REGIONAL FLOOD CONTROL DISTRICT

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Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
495 S Main Street, 5th Floor
Las Vegas, NV 89101

DISTRICT COMMENT(S): **SUMMERLIN WEST VILLAGE 31 PEAKING BASIN (DS5604C) (RFCD No. 24-14539)**

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated May 24, 2023, Addendum No. 1 dated August 10, 2023, Addendum No. 2 dated June 28, 2023, Supplement No. 1 dated March 8, 2023, for above-mentioned project as submitted by ATKINSREALIS. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated August 7, 2023.

District has the following comment(s):

1. The project proposes multiple inflow channels, outfall facilities, and a detention basin identified in the District's MPU as facility GOL3 0464. Per the City of Las Vegas approval letter dated August 7, 2023, structural plans, details, and calculations must be approved prior to District submittal and concurrence review. The Structural Approval Documentation and structural plan, details, and calculations must be provided with the next submittal for review and prior to District concurrence.

2. The project submittal to the District only includes the June 2023 addendum and associated improvement plans and appears to be missing the Technical Drainage Study, Addendum, Supplement, and Structural Plans as listed on the City of Las Vegas approval letter. As per typical process, provide a copy of all project material reviewed by the City for concurrence review. Comments made herein are based on the current project material provided to the District and additional concerns and comments may be provided based on the full project material and any subsequent changes to the project as a result of additional comments by the City or the District comments herein.

3. Clearly delineate a public drainage easement for the entirety of the detention basin improvements, including inflows channels and outfall facilities. It appears this is mostly consistent with the "Flood Control ROW" linework and should be clarified if it is intended to be a public drainage easement and shown on the improvement plans. Provide discussion on any no-man's land between the flood control ROW and parcel limits adjacent to the Red Rock Canyon National Conservation Area (RRCA) or if it will be included as part of the public drainage easement.

4. The proposed improvement plans propose a 960-ft wide emergency spillway at the outlet side of the detention basin covering the width of the basin. The District recommends an emergency overflow path and analysis throughout the downstream

project site to ensure the future development will be adequately protected from flooding over the emergency spillway due to clogging or overtopping from surcharge events. Provide discussion on the design choice of the emergency spillway as an emergency spillway is typically more controlled to allow for protection of downstream development and not over the full width of the basin. If the site development downstream of the emergency spillway has not been determined, protection should be addressed as the downstream parcels develop.

5. It is noted the detention basin proposes a water quality wall surrounding the outlet structure of the detention basin. However, the proposed low flow channel bypasses the water quality feature and appears to convey all low flow events directly to the outlet structure. Provide discussion and address the design intent of the water quality feature.

6. Sheet 39 shows pipe penetration details to the proposed retaining wall, however, there does not appear to be any RCP proposed along the retaining wall section as shown on the improvement plans. Clarify and revise all affected details and callouts as required.

7. It is noted that the June 2023 addendum provided calculations for the wave-run up and calculated a PMF stage of 4267.32 in the spillway parameters. However, the rating curve and performance data per Sheet 6 of the improvement plans and the same report reported a PMF stage of 4267.2. Provide discussion on the discrepancy and revise all affected calculations as required.

8. The District recommends coordinating with Matthew Meyer from maintenance for the City of Las Vegas to ensure adequate maintenance throughout the detention basin, and specifically at the outlet area enclosed by the water quality wall as shown on Sheet 10. It appears that in order to access this area, maintenance crews will be required to traverse a length of the low flow channel and make a sharp radius turn through a depressed lip of the low flow channel and may limit the type of heavy equipment used to maintain the detention basin. Additionally, it appears the design of the water quality wall and low flow channel would cause significant accumulation of sediment and debris in this section and complicate maintenance for the City of Las Vegas.

9. It is noted that the debris basin project proposes 12” Type II for certain sections of the maintenance access road. The District recommends the engineer set up a meeting with air quality and NDEP along with the District and City of Las Vegas staff to discuss final stabilization and allowable materials to prevent delays from closing out the debris basin project. Coordinate with the City of Las Vegas on air quality and NDEP requirements for the maintenance access road and other disturbed areas.

10. Address the following comments regarding the Flood Threat Recognition System (FTRS) design:

a. Coordinate with the District and hydrologist staff for the latest set of approvable FTRS monitoring station details to incorporate into the improvement plans. Revise all relevant details and references to match the latest approvable set of monitoring station details.

b. It is noted that the FTRS building called out on Sheets 10 and 35 of the improvement plans has been fully surrounded with iron fencing. However, no gate is shown on the fencing to provide access to service the FTRS building and must be provided. Clarify setback distance on the details to show a minimum of 4-ft from the building face to the proposed fence enclosure. Additionally, provide standard drawing and specification reference for the iron fence or if it will be decorative fencing or expanded metal fencing.

c. Per staff discussion, the District recommends relocating the proposed trash rack access opening along the sloped trash rack to an enclosed concrete access structure near the outlet structure adjacent to the triple (3) 6'x6' RCB outlet and orifice plate. The District recommend light-weight grate with lock bar or manhole cover with ladder steps to ensure service and accessibility to the outlet structure sensor. Coordinate with the District hydrology staff on required enclosures and specifications along the proposed trash rack to allow for the installation and service of the FTRS sensor instrumentation.

d. The proposed FTRS building is situated approximately 200-ft away from the outlet of the debris basin. It appears due to the design of the 960-ft emergency spillway, grading does not currently allow for relocation of the FTRS building closer to the outlet of the detention basin for sensor accuracy. If the conduit line distance to the sensor is greater than 100-ft, pullboxes with lock bars for the conduit and instrumentation line must be provided at a maximum spacing of 100-ft and clearly shown on the plans to ensure FTRS instrumentation can be properly installed.

e. It is unclear why two sets of conduit and ground rods are provided within the FTRS building as the design of the proposed debris basin is intended for a single sensor location. Additionally, the bench and bench details are missing from the building and must be provided.

f. Callout and provide a 2'x2' flat area on the roof to allow for installation of FTRS equipment by staff as needed.

g. Provide standpipe detail as part of the monitoring station detail and correct the mislabeled callout for Sheet DT-03 referenced on the plans.

h. Provide outlet structure sensor detail and how instrumentation will be able to be installed and connected from the monitoring station to the outlet structure.

11. Address the following comments regarding the detention basin inlet ramps, outlet structure, trash rack, and emergency spillway design:

    a. It is noted that certain sections of the inflow channel are above 25% slope. Note the HEC-RAS limitation that channel analysis should have slopes less than 10% as errors in the depth computation introduced by the magnitude of higher slopes becomes more significant based on the derivation of the energy equation for vertical head pressure. Additionally, steep slopes can introduce air entrainment to the flow that may not be accounted for by HEC-RAS. Provide discussion and address impacts of slopes greater than 10% in the hydraulic analysis.

    b. Provide an enlarged exhibit showing the reference locations of the HEC-RAS inlet channel ramp RS overlaid on the grading plans to ensure the proposed inlet channel ramps contains the depth of flow with freeboard if that was the design intention. Note any corrections to the vertical depth of water in the channel analysis per HEC-RAS recommendations for limitation of computation in channels greater than 10% slope.

    c. Provide structural plans for all inlets to verify the design of inlet concrete channel ramp to ensure appropriate slab and wall thickness. Provide trench details and connection details with joint seal of the proposed inlet channel ramps per Details B/33, C/33 and D/33 to the proposed concrete detention basin lining and the following items:

        i. Typical inlet channel ramp section and suitable sideslope with concrete strength, thickness, and sacrificial layer for excessive velocities.

        ii. Minimum rebar as required and total vertical depth from the finished grade.

        iii. Clearly delineate the adjacent bedding material the inlet channel ramps will be constructed on and any joint seal details or cut-off walls to ensure long term functionality of the inlets.

        iv. The improvement plans call out post-and-cable fall protection along the inlet channel ramps. Provide anchor detail and clarify if the anchor for the proposed fall protection will be cast-in-place with the inlet channel ramps.

v. It appears a construction joint is shown at the invert of the base slab. The District requests a minimum of a 3" lip to be added along the sides of the structure to be poured monolithically with base slab. Elevating the wall construction joint 3" will mitigate long term erosion and ensure constructability and stability for the proposed inlet facilities.

vi. Clarify cross fall slopes at the inlet channel ramps or if the design intent is for a flat bottom due to the steep longitudinal slopes at the inlets.

d. Provide expansion joint detail and the maximum expansion joint spacing for the proposed inlet channel ramps. Per the HCDDM, for channels with expansion joints greater than 100 feet on center, the ratio of longitudinal steel area to concrete cross-sectional area shall be greater than 0.005 and not less than a No. 5 bar at 10-inch spacing. For channels with expansion joints at 100 feet on center, there should be no less than a No. 4 bar at 8-inch spacing. Verify reinforcement requirements with the City of Las Vegas and revise accordingly. Additionally, the District recommends continually reinforced channel design per Section 700 of the HCDDM.

e. Provide connection / joint detail at the terminus of the concrete pavement per Construction Note #5 and the concrete inlet channel ramps to ensure constructability and adequate inspection.

f. It does not appear the hydraulic analysis for the inlet channel ramps matches the detail cross sections for the inlet ramp channels as shown on Details B/33, C/33 and D/33. Clarify differences in the geometry of the channel and top width of flow in the HEC-RAS input/output as compared to the detail cross section of the inlet channel ramps and revise all affected calculations and design parameters as required.

g. Response to CLV comment #3 in Addendum #1 is noted. Provide discussion and meeting minutes from the May 11th, 2023 meeting that indicates chute blocks and baffle blocks will not be required by the City of Las Vegas for energy dissipation at the inlet channel ramps.

h. It is noted that an end sill is provided at the terminus of the inlet access ramps. Provide discussion on outlet protection and riprap sizing to ensure the proposed riprap will be adequate for all flow profiles with higher velocities prior to the detention basin filling up to limit the extent of maintenance after minor storm events.

i. Clarify the proposed retaining wall on the northern side of the concrete access road near Inlet 3 as shown on Sheet 9. It appears that all other retaining walls

proposed at the inlet sections are located on the southern side of the concrete access road in order to funnel offsite flows to the inlet channel ramps. Provide additional cross section detail for area to ensure positive drainage, constructability, and adequate inspection.

j. Provide trench detail for the proposed triple (3) 6x6' RCB outfall to address constructability and the proposed means and methods of construction. Provide detail for any proposed grout or approved material in the spacing between the boxes throughout the outfall facilities as it does not appear the entire outfall from the outlet structure to the downstream terminus is to be within a monolithic concrete structure.

k. Provide additional details for the water quality wall per Detail H/32 to include material, strength, sizing of the staggered baffle blocks, and horizontal placement configuration of the blocks within the debris basin outlet to ensure constructability and adequate inspection.

l. Clarify if there are notches in the 3.75-ft water quality wall as shown on Detail H/32 to allow clean water to pass through without the need for ponding and weir over the water quality wall. Additionally, coordinate with the City of Las Vegas to verify if the sediment control is adequate as the debris basin is situated at the RRCA with the potential for large quantities of suspended sediment and bedload.

m. Per Sheet 10, the proposed concrete water quality wall connects to the concrete access ramp near the terminus of the access ramp. Clarify and provide details for joint seal at the connection or if it is meant to abut the concrete access ramp.

n. Clarify the discrepancies between the 39-ft horizontal dimension length for the proposed trash rack as shown on Details A and 2 on Sheet 33 and the 21-ft 7-inch horizontal dimension for the trash rack per Sheet 34.

o. The width of the proposed outlet structure is shown to be 30-ft per Detail 1/33, however, the width dimensions of the trash rack appear to be approximately 25-ft based on the dimensions for the four panels and clear spacing. Verify the width of the proposed trash rack to ensure adequate installation and functionality of the trash rack over the concrete outlet structure.

p. The details for the outlet structure per Details 1/33 and 2/33 references structural design details per Sheet 39 but no outlet structural details were provided on the referenced sheet and must be provided. Structural details and calculations must also address the angled wall that will house the trash rack and have sufficient details to ensure constructability and adequate inspection.

q. Detail A/33 for the outlet structure references Details 1/32 and 2/33 and should be revised to reflect Details 1/33 and 2/33. Verify all details be consistent on the improvement plans to ensure constructability and adequate inspection.

r. The configuration of the cut-off wall detailed called out for the outlet headwall section per Detail 2/33 does not match the detail A on Sheet 38. Provide additional detail section to match the proposed cut-off wall at the connection to the outlet structure and appropriate joint seal details as required.

s. Clearly delineate the STA for the end of the concrete spillway per CN #4 and CN #25 on Sheet 9 of the improvement plans, similar to the delineation of the STA for the beginning of the concrete spillway on Sheet 10 and Sheet 18.

t. Provide additional detail on the emergency spillway including identification of expansion joint layout and other required joints for review.

u. Provide discussion on box sizing selection as the proposed NDOT precast box specifications allow for greater span reaches to limit the amount of culvert cells and hydraulic instability at the abutment pier between the culvert cells. Clarify and provide details for any bullnose pier at the multiple culvert cell abutments to reduce hydraulic turbulence at the abutment. If any changes to the culvert sizing are proposed, ensure the appropriate orifice plate calculations and impacts any impacts to the detention basin design.

v. The improvement plans reference multiple NDOT details. Verify and ensure all referenced NDOT details are shown on the improvement plans so the final plan sets are standalone.

12. Address the following additional plan comments on the detention basin improvement plans:

a. It is unclear why the concrete spillway and embankment sections are shown to be outside of the Flood Control ROW per Detail B/17. Clarify and ensure all detention basin improvements are provided within a public drainage easement to ensure maintenance funding.

b. Clarify the 0.5-ft concrete lip as shown on Detail B/32 as it appears it may conflict with the guardrail and anchor.

c. It is noted that the retaining wall detail as shown on Sheet 39 shows earthen backfill for the retaining wall, however, details B/32 and E/32 shows concrete access road and concrete access ramp at the connection instead. Specify and

provide joint seal detail for the retaining wall where the improvement plans show concrete adjacent to the retaining wall.

d. Specify and correct retaining wall detail called out as XX on Detail E/32 to ensure constructability and adequate inspection.

e. Provide connection / joint detail at the connection of the concrete pavement per Construction Note #5 and the concrete access road per Construction Note #7 as shown on Sheets 7 through 9 to ensure constructability and adequate inspection.

f. Detail M per Construction Note # 9 could not be located on the plans. It appears the intent is to reference Detail F/32 in the construction note. Verify and revise all affected construction notes to be consistent with the improvement plans and details.

g. Clarify whether concrete pavement or dam structural fill is being proposed along the three inlet channel ramps to the detention basin. It is noted that Sheet 7 shows concrete pavement per CN #7 to either side of Inlet 1 but there are no CN's to indicate the proposed material between Inlets 2 and 3, while dam structural fill per CN #28 is shown to the southeast of Inlet 3. Address additional erosion protection or cut-off wall as required if there is the potential for undercutting the concrete sections.

h. It appears the spillway sections as shown on Details A/20 and B/20 should be revised to show the dual 8-ft cut-off walls at either side of the 14-ft access road.

i. Clarify the discrepancy between the 5-ft cut-off wall per CN #6 and the 8-ft cut-off wall as shown at the terminus of the outfall on Sheet 21. It appears the construction note callout should be referenced to CN #27. Additionally, verify if all other cut-off wall details at the outfall concrete pad are intended to be 5-ft or 8-ft.

j. Provide additional slope, detail cross sections, and construction note callouts for the access ramp to the outfall structure and maintenance staging area as shown on Sheet 11 and Sheet 21 to ensure constructability and adequate inspection.

k. The Water Surface Elevation as shown on Sheet 21 does not match the intended vertical elevation. Discrepancies in this plan and profile do not appear to have major impact on constructability but should be corrected for future reference.

l. It appears the outlet plan and profile section as shown on Sheet 21 should be revised to show the dual 8-ft cut-off walls at either side of the 14-ft access ramp and 12-ft access road.

m. The top of the flood wall plan and profile on Sheet 30 is shown to be 10.31% with the maintenance access road shown to be parallel to the wall slope. Provide discussion and verify with the City of Las Vegas maintenance staff to ensure they will allow maintenance access roads in excess of 10%.

n. It is noted that the cut-off wall detail as shown on Sheet 38 shows connection to concrete with a separation joint detail. However, this does not appear to be the detail for all cases referenced as detail A/32 shows connection to Type II. Recommend providing additional detail for constructability and adequate inspection.

o. The configuration of the cut-off wall detailed called out for the concrete spillway per Detail C/32 does not match the detail A on Sheet 38. Provide additional detail section to match the proposed cut-off wall at the top of the access road of the concrete spillway.

p. It is noted that the sideslopes are shown as 26.3% at the depressed lip section of the low flow channel per Detail G/32. Clarify whether the depressed lip section for the low flow channel is meant to be drivable and coordinate with the City of Las Vegas maintenance staff on drivability beyond 10%. Additionally, clarify and detail whether the 6-inch-thick concrete is to be thickened with the 1-inch depressed lip for the sideslope.

q. It appears there is transition linework at the 12-ft low flow channel with 1" depressed lip as shown on Sheet 12 of the improvement plans. Clarify and provide a transition detail from the proposed 12-ft low flow channel to the low flow channel with 1" depressed lip to ensure constructability and adequate inspection.

r. Revise earthwork hatching to be flush with the top of the 26.3% concrete sideslope in the depressed lip section of the low flow channel per Detail G/32 to ensure the section will function as intended as the earthwork hatching is only shown at the bottom of the sideslope slab. Additionally, provide finished grade callouts on Sheet 12 for the proposed improvements to ensure adequate inspection.

s. Note per City of Las Vegas approval condition #20, a 6" PVC opening, 40-ft on center, shall be provided for the water quality wall. Provide full detail of

the revised section for review. Verify the grading plans reflects and matches the latest detail for constructability and adequate inspection.

13. The 2023 MPU is currently ongoing, and it is expected that the proposed debris basin and outfall alignment changes to the District's MPU Facility GOL3 0464 will be incorporated by the City of Las Vegas. Note if significant changes are subsequently made to the proposed facilities, then a Master Plan Amendment (MPA) may be required as the 2023 MPU is wrapping up facility planning and undergoing final review.

14. The proposed detention basin is being referenced to as a peaking basin throughout the Technical Drainage Study and improvements plans. However, it appears the proposed low flow channel has a capacity of less than the 2-yr recurrence interval. Provide discussion on the design intent of the peaking basin or if it should function as a typical detention basin.

15. It is noted per approval condition #3 that the proposed improvements will require approval by the State of Nevada – Division of Water Resources for Dam Safety. As there are missing submittal items in the District concurrence review submittal, it is unclear whether a seepage analysis has been provided and should be noted, as that is a typical requirement in the State review and approval process.

16. Provide discussion on construction timing and layout of the downstream parcel development. As noted in District comment #4 above, the proposed emergency spillway is the approximate width of the entire detention basin and may not provide for a more controlled emergency spillway and downstream overflow section as seen in a more typical design to ensure the protection of life and property, depending on the downstream development, in the event that the spillway activates.

17. The District requests to be invited for the final walk-through by the City of Las Vegas for the proposed improvements intended to be part of the ultimate Regional Master Planned system as shown on the latest adopted Master Planned Update, prior to acceptance of public maintenance by the City of Las Vegas.

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

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

The consultant must be advised to submit any revisions to the Technical Drainage Study and Improvement Plans to City of Las Vegas Department of Public Works for review/re-approval. District review of any such revisions will commence upon acceptance by City of Las Vegas Department of Public Works.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by ATKINSREALIS may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage.

The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

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By: Brittney Duncan
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By: Ching Wang (Mar 13, 2024 16:48 PDT)
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c: MOLLY ANDERSON, ATKINSREALIS

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