FINAL
DRAINAGE DESIGN REPORT
FOR
CENTENNIAL PARKWAY CHANNEL WEST–CC 215
PIONEER WAY TO US 95

412.654

July 2015

GCW
ENGINEERS \ SURVEYORS

Prepared By:

G. C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, NV 89146
Phone: (702) 804-2000
Fax: (702) 804-2297

Final Submittal

This report addresses the final design level for the necessary drainage facilities associated with Centennial Parkway Channel West – CC 215 Improvements. The following comment matrix and responses provide a summary of project changes that have occurred subsequent to the 90% and 90%+ Submittals completed in September and October 2014.

Additionally, previously proposed RCB stub facilities have been revised to include a 5-foot minimum height and a 12-foot wide maintenance road has been provided for access to the storm drain manholes in the unpaved areas. The beginning of the 10-foot transition from a 22-foot wide by 7-foot high RCB to double 15-foot wide by 7-foot high RCB has been moved from "CPCW" 36+23.17 to 31+24.38.

City of Las Vegas Centennial Channel Pkwy West Project - 90% Submittal Comments and Responses

Job No: 412-654

Reviewer	Comment No.	Page/ Sheet No.	Reviewer's Comments	GCW Response	Initial if Done
CLV CPM - ED	1	G-2	Update CLV General Notes and CLV Traffic Notes	Plans have been updated.	RRB
CLV CPM - ED	2	G-2	Spelling in sheet index "CAST"	Plans have been updated.	RRB
CLV CPM - ED	3	G-3	Add ALIGNMENT ABBREVIATIONS	Plans have been updated.	RRB
CLV CPM - ED	4	HZ-1	Any northing/easting or points to know where alignment begins?	Bearing and distance from monument has been provided.	RRB
CLV CPM - ED	5	HZ-1	Any background on the Horizontal Control sheets (typical)?	Plans have been updated.	RRB
CLV CPM - ED	6	HZ-2	At Matchline 33+00, Sheet HZ-2 is referenced. It should reference Sheet HX-1.	Plans have been updated.	RRB
CLV CPM - ED	7	HZ-2	At Matchline 22+00, an extra parentheses is shown (just for consistency).	Plans have been updated.	RRB
CLV CPM - ED	8	C-TYP	Label what elevation is in profile (typical). Is the () CL roadway or storm drain?	Plans have been updated.	RRB
CLV CPM - ED	9	C-1	Any detail to call-out for Construction Note 11?	No, precast plugs are readily available.	RRB
CLV CPM - ED	10	C-1	Profile missing from 7-ft x 3-ft RCB lateral.	Plans have been updated.	RRB
CLV CPM - ED	11	C-1	Any match-line for 7-ft x 3-ft lateral?	Plans have been updated.	RRB
CLV CPM - ED	12	C-1	Is manhole required (SDMH #2) if Access Grate this close?	No, manhole has been removed.	RRB
CLV CPM - ED	13	C-1	Call-out missing for Access Manhole in plan-view.	Plans have been updated.	RRB
CLV CPM - ED	14	C-3	Removal and replacement of improvements over the 36" RCP lateral on Sky Pointe Drive are missing from the plans. (Pavement, C&G, Median Island, Traffic Loops?, etc...)	RR improvements have been added to Sheet RC-1.	RRB
CLV CPM - ED	15	C-3	Any profile for the lateral across Sky Pointe?	Profile has been added to Sheet C-11.	RRB
CLV CPM - ED	16	C-4	Missing call-out in profile?	Plans have been updated.	RRB
CLV CPM - ED	17	C-4	Is rip-rap going to be removed/replaced in area near STA 39+00?	Yes, the removal will be included as part of structure excavation and replacement will be shown on NDOT plans.	RRB
CLV CPM - ED	18	C-6	What is happening to the 48" Storm Drain South of the proposed RCBs? Abandoned in place, does NDOT remove?	A portion of the 48" RCP that is in the proposed RCB alignment will be removed. The remaining portion south of the proposed RCB will be abandoned with slurry cement Class A backfill and then NDOT will remove the RCP in future phases.	RRB
CLV CPM - ED	19	C-7	In the profile, "CPCW" 14+1373 - a Double CIP A5'x7' is called-out. Shouldn't this be a Double CIP 15'x7'?	Plans have been updated.	RRB
CLV CPM - ED	20	C-8 through C-12	Why not have construction notes for all being installed, some have notes and others have numbers?	Plans have been updated.	RRB
CLV CPM - ED	21	C-9	Provide better location map/STA/etc., how does Contractor know where this work is?	Northings and eastings have been provided along with Key Map and street names.	RRB
CLV CPM - ED	22	C-9	Call-out states to install "bumped head", list per what?	A reference to Detail 3/CD3 has been added.	RRB
CLV CPM - ED	23	C-9	Verify detail call-out (DET 1/CD-3).	Call-out has been verified. Detail 1/CD-3 was provided by LVVWD.	RRB
CLV CPM - ED	24	C-10	Profile missing for 7-ft x 3-ft RCB.	Plans have been updated.	RRB
CLV CPM - ED	25	C-11	Verify slopes match for lateral listed.	Plans have been updated.	RRB
CLV CPM - ED	26	C-12	Revise Note to correctly identify RCB installation.	Plans have been updated.	RRB
CLV CPM - ED	27	RC-1 & RC-2	Provide Station and Offset for both pavement removal/replacement and milling/overlay.	Plans have been updated.	RRB
CLV CPM - ED	28	RC-1 & RC-2	Sawcut note missing from plan view.	Plans have been updated.	RRB
CLV CPM - ED	29	RC-1 & RC-2	Do traffic loops need to be removed and replaced?	Traffic loops do not exist.	RRB

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CLV CPM - ED	30	RC-2	Does the rip-rap get removed/salvaged/replaced?	Yes, the removal will be included as part of structure excavation and replacement will be shown on NDOT plans.	RRB
CLV CPM - ED	31	ST-TYP	TRAFFIC NOTES: Note #1, Change 'Drawing No. 2' to 'Sheet G-2'.	Plans have been updated.	RRB
CLV CPM - ED	32	ST-1	Sky Pointe Drive will need to be restriped in area that will be affected by new 36" lateral.	Plans have been updated.	RRB
CLV CPM - ED	33	CD-1	Will there be a special section required for NDOT on the geotextile?	NDOT specifications will cover geotextile and non-woven geotextile called out on plans.	RRB
CLV CPM - ED	34	CD-1	Is the pavement section the same for the lateral in Sky Pointe?	No, the lateral pavement section will be the same as that called out for the Buffalo Ramps pavement.	RRB
CLV CPM - ED	35	S-9	Are the interior wall opening called out anywhere on the plans except here, they could be overlooked during constructions?	Yes, on the profile sheets and there is also a reference to Detail 2/S-9.	RRB
CLV CPM - ED	36	Note 6	Note 6 has been updated: THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL UTILIZE TYPE XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.	Plans have been updated.	RRB
CLV CPM - ED	37	Note 12	Note 12 has been updated: THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING RTC TRANSIT IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.	Plans have been updated.	RRB

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CLV CPM - ED	38	Note 20	Note 20 has been updated: SANITARY SEWER AND STORM DRAIN FINAL LOCATION INFORMATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO PROJECT ACCEPTANCE. THE INFORMATION SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION INFORMATION MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION INFORMATION.	Plans have been updated.	RRB
CLV TRAFFIC	1	G-3, C-3, C-11, RC-1	The existing traffic signal at Buffalo Drive and Sky Pointe Drive is operated and maintained by the City of Las Vegas. Please have this noted on the applicable plan sheets. Also add the CLV standard note to the plans that states "...the traffic signal must remain operational at all times..."	These notes have been added to Sheets C-3, C-11 and RC-1.	RRB
CLV TRAFFIC	2	G-3, C-3, C-11, RC-1	The plans must show existing traffic signal and ITS underground infrastructure at the Buffalo/Sky Pointe intersection on the appropriate plan sheets, including [as noted left]. There may also be existing traffic conduit at the Sky Pointe/Centennial intersection.	Plans have been updated.	RRB
CLV TRAFFIC	3	G-3, C-3, C-11, RC-1	Night work will be required for work that impacts traffic on Buffalo Drive and Sky Pointe Drive/Centennial Pkwy. Weekend marathon work should be considered for RCB installation across US95 ramps.	NDOT specifications will cover construction duration requirements at these locations.	RRB
CLV TRAFFIC	4	All	Refer to the attached redline plan set for additional information.	Noted.	RRB
CLV TRAFFIC	5	ST-1	Verify loop or video detector.	Field visit verified video detector is existing.	RRB
CLV PW CM	1	G-3	Add riprap?	Riprap has been added to Sheet C-10.	RRB
CLV PW CM	2	C-1	Do you need a MH (SDMH #2) so close to Maint Access?	No, manhole has been removed.	RRB
CLV PW CM	3	C-1	Show [concrete collar] in detail.	A manhole has been added in lieu of a concrete collar.	RRB
CLV PW CM	4	C-3	Riprap?	Riprap has been added to Sheet C-11.	RRB
CLV PW CM	5	C-4	Add steel bullnose [near 36+00], see S-4.	Details 2 and 3/S-7 have been added.	RRB

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CLV PW CM	6	C-4	Add manholes in both RCB barrels?	Manholes have only been provided on north side of double RCB barrels with interior wall opening since NDOT proposed ramp embankment slope will cover the south cell.	RRB
CLV PW CM	7	C-4	Connect to existing storm drain [at headwall].	RCB has been extended to go beyond NDOT proposed embankment slope.	RRB
CLV PW CM	8	C-5	Add MHs [near 28+00 and 32+00]?	Manholes have only been provided on north side of double RCB barrels with interior wall opening since NDOT proposed ramp embankment slope will cover the south cell.	RRB
CLV PW CM	9	C-6	Add concrete collar [48" RCP].	Plans have been updated. See Detail 3/CD-2.	RRB
CLV PW CM	10	C-6	Talk to SNWA or LVVWD about relocating anode sta [near 26+00].	LVVWD does not require relocation.	RRB
CLV PW CM	11	C-6	Add MH [near 22+00].	Manholes have only been provided on north side of double RCB barrels with interior wall opening since NDOT proposed ramp embankment slope will cover the south cell.	RRB
CLV PW CM	12	C-6	Add Note (several locations): CONTRACTOR MUST COORDINATE STANDBY FOR EASEMENT.	Plans have been updated.	RRB
CLV PW CM	13	C-7	Add MHs [near 18+00 and 15+00]?	Manholes have only been provided on north side of double RCB barrels with interior wall opening since NDOT proposed ramp embankment slope will cover the south cell.	RRB
CLV PW CM	14	C-7	Need MHs [SDMH #15] this close to end of box?	Yes, to meet 400' spacing requirement.	RRB
CLV PW CM	15	C-8	Are thrust blocks required at bumped heads?	LVVWD does not require thrust blocks.	RRB
CLV PW CM	16	C-8	Add this note at locations gas line crosses proposed storm drain: NOTE: CALL KERN RIVER GAS AT 702-592-4864 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES.	Plans have been updated.	RRB
CLV PW CM	17	C-10	See comment 16 above.	Plans have been updated.	RRB
CLV PW CM	18	C-11	Riprap?	Riprap has been added.	RRB
CLV PW CM	19	C-12	Connect to existing storm drain? Big skew.	RCB has been extended to go beyond NDOT proposed embankment slope. 30 degree skew required since lateral is greater than 60-inches.	RRB
CLV PW CM	20	RC-1	Straight cuts?	Plans have been updated.	RRB
CLV PW CM	21	RC-2	Will this foundation work after the box is in?	Yes, there is over 7 feet of clearance between finished grade and top of proposed box. The existing Type 7 pole has 5-foot foundation.	RRB
CLV PW CM	22	S-4	Add a steel bullnose? [Detail 3]	Plans have been updated.	RRB
RFCD (Todd Myers)	1	C-1	Provide plan & profile connections, etc. for 7' x 3' RCB	Plans have been updated.	RRB
RFCD (Todd Myers)	2	C-1	Consider moving access closer to 2: 15'x7' transition.	Access has not been revised based on discussions with CLV and RFCD.	RRB
RFCD (Todd Myers)	3	C-3	Pothole; plan & profile; any dry utilities? [at 36" RCP]	Potholes have been performed and are included on Sheet G-3.	RRB

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RFCD (Todd Myers)	4	C-4	Check hydraulics to see if we can move transition downstream of junction. Also check hydraulics if transition is moved to 1% to .55% grade break.	The transition was moved to Station "CPCW" 31+14.38.	RRB
RFCD (Todd Myers)	5	C-5	Is it possible to transition to 2:15'x7' downstream of 11'x4' RCB junction?	The transition was moved to Station "CPCW" 31+14.38.	RRB
RFCD (Todd Myers)	6	C-7	Provide instructions to contractor. Usually these cut-off walls aren't vertical; they dig a ditch and pour against dirt.	A note has been added to Sheet S-4.	RRB
RFCD (Todd Myers)	7	C-10	Provide plan & profile for 7'x3'.	Plans have been updated.	RRB
RFCD (Todd Myers)	8	RC-1	Extend removal (see drawing).	Plans have been updated.	RRB
RFCD (Todd Myers)	9	RC-2	Noted construction already on removal plan.	Notes have been left since they include remove and reset.	RRB
RFCD (Todd Myers)	10	CD-1	Detail 6: Hard to get compaction w/ 2:1 slopes.	2:1 slopes are proposed based on discussions with CLV.	RRB
RFCD (Todd Myers)	11	CD-2	Detail 2: Reduce to 8" (min) for CLSM. If typ backfill 24" min. Why not allow for granular or Type II BF with wider trench? Let contractor choose. Requiring CLSM? Allow for a 3" crushed rock leveling course.	Plans have been revised to conform to NDOT standard trench sections.	RRB
RFCD (Todd Myers)	12	CD-2	Detail 1: 8" (min) for CLSM, 24" otherwise.	Plans have been revised to conform to NDOT standard trench sections.	RRB
RFCD (Todd Myers)	13	S-1	Delete [note 13] ref. to geo report. Not part of contract.	Plans have been updated.	RRB
RFCD (Todd Myers)	14	S-4	It's likely existing cutoff wall was not formed--trenched and poured against earth. Provide instructions accordingly.	Plans have been updated.	RRB
RFCD (Todd Myers)	15	S-5	See comment on sheets C-4, C-5. Any way to tie 11'x4' into 22'x7' RCB and get rid of all the equalization chambers?	The transition was moved to Station "CPCW" 31+14.38 to allow the lateral to tie into the 22'x7' RCB.	RRB
RFCD (Todd Myers)	16	S-6	Continue Kern River coordination.	Noted.	RRB
Flood Control	1	G-3	Complete pothole data.	Potholes have been performed and are included on Sheet G-3.	RRB
Flood Control	2	HZ-1	What is control plan tied to? 11x4 RCB.	A tie has been provided.	RRB
Flood Control	3	C-1	MH needed [30" RCP].	Plans have been updated.	RRB
Flood Control	4	C-1	Label key contours.	Plans have been updated.	RRB
Flood Control	5	C-1	Note additional const. key note 4.	Plans have been updated.	RRB
Flood Control	6	C-1	See C-x for plan and profile of 7x3 RCB.	Plans have been updated.	RRB
Flood Control	7	C-1	Typical: Show maintenance access road, 12' wide of 6" type II base.	Plans have been updated.	RRB
Flood Control	8	C-1	Eliminate MH (SDMH #2) due to access grate location.	Plans have been updated.	RRB
Flood Control	9	C-2	Add note 4 to SDMH #3 and #4.	Plans have been updated.	RRB
Flood Control	10	C-2	Label contours and show maintenance access road.	Plans have been updated.	RRB
Flood Control	11	C-3	Show existing SD [north leg of intersection].	Plans have been updated.	RRB
Flood Control	12	C-3	Include these impacts. See C-xx for plan & profile.	Plans have been updated.	RRB
Flood Control	13	C-3	Show maintenance access road.	Plans have been updated.	RRB
Flood Control	14	C-3	R&R fencing, otherwise, P in P.	Plans have been updated.	RRB

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Flood Control	15	C-3	Show st. lt. conduit. Show grading, filling old channel.	Plans have been updated. See Sheet RC-1.	RRB
Flood Control	16	C-4	Grade ditch.	Plans have been updated.	RRB
Flood Control	17	C-5	Show st. lt. conduit. Will std. street light foundation work or do we need special design.	Yes, there is over 7 feet of clearance between finished grade and top of proposed box. The existing Type 7 pole has 5-foot foundation.	RRB
Flood Control	18	C-5	11'x5', 5' high minimum.	Plans have been updated.	RRB
Flood Control	19	C-6	Is this a removal needed for NDOT ramps?	Plans have been updated.	RRB
Flood Control	20	C-7	Label key contours.	Plans have been updated.	RRB
Flood Control	21	C-7	Show maintenance access road.	Plans have been updated.	RRB
Flood Control	22	C-8	Contours do not reflect existing channel.	Detailed grading of this area will be shown on NDOT plans.	RRB
Flood Control	23	C-10	Regrade existing channel. Show fill & regrading at surface laterals. 6:1 slopes. Show rel. grades TC ≈ 88 ±.	2:1 slopes are proposed based on discussions with CLV.	RRB
Flood Control	24	C-10	MH required. 10:1 for access to MH (6:1).	Plans have been updated. 8.82% slope has been provided from access road.	RRB
Flood Control	25	C-11	Fill area. Prefer 6:1 slopes.	Plans have been updated.	RRB
Flood Control	26	C-12	Fill area. [Q per MPU note crossed out]	Plans have been updated.	RRB
Flood Control	27	RC-1	New fence with RCB removal and regrading (fill needed), straighten out fencing.	Plans have been updated.	RRB
Flood Control	28	RC-2	Construction plan: Do we need special foundation and added SL conduit.	No, there is over 7 feet of clearance between finished grade and top of proposed box. The existing Type 7 pole has 5-foot foundation.	RRB
Flood Control	29	ST-1	With storm drain lateral extension, what are traffic marking & signal impacts.	Plans have been updated.	RRB
Flood Control	30	CD-1	See various question marks in Details 1 and 2. Detail 6: Min 6:1 slopes.	2:1 slopes are proposed based on discussions with CLV. Plans have been revised to conform to NDOT standard trench sections.	RRB
Flood Control	31	CD-2	Detail 2: 18" min if backfill, reduce to 8" if CLSM.	Plans have been revised to conform to NDOT standard trench sections.	RRB
Flood Control	32	S-1	Note 4: 5,000 psi due to higher velocities.	Plans have been updated.	RRB
Flood Control	33	S-5	45° angle? [11'x4' RCB]	30 degree skew required since lateral is greater than 60-inches.	RRB
Flood Control	34	S-6	[See notes on] Kern River Gas.	Plans have been updated.	RRB
Flood Control	35	S-8	Angle [7'x3' RCB].	Plans have been updated.	RRB
Flood Control	36	S-10	3. Need to provide lifting rings for grate panels. (Add detail)	Plans have been updated.	RRB

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Centennial Parkway Channel West - CC 215
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Flood Ctl	1	C-1	Bulb out access rd around access structure.	Plans have been updated.	RRB
Flood Ctl	2	C-3	Access w/ fence. 36" is 24".	Plans have been updated. See Sheet RC-1.	RRB
Flood Ctl	3	C-4	Verify RCB slope on plan vs profile.	Plans have been updated.	RRB
Flood Ctl	4	C-5	Verify that street light foundation fits on top of RCB, 5' minimum depth.	There is over 7 feet of clearance between finished grade and top of proposed box.	RRB
Flood Ctl	5	C-7	Looks like text overlaps (profile).	Plans have been updated.	RRB
Flood Ctl	6	C-10	[Indicate] rip-rap class (typ)	Plans have been updated.	RRB
Flood Ctl	7	C-11	Extend rip-rap to top of channel. Headwall; class; rip-rap class per NDOT?	Plans have been updated.	RRB
Flood Ctl	8	C-12	[Indicate] class (profile).	Plans have been updated.	RRB
Flood Ctl	9	C-13	Cap existing RCB opening. Show regrading (see 1/5-6). Class of rip-rap.	See Detail 3/S-8 for RCB plug.	RRB
Flood Ctl	10	CD-1	Trench per NDOT (Detail 3). Laid pack stepped trench (Detail 2). (see angled marks)	Plans have been revised to conform to NDOT standard trench sections.	RRB
Flood Ctl	11	CD-2	Add full cross-section; depth & side slopes of rip-rap protection @ culvert entries.	Plans have been updated.	RRB
Flood Ctl	12	S-6	How do we overcome single source under Fed. guidelines; NDOT to review with FHWA (Notes 6 and 8).	NDOT is addressing.	RRB

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Centennial Parkway Channel West - CC 215
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CLV Public Works	1	All Sheets	Provide "BID#" and "DESIGNED BY"	NDOT "BID#" not available yet. "DESIGNED BY" information has been provided.	RRB
CLV Public Works	2	G-2	Add abbreviation "NRCB" from sheet C-13	Plans have been updated.	RRB
CLV Public Works	3	C-1	Add RCP Plug detail; identify hatch legend for access road.	Plugs will be provided by precast manufacturer. Plans have been updated.	RRB
CLV Public Works	4	C-2 to C-5, C-10 to C-13	[Identify] hatch legend (typ).	Plans have been updated.	RRB
CLV Public Works	5	C-5	Move note leader to MH symbol.	Plans have been updated.	RRB
CLV Public Works	6	C-5	22'x7' or 15'x7' per Const Key Note 3?	Plans have been updated.	RRB
CLV Public Works	7	C-6	Plug end?	No, pipe will be filled with slurry cement Class A backfill.	RRB
CLV Public Works	8	C-6	Clarify how this (abandon pipe) will happen.	No, pipe will be filled with slurry cement Class A backfill.	RRB
CLV Public Works	9	C-7	Text overlaps.	Plans have been updated.	RRB
CLV Public Works	10	C-8	[Install bumped head] per UDACS? 2nd request.	Detail 3/CD-3 provided per LVVWD.	RRB
CLV Public Works	11	C-9	[Install bumped head] per UDACS? 2nd request. Ref work per UDACS.	Detail 3/CD-3 provided per LVVWD.	RRB
CLV Public Works	12	C-10	SDMH #2: MH construction note call-out? Access road? Turn around?	Plans have been updated. Turnaround not provided due to short distance from access road.	RRB
CLV Public Works	13	C-11	MH Const note? Concrete cap? Tie into existing DI? Should be dashed or different line weight.	Plans have been updated.	RRB
CLV Public Works	14	C-12	Riprap detail.	Riprap details have been added to Sheet CD-2.	RRB
CLV Public Works	15	C-13	Alignment not called out on G-2. Profile needs elevations and stations.	Plans have been updated.	RRB
CLV Public Works	16	RC-1	Is median landscaped? Any work to replace?	Yes, NDOT to include in specifications.	RRB
CLV Public Works	17	RC-1 and RC-2	Provide access road hatching in legend.	Plans have been updated.	RRB

Project: **CLV Centennial Pkwy Channel West - CC 215 Pioneer Way to US 95**
Client: **City of Las Vegas**
Engineer: **GC Wallace**
Submittal Set: **90% Construction Documents**
Submittal Date: **09/2014**

OCMI Project #: **14172**
Review Type: **Constructibility**
Review Date: **19 Nov 2014**
A/E Reconciliation Date:
Backcheck Review Date:

Item	Drawing # Spec #	Grid / Rm # / Detail #	Finding Description / Suggested Corrective Action	Response	Action Verification
			DRAWINGS		
1	General		Provide design data indicating location and details of existing dry utilities such as Southwest Gas Company, power, tele/data, cable television, etc. at street crossings, etc.	Pothole data has been provided on Sheet G-4.	RRB
2	General		Confirm the intent is for the contractor to backfill over RCB below existing grade to match original existing grades. Is this necessary and/or preferred?	The intent is to backfill over the RCB to existing grade. Detailed grading is shown on the plans.	RRB
3	General		Should a limits of construction phasing plan be provided so the contractor understands available area for staging, spoils, stockpiling, and access roads?	NDOT will be performing the construction management for the project and will address these items in the specifications and during construction.	RRB
4	General		If an alternate for precast reinforced concrete box is made available to the contractor, how will it affect the current drawings and details?	Precast RCBs are required at the Buffalo and Sky Pointe crossings. The plans provide details for cast-in-place outside of these areas but the contractor will be given the option to use precast RCBs in the specifications.	RRB
5	General		Is a dust palliative required over disturbed soils?	Rock or aggregate base will placed over all disturbed soils and shown on NDOT plans.	RRB
6	G-3		Consider labeling contour lines with elevations.	Plans have been updated.	RRB
7	G-3		Potholes #10, #11, #12 still require Ground Elevation, Depth and Utility Top of Elevation data.	Plans have been updated.	RRB
8	G-3		Only water and gas utilities appear to have potholing data. What is the strategy for storm drain, sewer, tele/data, cable television and electrical power?	Storm drains have been surveyed. No sewer, tele/data, cable TV and electrical relocations have been identified through coordination with utilities and field investigations.	RRB
9	C-1		At the connection to the existing 22' x 7' RCB structure ("CPCW" 65+51.59) is there an existing plug or block out wall to be removed? Indicate type of end condition of existing RCB.	Note 1 has been added to remove end cap.	RRB
10	C-1		For the 7' x 3' RCB of 562 LF at station "CPCW" 64+80.92, provide a profile and condition at the receiving end of the structure.	Plans have been updated.	RRB
11	C-3		Provide a profile for the 36" RCP line at "CPCW" 45+04.27.	Plans have been updated.	RRB
12	C-3		Provide connection details and drain inlet structure for the 36" RCP line at the curb and sidewalk at Buffalo Dr. and Sky Pointe Dr.	See Detail 3/S-11 for connection detail.	RRB
13	C-3		Use Removal Key Notes to indicate which street improvements need to be removed and replaced for the 36" RCP line.	Plans have been updated. See Sheet RC-1.	RRB
14	C-4		Construction Key Note #12 appears to erroneously reference Detail 2, Drawing S-4 which is a connection to an existing RCB rather than a transition.	Plans have been updated.	RRB
15	C-5		There is a conflict in double 15' x 7' length between the plan and profile views. The plan view states it as 668.31 LF and profile has it listed as 650.95 LF. The latter appears the correct one.	Plans have been updated.	RRB
16	C-5		In the profile view, a vertical line is missing at "CPCW" 32+33.38 at the beginning of the junction structure.	Plans have been updated.	RRB

Project: **CLV Centennial Pkwy Channel West - CC 215 Pioneer Way to US 95**
Client: **City of Las Vegas**
Engineer: **GC Wallace**
Submittal Set: **90% Construction Documents**
Submittal Date: **09/2014**

OCMI Project #: **14172**
Review Type: **Constructibility**
Review Date: **19 Nov 2014**
A/E Reconciliation Date:
Backcheck Review Date:

Item	Drawing # Spec #	Grid / Rm # / Detail #	Finding Description / Suggested Corrective Action	Response	Action Verification
			DRAWINGS		
17	C-5		A grade break is shown at "CPCW" 31+41.75 which is within the boundaries of the precast double 15' x 7' RCB unit. Would it be easier to construct the precast unit without the grade break, and move the grade break outside the precast unit boundary?	Grade break remains unchanged.	RRB
18	C-5	Profile View	At SDMH #11 and eastward, the special manhole shows a double line extending down into the RCB. What is the intent here? These double lines were omitted westward as it seems unnecessary?	Manholes have only been provided on north side of double RCB barrels with interior wall opening since NDOT proposed ramp embankment slope will cover the south cell.	RRB
19	C-6		There is a conflict in double 15' x 7' length between the plan and profile views. The plan view states it as 668.31 LF and profile has it listed as 650.95 LF. The latter appears the correct one.	Plans have been updated.	RRB
20	C-6		A note and details appear missing for the connection of the 48" RCP to existing at "CPCW" 25+96.77.	Plans have been updated. See Detail 3/CD-2.	RRB
21	C-6		Is the remaining existing 48" RCP pipe to be abandoned in place, removed, plugged, slurry filled, etc.?	The remaining 48" RCP will be abandoned and backfilled with Class A slurry cement.	RRB
22	C-6	Profile View	At station 23+00 the callout references "Existing Grade at Centerline of Roadway" while others reference centerline of the RCB.	Plans have been updated.	RRB
23	C-6		Should a length of pipe be provided for the 30" RCP at "CPCW" 20+00?	A storm drain lateral table has been added and includes length.	RRB
24	C-7	Profile View	Missing the note "Proposed Grade at Centerline of RCB".	Plans have been updated.	RRB
25	C-7		The lengths of demolition of the two headwalls is a little off from those shown in Detail 1, drawing S-4.	Plans have been updated.	RRB
26	C-9		In the "Azure Drive - 36" MCLP w Cap" detail, at the "Cut 36" MLCP water and install bumped head with manual air-release" note the detail reference needs to be changed from 1/CD-3 to 3/CD-3.	Plans have been updated.	RRB
27	C-9		In the same detail there is reference to a blow-off. Provide detail for the blow-off condition.	Plans have been updated.	RRB
28	C-11	Profile View	At station 48+16.38, add the word "headwall" into the description.	Plans have been updated.	RRB
29	RC-1	Removal Plan	Provide a note that indicates the symbol for sawcutting is "sawcut".	Plans have been updated.	RRB
30	RC-1	Removal Plan	Contractor may need to remove and replace more than 43 LF of existing fence in order to allow access for the 22' x 7' and 7' x 3' RCBs installation.	Plans have been updated.	RRB
31	RC-1	Removal Plan	Contractor may need to remove and replace more than 24 and 33 LF of existing curb and gutter in order to allow access for the 22' x 7' RCB installation.	Plans have been updated.	RRB
32	RC-1	Removal Plan	It will be difficult to protect in place the curb and gutter above the 117 LF of RCB that is called out for removal.	Plans have been updated.	RRB
33	RC-1	Removal Plan	Can the contractor abandon the 117 LF of RCB in place?	NDOT has requested that the RCB be removed.	RRB
34	RC-1	Construction Key Notes	Item 22 addresses installation of a pull box. Suggest including conduit and wire as necessary to make a completely operation system.	Included in NDOT specifications.	RRB
35	RC-1	Removal Key Notes	In Item 6 can an approximate size of the RCB to be removed be provided?	Note remains unchanged.	RRB

Project: **CLV Centennial Pkwy Channel West - CC 215 Pioneer Way to US 95**
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Item	Drawing # Spec #	Grid / Rm # / Detail #	Finding Description / Suggested Corrective Action	Response	Action Verification
			DRAWINGS		
36	RC-1	Removal Key Notes	Item 13 addresses removal of the pull box. Suggest including conduit and wire as necessary.	Included in NDOT specifications.	RRB
37	RC-2	Construction Plan	There are murals in the decorative rock over the new RCB corridor alignment. Is it the intention to have the contractor repair and restore the design? If so, more details regarding area and the design need to be provided.	Based on discussions with Clark County the decorative rock will be removed but not replaced.	RRB
37	RC-2	Removal Plan	Provide a note that indicates the symbol for sawcutting is "sawcut".	Plans have been updated.	RRB
38	RC-2	Removal Plan	There is a contradiction in notes at the gate about protecting in place and removing.	The notes are correct as the east half will be protected in place and the west half will be removed and reset.	RRB
39	CD-3	Detail 3	There is reference to a concrete collar detail, but no such detail appears to exist.	Plans have been updated.	RRB
40	S-6	Detail 3	Suggest stating the intent is protect in place and leave the existing 36" KRGT pipe in place and operational, and that the bedding and backfill are to be removed and replaced.	Plans and specifications have been updated.	RRB
41	S-6	Detail 3	Suggest adding cautionary language about the dangers of working in close proximity to an active gas line.	Plans have been updated.	RRB
42	S-6	Detail 3	Suggest adding language about supporting the existing KRGT pipe while excavation and backfill is in progress.	Plans and specifications have been updated.	RRB
43	S-6	Detail 3	Spell out KRGT and provide phone numbers and emergency contact data. Do any KRGT representatives need to witness the work at the pipeline - if so, indicate?	Plans have been updated.	RRB
44	S-10		Are there any required finishes on the embedded iron or W12x30 structural steel beams?	Yes, see Note 10 Sheet S-1.	RRB
45	Bid Item 206.00		Are the calculations available for review of the 107,855 CY of structural backfill?	Yes and quantities have been updated.	RRB
46	Bid Item 207.00		Are the calculations available for review of the 63,773 CY of granular backfill?	Yes and quantities have been updated.	RRB

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I. INTRODUCTION

The City of Las Vegas (CLV) has contracted with G. C. Wallace, Inc. (GCW) to provide engineering and design services for the Centennial Parkway Channel West – CC 215 Pioneer Way to US 95 storm drain project. The following tasks were performed in the preparation of this report:

- Collect and review pertinent improvement plans and hydraulic information from existing projects and previously approved drainage studies near and/or adjacent to the project site.
- Identify the FEMA floodplain designation for the project site.
- Identify offsite tributary areas and storm flows to the Clark Country Regional Flood Control District (CCRFCD) Facilities using the 2013 Las Vegas Valley Flood Control Master Plan Update (Reference 1, hereinafter referred to as the 2013 MPU).
- Reference the 2013 MPU for 100-year offsite flow tributary to the proposed RCB storm drain mainline.
- Provide storm drain stubs and laterals to accommodate proposed and future Nevada Department of Transportation (NDOT) interchange improvements.
- Prepare hydraulic analyses to determine recommended sizes for the proposed storm drain mainline facilities.
- Survey and pothole existing facilities and utilities and size storm drain stubs/laterals.
- Coordinate with the City of Las Vegas (CLV), NDOT, Clark County Public Works (CCPW), Kern River Gas, and Las Vegas Valley Water District (LVVWD) for concurrence and existing utilities research.
- Coordinate with concurrent and future projects in the area, specifically the Nevada Department of Transportation's (NDOT's) Phase 3A-E Projects.
- Prepare final improvement plans incorporating the recommended drainage facilities.

This report addresses the final design level for the proposed flood control improvements. The purpose of this report is to provide detailed hydraulic analyses in support of the proposed recommended flood control facilities.

II. LOCATION AND DESCRIPTION

The project improvements are located in Sections 21 and 22, Township 19 South, Range 60 East, M.D.M., in Las Vegas, Nevada, within the northeast quadrant of the US 95 and CC 215 Intersection. The limits of the Project begin at the west end of the Clark County Bruce Woodbury Beltway – Tenaya Way to Decatur Project and extends northwest approximately 5,150 linear feet to the existing 22-foot wide by 7-foot high reinforced concrete box (RCB) proposed with NDOT's Phase 2A Project. Referenced improvement plans for the NDOT Phase 2A Project are included in Appendix D. Please see Figure 1 and Figure 2 for the vicinity and location of the project site.

III. UTILITY RESEARCH

GCW performed utility research in the vicinity of the project limits and has obtained potholes for existing gas and waterlines that cross the proposed storm drain alignment. Utility layouts and relocations have been included with the final plans in Appendix E.

IV. GEOTECHNICAL INVESTIGATION

A geotechnical evaluation has been prepared by Ninyo & Moore for the project. A finalized scanned copy of the geotechnical data report dated July 17, 2015 has been included on CD in Appendix H.

V. ENVIRONMENTAL REQUIREMENTS

The Project will be constructed as part of NDOT's Phase 3A Project. Therefore, all environmental requirements for the Project, including all necessary local, state and federal permits, have been obtained by NDOT as part of their US 95/CC 215 interchange project.

VI. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD HAZARD ANALYSIS

Based on the Flood Insurance Rate Map (FIRM) Community Panel 32003C 1745 E, updated September 27, 2002, the project site is located within a Flood Zone "X". Areas designated as Zone "X" are described as being outside the 500-year floodplain

and not located in a FEMA-designated Special Flood Hazard Area (SFHA). Figure 3 shows the site denoted on a portion of the aforementioned FIRM panel.

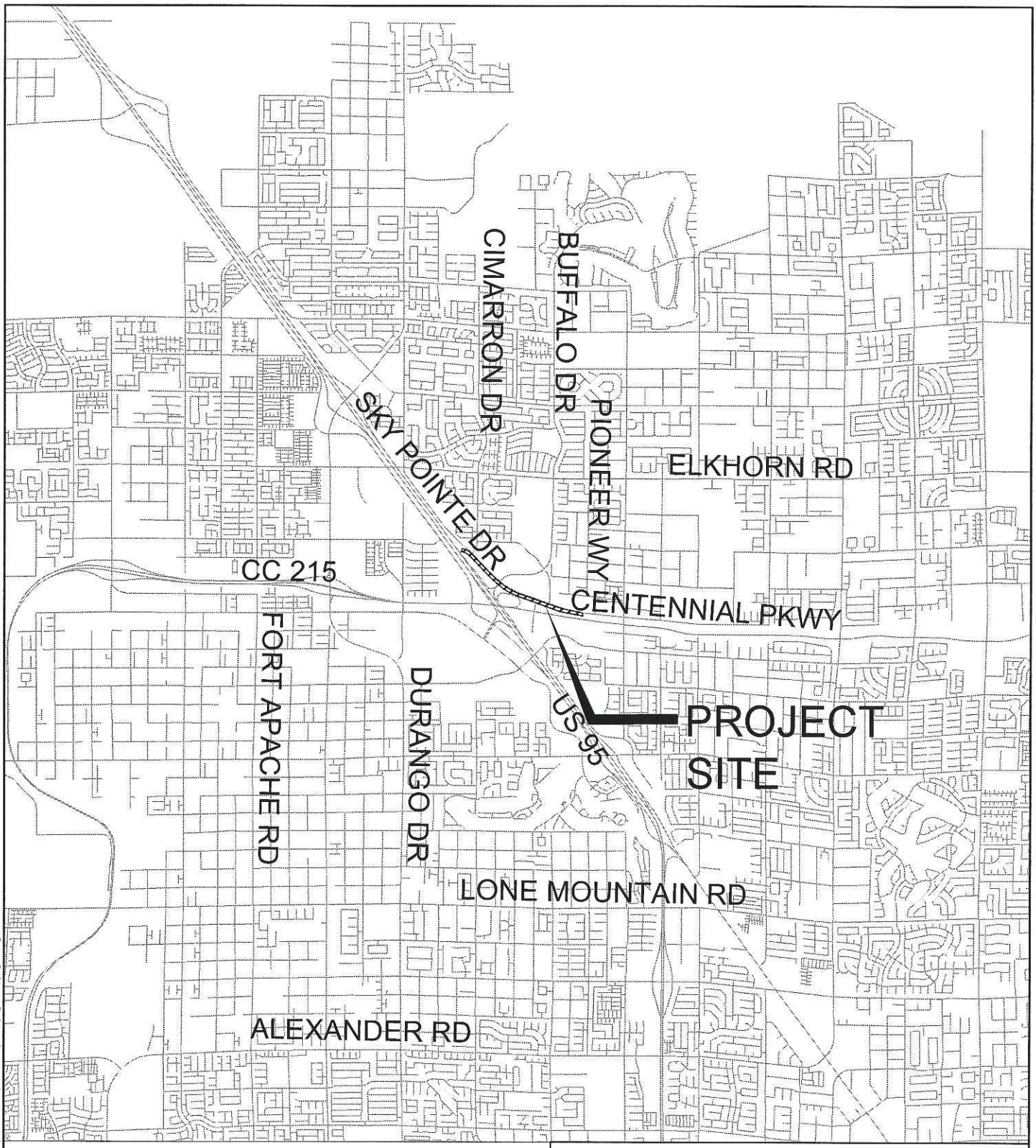
VII. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD) FACILITIES

Figure 4 is reproduced from Figure F-13 of the *2013 Las Vegas Valley Clark County Regional Flood Control Master Plan Update*. This figure depicts the project site in relation to existing and proposed CCRFCD facilities. The project proposes to construct CCRFCD Facilities CNWE 0301 and CNWE 0304. CCRFCD Facility CNWE 0301 is shown in the 2013 MPU as a proposed 32-foot wide by 10-foot deep rectangular concrete-lined channel. Additionally, CCRFCD Facility CNWE 0304 is shown in the 2013 MPU as a proposed 32-foot wide by 10-foot high RCB. According to the 2013 MPU, the 100-year flow in CCRFCD Facilities CNWE 0301 and CNWE 0304 is 3,593 cfs. This Project proposes to construct CCRFCD Facilities CNWE 0301 and CNWE 0304 as an approximately 5,150 linear foot-long 22-foot wide by 7-foot high RCB and double 15-foot wide by 7-foot high RCB. The proposed CCRFCD Facilities will connect to CCRFCD Facilities CNWE 0314 and CNWE 0287 to the north and south, respectively.

The facility upstream of the proposed improvements is CCRFCD Facility CNWE 0314, a 22-foot wide by 7-foot high RCB. CCRFCD Facility CNWE 0314 will be constructed with the NDOT's Phase 2A Project and is assumed to be built prior to construction of the proposed Centennial Parkway Channel West storm drain improvements. Additionally, please note that improvement plans for the NDOT Phase 2A Project shows CCRFCD Facility CNWE 0314 located approximately 1,500 feet north of its location as shown on the 2013 MPU.

The facility at the downstream end of the proposed improvements is CCRFCD Facility CNWE 0287 and is located south of Centennial Parkway approximately 1,250 feet east of John Herbert Boulevard. CCRFCD Facility CNWE 0287 is shown in the 2013 MPU as a 13-foot wide by 10-foot deep concrete-lined trapezoidal channel with 2 to 1 side slopes. However, CCRFCD Facility CNWE 0287 was constructed as a 32-foot wide by 8 to 12 foot deep concrete lined rectangular channel as part of the Clark County's Bruce Woodbury Beltway – Tenaya Way to Decatur Boulevard Project.

Referenced plans for the existing upstream and downstream facilities have been included in Appendix D.



CENTENNIAL PARKWAY CHANNEL WEST – CC 215

PIONEER WAY TO US 95

GRAPHIC SCALE

5000 0 2500 5000

(IN FEET)

1 inch = 5000 ft.

NORTH

FIGURE 1

VICINITY MAP

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
6655 S. CIMARRON ROAD · LAS VEGAS, NV 89113
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

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GRAPHIC SCALE

1000 0 500 1000

(IN FEET)

1 inch = 1000 ft.

NORTH

CENTENNIAL PARKWAY CHANNEL WEST – CC215

PIONEER WAY TO US95

FIGURE 2

LOCATION MAP

G. C. WALLACE COMPANIES
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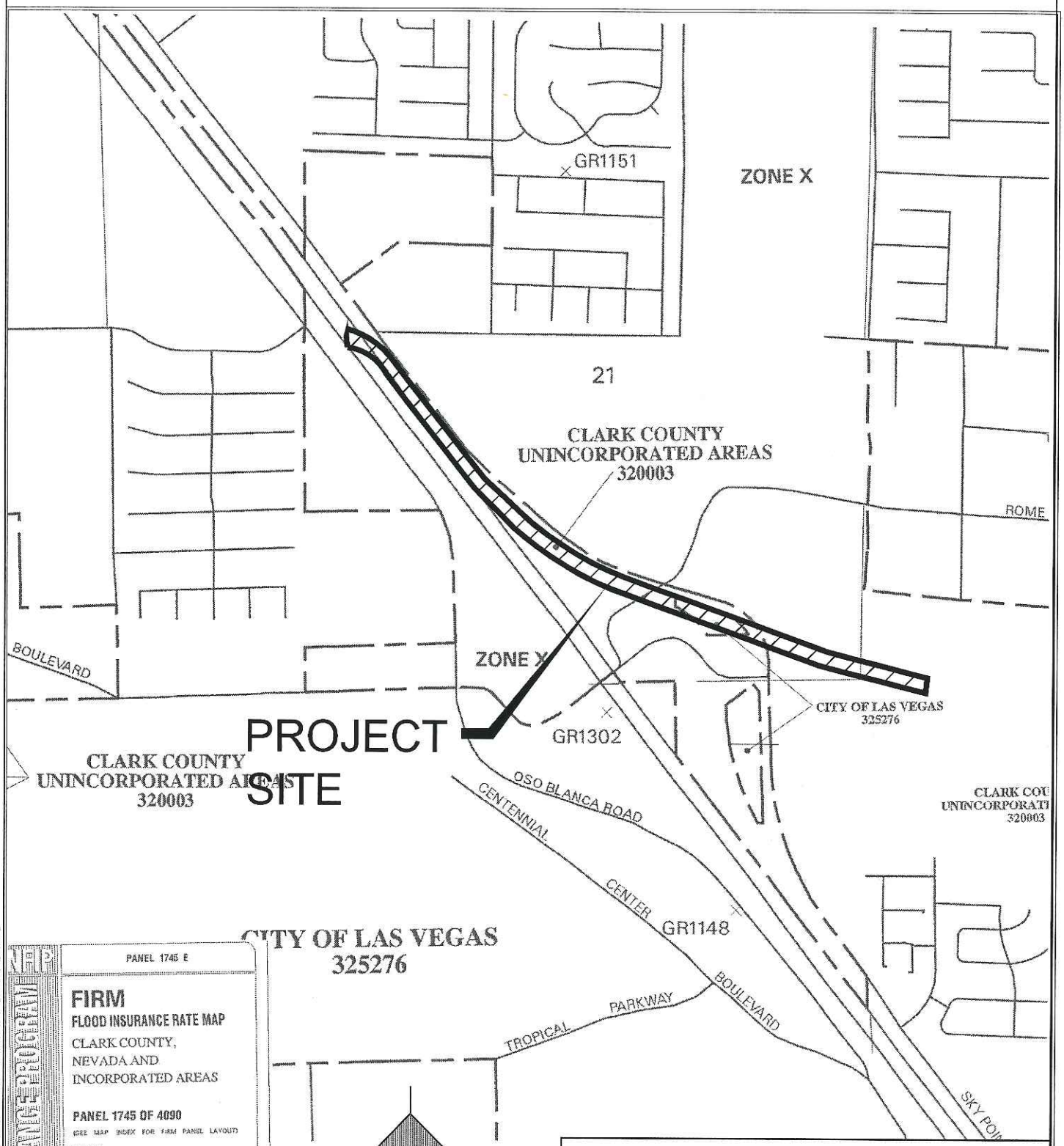

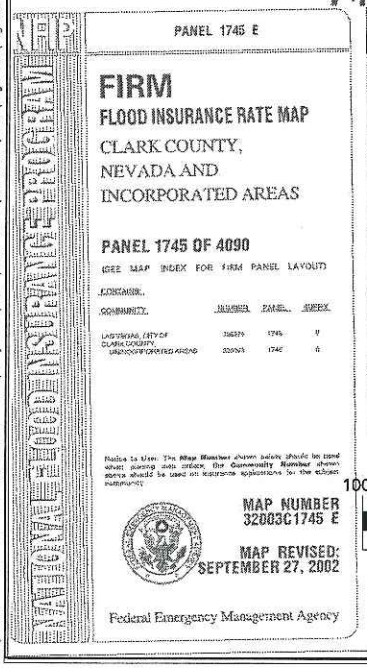

NORTH

GRAPHIC SCALE

1000 0 500 1000

(IN FEET)

1 inch = 1000 ft.

CENTENNIAL CHANNEL PARKWAY WEST – CC 215

PIONEER WAY TO US 95

FIGURE 3

F.I.R.M.

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
6655 S. CIMARRON ROAD · LAS VEGAS, NV 89113
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

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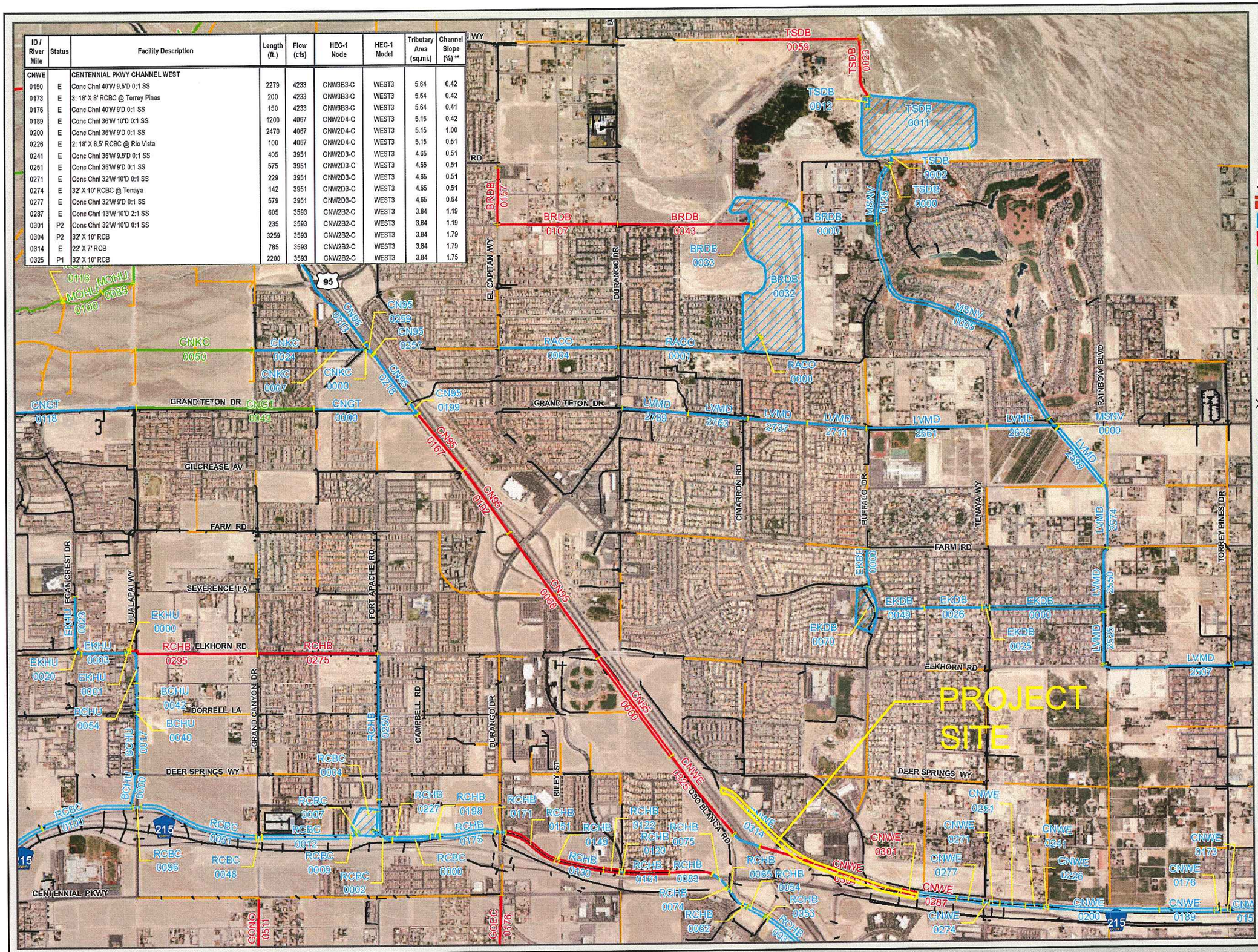
ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
CNWE		CENTENNIAL PKWY CHANNEL WEST						
0150	E	Conc Chnl 40'W 9.5'D 0:1 SS	2279	4233	CNW3B3-C	WEST3	5.64	0.42
0173	E	3: 18' X 8' RCBC @ Torrey Pines	200	4233	CNW3B3-C	WEST3	5.64	0.42
0176	E	Conc Chnl 40'W 9'D 0:1 SS	150	4233	CNW3B3-C	WEST3	5.64	0.41
0189	E	Conc Chnl 36'W 10'D 0:1 SS	1200	4067	CNW2D4-C	WEST3	5.15	0.42
0200	E	Conc Chnl 36'W 9'D 0:1 SS	2470	4067	CNW2D4-C	WEST3	5.15	1.00
0226	E	2: 18' X 8.5' RCBC @ Rio Vista	100	4067	CNW2D4-C	WEST3	5.15	0.51
0241	E	Conc Chnl 36'W 9.5'D 0:1 SS	405	3951	CNW2D3-C	WEST3	4.65	0.51
0251	E	Conc Chnl 36'W 9'D 0:1 SS	575	3951	CNW2D3-C	WEST3	4.65	0.51
0271	E	Conc Chnl 32'W 10'D 0:1 SS	229	3951	CNW2D3-C	WEST3	4.65	0.51
0274	E	32' X 10' RCBC @ Tenaya	142	3951	CNW2D3-C	WEST3	4.65	0.51
0277	E	Conc Chnl 32'W 9'D 0:1 SS	579	3951	CNW2D3-C	WEST3	4.65	0.64
0287	E	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	3259	3593	CNW2B2-C	WEST3	3.84	1.79
0314	E	22' X 7' RCB	785	3593	CNW2B2-C	WEST3	3.84	1.79
0325	P1	32' X 10' RCB	2200	3593	CNW2B2-C	WEST3	3.84	1.75



REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 13

FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

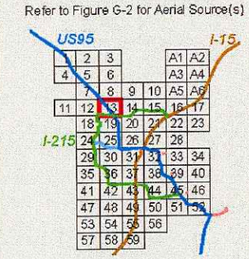
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

FIGURE 4

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet

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



VIII. HYDROLOGY

The 2013 MPU design flow of 3,593 cfs was used to size the proposed facilities. The HEC-1 (Reference 3) model output from the 2013 MPU, hydrology maps, hydrologic parameters, as well as other pertinent reference material, are included in Appendix A.

IX. HYDRAULIC SUMMARY AND RECOMMENDED STORM DRAIN FACILITIES

All proposed flood control facilities are shown on Figures 5 and 6. Hydraulic calculations for the recommended facilities are included in Appendix B. The proposed storm drain mainline, laterals, and stubs have been designed based on the maximum fill that will exist with future NDOT facilities and embankments. The maximum fill heights have been coordinated with NDOT.

The proposed Centennial Parkway Channel West storm drain mainline will connect to and extend the existing 32-foot wide by 8 to 12-foot deep rectangular concrete channel constructed as part of Clark County's Bruce Woodbury Beltway – Tenaya Way to Decatur Project (CCRFCD Facility CNWE 0301), north to connect to the 22-foot wide by 7-foot high proposed with NDOT's Phase 2A Project (CCRFCD Facility CNWE 0314). The proposed Centennial Parkway Channel West storm drain mainline will include approximately 3,430 feet of 22-foot wide by 7-foot high RCB; 1,700 feet of a double celled 15-foot wide by 7-foot high RCB; and two 10-foot long transitions.

Hydraulic modeling for the proposed Centennial Parkway Channel West storm drain mainline was performed with the CIVILDESIGN Corp. WSPGW Water Surface Pressure Gradient Package (Reference 4, hereinafter referred to as WSPGW). A copy of the proposed mainline WSPGW model has been included in Appendix B. An electronic copy of the model is included on a CD in Appendix F. The mainline model begins approximately 840 feet downstream of the connection to the existing 32-foot wide by 10-foot wide rectangular channel. The Centennial Parkway Channel West storm drain mainline model is labeled "CentennialSD.WSW". The results of the WSPGW model are summarized in Table 1.

TABLE 1
WSPGW MODEL MAINLINE SUMMARY

CentennialSD.wsw

Station	Invert (ft)	Flow Depth (ft)	HGL (ft)	Q Total (cfs)	Velocity (fps)	Froude	Facility Description
564.45	2349.160	4.089	2353.249	3593	27.4	2.39	32'X7' REC. CHANNEL
604.77	2349.802	4.089	2353.890	3593	27.4	2.39	32'X7' REC. CHANNEL
1403.73	2362.520	4.214	2366.734	3593	26.6	-	32'X7' REC. CHANNEL
1403.73	2362.520	4.764	2367.284	3593	26.0	2.21	TRANSITION STRUCTURE
1413.73	2362.699	4.549	2367.248	3593	26.3	2.28	DOUBLE 15'x7' RCB
1503.96	2364.310	4.555	2368.865	3593	26.2	2.28	DOUBLE 15'x7' RCB
2027.15	2373.674	4.774	2378.448	3593	25.0	2.12	DOUBLE 15'x7' RCB
2215.79	2377.050	5.007	2382.057	3593	23.9	1.98	DOUBLE 15'x7' RCB
2315.66	2378.837	5.230	2384.068	3593	22.9	1.85	DOUBLE 15'x7' RCB
2387.85	2380.129	5.486	2385.614	3593	21.8	1.72	DOUBLE 15'x7' RCB
2437.87	2381.024	5.753	2386.777	3593	20.8	1.60	DOUBLE 15'x7' RCB
2473.43	2381.660	6.034	2387.694	3593	19.8	1.49	DOUBLE 15'x7' RCB
2490.26	2381.753	5.993	2387.745	3593	19.9	1.51	DOUBLE 15'x7' RCB
2595.36	2382.331	5.714	2388.045	3593	20.9	1.62	DOUBLE 15'x7' RCB
2688.36	2382.843	5.448	2388.291	3593	21.9	1.74	DOUBLE 15'x7' RCB
2772.78	2383.308	5.194	2388.502	3593	23.0	1.87	DOUBLE 15'x7' RCB
2850.55	2383.736	4.953	2388.689	3593	24.1	2.01	DOUBLE 15'x7' RCB
2922.90	2384.135	4.722	2388.857	3593	25.3	2.16	DOUBLE 15'x7' RCB
2990.62	2384.508	4.502	2389.010	3593	26.6	2.32	DOUBLE 15'x7' RCB
3054.31	2384.858	4.293	2389.151	3593	27.9	2.49	DOUBLE 15'x7' RCB
3114.38	2385.189	4.093	2389.282	3593	29.2	-	DOUBLE 15'x7' RCB
3114.38	2385.189	3.659	2388.848	3593	29.7	2.74	TRANSITION STRUCTURE
3124.38	2385.244	5.854	2391.098	3593	27.9	2.03	22'X7' RCB
3141.75	2385.340	5.811	2391.151	3593	28.1	2.05	22'X7' RCB

TABLE 1 WSPGW MODEL MAINLINE SUMMARY CentennialSD.wsw							
3313.91	2387.060	5.594	2392.654	3593	29.2	2.18	22'X7' RCB
3483.80	2388.757	5.334	2394.091	3593	30.6	2.34	22'X7' RCB
3623.17	2390.150	5.085	2395.235	3593	32.1	2.51	22'X7' RCB
3673.73	2391.160	5.086	2396.246	3593	32.1	2.51	22'X7' RCB
4123.99	2400.139	5.086	2405.225	3593	32.1	2.51	22'X7' RCB
5031.17	2418.230	5.087	2423.316	3593	32.1	2.51	22'X7' RCB
5085.27	2419.308	5.087	2424.395	3593	32.1	2.51	22'X7' RCB
6016.49	2437.870	5.168	2443.039	3593	31.6	2.45	22'X7' RCB
6432.17	2446.170	5.316	2451.486	3593	30.7	2.35	22'X7' RCB
6551.59	2448.550	5.389	2453.939	3593	30.3	2.30	22'X7' RCB
6824.00	2453.835	5.635	2459.470	3593	28.9	2.15	22'X7' RCB
6988.65	2457.029	5.910	2462.939	3593	27.6	2.00	22'X7' RCB
7053.22	2458.282	6.067	2464.348	3593	26.9	1.93	22'X7' RCB
7142.16	2460.007	6.363	2466.370	3593	25.6	1.79	22'X7' RCB
7206.70	2461.259	6.673	2467.933	3593	24.4	1.37	22'X7' RCB
7254.68	2462.190	7.000	2469.190	3593	23.3	-	22'X7' RCB

The Centennial Parkway Channel West mainline design provides an open channel flow condition to prevent pressurizing the system due to the limited interim cover that will exist prior to construction of the NDOT Phase 3A Project and future phases. The alignment for the mainline has been coordinated with the NDOT Phase 3A-E Projects and is located west of Sky Pointe Drive and south of Centennial Parkway within the project limits. Grade breaks have been provided in the storm drain profile at Stations "CPCW" 36+23.17, 31+41.75, and 24+73.43 that changes the mainline slope from 1.99 percent to 1.00 percent to 0.55 percent in order to provide clearance for the existing 36-inch Kern River Gas line that crosses the alignment between Stations "CPCW" 25+13.86 and Station "CPCW" 23+20.91.

Per CLV's request, it is proposed to extend an existing 24-inch RCP from an existing drop