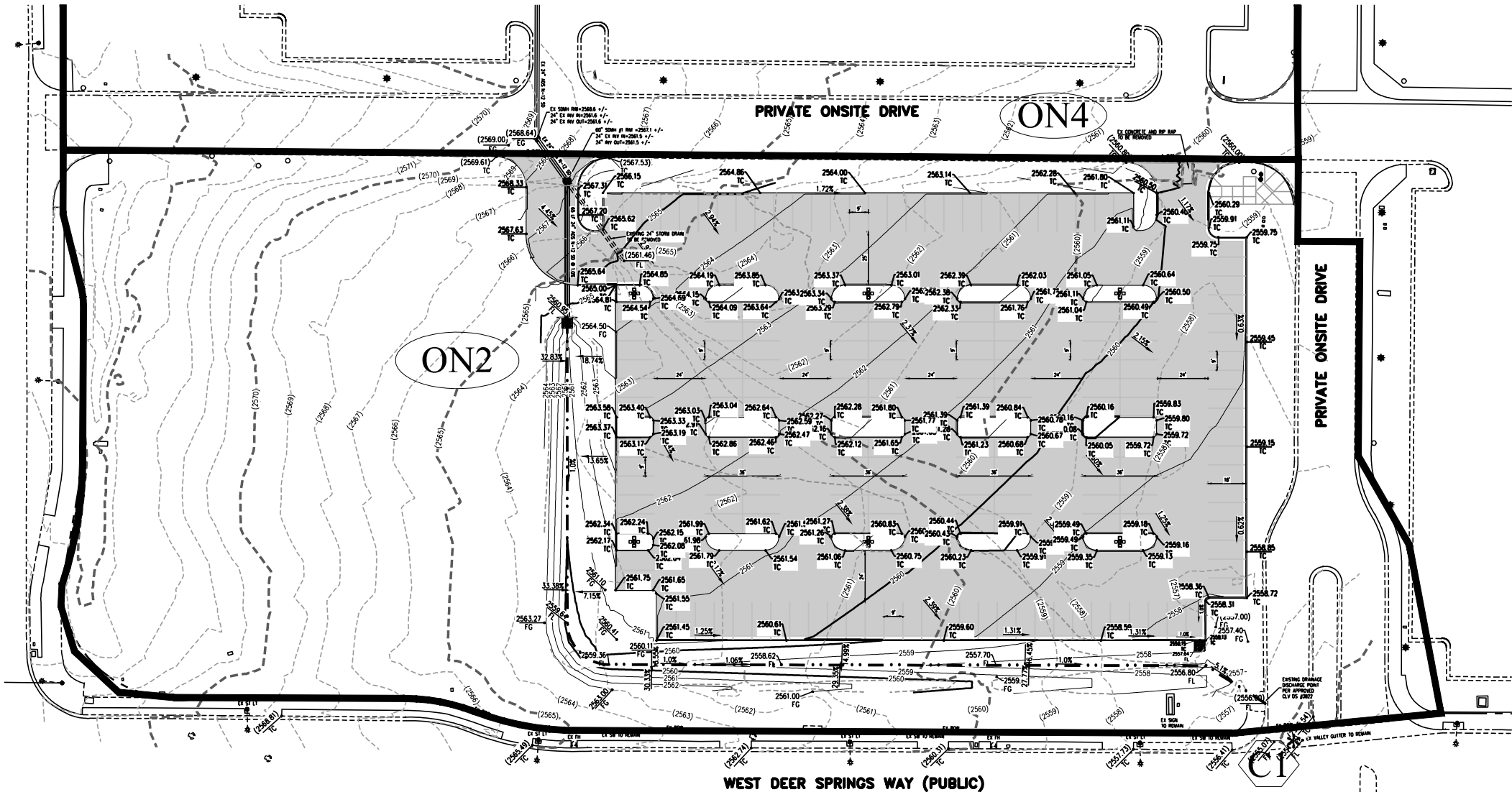
PROJECT: _____

DRAWING TITLE: _____

SEAL: _____

SHEET NO.: _____

FIG 8



LEGEND	
	BASIN BOUNDARY
	FLOW ARROW
	BASIN ID
	COMBINATION POINT
10 cfs/100 cfs	Q ₁₀₀ /Q ₁₀

BASIN FLOW SUMMARY			
BASIN ID	AREA (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
ON1*	4.3	8	15
ON2*	3.6	8	14
ON4*	3.8	7	13
C1*	-	18	34

NOTE: FLOWS REFERENCED FROM THE ORIGINAL APPROVED DRAINAGE STUDY ARE DENOTED BY * ON THIS DRAINAGE MAP

BASIS OF BEARINGS

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FTUS)

DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
NEVADA COORDINATE REFERENCE SYSTEM (NCRS)

ZONE: LAS VEGAS

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 200,000,000 M (656,166.6667 FTUS)
EASTING AT CENTRAL MERIDIAN: 100,000,000 M (328,083.3333 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.0001 (EXACT)

NOTES:

- ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
- GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK STATION: 5LV9020E6
DESCRIPTION: RIVET AND ROUND ALUMINUM PLATE IN TOP OF CURB AT THE SOUTHWEST CORNER OF RILEY STREET AND DEER SPRING SPRINGS.
ELEVATION: 774.781 METERS
2541.93 FEET (U.S. SURVEY FEET)

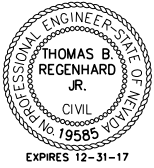
VALLEY HEALTH SYSTEM, LLC
14400 METCALF AVENUE, OVERLAND PARK, KS 66223

MHP LIMITED, LLC
8440 SKY POINT DRIVE #40-385
LAS VEGAS, NEVADA 89131-0407
P: (702) 672-8886
WWW.MHPLIMITED.COM

DEVELOPED CONDITION DRAINAGE MAP
CITY OF LAS VEGAS, NEVADA

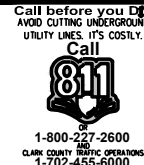
CENTENNIAL HILLS HOSPITAL
PHASE 2 PARKING LOT EXPANSION

DRAWING INFORMATION:	
DRAWN BY:	JCF 10/24/2016
DESIGNED BY:	JCF 10/24/2016
CHECKED BY:	TBR 10/24/2016
PROJECT NO.:	1600011
SCALE:	1" = 20' HORIZ. 1" = 20' VERT.

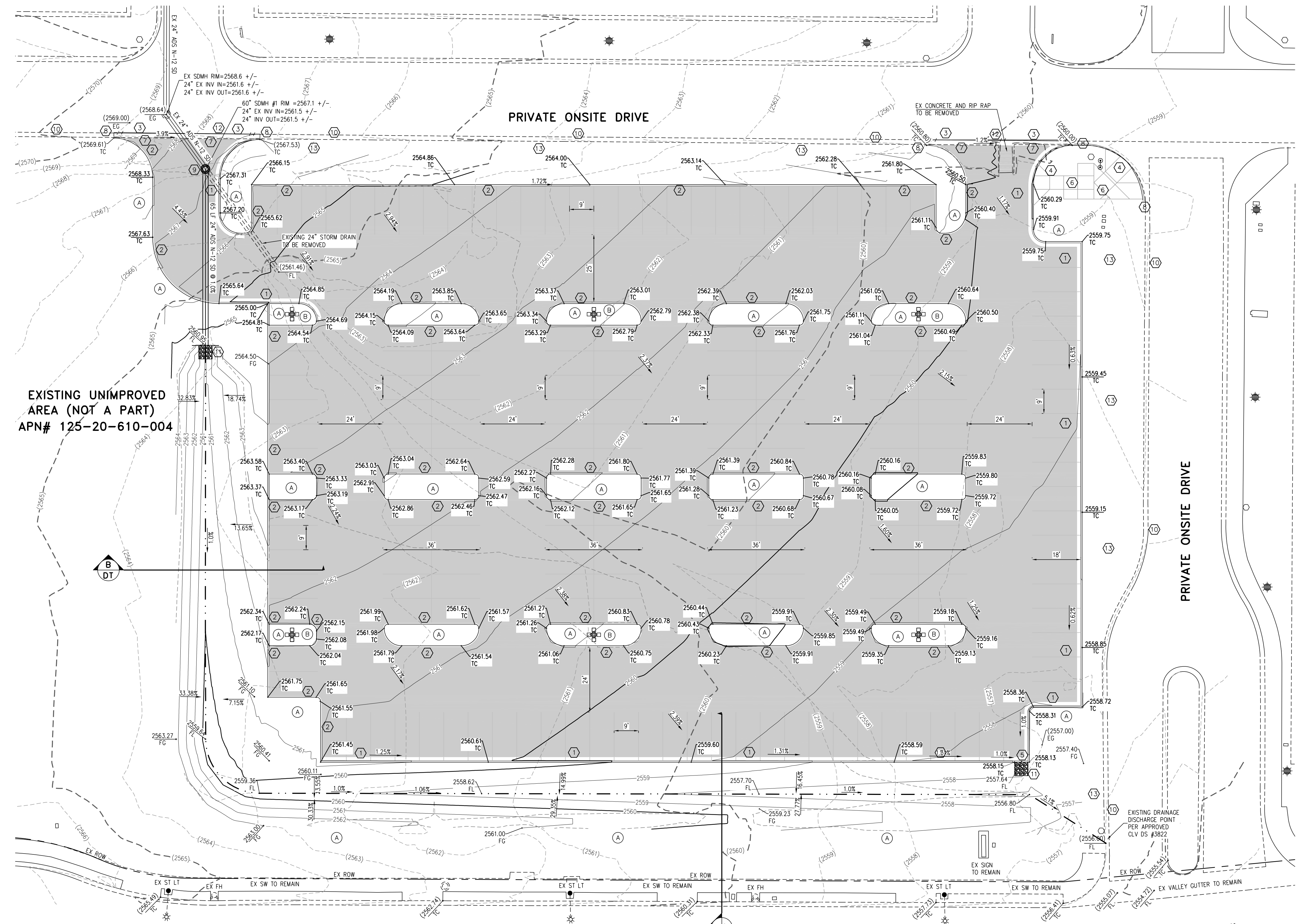


SHEET

1 OF 1
DRAWING NO.



5. CENTENNIAL HILL PARKING DRAINAGE MAP.DWG



BASIS OF BEARINGS

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FT/US)

DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
NEVADA COORDINATE REFERENCE SYSTEM (NCRS)

ZONE: LAS VEGAS

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 200,000,000 M (656,166.6667 FT/US)
EASTING AT CENTRAL MERIDIAN: 100,000,000 M (328,083.3333 FT/US)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.0001 (EXACT)

NOTES:

1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.

2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

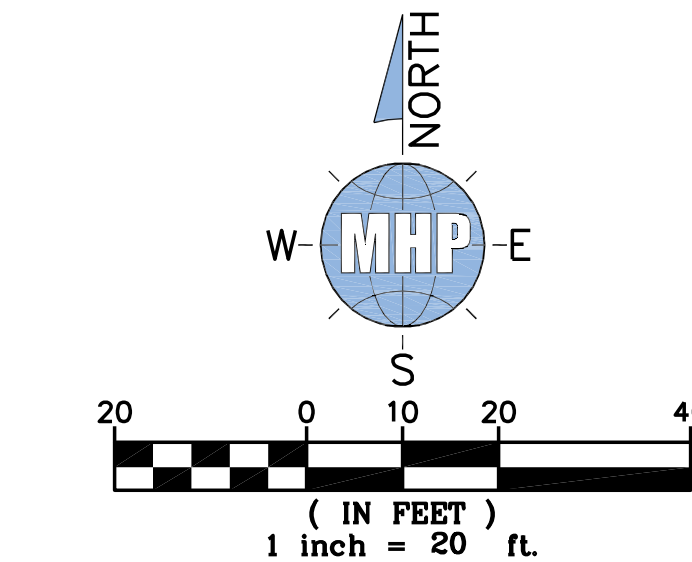
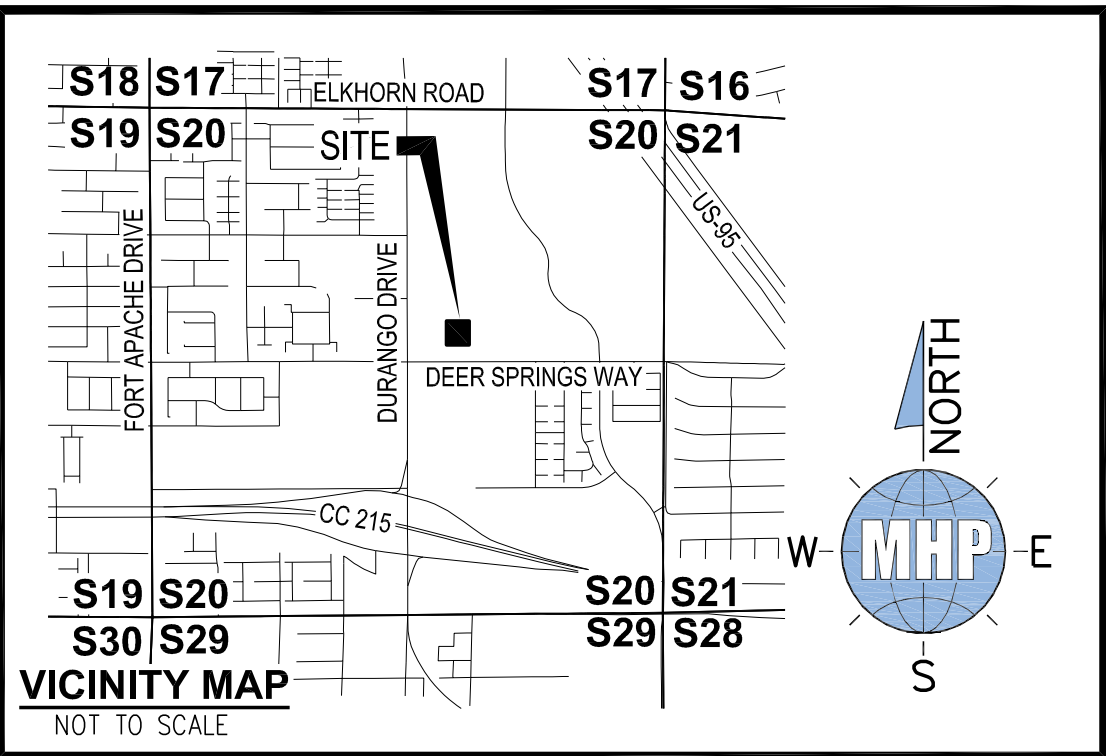
BENCHMARK

CITY OF LAS VEGAS BENCHMARK STATION: SLV90206
DESCRIPTION: RIVET AND ROUND ALUMINUM PLATE IN TOP OF CURB AT THE SOUTHWEST CORNER OF RILEY STREET AND DEER SPRING SPRINGS.
ELEVATION: 774.781 METERS
2541.93 FEET (U.S. SURVEY FEET)

WEST DEER SPRINGS WAY (PUBLIC)

LEGEND

- 1/16 LINE
- TREES/ SHURBS
- EXISTING SIGNS
- HANDICAP PARKING
- EXISTING AREA LIGHT
- PROPOSED AREA LIGHT
- EXISTING BACK OF CURB
- EDGE OF PAVEMENT/SAW OUT LINE
- EXISTING MANHOLE
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- FLOWLINE / SWALE / STORM DRAIN



CONSTRUCTION ITEMS

- INSTALL "L" TYPE CURB AND GUTTER PER DETAIL 6 ON SHEET DT.
- CONSTRUCT TYPE "A" CURB PER DETAIL 5 ON SHEET DT.
- SAWCUT AND MATCH EXISTING AC.
- CONSTRUCT SIDEWALK CURB RAMP PER DETAIL 2 ON DT AND ARCHITECTURAL PLANS.
- CONSTRUCT 5' WIDE DEPRESSED CURB FOR DRAINAGE.
- CONSTRUCT CONCRETE SIDEWALK PER DETAIL 4 ON SHEET DT. (WIDTH VARIES FROM 3' TO 15') ALSO, SEE ARCHITECTURAL PLANS FOR DETAILS.
- CONSTRUCT 2' CONCRETE VALLEY GUTTER PER DETAIL 1 ON SHEET DT.
- MATCH EXISTING WITH PROPOSED CONSTRUCTION.
- 60" TYPE I STORM DRAIN MANHOLE PER CCAUSD NO. 403 AND 401.
- EXISTING "L" CURB, PROTECT IN PLACE.
- 5'x5' RIPRAP PAD D50=6" DEPTH=1'
- REMOVE EXISTING "L" CURB.
- EXISTING LANDSCAPING. PROTECT IN PLACE.

COORDINATION ITEMS

- (A) LANDSCAPE AREA. SEE LANDSCAPE PLANS FOR IRRIGATION SCHEMATIC, PLANTING SCHEDULE AND DETAILS.
- (B) PROPOSED AREA LIGHT LOCATION. SEE LIGHTING PLAN FOR DETAILS.

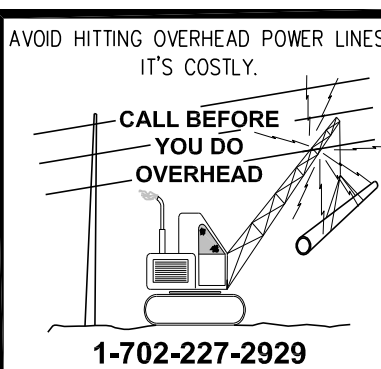
PAVEMENT LEGEND

- ON-SITE PAVEMENT AREAS. SEE SHEET DT FOR SECTION DETAIL

ONSITE EARTHWORK QUANTITIES

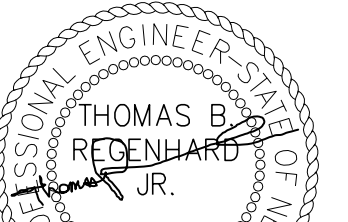
CUT	FILL	NET
983 CUBIC YARDS	645 CUBIC YARDS	338 CUBIC YARDS (FILL)

NOTE:
ALL EXPORTED DIRT SHOULD BE PLACED UNDER AN APPROVED CLV GRADING PERMIT. NO ILLEGAL DUMPING.



DRAWING INFORMATION:

DRAWN BY:	JCF	10/24/2016
DESIGNED BY:	JCF	10/24/2016
CHECKED BY:	TBR	10/24/2016
PROJECT NO.:	1600011	11/30/16



SHEET	GR
4 OF 5	DRAWING NO.

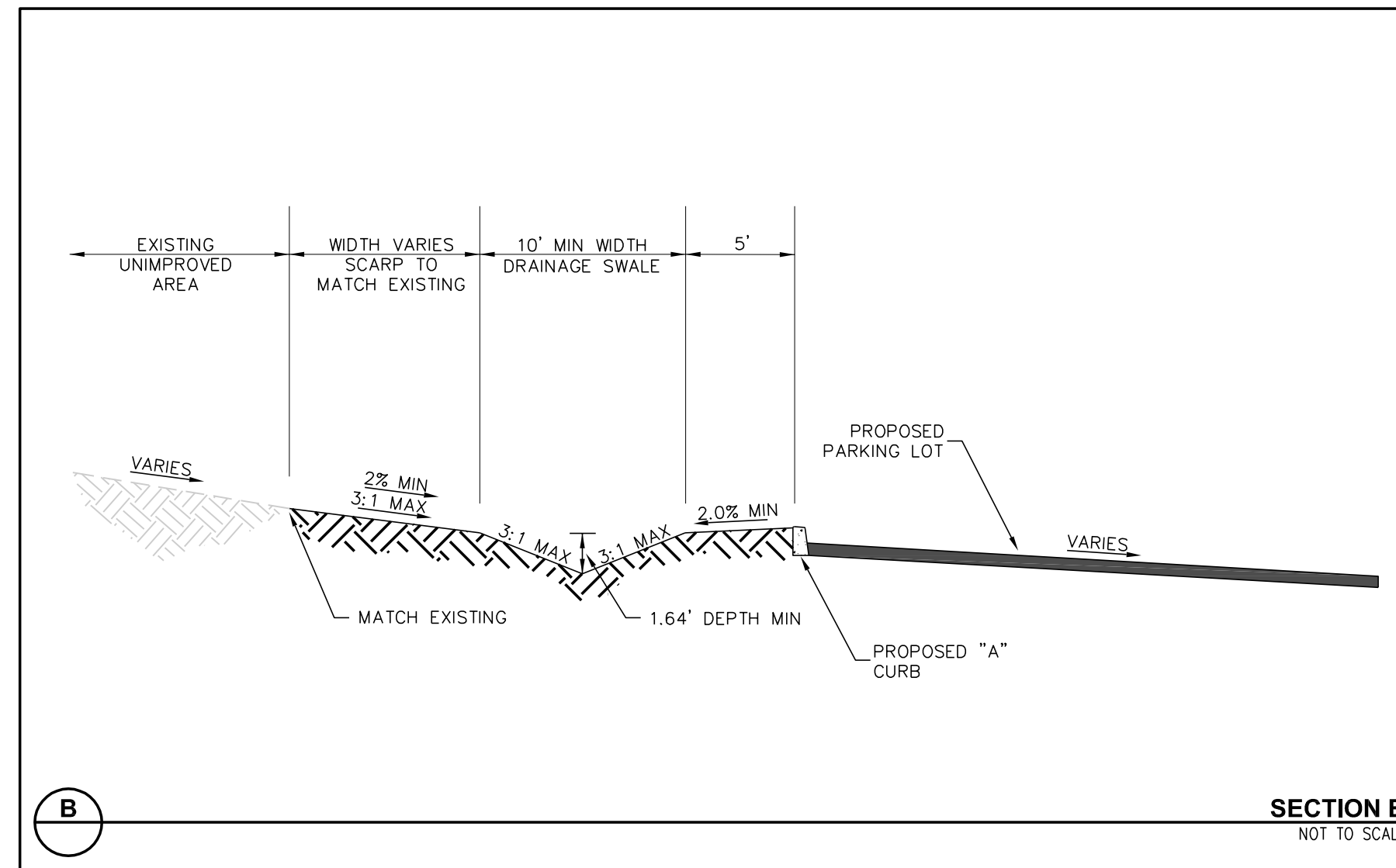
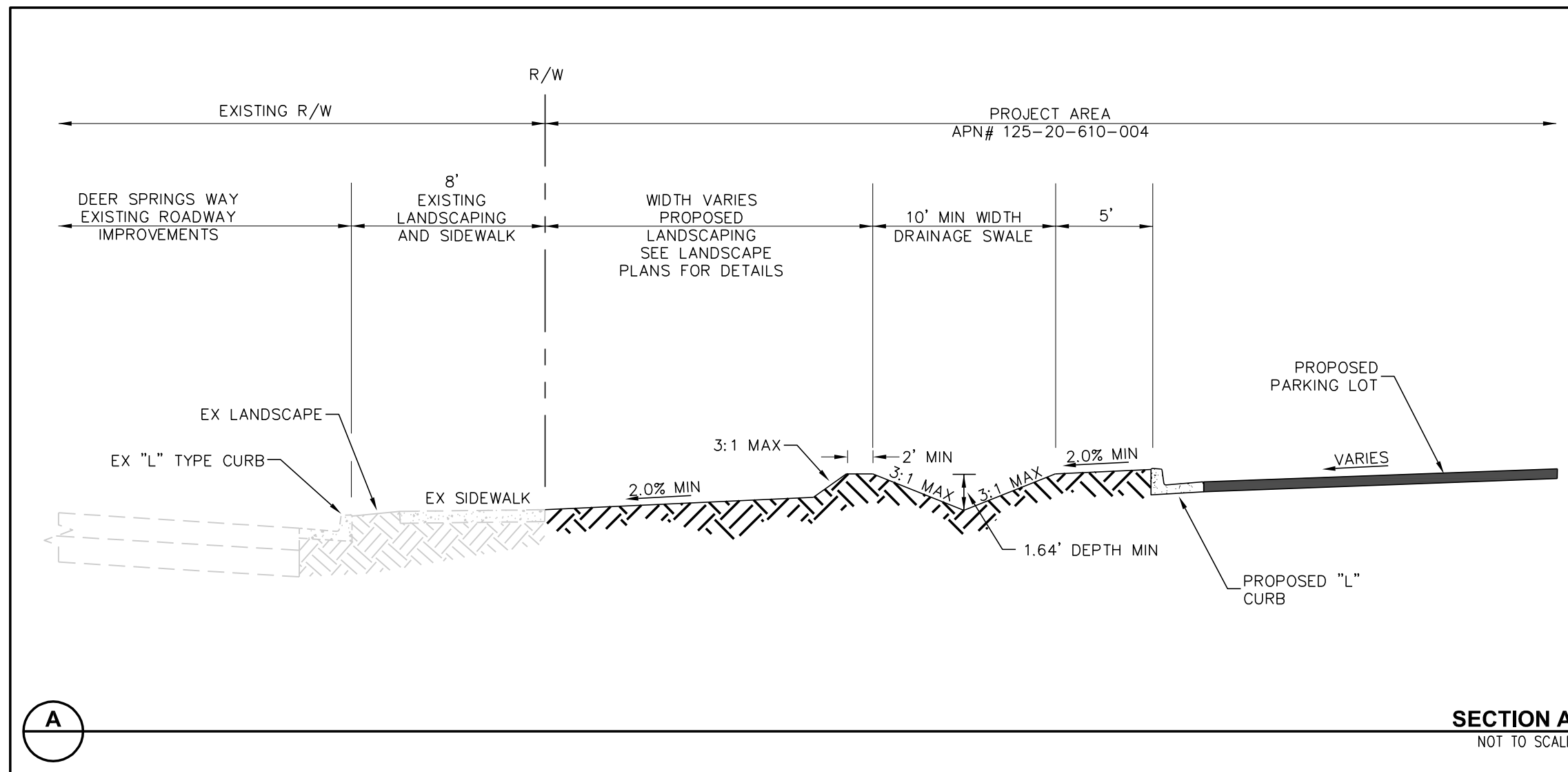
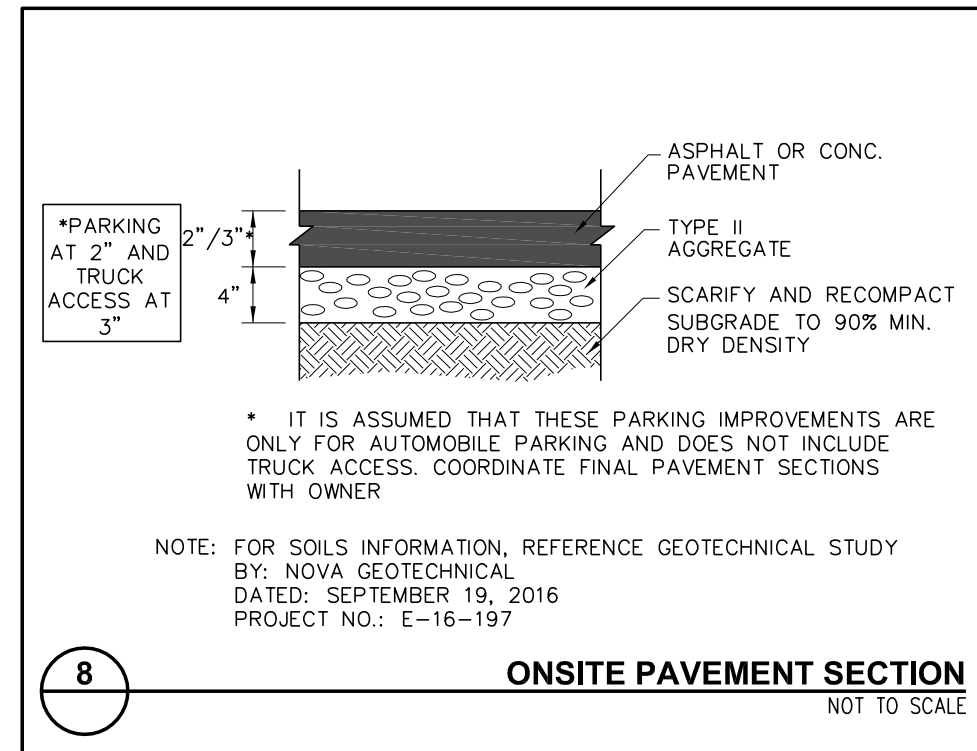
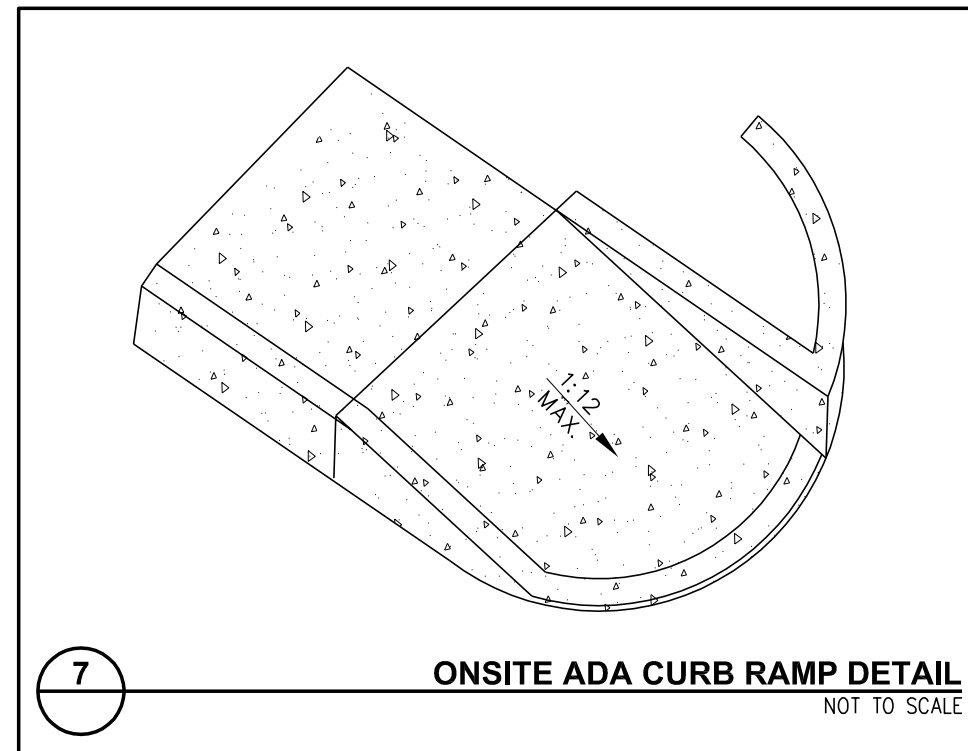
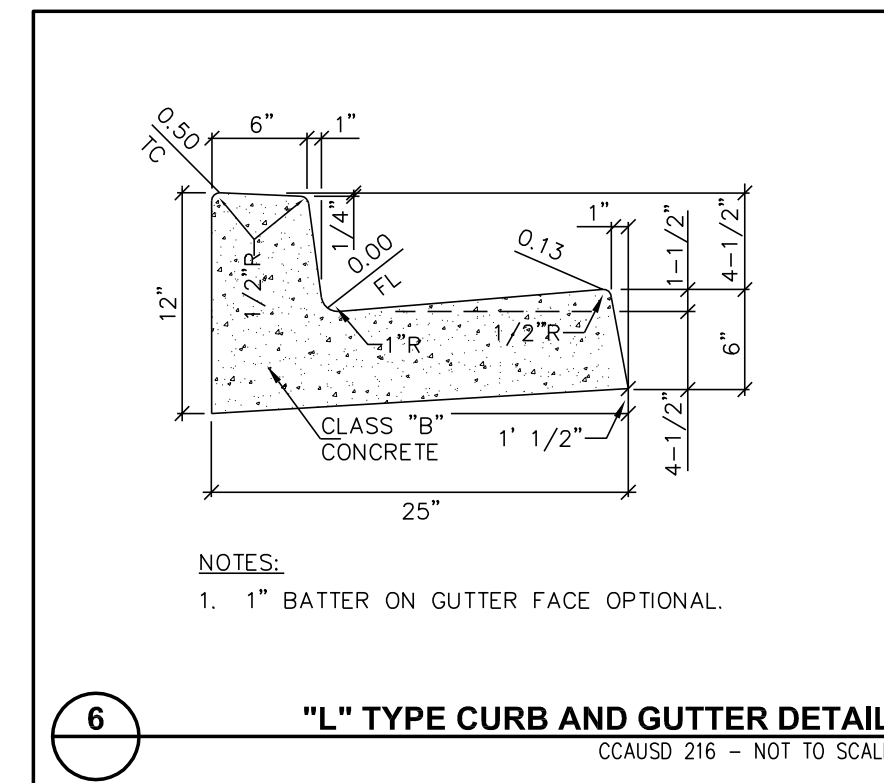
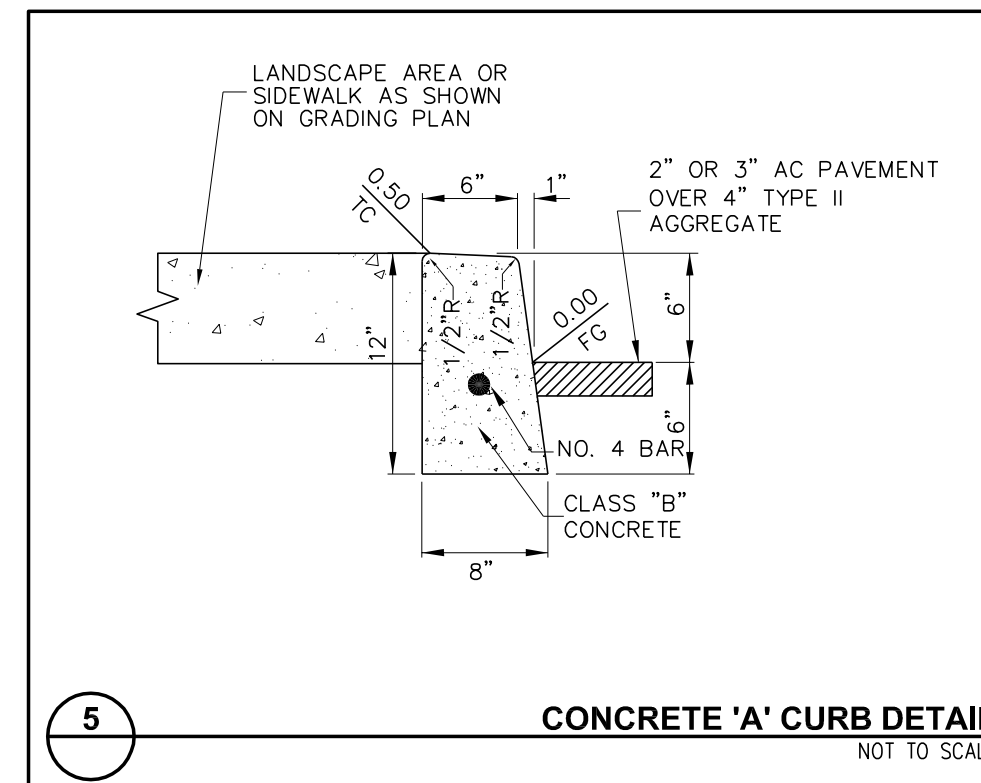
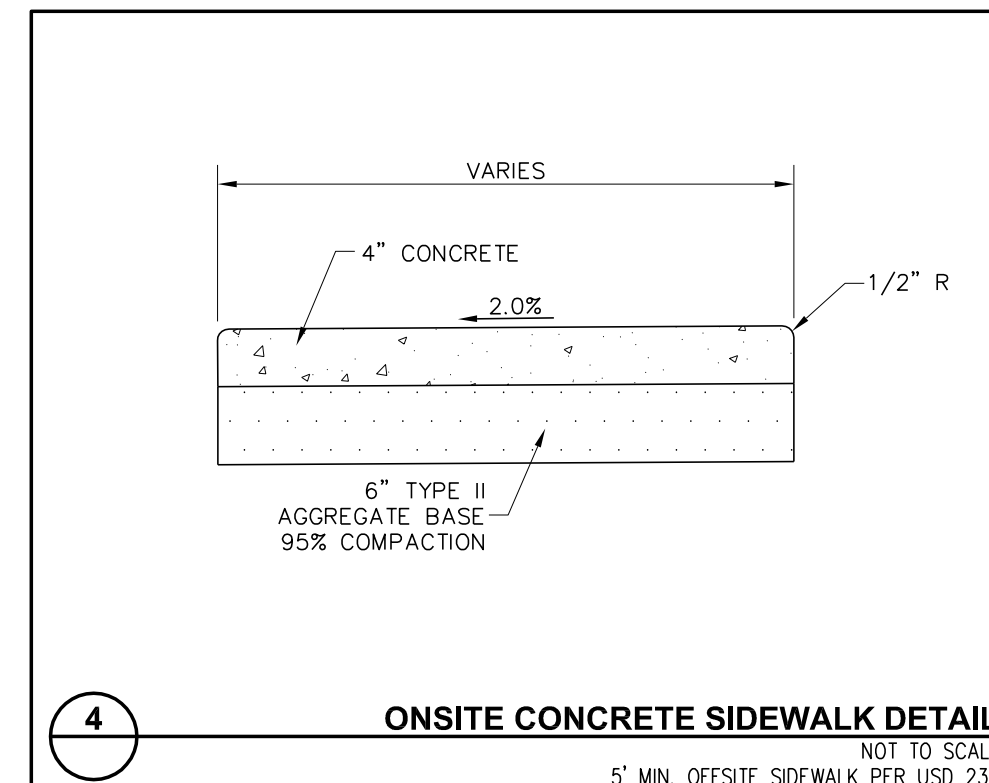
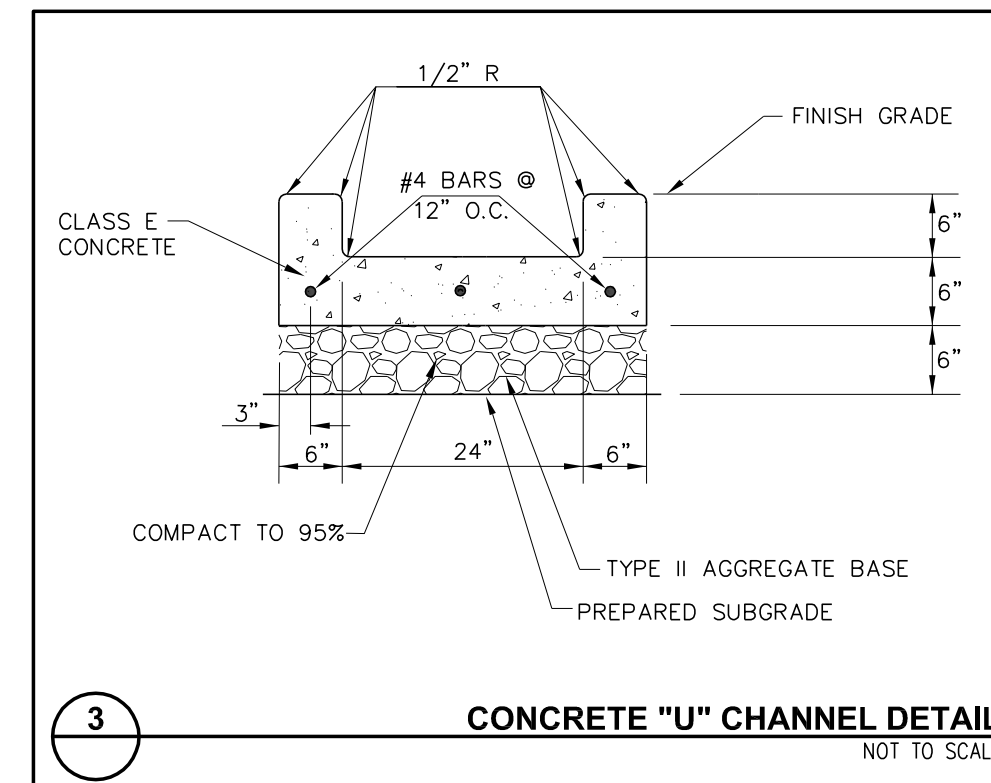
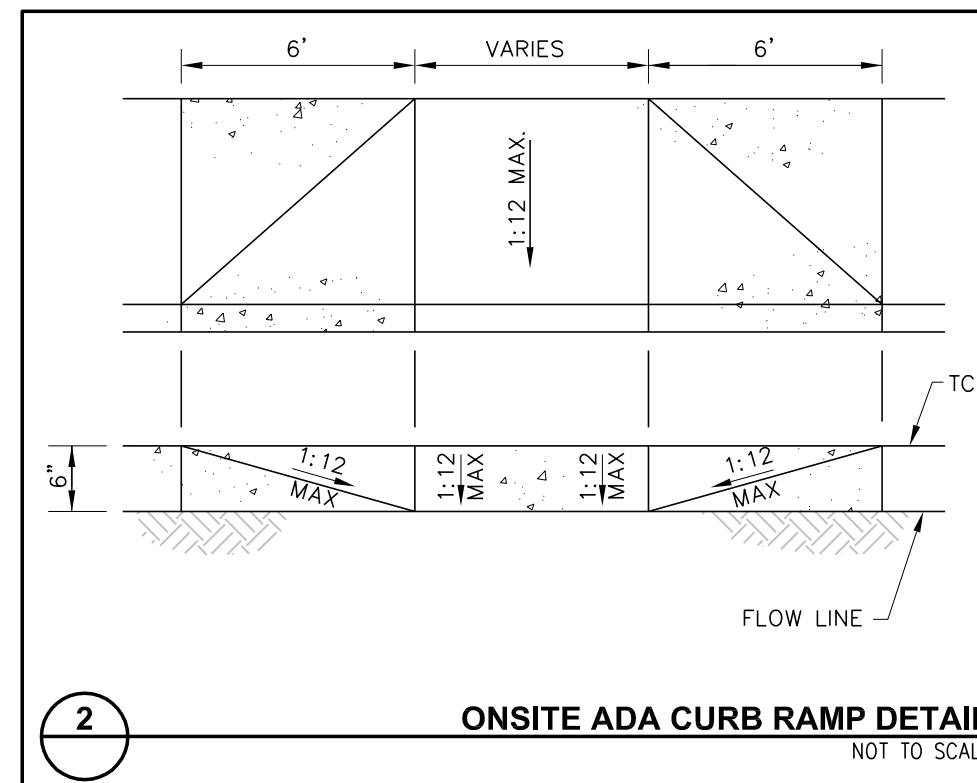
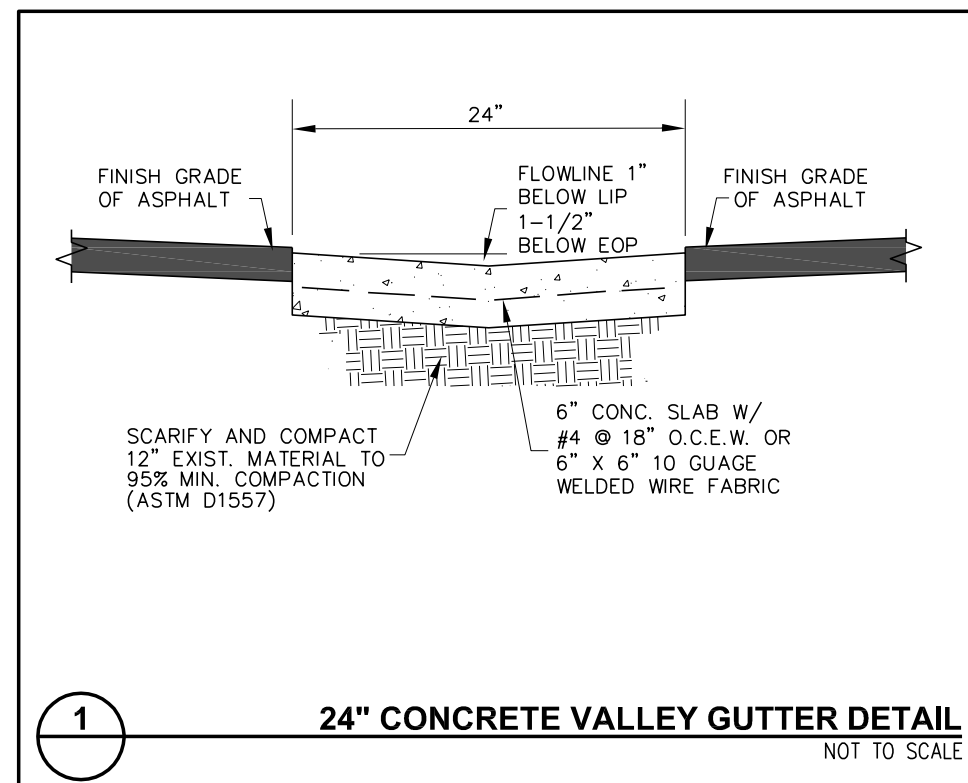
VALLEY HEALTH SYSTEM, LLC
14400 METCALF AVENUE, OVERLAND PARK, KS 66223

MHP LIMITED, LLC
8440 SKY POINTE DRIVE #140-385
LAS VEGAS, NEVADA 89131-4047
P: 702.672-8586 INFO@MHPLIMITED.COM
WWW.MHPLIMITED.COM

GRADING PLAN SHEET

CITY OF LAS VEGAS, NEVADA
CENTENNIAL HILLS HOSPITAL
PHASE 2 PARKING LOT EXPANSION

REV	DATE	BY	REVISIONS

[illegible]

VALLEY HEALTH SYSTEM, LLC
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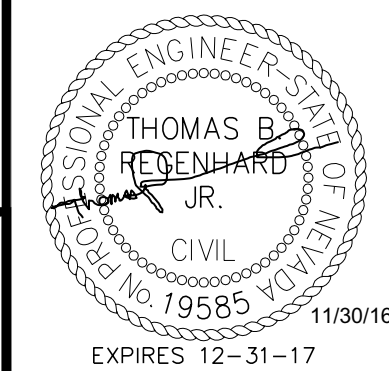
DETAIL SHEET

CITY OF LAS VEGAS, NEVADA

**CENTENNIAL HILLS HOSPITAL
PHASE 2 PARKING LOT EXPANSION**

PHASE 2 PARKING LOT EXPANSION

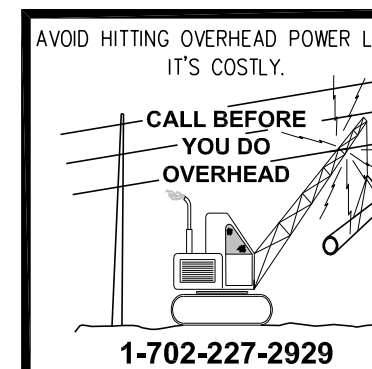
DRAWING INFORMATION:	
DRAWN BY:	JCF 10/24/16
DESIGNED BY:	JCF 10/24/16
CHECKED BY:	TBR 10/24/16
PROJECT NO:	1600041
SCALE:	1" = 20' HORIZ. N/A VERT.



SHEET
DT
5 OF 5
DRAWING NO.

DRAWING NO.

DRAWING NO.



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