

DS #: 4523

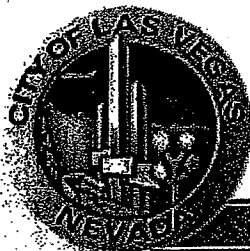
APN: 137-25-411-001

PROJECT: DESERT SPRINGS UNITED METHODIST CHURCH — UPDATE #2

SUBMITTAL: 1ST

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		March 14, 2011
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	Desert Springs United Methodist Church – Update #2	
Cross Streets:	NEC of Pavilion Center Dr. & Greenmoor Ln.	
File Number:	F:\Depot\DSMemos\DS4523A.doc	
Parcel Number:	137-25-411-001	
Zoning Action:	CRG-40699	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		Wright One Source Church Methodist Desert Springs Bart Anderson, P.E., DevCo

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	3/1/2011	3/14/2011	See Comments Below	\$400.00	163651: \$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.

1. The new building location is well below the *Pavilion Center Drive* street elevation. A flood wall such as a solid grouted 8"-CMU must be provided at the property line to serve a major storm flood protection purpose. The wall must be solid grouted to a height of minimum 18" above the 100-year water surface in the corresponding street section. Revise the grading plan and Section B/DT1 accordingly.
2. **Sheet GP2:** A proposed FL/HP of 45.64 at the northwest corner of the new building is higher than the finish floor of the building which is not acceptable. Lower the FL/HP to a minimum of 6" below the new building.
3. **Figure 5 (Existing Condition Basin Map):** Provide a summary table for street flows and hydrologic basins data such as Q_{10}/Q_{100} , V_{10}/V_{100} and d_{10}/d_{100} etc.
4. Provide a note on the grading plan: "All onsite storm drain and the associated facilities are privately owned and to be privately maintained".

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: T20S/R59E/25
AREA K-25

WRIGHT ENGINEERS

Rec'd: 3/1/11
UPDATE #2 TO THE
TECHNICAL DRAINAGE STUDY
FOR
DESERT SPRINGS UNITED
METHODIST CHURCH

CRG-40699

DS 4523
~~DS 3988~~
K-25
\$400

CITY OF LAS VEGAS
February 24, 2011



PREPARED FOR:

JOSEPH N. BRANCA ARCHITECT
2821 CHANNEL BAY DRIVE
LAS VEGAS, NV 89127



February 24, 2011

CIVIL

Albert Sung
City of Las Vegas Public Works
731 S. 4th Street
Las Vegas, NV 89101

STRUCTURAL

MECHANICAL

**RE: UPDATE #2 TO THE TECHNICAL DRAINAGE STUDY FOR DESERT SPRING
UNITED METHODIST CHURCH. AKA DSUMC SANCTUARY EXPANSION**
Job No. CN100298

ELECTRICAL

PLUMBING

Dear Mr. Sung:

SURVEYING

Wright Engineers is pleased to submit two copies of the Update to the Technical Drainage Study for your review and approval for the above-mentioned project. The project is located at the northeast corner of N. Pavilion Center Drive and Greenmoor Lane. The site is recorded on the Clark County Assessor's maps as APN 137-25-411-001. See *Figure 1, Vicinity Map*.

PLANNING

LEED

This update is in regards to the addition of a sanctuary to the Desert Spring United Methodist Church (DSUMC). The addition will also include additional classrooms, onsite parking, and a site entrance from Pavilion Center Drive.

Previous drainage studies to this site include:

- Technical Drainage Study for DSUMC (DS2524) completed by WRG Design, Inc. and approved in 1999. This is the original drainage study for the project site and included conceptual calculations for the proposed expansion.
- Update #1 to the TDS for DSUMC (DS3988) completed by Wright Engineers, and approved on June 16, 2006. This updated was for a classroom expansion located north of the original building.

Pertinent referenced material from the each study has been included with this update in the Appendix.

Since the proposed improvements do not correspond well to the basin delineations in the original study completed by WRG the Area-Ratio method has been used to determine flow values for areas impacted by this expansion. As specified in the original study the entire site produces a peak flow of 16cfs (9cfs, 10-year). Table 1 provides calculations for the onsite sub-basins. Overall drainage patterns remain the same as the original study.

7425 Peak Drive
Las Vegas, NV 89128
(p) 702.933.7000
(f) 702.933.7001
800.933.7611
wrightengineers.com

Table 1: Sub-basin Calculations

Desc.	Area (ac)	Q100 (cfs)	Q10 (cfs)	Comments
Total Site	4.14	16	9	Referenced
OND1	0.14	0.54	0.30	
OND2	0.12	0.46	0.26	
OND3	0.23	0.89	0.50	
OND4	0.17	0.66	0.37	
OND5	0.42	1.62	0.91	
OND6	0.12	0.46	0.26	
CP1	--	1.35	0.76	OND3+OND6
CP2	--	3.29	1.85	OND1+OND2+OND4+OND5

Cross sections A and B provide flow depths adjacent to the building. In areas where adequate freeboard is not provided, the building will be flood protected to a minimum of 6" above the finished grade. This occurs on the northern and western sides of the building.

An onsite storm drain system has been provided along the western edge of the project site. This proposed system connects to the existing onsite storm drain system. It is noted that CLV normally requires a minimum storm drain size of 12", however due to downstream tie in constraints and limited cover 8" and 10" storm drain has been provided in some areas. Overflow paths have been provided in the event that the storm drain system is not functional. FlowMaster sections have been provided to ensure the storm drain is adequately sized to handle the Q100 flow.

The street flows have been referenced from the original drainage study and have not been revised with this update. The depth of flow in Pavilion Center Dr is 0.38'. The back of the existing sidewalk protects the site from Pavilion Center Dr flows; therefore, the site is adequately flood protected from the flows in the right-of-way. A high point has been provided at the site entrance along Pavilion Center Dr at a minimum of 6" above the flow depth. The depth of flow in Greenmoor Lane is 0.50'. By observation, the onsite buildings are much higher than the existing grades in Greenmoor and will not be impacted by flows in the right-of-way.

According to Figure F-29 of the 2008 CCRFCD'S *Master Plan Update* (Figure 2), no proposed or constructed regional facilities are located adjacent to the project site. Descriptions of nearby facilities are shown on the *Master Plan Update* on Figure 2, *Flood Control Facilities* (Appendix A).

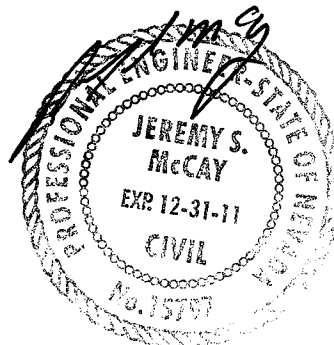
According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel Number 32003C 2150E, Clark County, Nevada, effective September 27, 2002, the site lies within a FEMA designated Zone "X". A Zone "X" is described as an area determined to be outside the 500-year floodplain. See *Figure 3, FEMA Map*

If you have any questions or comments regarding this project, please do not hesitate to contact this office at (702) 933-7000.

Sincerely,
Wright Engineers



Robert D. Hansen, E.I.
Hydrologic/Hydraulic Services



FEB 24 2011

Jeremy S. McCay, P.E.
Principal

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: DSUMC Sanctuary Expansion Date: February 24, 2011

Location of Development: a) Descriptive (Cross Streets) North/South: N Pavilion Center Dr
East/West: Greenmore Ln

b) Section: 25 Township: 20 S Range: 59 E

c) APN: 137-25-411-001

Name of Owner: Church Methodist Desert Spring (Joseph N. Branca Architect)

Telephone No.: (702) 308-1603 Facsimile No.: (702) 256-3002 Email Address: joeb@cox.net

Address: 2821 Channel Bay Drive Las Vegas NV 89127

Contact Person Name: Rob Hansen Telephone No: (702) 933-7000

E-mail Address: rhansen@wrightengineers.com

Firm: Wright Engineers

Address: 7425 Peak Drive, Las Vegas, NV 89128

Type of Land Development/Land Disturbance Process:

☐
☐
☐

Rezoning
Parcel Map
Large Parcel Map

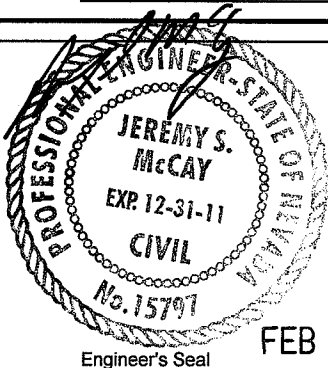
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Subdivision Map
Planned Unit Development
Building Permit

☐

Clearing and Grading Only
Other (Please specify below)

1. Total Owned Land Area: At Site: 4.08 +/- ac Being Developed/Disturbed: 2.00 +/- ac
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 (Church Expansion)
5. Approximate upstream land area which drains to the subject site? 30 +/- ac
6. Has the site drainage been evaluated in the past? YES ☐ NO ☐ If yes, please identify documentation:
1. TDS for DSUMC (DS2524) - Original study for the project site.
2. Update #1 to TDS for DSUMC a.k.a Classroom Expansion @ DSUMC (DS3988) - Added a classroom building to the site.
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
Runoff from the site travels southeast to Greenmoor Lane.
8. Briefly describe your proposed schedule for the subject project: As soon as possible



FEB 24 2011

Local Entity File No.

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.

Revision	Date

Reference: Wright Engineers, Inc. Job Number: CN100298

STANDARD FORM 1



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 06/06/01)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (Design Manual).

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT		
Yes	No	
N/A		A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
X		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.

II. GRADING PLAN INFORMATION		
Yes	No	
X		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flow. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
N/A		Back of lot elevations and lot drainage pattern for all lots including common lots.
N/A		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
N/A		This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
X		Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. LOCAL ENTITY CRITERIA - CITY OF LAS VEGAS - MANUAL SECTION 1600		
Yes	No	
X		Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
N/A		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
N/A		The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
N/A		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir or submerged weir elevation, whichever is greater.
N/A		Lots with "B and C Type Drainage" shall be required to install an underground nuisance drainage system or a 2-foot valley gutter through the lot. 16" x 24" minimum block wall openings are required for both options.
N/A		Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: DSUMC Sanctuary Expansion		Map ID:																
Firm Name: Wright Engineers		Engineer: Jeremy S. McCay, P.E.																
Address: 7425 Peak Drive																		
City: Las Vegas		State: NV	Zip: 89128															
Phone Number: (702) 933-7000		Fax Number: (702) 933-7001																
Property Owner: Church Methodist Desert Spring (Joseph N. Branca Architect)																		
Address: 2821 Channel Bay Drive																		
City: Las Vegas		State: NV	Zip: 89127															
Reviewed by:		Date Received:	Date Accepted for Review:															
The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL). This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use. If items are not applicable for the subject site, provide N/A. I. GENERAL REQUIREMENT <table><thead><tr><th>Yes</th><th>No</th><th></th></tr></thead><tbody><tr><td><u>X</u></td><td><u> </u></td><td>Design Manual Standard Form 1 with the engineer's seal and signature.</td></tr><tr><td><u>X</u></td><td><u> </u></td><td>Design Manual Standard Form 4.</td></tr><tr><td><u>X</u></td><td><u> </u></td><td>2 copies of the 24" x 36" Drainage Plan.</td></tr><tr><td><u>N/A</u></td><td><u> </u></td><td>A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.</td></tr></tbody></table>				Yes	No		<u>X</u>	<u> </u>	Design Manual Standard Form 1 with the engineer's seal and signature.	<u>X</u>	<u> </u>	Design Manual Standard Form 4 .	<u>X</u>	<u> </u>	2 copies of the 24" x 36" Drainage Plan.	<u>N/A</u>	<u> </u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.
Yes	No																	
<u>X</u>	<u> </u>	Design Manual Standard Form 1 with the engineer's seal and signature.																
<u>X</u>	<u> </u>	Design Manual Standard Form 4 .																
<u>X</u>	<u> </u>	2 copies of the 24" x 36" Drainage Plan.																
<u>N/A</u>	<u> </u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.																
REFERENCE:			STANDARD FORM 2															

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
<u>X</u>	<u> </u>	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
<u>X</u>	<u> </u>	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
<u>N/A</u>	<u> </u>	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
<u>X</u>	<u> </u>	On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
<u>X</u>	<u> </u>	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
<u>X</u>	<u> </u>	Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
<u>X</u>	<u> </u>	Minimum scale: 1" = 60'.
<u>X</u>	<u> </u>	Project Name.
<u>X</u>	<u> </u>	Vicinity Map with local and major cross streets.
<u>X</u>	<u> </u>	Revision box.
<u>X</u>	<u> </u>	North arrow and bar scale.
<u>X</u>	<u> </u>	Engineer's/consultant's address and phone number.
<u>X</u>	<u> </u>	Elevation datum and benchmark.
<u>X</u>	<u> </u>	Legend for symbols and abbreviations.
<u>X</u>	<u> </u>	Cut/fill scarps, where applicable.
<u>X</u>	<u> </u>	Street names, grades, widths.
<u>X</u>	<u> </u>	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>X</u>	<u> </u>	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where applicable.
<u>X</u>	<u> </u>	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
<u>X</u>	<u> </u>	Proposed typical street sections.
<u>N/A</u>	<u> </u>	Streets with off-set crowns.
<u>X</u>	<u> </u>	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
<u>X</u>	<u> </u>	Property Lines.
<u>X</u>	<u> </u>	Right-of-way lines and widths, existing and proposed.
<u>X</u>	<u> </u>	Existing improvements and their elevations.
<u>X</u>	<u> </u>	Delineation of proposed onsite drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
<u>X</u>	<u> </u>	Concentration points and drainage flow direction with Q100 and V100 and D100 in streets.
<u>X</u>	<u> </u>	Cumulative flows, velocity , and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
<u>X</u>	<u> </u>	Location and cross-section of street capacity calculations.
<u>X</u>	<u> </u>	Cross-sectional detail for channels, including cutoff wall locations.
<u>X</u>	<u> </u>	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
<u>X</u>	<u> </u>	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
<u>N/A</u>	<u> </u>	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
<u>X</u>	<u> </u>	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>N/A</u>	<u> </u>	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
<u>X</u>	<u> </u>	Building and/or lot numbers.
<u>N/A</u>	<u> </u>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<u>N/A</u>	<u> </u>	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
<u>N/A</u>	<u> </u>	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
<u>X</u>	<u> </u>	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
<u>X</u>	<u> </u>	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
<u>X</u>	<u> </u>	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
<u>X</u>	<u> </u>	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
<u>X</u>	<u> </u>	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
<u>X</u>	<u> </u>	Use of correct precipitation values in and around the McCarran Airport rainfall area.
<u>X</u>	<u> </u>	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
<u>X</u>	<u> </u>	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
<u>X</u>	<u> </u>	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
<u>X</u>	<u> </u>	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
<u>N/A</u>	<u> </u>	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
<u>X</u>	<u> </u>	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
<u>X</u>	<u> </u>	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
<u>N/A</u>	<u> </u>	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
<u>N/A</u>	<u> </u>	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
<u>X</u>	<u> </u>	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, which ever is greater.
<u>N/A</u>	<u> </u>	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
<u>N/A</u>	<u> </u>	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
<u>X</u>	<u> </u>	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
<u>X</u>	<u> </u>	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE:

STANDARD FORM 2

APPENDIX A

ZONING/PLANNING CONDITIONS OF APPROVAL

PLANNING & DEVELOPMENT



DEVELOPMENT SERVICES CENTER

731 S. Fourth Street
Las Vegas, NV 89101

Voice: 702-229-6301
Fax: 702-474-0352
TTY: 702-386-9108

www.lasvegasnevada.gov

February 10, 2011

Ms. Cynthia Kimmel
Desert Spring United Methodist
120 North Pavilion Center Drive
Las Vegas, Nevada 89144

Re: CRG-40699 - CITY REFERRAL GROUP

Dear Ms. Kimmel:

Your request for a Major Amendment of a previously approved Summerlin Site Development Plan Review (SV-0021-99) FOR A PROPOSED 19,840 SQUARE-FOOT ADDITION AND SITE MODIFICATIONS TO AN EXISTING 13,720 SQUARE-FOOT CHURCH on 4.08 acres at 120 North Pavilion Center Drive (APN 137-25-411-001), P-C (Planned Community) Zone, Ward 2 (Wolfson), was considered by the City Referral Group on February 9, 2011.

The City Referral Group **APPROVED** your request subject to the following:

Planning and Development

1. Conformance to the Conditions of Approval for Rezoning (Z-0135-93) and Summerlin Site Development Plan Reviews (SV-0021-99, CRG-13106 and CRG-29259) shall be required, except as amended herein.
2. Conformance to the requirements and conditions of the Summerlin Non-Residential Design Review Committee (SNRDRC) contained within a letter dated 12/15/10.
3. All development shall be in conformance with the site plan, landscape plan, and building elevations, date stamped 02/07/11, except as amended herein.
4. Any changes based upon right-of-way, traffic or drainage studies or street improvements required by the city or public utilities shall not reduce the widths of perimeter landscape buffers, height of walls or quantities of plant materials from that on submitted landscape plans date stamped 02/07/11. Any changes based upon subsequently submitted studies must be accommodated elsewhere on the site.

Mayor
Oscar B. Goodman

City Council
Gary Reese
(Mayor Pro Tem)
Steve Wolfson
Lois Tarkanian
Steven D. Ross
Ricki Y. Barlow
Stavros S. Anthony

City Manager
Elizabeth N. Fretwell



5. Prior to occupancy, all necessary building permits shall be obtained and final inspections shall be completed in compliance with the Summerlin Development Standards and all codes as required by the Building and Safety Department.
6. Revised elevations shall be submitted to and approved by the Department of Planning, prior to the time application is made for a building permit, to depict the height, material and color of the trash enclosure in conformance with Summerlin Development Standards.
7. A technical landscape plan, signed and sealed by a Registered Architect, Landscape Architect, Residential Designer or Civil Engineer, must be submitted prior to or at the same time application is made for a building permit. A permanent underground sprinkler system is required, and shall be permanently maintained in a satisfactory manner; the landscape plan shall include irrigation specifications. Installed landscaping shall not impede visibility of any traffic control device. The technical landscape plan shall incorporate the requirements and conditions of the SNRDRC contained within a letter dated 12/15/10.
8. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

Public Works

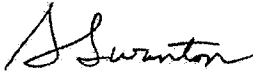
9. Remove all substandard driveway access ramps adjacent to this site and replace with new improvements meeting current ADA and City Standards, concurrent with development of this site.
10. All landscaping and private improvements installed with this project shall be situated and maintained so as not to create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections.
11. An update to the previously approved Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any grading or building permits or the submittal of any construction drawings, whichever may occur first. Provide and improve all drainage ways as recommended in the approved drainage plan/study.

Ms. Cynthia Kimmel
CRG-40699 - Page Three
February 10, 2011

12. Site development to comply with all applicable Summerlin Development and Improvement Standards.

This action by the City Referral Group on February 9, 2011 is final unless a written appeal is filed with the Director of the Department of Planning within ten (10) days of the date of the City Referral Group's decision.

Sincerely,



Steve Swanton, AICP
Senior Planner
Department of Planning
Case Planning Division

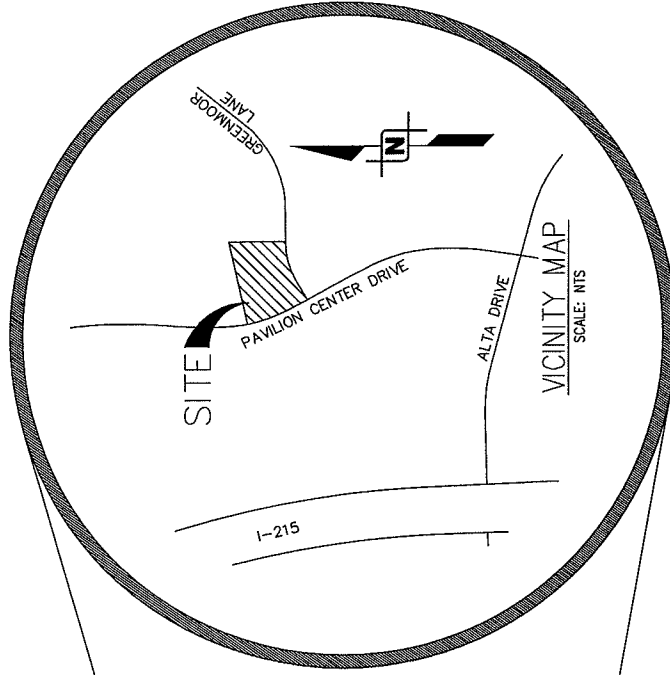
SS:clb

cc: Mr. Joseph Branca
2821 Channel Bay Drive
Las Vegas, Nevada 89128

APPENDIX B

FIGURES

DSUMC SANCTUARY EXPANSION



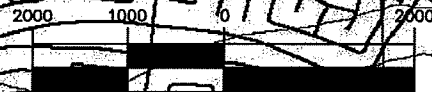
VICINITY MAP
SCALE: NTS

FIGURE 1

VICINITY MAP

**CITY OF
LAS VEGAS
325276**

GRAPHIC SCALE



1 inch = 2000 ft.

PROJECT SITE

N

**CLARK COUNTY
UNINCORPORATED AREAS
320003**

**RED ROCK
DETENTION BASIN**

**CITY OF LAS VEGAS
CLARK COUNTY**

ZONE A

ZONE

ZONE X

GR1234

GR1233

1235
ZONE A
38
MASONRY

PANEL 2150 E

**FIRM
FLOOD INSURANCE RATE MAP**
CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2150 OF 4080

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SHEET
LAS VEGAS, CITY OF	325276	2150	11
CLARK COUNTY, UNINCORPORATED AREAS	320003	2150	11

Notice to User: The Map Boundary shown below should be used when plotting map indices. The Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER
32003C2150 E**

**MAP REVISED:
SEPTEMBER 27, 2002**

Federal Emergency Management Agency

FIGURE 3

FEMA MAP

WRIGHT
one source

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE H-29
HYDROLOGIC SUMMARY

PROJECT SITE

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/Parallel Facilities
- Category B Remove & Replace/Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

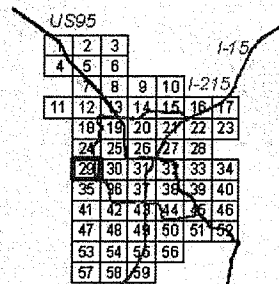
- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural
- 4 / 14* Low Density Residential
- 5 / 15* Medium Density Residential
- 6 / 16* High Density Residential
- 7 / 17* Public Facility, Residential
- 8 / 18* Very High Density Residential
- 9 / 19* Commercial, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

* Drought Ordinance Applied



Scale: 1 inch = 2,000 feet

Refer to Figure G-2 for Aerial Source(s)



PBSI

FIGURE 4

SOILS MAP

WRIGHT
one source

APPENDIX C

HYDRAULIC CALCULATIONS

Project Description

Input Data

Station (ft)	Elevation (ft)
0+00.0	3.00
0+00.0	0.08
0+00.5	0.00
0+01.0	0.08
0+10.0	3.08

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 3.00)	(0+01.0, 0.08)	0.013
(0+01.0, 0.08)	(0+10.0, 3.08)	0.025

Normal Depth	0.27	ft
Elevation Range	0.00 to 3.08	ft
Flow Area	0.29	ft²
Wetted Perimeter	1.82	ft
Top Width	1.58	ft
Normal Depth	0.27	ft
Critical Depth	0.23	ft
Critical Slope	0.01030	ft/ft
Velocity	1.72	ft/s
Velocity Head	0.05	ft
Specific Energy	0.32	ft
Froude Number	0.71	

Worksheet for A

Results

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	0.27	ft
Critical Depth	0.23	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01030	ft/ft

Project Description

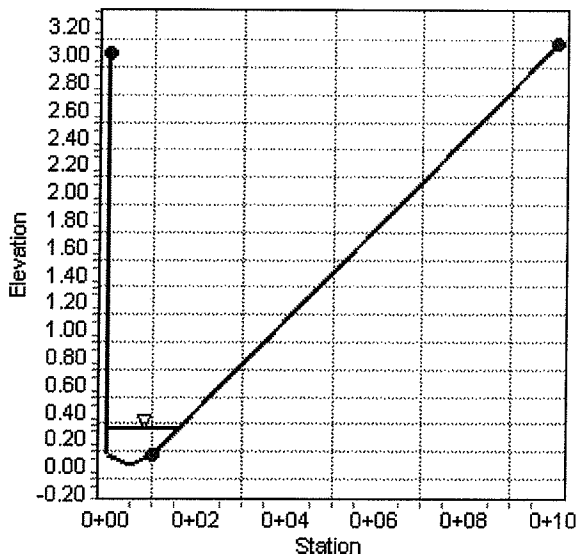
Manning Formula

Normal Depth

Input Data

Channel Slope	0.50000	%
Normal Depth	0.27	ft
Discharge	0.50	ft ³ /s

Cross Section Image



Project Description

Manning Formula

Normal Depth

Input Data

2.28000 %

0.90 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.25
0+04.5	0.00
0+13.5	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.25)	(0+13.5, 3.00)	0.025

Results

Elevation Range 0.00 to 3.00 ft

Wetted Perimeter 4.42 ft

Normal Depth 0.21 ft

Critical Depth 0.21 ft

Critical Slope	0.01939	ft/ft
----------------	---------	-------

Velocity	1.97	ft/s
----------	------	------

Velocity Head 0.06 ft

Specific Energy 0.27 ft

Froude Number 1.08

Flow Type	Supercritical
-----------	---------------

Worksheet for B

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	0.21	ft
Channel Slope	0.02280	ft/ft
Critical Slope	0.01939	ft/ft

Cross Section for B

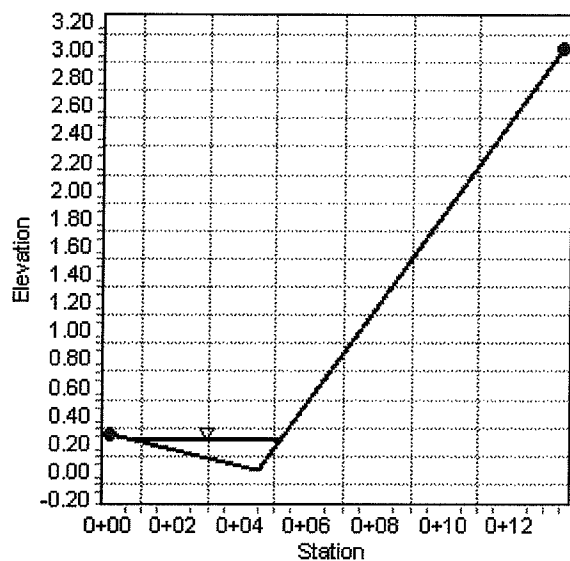
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.28000 %
Normal Depth 0.21 ft
Discharge 0.90 ft³/s

Cross Section Image



Worksheet for 8" PVC_OND3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.50000	%
Diameter	8.00	in
Discharge	0.89	ft ³ /s

Results

Normal Depth	0.58	ft
Flow Area	0.32	ft ²
Wetted Perimeter	1.59	ft
Top Width	0.46	ft
Critical Depth	0.45	ft
Percent Full	86.3	%
Critical Slope	0.00867	ft/ft
Velocity	2.78	ft/s
Velocity Head	0.12	ft
Specific Energy	0.70	ft
Froude Number	0.59	
Maximum Discharge	0.92	ft ³ /s
Discharge Full	0.85	ft ³ /s
Slope Full	0.00542	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	86.33	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s

Worksheet for 8" PVC_OND3

GVF Output Data

Normal Depth	0.58	ft
Critical Depth	0.45	ft
Channel Slope	0.50000	%
Critical Slope	0.00867	ft/ft

Cross Section for 8" PVC_OND3

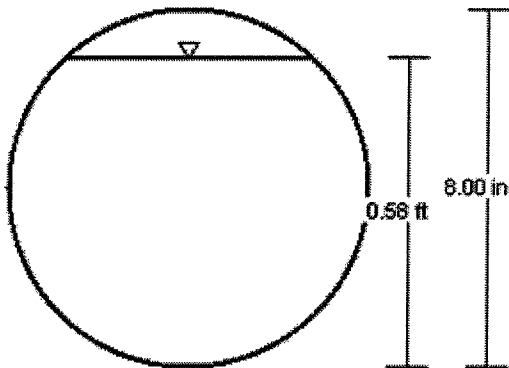
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.50000 %
Normal Depth	0.58 ft
Diameter	8.00 in
Discharge	0.89 ft ³ /s

Cross Section Image



V: 1 
H: 1

Worksheet for 10" PVC CP1

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013
Channel Slope	0.50000 %
Normal Depth	0.83 ft
Diameter	10.00 in
Discharge	1.55 ft ³ /s ← > 1.35 cfs CP1 ok

Results

Discharge	1.55 ft ³ /s
Normal Depth	0.83 ft
Flow Area	0.55 ft ²
Wetted Perimeter	2.62 ft
Top Width	0.00 ft
Critical Depth	0.56 ft
Percent Full	100.0 %
Critical Slope	0.00804 ft/ft
Velocity	2.84 ft/s
Velocity Head	0.13 ft
Specific Energy	0.96 ft
Froude Number	0.00
Maximum Discharge	1.67 ft ³ /s
Discharge Full	1.55 ft ³ /s
Slope Full	0.00500 ft/ft
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
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	100.00 %

Worksheet for 10" PVC CP1

GVF Output Data

Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.83	ft
Critical Depth	0.56	ft
Channel Slope	0.50000	%
Critical Slope	0.00804	ft/ft

Cross Section for 10" PVC_CP1

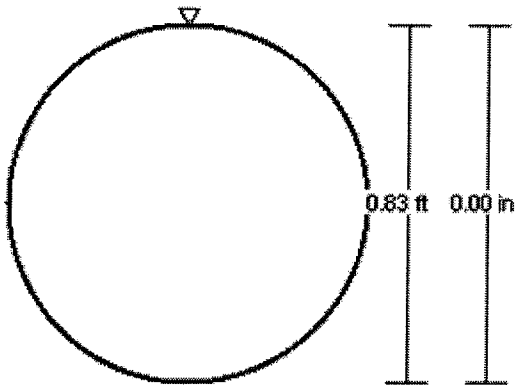
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013
Channel Slope	0.50000 %
Normal Depth	0.83 ft
Diameter	10.00 in
Discharge	1.55 ft ³ /s

Cross Section Image



V: 1 
H: 1

Worksheet for 12" PVC CP1

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013
Channel Slope	0.50000 %
Normal Depth	1.00 ft
Diameter	12.00 in
Discharge	2.52 ft ³ /s > 1.35 cfs CP1 ok

Results

Discharge	2.52 ft ³ /s
Normal Depth	1.00 ft
Flow Area	0.79 ft ²
Wetted Perimeter	3.14 ft
Top Width	0.00 ft
Critical Depth	0.68 ft
Percent Full	100.0 %
Critical Slope	0.00770 ft/ft
Velocity	3.21 ft/s
Velocity Head	0.16 ft
Specific Energy	1.16 ft
Froude Number	0.00
Maximum Discharge	2.71 ft ³ /s
Discharge Full	2.52 ft ³ /s
Slope Full	0.00500 ft/ft
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
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	100.00 %

Worksheet for 12" PVC CP1

GVF Output Data

Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.68	ft
Channel Slope	0.50000	%
Critical Slope	0.00770	ft/ft

Cross Section for 12" PVC_CP1

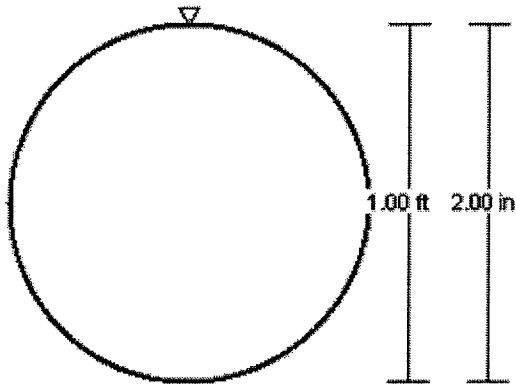
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013
Channel Slope	0.50000 %
Normal Depth	1.00 ft
Diameter	12.00 in
Discharge	2.52 ft ³ /s

Cross Section Image



V: 1 
H: 1

APPENDIX D

REFERENCE MATERIAL

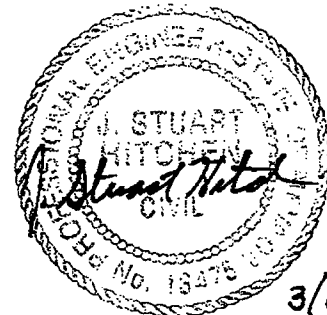
DS 2524
K-25
#250

**TECHNICAL DRAINAGE STUDY
FOR
DESERT SPRING
UNITED METHODIST CHURCH
THE ARBORS - UNIT 2A
SUMMERLIN VILLAGE 11/12**

W.R.G. Project No. UMC001

CITY OF LAS VEGAS, NEVADA

A portion of the Southeast ¼ of Section 25,
Township 20 South, Range 59 East, M.D.M.,
Clark County, Nevada



3/16/99

Prepared for:

**DESERT SPRING
UNITED METHODIST CHURCH
2724 Childress Drive
Las Vegas, NV 89134**

DESIGN

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		September 13, 1999
TO: Land Development Services Department of Public Works		FROM: Dennis W. Stensky, P.E. Flood Control Project Manager Department of Public Works
SUBJECT: Drainage Study for: Desert Spring United Methodist Church		COPIES TO: WRG Design, Inc. Desert Spring United Methodist Church Cheri Edelman, P.E., DevCo
Cross Streets:	Pavillion Center Drive & Greenmoor Lane	
FILE No.	\\khan\\flood\\Depot\\DSMEMOS\\DS2524B.doc	
Parcel Number:	137-25-411-001	
Zoning Action:	SV-21-99	
FEMA Flood Zone	YES	No X
Proposed Storm Drain	YES X	No

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	07/29/99	08/11/99	Not Acceptable	\$250.00
2nd Submittal	09/01/99	09/13/99	See Comments Below	\$250.00
			TOTAL FEES:	\$500.00

REMARKS:

2nd Submittal (Addendum)

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

X	is acceptable in concept subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District CCRFCD) concurrence

- The landscape walkway under-drain at the southeast corner of the site is just to the west of the existing drainage easement. Either the drainage way must be located within the existing easement or an additional easement provided through the Summerlin common lot.
- The existing 6-foot high garden wall along the north property line must also be labeled on Sheet C4.
- Construction Notes 7/G and 8/G call for "A" and "L" curb. The line types on the grading plan for these items is the same. A separate line type should be used for each curb type to avoid confusion and should be included in the legend.

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 CLV 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

ssn

T/R/S: 20/59/25

AREA K-25

PLANS SENT TO LAND DEVELOPMENT yes (pending revision to above comments)

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **DESERT SPRING UNITED METHODIST CHURCH**

Date : 3/10/99

Location of Development: a) Descriptive: **NE Corner of intersection of Greenmoor & Pavillion Center**
b) Sect: 25 Twn: 20 South Rng: 59 East

Name of Owner: **Desert Spring United Methodist Church**

Assessors Parcel No: **137-255-411-001**

Contact Person - Name: **Allen Barrett**

Telephone No: **(702) 990-9300**

Firm: **W.R.G. Design, Inc.**

Address: **2260 Corporate Circle Drive, Suite 430
Henderson, NV 89014**

Type of Land Development/Land Disturbance Process:

- | | | |
|---|---|--|
| ☐ Rezoning | ☐ Subdivision | ☐ 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: **4.1+/- ac.** Being Developed/Disturbed: **4.1+/- ac.**

2. Is a portion or all of the subject property located in a designated FEMA Flood Harzard 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**

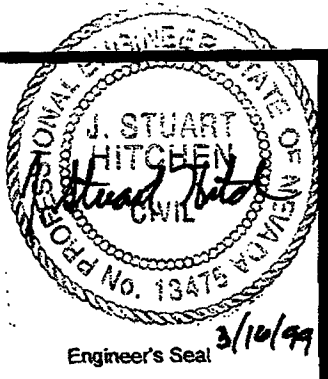
4. Proposed type of development (Residential, Commercial, Etc.)? **Church**

5. Approximate upstream land area which drains to the subject site? **60+/- ac.**

6. Has the site drainage been evaluated in the past? **YES** NO. If yes, please identify documentation:
Technical Drainage Study for the Arbors-Unit 2A Street Improvements, Summerlin Village 11/12, G.C. Wallace, March 1996.

7. If known, please briefly identify the proposed discharge point (s) of runoff from the site: **Greenmoor Lane**

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 the Conceptual Drainage Study.

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

Revision	Date

III. PROPOSED DRAINAGE FACILITIES

A. General

This study will establish the methods and necessary improvements to protect the project from offsite flows, and to convey onsite flows to local and regional flood control facilities without impacting downstream properties. Specifically, offsite flows from Pavillion Center Drive and Greenmoor Lane will not enter the site and the developed site peak flows will be consistent with those established by Reference 6.

The site will be developed in two phases. Phase One will consist of developing the south half of the parcel and Phase Two, the north half. Three conditions are modeled as follows:

1. Existing Condition (Proposed Development condition taken from Ref. 6);
2. Proposed Condition (Phase I developed, Phase II undeveloped);
3. Future Condition (Phase I & II developed).

B. Offsite Drainage Facilities

Because the infrastructure (including streets and storm drain system) within The Arbors - Unit 2A has been constructed, the offsite improvement for Phase I will consist of one driveway entrance off of Greenmoor Lane. The Phase II offsite improvement will consist of one driveway entrance constructed off of Pavillion Center Drive.

Existing and developed offsite peak flows impacting the project site were taken from Reference 6. Reference 6 established developed 100-year street flows

adjacent the site as 11 cfs with a depth of 0.38', and 19 cfs with a depth not exceeding 0.5' for Pavillion Center Drive and Greenmoor Lane, respectively.

C. Onsite Drainage Facilities

The onsite proposed drainage pattern will be consistent with the one established in the *Technical Drainage Study for The Arbors – Unit 2A Street Improvements Summerlin Village 11/12* (Reference 6) and convey site runoff to Greenmoor Lane. Reference 6 established 100-year developed condition peak runoff from the site not to exceed 18 cfs. The results of this study demonstrate the 100-year developed condition peak runoff (Phase I & II developed) from the site to be 16 cfs.

As previously mentioned, Phase I will consist of developing the south half of the parcel and Phase II the north half. (Refer to Appendix V, Exhibits) Runoff from the (undeveloped) Phase II portion of the site will be conveyed through Phase I in the interim (proposed condition).

Drainage swales and area drains will be utilized onsite to convey nuisance flows and storm runoff away from structures to Greenmoor Lane. Two sidewalk under-drains at the southern boundary of the site will convey nuisance flows to Greenmoor Lane. Calculations for onsite drainage swales, area drains and sidewalk under-drains are included in the appendix.

The site will be protected from offsite flows from the north and east by a property wall. The site will be protected from offsite flows from Greenmoor Lane to the south by the existing curb and gutter. Because the finished floor elevations will be below that of the adjacent, high-side top of curb, a landscape berm and highpoint in the driveway will protect the site along Pavillion Center Drive. The landscape berm and driveway highpoint will be set at a vertical distance above

the gutter flowline of at least twice the depth of flow in the gutter flowline of Pavillion Center Drive.

D. Compliance with Regulations and Adopted Plans

The design of this development is in compliance with local requirements, including the *Technical Drainage Study for The Arbors – Unit 2A Street Improvements Summerlin Village 11/12* (Reference 6), the *Conceptual Master Drainage Plan for Summerlin Village 11/12* (Reference 7), and the 1997 *CCRFCD Master Plan Update of the Las Vegas Valley* (Reference 3).

E. Hydrologic Criteria

1. Point Rainfall

The precipitation values used to model the onsite drainage basins are 1.76 inches and 3.15 inches for the 10-year and 100-year storm events, respectively. These were obtained from Reference 6.

2. Design Storm

The CCRFCD Design Manual (Reference 1) specifies the design storm within its jurisdiction as a 6-hour duration storm. Two design storm distributions are used within the Clark County area, SDN 3 and SDN 5. Because the project site is less than 10 square miles in size, the SDN 3 design storm distribution was used in the *Army Corps of Engineers Flood Hydrograph Package, HEC-1* model (SCS unit hydrograph method).

IV. CONCLUSIONS

The 100-year peak flow in Pavillion Center Drive and Greenmoor Lane will not exceed a depth of 0.5 feet as determined by Reference 6. Because the finished floor elevations will be below that of the adjacent, high-side top of curb in Pavillion Center Drive, a landscape berm and highpoint in the driveway will protect the site from offsite flows.

The project is in conformance with the *Conceptual Master Drainage Plan for Summerlin Village 11/12* (Reference 7) and CCRFCD's *1997 Flood Control Master Plan Update of the Las Vegas Valley* (Reference 3).

This project complies with:

1. The applicable Drainage Laws as recognized by the State of Nevada.
2. The CCRFCD Hydrologic Criteria and Drainage Design Manual.
3. The City of Las Vegas standards for Public Works' Off-site Improvements.

Flow Summary

ONSITE (FUTURE) PHASE I & II DEVELOPED

Drainage Basin	Area (acres)	Q10 (cfs)	Q100 (cfs)	Comments
P1-1	0.966	2	4	Phase I
P1-1A	0.042	<1	<1	Phase I
P1-2	0.44	1	2	"
P1-3	0.069	<1	<1	"
P1-4	0.333	1	1	"
P1-5	0.13	<1	1	"
P1-6	0.083	<1	<1	"
P1-7	0.025	<1	<1	"
				P1-8 Not Used
				P1-9 Not Used
P1-10	0.068	<1	<1	Phase I
P1-11	0.065	<1	<1	"
P2-1	0.044	<1	<1	Phase II
P2-2	0.274	1	1	"
P2-3	0.343	1	1	"
P2-4	0.98	2	4	"
P2-5	0.213	<1	1	"
CP1	n/a	5	9	Combine @ SE corner on-site
				CP2 NOT USED
CP3	n/a	9	16	Combine @ SE corner off-site
CP4	n/a	2	3	Swale
CP5	n/a	1	2	
CP6	n/a	2	3	Swale

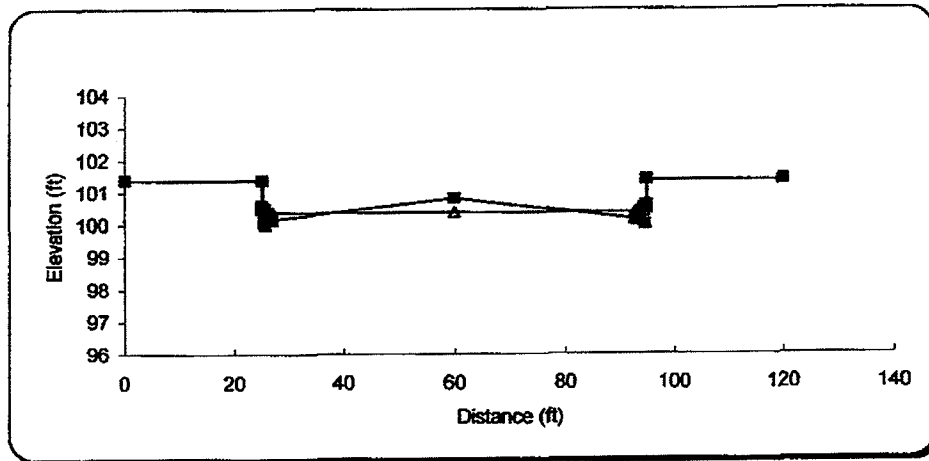
STREET FLOWS

Pavillion Center Drive - 100-Year Flow (Worst Case)

Data taken from Reference 6 (for Husite near 157+00) ~~SEE~~ ALSO APPENDIX 4

Input variables:		Output variables:	
Flow depth, d	0.38 ft	Capacity at d	11.0 cfs
Road width	70.0 ft	Velocity	3.4 fps
Crown height	0.83 ft	Top width	70.0 ft
Street slope	2.00 %	SECTION:	
Sidewalk width	0.0 ft		
Curb height	6 in		
Median width	0.0 ft		
Rt back of walk	100.0 %		
Lt back of walk	100.0 %	Cross Slope	2.0 %
		Gutter Depression	2.0 in
		Depth - Velocity Product	1.28
		Manning's n	0.016

Note: Input 100% slope at back of walk for vertical walls.



11 cfs ...FLOW RATE
 0.38 ft ...FLOW DEPTH
 2.00 % ...STREET SLOPE
 70.0 ft ...TOP WIDTH

STREET FLOWS

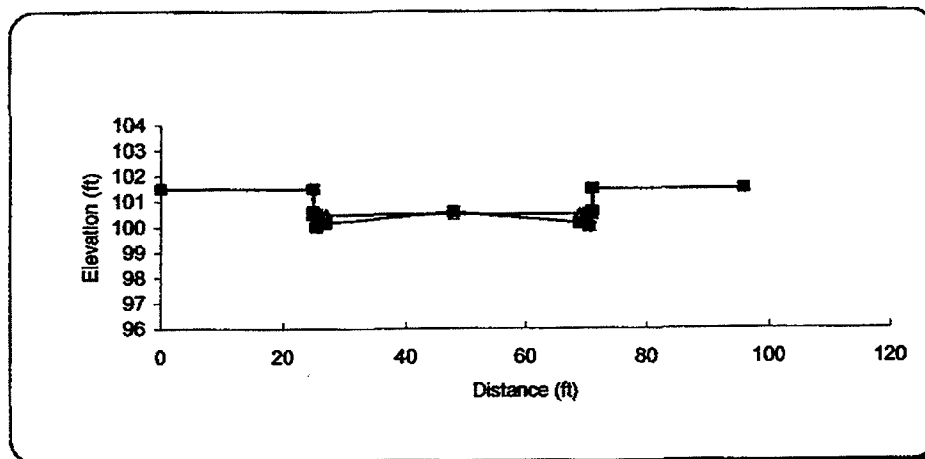
Greenmoor Lane - 100-Year Flow (Worst Case)

SEE ALSO APPENDIX 4

Data taken from Reference 6 (for Greenmoor north side u/s end @ 14+70) $Q(100)=19.5$ cfs

Input variables:		Output variables:	
Flow depth, d	0.50 ft	Capacity at d	39.2 cfs
Road width	46.0 ft	Velocity	5.9 fps
Crown height	0.59 ft	Top width	46.0 ft
Street slope	3.88 %	SECTION:	
Sidewalk width	0.0 ft		
Curb height	6 in		
Median width	0.0 ft		
Rt back of walk	100.0 %		
Lt back of walk	100.0 %	Cross Slope	2.0 %
		Gutter Depression	2.0 in
		Depth - Velocity Product	2.90
		Manning's n	0.016

Note: Input 100% slope at back of walk for vertical walls.



39 cfs ...FLOW RATE
 0.50 ft ...FLOW DEPTH
 3.88 %STREET SLOPE
 46.0 ftTOP WIDTH

**DEVELOPMENT:
CALCULATED BY:**

Desert Spring United Methodist Church
ACB

DATE: January 1999

SUB-BASIN DATA			INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)				tc CHECK (URBANIZED BASINS)		FINAL tc	REMARKS			
DESIGN	K	AREA Ac	LENGTH Ft	SLOPE %	ti Min	LENGTH Ft	SLOPE %	VELOCITY FPS	tt Min	TOTAL LENGTH Ft	tc Min	CN	IL Hrs	Urbanized?	Soil Type	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)				
P1-1A	0.8772	0.042	50	3.0	2.0	25	5.0	2.2	0.2	75	10.4	2.2	96	0.050	Yes	C
P2X-1	0.8772	0.476	100	2.0	3.2	40	10.0	3.2	0.2	140	10.8	3.4	96	0.050	Yes	C
ONX	0.7320	4.075	500	4.0	9.3	100	4.0	2.0	0.8	-	-	10.2	85	0.102	No	C
P2-X	0.8772	1.358	120	4.0	2.8	510	4.0	2.0	4.2	630	13.5	7.0	96	0.070	Yes	C
P1-1	0.9036	0.968	240	5.5	3.1	200	0.5	1.4	2.4	440	12.4	5.5	98	0.055	Yes	C
P1-2	0.9036	0.440	160	3.5	2.9	60	5.0	4.5	0.2	220	11.2	3.2	98	0.050	Yes	C
P1-3	0.8772	0.069	35	2.0	1.9				0.0	35	10.2	1.9	96	0.050	Yes	C
P1-4	0.8772	0.333	45	8.0	1.3	225	2.0	2.1	1.8	270	11.5	3.1	96	0.050	Yes	C
P1-5	0.9036	0.130	50	2.0	2.0	80	1.0	2.0	0.7	130	10.7	2.7	98	0.050	Yes	C
P1-6	0.9036	0.083	40	20.0	0.8				0.0	40	10.2	0.8	98	0.050	Yes	C
P1-7	0.9036	0.025	100	3.5	2.3		0.0		0.0	100	10.6	2.3	98	0.050	Yes	C
P1-8	0.8772	0.020	20	3.3	1.2		0.0		0.0	20	10.1	1.2	96	0.050	Yes	C
P1-10	0.8772	0.068	5	4.0	0.6				0.0	5	10.0	0.6	96	0.050	Yes	C
P1-11	0.8772	0.065	20	22.0	0.6	105	1.5	1.8	1.0	125	10.7	1.6	96	0.050	Yes	C

$$t_i = 1.8 (1.1 - K) L^{0.5} / S^{0.5} (1/3)$$

$$t_c = t_i + t_t$$

$$K = 0.0132 CN - 0.39$$

$$t_L = t_L AG = 0.6 t_c$$

$$t = L / (60 V)$$

LOCATION:

Onsite

HYDROLOGIC CONDITION:

Existing & Proposed

Desert Spring United Methodist Church
ACB

January 1999

	LOCATION:	HYDROLOGIC CONDITION:	Onsite	Future
$t_i = 1.8 (1.1 - K) L^{.4}(0.5) / S^{.4}(1/3)$	$t_c = t_i + t_f$	$t_L = t_{LAG} = 0.6 t_c$		
$K = 0.0132 CN - 0.39$				
$t_f = L / (60 V)$				

HEC-1

FUTURE CONDITION

FLOOD HYDROGRAPH PACKAGE (HEC-1) *

* MAY 1991 *

* VERSION 4.0.1E *

* Lahey F77L-EM/32 version 5.01 *

* Dodson & Associates, Inc. *

* RUN DATE 03/10/99 TIME 13:59:16 *

* U.S. ARMY CORPS OF ENGINEERS *

* HYDROLOGIC ENGINEERING CENTER *

* 609 SECOND STREET *

* DAVIS, CALIFORNIA 95616 *

* (916) 551-1748 *

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X X X X X
X X XXXXXXX XXXXX XXX

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

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

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	Project: DESERT SPRING UNITED METHODIST CHURCH									
2	ID	Project #: UMC001									
3	ID										
4	ID	MARCH 1999									
5	ID										
6	ID	10-YEAR AND 100-YEAR STORM EVENTS									
7	ID	6-HOUR RAINFALL, 5 MIN INTERVALS									
8	ID										
9	ID	SCS UNIT HYDROGRAPH METHOD									
10	ID										
11	ID	Desert Spring United Methodist Church - Future Condition (PHASE II)									
12	ID										
13	ID										
14	ID										
15	ID	10-YEAR, 6-HOUR STORM (DEPTH=1.76 IN)									
16	ID	100-YEAR, 6-HOUR STORM (DEPTH=3.15 IN)									
17	ID										
18	ID	FILE: PP2R1.dat									
19	ID										
		*DIAGRAM									
20	ID										
21	IT	5	0	0	300						
22	IO	5	0	0							
23	IN	5	0	0							
24	JR	PREC	.56	1.0							
25	KK	P2-5									
26	KM	P2-5									
27	BA	.00033									
28	PB	3.15									
29	PC	0	.02	.057	.07	.087	.108	.124	.13	.13	.13
30	PC	.13	.13	.13	.133	.14	.142	.148	.158	.172	.181
31	PC	.19	.197	.199	.20	.201	.204	.214	.229	.241	.249
32	PC	.251	.256	.27	.278	.281	.283	.295	.322	.352	.409
33	PC	.499	.590	.71	.744	.781	.812	.819	.835	.851	.856
34	PC	.86	.868	.876	.888	.91	.926	.937	.95	.97	.976
35	PC	.982	.985	.987	.989	.99	.993	.993	.994	.995	.998
36	PC	.998	.999	1.00							
37	LS	0	96								
38	UD	0.079									
39	KK	P2-4									
40	KM	P2-4									
41	BA	.00153									
42	LS	0	98								
43	UD	.050									
44	KK	P1-1									
45	KM	P1-1									
46	BA	.00151									
47	LS	0	98								
48	UD	.055									

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
93	KK P1-6
94	KM P1-6
95	BA .00013
96	LS 0 98
97	UD .050
98	KK P2-3
99	KM P2-3
100	BA .00054
101	LS 0 96
102	UD .050
103	KK CP5
104	KM COMBINE
105	HC 3
106	KK P1-2
107	KM P1-2
108	BA .00069
109	LS 0 98
110	UD .050
111	KK CP3
112	KM COMBINE NEAR DI IN GREENMOOR
113	HC 6
114	KK P2-1
115	KM P2-1
116	BA .00007
117	LS 0 96
118	UD .050
119	KK P1-10
120	KM P1-10
121	BA .00011
122	LS 0 96
123	UD .050
124	ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT

LINE

(V) ROUTING

(--->) DIVERSION OR PUMP FLOW

NO.

(.) CONNECTOR

(<---) RETURN OF DIVERTED OR PUMPED FLOW

25	P2-5				
	.				
	.				
39	.	P2-4			
	.	.			
	.	.			
44	.	.	P1-1		
	.	.	.		
	.	.	.		
49	CP1.....				
	.				
	.				
52	.	P1-1A			
	.	.			
	.	.			
57	.	.	P2-2		
	.	.	.		
	.	.	.		
62	.	.	.	P1-4	
	.	.	.	.	
	.	.	.	.	
67	.	.	.	.	P1-5
	.	.	.	.	.
	.	.	.	.	.
72	.	.	CP4.....		
	.	.	.		
	.	.	.		
75	.	.	.	P1-11	
	.	.	.	.	
	.	.	.	.	
80	.	.	CP6.....		
	.	.	.		
	.	.	.		
83	.	.	.	P1-3	
	.	.	.	.	
	.	.	.	.	
88	.	.	.	.	P1-7
	.	.	.	.	.
	.	.	.	.	.
93	.	.	.	.	P1-6
	.	.	.	.	.
	.	.	.	.	.
98	.	.	.	.	P2-3
	.	.	.	.	.
	.	.	.	.	.
103	.	.	.	CP5.....	
	.	.	.	.	
	.	.	.	.	
106	.	.	.	.	P1-2
	.	.	.	.	.
	.	.	.	.	.
111	CP3.....				

1

114

P2-1

119

P1-10

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

1

1

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 *
 * FLOOD HYDROGRAPH PACKAGE (HEC-1) *
 * MAY 1991 *
 * VERSION 4.0.1E *
 * Lahey F77L-EM/32 version 5.01 *
 * Dodson & Associates, Inc. *
 * RUN DATE 03/10/99 TIME 13:59:16 *

 *
 * U.S. ARMY CORPS OF ENGINEERS *
 * HYDROLOGIC ENGINEERING CENTER *
 * 609 SECOND STREET *
 * DAVIS, CALIFORNIA 95616 *
 * (916) 551-1748 *
 *

Project: DESERT SPRING UNITED METHODIST CHURCH
 Project #: UMC001

MARCH 1999

10-YEAR AND 100-YEAR STORM EVENTS
 6-HOUR RAINFALL, 5 MIN INTERVALS

SCS UNIT HYDROGRAPH METHOD

Desert Spring United Methodist Church - Future Condition (PHASE II)

10-YEAR, 6-HOUR STORM (DEPTH=1.76 IN)
 100-YEAR, 6-HOUR STORM (DEPTH=3.15 IN)

FILE: PP2R1.dat

22 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 0.08 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

0.56 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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				0.56	1.00
HYDROGRAPH AT	P2-5	0.00	1	FLOW	0.
				TIME	3.50
HYDROGRAPH AT	P2-4	0.00	1	FLOW	2.
				TIME	3.50
HYDROGRAPH AT	P1-1	0.00	1	FLOW	2.
				TIME	3.50
3 COMBINED AT	CP1	0.00	1	FLOW	5.
				TIME	3.50
HYDROGRAPH AT	P1-1A	0.00	1	FLOW	0.
				TIME	3.50
HYDROGRAPH AT	P2-2	0.00	1	FLOW	1.
				TIME	3.50
HYDROGRAPH AT	P1-4	0.00	1	FLOW	1.
				TIME	3.50
HYDROGRAPH AT	P1-5	0.00	1	FLOW	0.
				TIME	3.50
3 COMBINED AT	CP4	0.00	1	FLOW	2.
				TIME	3.50
HYDROGRAPH AT	P1-11	0.00	1	FLOW	0.
				TIME	3.50
2 COMBINED AT	CP6	0.00	1	FLOW	2.
				TIME	3.50
HYDROGRAPH AT	P1-3	0.00	1	FLOW	0.
				TIME	3.50
HYDROGRAPH AT	P1-7	0.00	1	FLOW	0.
				TIME	3.50
HYDROGRAPH AT	P1-6	0.00	1	FLOW	0.
				TIME	3.50
HYDROGRAPH AT	P2-3	0.00	1	FLOW	1.
				TIME	3.50
3 COMBINED AT	CP5	0.00	1	FLOW	1.
				TIME	3.50
HYDROGRAPH AT	P1-2	0.00	1	FLOW	1.
				TIME	2.

TIME 3.50 3.50

6 COMBINED AT CP3 0.01 1 FLOW 9. 16.
TIME 3.50 3.50

HYDROGRAPH AT P2-1 0.00 1 FLOW 0. 0.
TIME 3.50 3.50

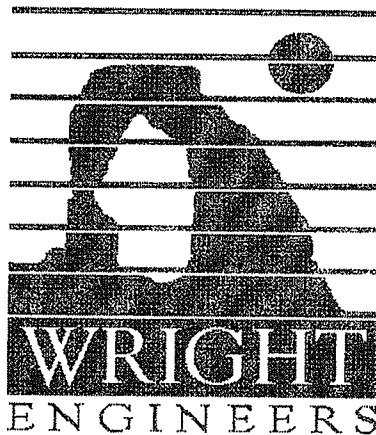
HYDROGRAPH AT P1-10 0.00 1 FLOW 0. 0.
TIME 3.50 3.50

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

WRIGHT ENGINEERS

**UPDATE #1 TO THE
TECHNICAL DRAINAGE STUDY
FOR
DESERT SPRING UNITED
METHODIST CHURCH**

**CITY OF LAS VEGAS
April 12, 2006**



PREPARED FOR:

**CARPENTER SELLERS ARCHITECTS
1919 S. JONES BOULEVARD, SUITE C
LAS VEGAS, NV 89146**

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: June 13, 2006
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Desert Spring United Methodist Church - Classroom Expansion	COPIES TO: Wright Engineers
Cross Streets:	NEC of Pavilion Center Dr & Greenmoor Ln.	Desert Spring United Methodist Ch.
File Number:	F:\Depot\DSMemos\DS3988B.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-25-411-001	
Zoning Action:	CRG-13106	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	4/13/2006	4/27/2006	Not Approved	\$400.00	Paid:\$400
2 nd Submittal	5/11/2006 & 6/5/2006	6/13/2006	See Comments Below	\$400.00	45301:\$400
			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.

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 of a project.

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

END OF REMARKS
RC

T/R/S: T20S/R59E/25
AREA K-25

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Classroom Expansion @ DSUMC Date: 5/10/2006

Location of Development: a) Descriptive (Cross Streets) North/South Pavilion Center Dr East/West Greenmoor Ln
b) Sect. 25 Twn. 20 S Rng. 59 E

Name of Owner: Carpenter Sellers Architects Assessors Parcel No: 137-25-411-001

Telephone No.: (702) 251-8896 Facsimile No.: (702) 251-8876

Address: 1919 South Jones Boulevard, Suite C
Las Vegas NV 89146

Contact Person Name: Mark Boren Telephone No: (702) 933-7000

Firm: Wright Engineers

Address: 7425 Peak Drive

Type of Land Development/Land Disturbance Process:

☐
☐
☐

Rezoning
Parcel Map
Large Parcel Map

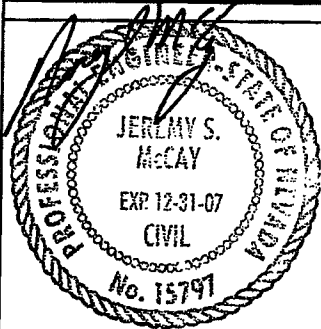
☐
☐
☒

Subdivision Map
Planned Unit Development
Building Permit

☐
☐

Clearing and Grading Only
Other (Please specify below)

- Total Owned Land Area: At Site: 4.08 +/- ac Being Developed/Disturbed: 0.23 +/- ac
- Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? YES* ☐ NO ☒
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? YES* ☐ NO ☒
- Proposed type of development (Residential, Commercial, Etc.)? Church and school
- Approximate upstream land area which drains to the subject site? 60 +/- ac
- Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation:
Technical drainage study for Desert Spring United Methodist Church (DS 2524) done by WRG Design, Inc in September 1999.
Conceptual Master Plan for Summerlin Village 11/12 done by G.C. Wallace in February 1996.
- If known, please briefly identify the proposed discharge point(s) of runoff from the site:
All of the runoff from the site will discharge by discharged south to Greenmoor Lane.
- Briefly describe your proposed schedule for the subject project: As soon as possible



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.

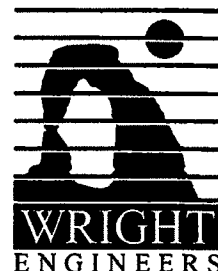
* Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File No.

Revision	Date

Reference: Wright Engineers, Inc. Job Number: CN2520901

STANDARD FORM 1



April 12, 2006

Peter Jackson
City of Las Vegas Public Works
731 S. 4th Street
Las Vegas, NV 89101

**RE: UPDATE #1 TO THE TECHNICAL DRAINAGE STUDY FOR DESERT SPRING
UNITED METHODIST CHURCH: CLASSROOM EXPANSION @ DSUMC
Job No. CN2520901**

Dear Mr. Jackson:

Wright Engineers is pleased to submit a copy of the Update to the Technical Drainage Study for your review and approval for the above-mentioned project. The proposed project is located in a portion of the South Half (S ½) of the Southwest Quarter (SW ¼) of Section 25, Township 20 South, Range 59 East, City of Las Vegas, Clark County, Nevada. The site is recorded on the Clark County Assessor's maps as APN# 137-25-411-001. See *Figure 1, Vicinity Map*.

This update is in regards to the addition of an onsite classroom building northwest of the existing church building. This study updates the Technical Drainage Study for Desert Spring United Methodist Church done by WRG Design, Inc. and approved in 1999. Pertinent referenced material from the original drainage study has been included with this update in the Appendix.

Drainage plans for the proposed condition (EX-3A) and ultimate condition (EX-3B) have been referenced from the original drainage study. The proposed improvements for the "Classroom" building expansion fall within drainage basin P1-4 as shown in figures EX-3A and EX-3B. During a 100-year storm event, basin P1-4 generates a peak flow rate of 1 cfs (1 cfs, 10-year). New hydrologic calculations have not been performed in this update; instead, the onsite basin delineations and peak flow rates have been referenced from the original drainage study.

The flow patterns for basin P1-4 will be revised slightly with the proposed improvements. Approximately half of basin P1-4 will flow east from the "Classroom" building towards the existing roundabout northeast of the existing "Church" building. The other half of the basin will flow south and follow existing drainage patterns as portrayed in the original drainage study. The revisions to the flow patterns of basin P1-4 will not have a negative impact downstream. All of the flow from basin P1-4 will still eventually drain into Greenmoor Lane, which was the original plan.

Hydraulic Section A has been provided for the swale along the north side of the proposed "Classroom" building. A conservative flow rate of 1 cfs has been used for the cross section calculation. The proposed finish floor elevation of the "Classroom" building has been a minimum of twice the depth of flow above the flowline of the adjacent swale.

The majority of the flowlines surrounding the proposed and existing onsite buildings have been checked to assure that they are a minimum of 6 inches below the finish floor elevations. There will not be more than 1 cfs in any of the surrounding flowlines, which should provide sufficient flood protection for the buildings during a 100-year storm event.

There is one area where the adjacent flowlines are not 6-inches below the finish floor elevations. The proposed flowlines in the concrete commons area between the Classroom and Church buildings have not been set 6 inches below the finish floor elevations. In order to meet American Disabilities Act (ADA) requirements the flowlines could not be lower than what are shown on the Grading Plan. However, the flowlines will be draining small areas and are draining away from the buildings.

There is a proposed surface drain east of the Classroom building in the concrete commons area that will be used to drain a small area between the two buildings. If the surface drainage were to be clogged in the future water will be able to exit through the highpoints before flooding the buildings.

The street flows have been referenced from the original drainage study and will not be revised with this update. The depth of flow in Pavilion Center Drive is 0.38'. The back of the existing sidewalk along Pavilion Center has been checked and found to be a minimum of twice the depth of flow above the flowline; therefore, the site is adequately flood protected from the flows in the right-of-way. The depth of flow in Greenmoor Lane is 0.50'. By observation, the onsite buildings are much higher than the existing grades in Greenmoor and will not be impacted by flows in the right-of-way.

According to Figure F-11 of the 2002 CCRFCD'S *Master Plan Update* (Figure 2), no proposed or constructed regional facilities are located adjacent to the project site. Descriptions of nearby facilities are shown on the *Master Plan Update* on Figure 2, *Flood Control Facilities* (Appendix A).

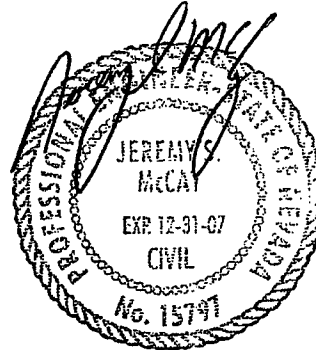
According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel Number 32003C 2150E, Clark County, Nevada, effective September 27, 2002, the site lies within a FEMA designated Zone "X". A Zone "X" is described as an area determined to be outside the 500-year floodplain. See Figure 3, *FEMA Map*.

If you have any questions or comments regarding this project, please do not hesitate to contact this office at (702) 933-7000.

Sincerely,
Wright Engineers



Mark Boren, E.I.T.
Hydrologic/Hydraulic Services



APR 13 2006
Jeremy S. McCay, P.E.
Project Engineer

APPENDIX E

PLANS



TRANSMITTAL

DATE: Mar 1, 2011

CIVIL

TO: City of Las Vegas – Flood Control
333 N. Rancho Drive
Las Vegas, NV 89106

ATTN: ALBERT SUNG

STRUCTURAL

MECHANICAL

PROJECT: Desert Spring United Methodist Church
PROJECT No: CN100298-003
PROJECT MGR: Jeremy S. McCay

VIA: Hand Deliver
FOR: Approval
COPIES TO:

ELECTRICAL

PLUMBING

FROM: Amber Dolce

ITEM	QTY	DESCRIPTION
OTHER	1	Drainage Study Update #2
CHECK	1	#11967 in the amount of \$400.00
REMARKS:		Albert, please accept the attached Drainage Study Update #2 for review. Let us know if you need anything additional. Thank you!

LEED
ADMINISTRATION

**** Duplicate Receipt ****

City of Las Vegas

Development Services Center

731 South Fourth Street

Las Vegas, NV 89101

03/01/2011 16:17 Trn 163651

Cashier 890381

PRJ Permit # 084523 \$400.00

Subtotal \$400.00

Tax \$0.00

Total \$400.00

Received CHECK \$400.00

Check # 11967

Change \$0.00

For questions related to this receipt call

702-229-6251

Las Vegas
7425 Peak Drive
Las Vegas, NV 89128
(p) 702.933.7000
(f) 702.933.7001
800.933.7611

Irvine
2 Venture, Suite 200
Irvine, CA 92618
(p) 949.477.4001
(f) 949.477.4009

Phoenix
3115 S. Price Road
Chandler, AZ 85248
(p) 480.483.6111
(f) 480.483.6112

Salt Lake
9176 South 300 West
Suite 12
Sandy, UT 84070
(p) 801.352.2001
(f) 801.352.2006
wrightengineers.com
(p) 800.933.7611

COMPLETED BY: Amber Dolce

CALLED BY:

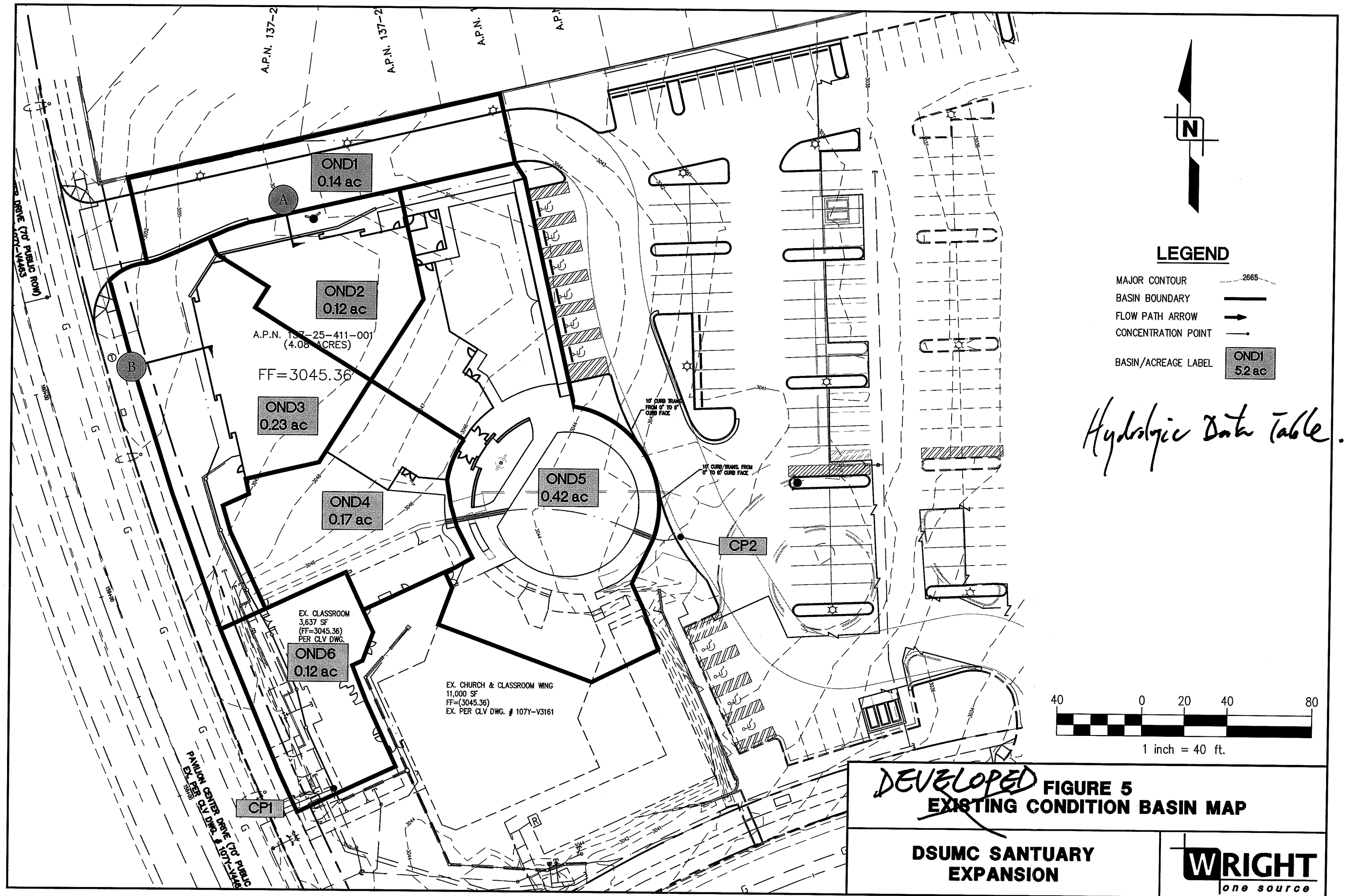
TIME:

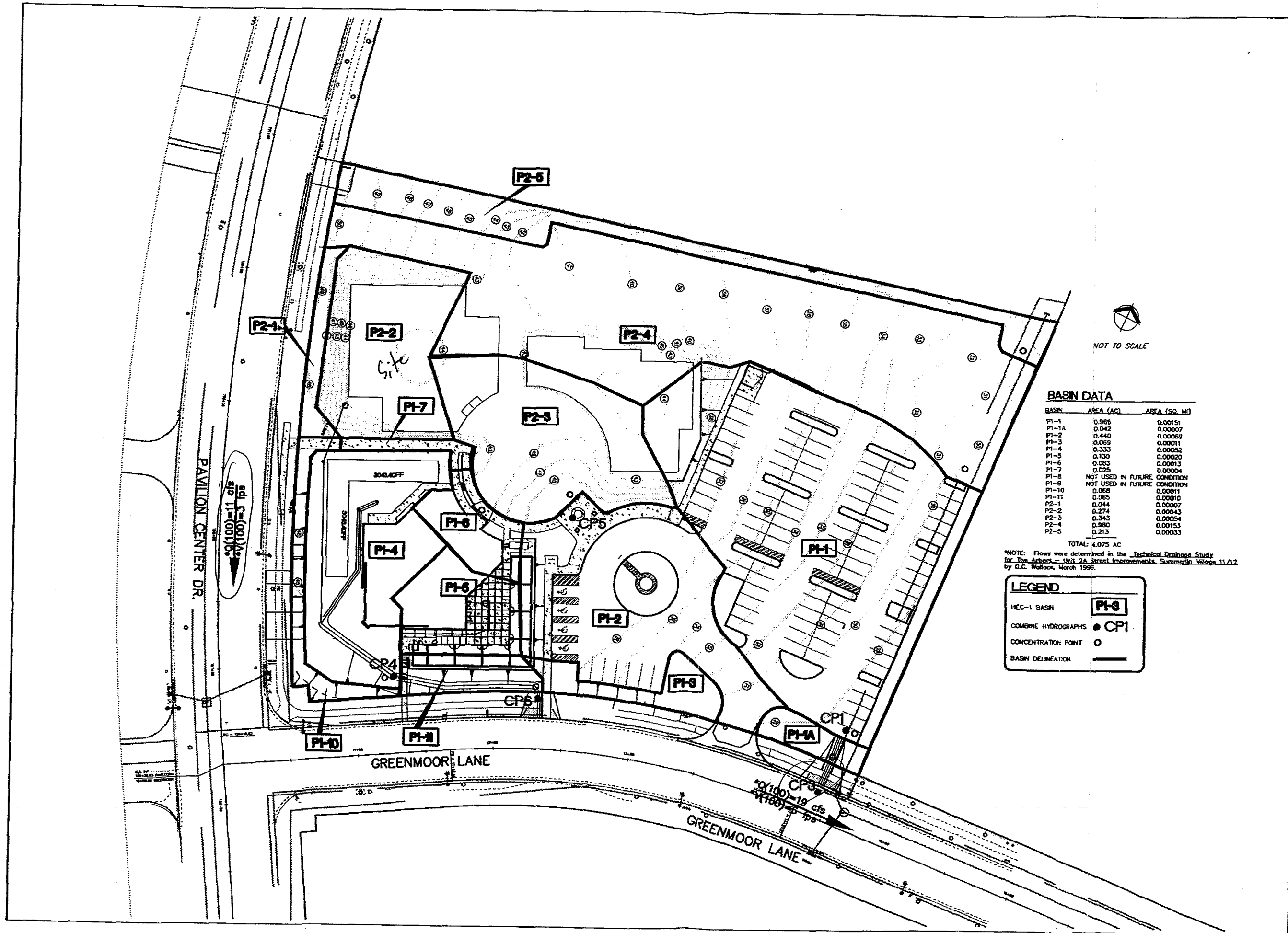
DATE:

SIGNATURE:

PRINT NAME:

DATE:





BASIN DATA

BASIN	AREA (AC)	AREA (SQ. MI)
P1-1	0.966	0.00151
P1-1A	0.042	0.00067
P1-2	0.440	0.00069
P1-3	0.069	0.00011
P1-4	0.333	0.00052
P1-5	0.130	0.00020
P1-6	0.083	0.00013
P1-7	0.025	0.00004
P1-8	NOT USED IN FUTURE CONDITION	
P1-9	NOT USED IN FUTURE CONDITION	
P1-10	0.068	0.00011
P1-11	0.065	0.00010
P2-1	0.044	0.00007
P2-2	0.274	0.00043
P2-3	0.343	0.00054
P2-4	0.980	0.00153
P2-5	0.213	0.00033

TOTAL: 4.075 AC

*NOTE: Flows were determined in the Technical Drainage Study for the Arbores - Unit 2A Street Improvements, Summerlin Village 11/12 by G.C. Wallace, March 1995.

LEGEND

- HEC-1 BASIN
- COMBINE HYDROGRAPHS
- CONCENTRATION POINT
- BASIN DELINEATION

DESERT SPRING UNITED METHODIST CHURCH PHASE II - FUTURE CONDITION

LAS VEGAS, NEVADA

SECTION 25, TOWNSHIP 20 SOUTH, RANGE 59 EAST, N.D.M.

REV.	DATE	BY

PROJECT NO.

UMC001

DATE 3/10/99

DESIGNED

ENGINEER

CHECKED

SHEET TITLE

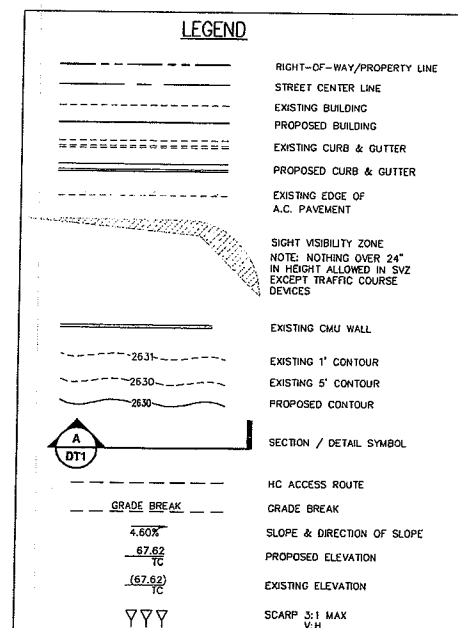
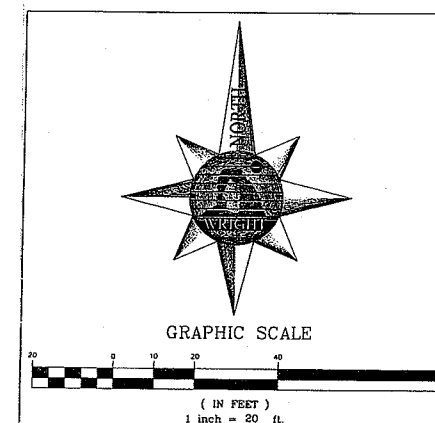
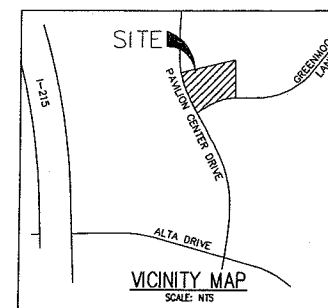
EXHIBIT 3B

SHEET NUMBER

EX-3B



2280 Corporate Circle Henderson, Nevada 89014
702 990-9300 FAX: 702 990-9305
PLANNERS • ENGINEERS • LANDSCAPE ARCHITECTS • SURVEYORS



CONSTRUCTION NOTES:

1. INSTALL CONCRETE SIDEWALK PER CAAUSD #234
2. INSTALL 12" STANDARD AOS DRAIN BASIN MODEL 2B12AG OR EQUIVALENT
3. INSTALL 15 LF 5"x12" RECTANGULAR DRAIN UNDER SIDEWALK - SEE DETAIL ON SHEET DT1
4. CONSTRUCT 2' VALLEY GUTTER PER DETAIL ON SHEET DT1
5. MATCH FINISH GRADE TO EXISTING AT PL
6. INSTALL 12"x12"x12" STORM DRAIN TIE

EARTHWORK QUANTITIES

NOTE: THESE QUANTITIES ARE APPROXIMATE AND AREA RAW VOLUMES ONLY. OVER EXCAVATION, SUBSIDENCE, SHRINKAGE AND BULKING FACTORS, ARE NOT INCLUDED AS PART OF THESE EARTHWORK QUANTITIES.

CUT (NET)	273 CUBIC YARDS
FILL (NET)	0 CUBIC YARDS
NET	273 CUBIC YARDS (OUT)

COMPLETION OF SECTION 1 OF DRAINAGE COMPLIANCE REPORT REQUIRED.

DISCLAIMER NOTE

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDER-GROUND 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 PROPER LOCATION. ALL DISCREPANCIES MUST BE IMMEDIATELY REPORTED TO THE ENGINEER.

CALL BEFORE YOU DIG: 1-800-227-2600.

AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

**Call
before you
Dig.**

1-800-227-2600

UNDERGROUND SERVICE ALERT (USA)
A SERVICE OF THE NATIONAL
ASSOCIATION OF DRAINAGE CONTRACTORS
(NADC) AND THE NATIONAL
ASSOCIATION OF ELECTRICAL CONTRACTORS
(NECA)

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.

Call
before you
OVERHEAD
1-702-593-6111
SECURE POWER ENCLOSURE AND



AVOID HITTING UNDERGROUND
TRAFFIC SIGNAL SYSTEMS
AND STREET LIGHT SYSTEM CONDUITS
ITS COVER
CALL BEFORE
YOU DIG
UNDERGROUND

Call before you dig

Underground

1-702-455-7671
CLARK COUNTY TRAFFIC OPERATIONS

1-702-229-6861

LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

BASIS OF BEARING

THE LINE BETWEEN THE INTERSECTION OF THE CENTERLINES OF REGAL MESA AVENUE AND THE CENTERLINE OF SILVER CASTLE STREET AND THE NORTHERLY END OF SILVER CASTLE STREET (7.5' FROM THE CENTER OF THE CUL-DE-SAC) WAS TAKEN A N04°07'32"E, AS CALCULATED FROM THE MAP OF CHARDONNA No. 41 - BY LEWIS HOMES PER MAP IN BOOK 80 OF PLATS AT PAGE 47, CLARK COUNTY NEVADA RECORDS.

LEGAL DESCRIPTION
LOT 6, BLOCK B OF THE ARBORS AT SUMMERLIN VILLAGE 11/
NO. 2A AS RECORDED IN BOOK 75 OF PLATS PAGE 75 FOUND
IN THE RECORDERS OFFICE OF CLARK COUNTY, NEVADA.

BENCHMARK

PROJECT VERTICAL DATUM: NAVD88
CITY OF LAS VEGAS B.M. 01V09 36NWS
NAVD88 ELEV: 927.9652 METERS (3044.50 FEET)

INSET AND PLATE IN TOP OF CURB AT THE NORTHWEST CORNER
OF PAVILION CENTER AND GREENWOOD.
CITY OF LAS VEGAS, NEVADA

CARPENTER SELLERS ARCHITECTS
1919 S. JONES BLVD., STE. C
LAS VEGAS, NEVADA 89146
TEL. (702) 251-8858 FAX (702) 251-8878

WRIGHT ENGINEERS
7425 PEAK DRIVE
LAS VEGAS, NEVADA 89128
TEL. (702) 933-1000 FAX (702) 933-7001

STRUCTURAL MEP SURVEYING



WRIGHT
ENGINEERS

CARPENTER SELLERS ARCHITECTS
CLASSROOM EXPANSION @ DSU/MC

GRADING PLAN

DATE: 5/70/06	DATE: 5/70/06	DATE: 5/70/06	DATE: 5/70/06
CHECK NO. 1	CHECK NO. 2	CHECK NO. 3	CHECK NO. 4
AMOUNT	AMOUNT	AMOUNT	AMOUNT
PROJECT NO. CN25209	PROJECT NO. CN25209	PROJECT NO. CN25209	PROJECT NO. CN25209
SCALE: 1"=20'	SCALE: 1"=20'	SCALE: 1"=20'	SCALE: 1"=20'

PROFESSIONAL ENGINEER - STATE OF NEVADA

JEREMY S. MCCAY

Exp. 12/31/07

CIVIL

No. 15797

MAY 10 2006

SHEET

GP1

5 7 SHEETS

DRAWING NO.

