

# HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

## DRAINAGE STUDY INFORMATION FORM

Name of Development: Kyle Canyon Rd. and Oso Blanca Rd. Date: February 3, 2025

Location of Development: a) Descriptive (Cross Streets) North/South: Oso Blanca Rd  
 East/West: Kyle Canyon Rd.

b) Section: 1 Township: 19 SOUTH Range: 59 EAST

c) APN : 126-01-702-007 & 126-01-779-006

Name of Owner: Silver Meadow Properties, LLC - Tim Robinson

Telephone No.: N/A Fax No.: \_\_\_\_\_ E-Mail Address: trobinson@gvgrocery.com

Address: 1580 S. Jones Blvd. Las Vegas, NV 89146

Contact Person-Name: Randy Skorpinski, PE Telephone No.: 702-448-8737

\* E-Mail Address: rskorpinski@acg.design Fax No.: N/A

Firm: ACG Design

Address: 4310 Cameron Street, Suite 12-A, Las Vegas, NV 89103

Type of Land Development/Land Disturbance Process:

<input type="checkbox"/>	Rezoning	<input type="checkbox"/>	Subdivision Map	<input type="checkbox"/>	Clearing and Grading Only
<input type="checkbox"/>	Parcel Map	<input type="checkbox"/>	Planned Unit Development	<input type="checkbox"/>	Other (Please specify below)
<input type="checkbox"/>	Large Parcel Map	<input checked="" type="checkbox"/>	Building Permit		

1. Total Owned Land Area: At Site: 2.48 +/- Acers Being Developed/Disturbed: 2.48 +/- Acers

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 - Convenience Store

5. Approximate upstream land area which drains to the subject site: 25.00 +/- Acers

6. Has the site drainage been evaluated in the past?  YES  NO If yes, please identify documentation: TDS for US95 Kyle Canyon Road Interchange

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: East to Existing dual RCBS (6'x3' RCB's)

8. Briefly describe your proposed schedule for the subject project: ASAP



02/03/25

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

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

Project Name: Kyle Canyon & Oso Blanca		Map ID:
Firm Name: ACG Design		Engineer: Randy Skorpinski, PE
Address: 4310 Cameron Street, Suite 12-A		
City: Las Vegas	State: NV	Zip: 89103
Phone Number: (702) 448-8737	Fax Number:	
Property Owner: Silver Meadow Properties, LLC		
Address: 1580 S. Jones Blvd.		
City: Las Vegas	State: NV	Zip: 89146
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

- |                                     |                                     |  |
|-------------------------------------|-------------------------------------|--|
| Yes                                 | No                                  |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Design Manual <b>Standard Form 1</b> with the engineer's seal and signature.                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Design Manual <b>Standard Form 4</b> .   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2 copies of the 24" x 36" Drainage Plan.   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge. |

### II. MAPS AND EXHIBITS

- |                                     |                          |   |
|-------------------------------------|--------------------------|---|
| Yes                                 | No                       |   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated. |

**REFERENCE:**

**STANDARD FORM 2**

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

### II. MAPS AND EXHIBITS (Continued)

- | Yes                                 | No                       |  |
|-------------------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.              |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 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. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Vicinity Map with local and major cross streets identified and a north arrow.  |

### III. DRAINAGE PLAN

- | Yes                                 | No                       |   |
|-------------------------------------|--------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Minimum scale: 1" = 60'.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Project name.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Vicinity Map with local and major cross streets.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Revision box.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | North arrow and bar scale.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Engineer's/consultant's address and phone number.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Elevation datum and benchmark.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Legend for symbols and abbreviations.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Cut/fill scarps, where applicable.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Street names, grades, widths.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 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. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Proposed typical street sections.   |

**REFERENCE:**

**STANDARD FORM 2**

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

### III. DRAINAGE PLAN (Continued)

Yes	No	
<input type="checkbox"/>	<u>N/A</u>	Streets with off-set crowns.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Property lines.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Right-of-way lines and widths, existing and proposed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing improvements and their elevations.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Concentration points and drainage flow direction with $Q_{100}$ and $V_{100}$ and $D_{100}$ in streets.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location and cross-section of street capacity calculations.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cross-sectional detail for channels, including cutoff wall locations.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
<input type="checkbox"/>	<u>N/A</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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Building and/or lot numbers.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<input type="checkbox"/>	<u>N/A</u>	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

**REFERENCE:**

**STANDARD FORM 2**

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

### III. DRAINAGE PLAN (Continued)

- | Yes                                 | No                                      |  |
|-------------------------------------|---|--|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> N/A | 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. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>                | 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.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>                | Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>                | Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).   |

### IV. HYDROLOGIC ANALYSIS

- | Yes                                 | No                       |  |
|-------------------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 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.                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 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.                       |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Use of correct precipitation values in and around the McCarran Airport rainfall area.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.                                    |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | A summary table of stormwater flows showing basin area, $Q_{10}$ and $Q_{100}$ for both individual basins and combined basin flows, where applicable.                        |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Calculation for impervious area for parking lots and LIDs (if required).   |

REFERENCE:

STANDARD FORM 2

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

### V. HYDRAULIC ANALYSIS

Yes	No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>N/A</u> Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q <sub>100</sub> and Q <sub>10</sub> flows representing the worst case for interior and all perimeter streets. Q <sub>100</sub> d x v ≤ 8. Q <sub>10</sub> d x v ≤ 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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A summary table of interior and exterior street capacity calculations showing the street name, Q <sub>100</sub> flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>N/A</u> Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 <sub>100</sub> weir height or flow depth, whichever is greater.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>N/A</u> A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. <ul style="list-style-type: none"> <li>• Field survey data.</li> <li>• Input and output information.</li> <li>• Plotted cross-sections based on survey with proper encroachments.</li> <li>• A map showing the location of the cross-sections.</li> <li>• Analysis of both sub and super-critical flow segments.</li> <li>• A summary table and a discussion of the results in the text of the report.</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

**REFERENCE:**

**STANDARD FORM 2**



# CITY OF LAS VEGAS

## MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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 (CCRFCD) 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 CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

**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.)
✓		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
✓		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file.  <u>RS</u> by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
✓		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
✓		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.
✓		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.)

**CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST**

II. GRADING PLAN INFORMATION		
Yes	No	
✓		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 flows. An overflow path must be provided over all storm drains.
✓		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.
✓		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.
✓		Back of lot elevations and lot drainage pattern for all lots including common lots.
✓		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.
✓		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.)
✓		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.
✓		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	
✓		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.
✓		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.
✓		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

**CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST**

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Lots with “B and C Type Drainage” that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 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.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. 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.