HYDROLOGY B18/~~D3~~ D2 1 of 4 7 PLANS

B18/D3

7 PLANS

FJA
B.G.
P.M
B.M

B13/03

MEMORANDUM

RECEIVED
APR 25 1985
DH0048
HYDROLOGY SECTION

TO: LA CUEVA FILE

FROM: MIKE EMERY

DATE: APRIL 22, 1985

RE: MEETING BETWEEN RICH LEONARD OF AMAFCA, JERRY BOHANNAN AND MYSELF ON FRIDAY, APRIL 19, 1985

The decision was made to bid the La Cueva project in two phases: the first phase will consist of all of the project to the east of the junction of the South and North La Cueva Arroyo conveyances. Phase 2 is that piece of the North La Cueva Channel from the above junction west to its tie to the North Diversion Channel. This is being done to insure that no delays are experienced in constructing Phase 1 due to the problems in obtaining the final hydraulic design approval from the Corps of Engineers for the tie of the North La Cueva Channel to the North Diversion Channel. However, AMAFCA and BHI will continue with fortified efforts to obtain that approval and bid the lower portion of the project by December 1985.

In order for the lower portion of the North La Cueva Channel to be bid, the question of how the South Camino flows can be diverted to the Camino Inlet to the North Diversion Channel must be resolved. This will require a cooperative effort between AMAFCA, the City Transportion Dept, the Sisters of St. Dominic and Al Vaio of Springer Building Materials Corp.

cc: Mr. Jerry Bohannan
Mr. Howard Stone
Mr. Mel Dahlberg
Mr. Tom Holtman
Mr. Rich Leonard
Mr. Larry Blair
Mr. Carl Rodolph
Mr. Walt Nickerson
Mr. Mike Mendoza
Mr. Mike Keleher
Mr. Stan Cheff
Mr. David Smith
Mr. John Salazar
Mr. Art Kelly
Mr. Jim Fink
Mr. Greg Olsen
Mr. Dick Buvens
Mr. Larry Andren
Mr. Bob Sheppard
Mr. Jack Leaman
Ms. Pat Westbrook
Mr. Bob Wharton
Mr. Al Vaio
Mr. Steve Hooper
Mr. Bob Fosnaugh
Mr. Andre Houle
Mr. Dave Harmon
Mr. Billy Goolsby

MME/mws
Job No. 51030

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
UNIVERSITY PLAZA, 330 GARFIELD SUITE 104 SANTA FE, N.M. 87509 505 988-7671
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491

June 6, 1985

RECEIVED
JUN 07 1985
HYDROLOGY SECTION

Mr. Fred Aguirre
Design Hydrologist
City of Albuquerque
Post Office Box 1293
Albuquerque, NM 87103

Re: Coronado Airport Drainage Management Plan

Dear Fred:

Attached please find one (1) copy of the referenced plan. We are requesting review for Development Plan approval. A development plan request for zoning and an annexation request have been submitted to the EPC and is to be heard at their meeting on July 18, 1985. The request contains a proposed street layout that is reflected in this plan.

We have held preliminary discussions with AMAFCA concerning the La Cueva Arroyo that crosses the site. This report is also being submitted to AMAFCA by copy of this letter for their review.

We will be glad to meet with you to discuss this plan due to its complexity. Receipt of your comments prior to the EPC hearing would be greatly appreciated. If you have any questions, please give me a call.

Sincerely,

Dan Grochowski

Daniel J. Grochowski, P.E. & L.S.
Project Manager

Enclosure

cc: Mr. David Bolton
Mr. Rich Leonard
Mr. Jim Leymon
Mr. Jon Havlak
Mr. Roma Campanile
Mr. John Salazar
Mr. Joe Fritz

DJG/mls
Job No. 5 119 0

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

File

RECEIVED
JUL 08 1985
DH0208
HYDROLOGY SECTION

July 3, 1985

RECEIVED
JUL 08 1985
CITY ENGINEER

Mr. Billy Goolsby
Design Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Coronado Airport Drainage Management Plan ~~(B18/1)~~ B18/D3

Dear Billy:

We have received comments from AMAFCA for the referenced project. A copy is attached to assist you in your review of the Drainage Plan.

Sincerely,

Dan Grochowski

Daniel J. Grochowski, P.E. & L.S.
Project Manager

Enclosure

DJG/mls
Job No. 5 119 0

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
UNIVERSITY PLAZA, 330 GARFIELD SUITE 104 SANTA FE, N.M. 87509 505 988-7671
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

D. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES MCCOY, SECRETARY-TREASURER
R. WARD HUNNICUTT, DIRECTOR
REX FUNK, DIRECTOR

RICHARD E. LEONARD
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 884-2215

RECEIVED B.H. JUN 29 1985

Vance
→ Brian
→ Dan H
INFO
cc: David Bolton
Fact Job # 5190

June 28, 1985

Mr. Michial Emery, President
Bohannan-Huston, Inc.
4127 Carlisle, NE
Albuquerque, NM 87107

Subject: Coronado Airport

Dear Mike:

Attached for your information are AMAFCA's comments to E.P.C. for the August Hearing Date.

Sincerely,

Dan Sabo

Dan Sabo
Drainage Engineer

ic
cc: Espey, Huston & Assoc. w/attach.

4 landowner rel... i... ... to

-85-75
AX-85-18

1. The following annexations and [illegible] requested:

A. Espey, Huston and Associates, Inc. agents for Coronado Joint Venture request annexation and simultaneous establishment of IP and SU-1 zoning and Site Development Plan approval, for Lots 1, 2, 3A, 4A, 5A, 6A, 7, 8 and 9, Coronado Industrial Park presently zoned County M-1 and A-1 and located north of Glendale Ave. between I-25 and Louisiana Blvd. and containing approximately 260.477 acres.

B. The City of Albuquerque expands the above request to include annexation and simultaneous establishment of RD zoning for Lots 14 thru 19, Block 22; Lot 23, Block 24; a portion of Lots 17, 18, 19, Block 6; Lots 14 thru 19 and a portion of Lots 13 and 20, Block 7; Lots 13 thru 20, Block 8; all of Block 25 and 26; Lots 1 thru 10, 23 thru 32, in Blocks 27, 28, 29 and 31, Lots 1 thru 10, 23 thru 31, Block 30; Lots 32B and 32A, SP-80-424, those portions of Blocks 9 thru 15 east of I-25 all in Tract A, Unit B, North Albuquerque Acres and containing approximately 261.00 acres.

DAN/PHIL

C. The City of Albuquerque also expands the request in A above to include annexation of the following street right-of-way: Elena, Pasadena, Venice, Beverly Hills, San Diego, Florence, Glendale, Alameda, Eagle Rock, Oakland, Richfield, Signal, Wilshire, Corona, Anaheim Avenues, San Pedro Street, and Louisiana Boulevard adjacent to the tracts described in A and B above, all of which are located east of I-25 Pan American Freeway and containing approximately 41.87 acres. (B&C-18&19)

Landowners, engineers and planners have coordinated well with AMAFCA. Recommend approval subject to:

1. The proposed diversion requires AMAFCA Board approval of modification of the Northeast Heights Drainage Management P

AX-85-18

I. The following annexations are requested:

A. Espey, Huston and Associates, Inc. agents for Coronado Joint Venture request annexation and simultaneous establishment of IP and SU-1 zoning and Site Development Plan approval, for Lots 1, 2, 3A, 4A, 5A, 6A, 7, 8 and 9, Coronado Industrial Park presently zoned County M-1 and A-1 and located north of Glendale Ave. between I-25 and Louisiana Blvd. and containing approximately 260.477 acres.

B. The City of Albuquerque expands the above request to include annexation and simultaneous establishment of RD zoning for Lots 14 thru 19, Block 22; Lot 23, Block 24; a portion of Lots 17, 18, 19, Block 6; Lots 14 thru 19 and a portion of Lots 13 and 20, Block 7; Lots 13 thru 20, Block 8; all of Block 25 and 26; Lots 1 thru 10, 23 thru 32, in Blocks 27, 28, 29 and 31, Lots 1 thru 10, 23 thru 31, Block 30; Lots 32B and 32A, SP-80-424, those portions of Blocks 9 thru 15 east of I-25 all in Tract A, Unit B, North Albuquerque Acres and containing approximately 261.00 acres.

DAN/PHIL

C. The City of Albuquerque also expands the request in A above to include annexation of the following street right-of-way: Elena, Pasadena, Venice, Beverly Hills, San Diego, Florence, Glendale, Alameda, Eagle Rock, Oakland, Richfield, Signal, Wilshire, Corona, Anaheim Avenues, San Pedro Street, and Louisiana Boulevard adjacent to the tracts described in A and B above, all of which are located east of I-25 Pan American Freeway and containing approximately 41.87 acres. (B&C-18&19)

Landowners, engineers and planners have coordinated well with AMAFCA. Recommend approval subject to:

1. The proposed diversion requires AMAFCA Board approval of modification of the Northeast Heights Drainage Management P
2. Landowners agreement to grant drainage easements acceptable to AMAFCA as conceptually shown on Sector Development Plan Sheet #5
3. Easements are granted prior to or at the same time as any subdivision or development (including grading) occurs in any principal basin.
4. Landowner recognizes responsibility to construct channel improvements across Sector plan area.
5. Landowner agrees to paying 50% of design and construction cost for combined La Cueva - South Camino Channel between San Pedro Drive and I-25 culverts.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

July 5, 1985

Mr. Dan Grochowski
Bohannan-Huston, Inc.
4125 Carlisle Blvd. NE
Albuquerque, NM 87107

RE: CONCEPTUAL DRAINAGE MANAGEMENT PLAN FOR CORONADO AIRPORT PROPERTY (B18/D3) RECEIVED JUNE 7, 1985

Dear Dan,

I appologize for not responding earlier. I did give the submittal a cursory review for the purpose of accepting the proposed annexation and zoning for the EPC hearing this month. I identified that Hydrology did not have any objections to the request.

I am currently writing this response to identify some requirements of the City and AMAFCA for future processing & development of this area. The following comments will reiterate those of AMAFCA for the EPC hearing as well as identify some specific requirements by the City.

1. The proposed diversion of the South Camino Arroyo to combine with the La Cueva Arroyo will require review and approval by AMAFCA board.
2. Since the area will be subdivided, the developer and or landowners will be responsible for dedicating any and all easements & Right-of-Ways required for arroyo channels, streets, storm sewer systems and other major infrastructures required for developing this area. This dedication will be required prior to granting <u>any</u> approvals for construction activities in the area.
3. The developor/landowner will be responsible for the cost of construction of the required infrastructures for this area.

4. The street grades will be required to extend beyond the limits of the proposed development to allow for an adequate design and tie-in of adjacent future development. Please discuss in more detail with DRC if clarity of understanding is needed.

Should you have any questions or comments concerning this response, please call me at 766-7644.

Cordially,

Billy J. Goolsby

Billy J. Goolsby
Civil Engineer/Hydrology

BJG/cl

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N. E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
UNIVERSITY PLAZA, 330 GARFIELD SUITE 104 SANTA FE, N. M. 87509 505 988-7671
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491

October 14, 1985

RECEIVED
OCT 15 1985
HYDROLOGY SECTION

Mr. Fred J. Aguirre
Civil Engineering/Hydrology
City of Albuquerque
One Civic Plaza
Albuquerque, NM 87103

Re: Coronado Airport Project, Structure and Channel Design
(DRB-85-325)

Dear Fred:

The purpose of this letter is to relay some concerns and questions relating to the DRB meeting on October 1, 1985. At the meeting you expressed a potential legal problem with the joint use of flood control channels, recreational trails and landscaping. We would like to have you expand your views with respect to the joint use of these facilities and our legal implications. We were under the impression that the City was encouraging the joint use of these facilities.

You also expressed concerns about acquiring easements downstream of I-25 all the way to the North Diversion Channel. This is the first time we have heard anything about the requirement for such easements. They were not mentioned in Mr. Goolsby's comments concerning our preliminary grading and drainage plan. It would be extremely difficult, if not impossible, to acquire these easements any time in the near future. If indeed the easements are required, it would jeopardize the entire development schedule. We feel the need for further discussions with respect to this issue as soon as possible.

In reference to the Coronado Airport project meeting on September 12, 1985, Mr. Sheppard felt that Manorwood's financial surety should go to the City and that a separate agreement would be written between the City and AMAFCA for distribution of the funds. Your opinion at the DRB meeting was to have the financial surety go to AMAFCA since they conceptually agreed to be the lead agency in the major drainage portion of the project. Manorwood will provide the surety to either AMAFCA or the City whenever a decision is made to whom the surety shall go. We request resolution of this decision shortly so that we may advise the financial institutions accordingly.

At the DRB meeting I felt there may have been some confusion over what was considered the major drainage facilities for this project. The major drainage facilities consist of the North La Cueva Channel, South Camino Channel, and the North Camino Channel, all from Louisiana to I-25, including the crossing structures (see attached project map).

PRINCIPALS
JERRY R. BOHANNAN, P.E. & L.S.
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

To date, we have received comments from Mr. Goolsby and AMAFCA and have included them for your reference. Also enclosed is an infrastructure list, drainage management plans, and all correspondence in relation to the drainage facilities. We will be waiting to hear from you, and if you should have any further questions, please contact Mel Dahlberg or me at this office.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
President

Enclosures

cc: Mr. Terry Jones
Mr. C. Dwayne Sheppard
Mr. Jim Leymon

MHD/cs
Job No. 5 238 4

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
4801 INDIAN SCHOOL ROAD, N.E., SUITE 204
ALBUQUERQUE, N.M. 87110
(505) 255-1625

CORPORATE OFFICE
P.O. BOX 519
AUSTIN, TEXAS 78767

Rec'd at DRB
10/1/85

September 30, 1985

Mr. Carl Rodolph, Director
Municipal Development Department
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

SUBJECT: Procedural and Design Conference, Coronado Industrial Park
EH&A Job No. 6965

Dear Carl:

Coronado Joint Venture (CJV) is intending to submit for Site Development Plan and Preliminary Plat approval on October 11, 1985. Due to the extensive nature of the project, several procedural and design issues requires clarification prior to submittal. Per this letter, I am confirming that a special meeting of the Development Review Board (DRB) has been set for October 2, 1985 at 11:00 a.m. in the MDD Conference Room.

In order that our time may be properly focused, I have included a list of issues that will direct everyones efforts. We recognize and appreciate the commitment in time and effort involved with this request, however, everyone should greatly benefit from early on discussions prior to the public hearing.

Sincerely,

Randy L. Traynor
Senior Planner

/kh

Enclosures

cc: Richard Dineen
Marty Valdez
Bob Fosnaugh
Fred Aguirre
Jon Ertsgaard

ESPEY, HUSTON & ASSOCIATES, INC.

QUESTIONS TO DRB

1. What configuration should the R/W reservations for Elena/Balboa & San Diego at I-25 be for the future grade separation(s)?

   Is the language on the site development plan regarding reservation of R/W for the grade separation(s) appropriate for the plat?

2. Is there any objection to deleting that portion of Venice Avenue lying between San Pedro & I-25 from the site development plan?

3. What is the DRB's preference in the format & description of vacating the R/W within the plat boundaries? It would seem easier to vacate the entirety of the existing plat & existing roadways (w/exceptions), rather than trying to detail out very specific and cumbersome legal descriptions.

4. Is UTPPB action required prior to any final platting action?

5. We expect that a temporary easement for San Pedro will be necessary, in its present configuration and location, until such time as the final alignment of San Pedro has been dedicated and constructed. Is this assumption correct?

6. In the event San Pedro is allowed to cross the Sandia Pueblo, should the plat show the proposed alignment of San Pedro as a reservation w/notes as to future dedication? If yes, can the existing San Pedro alignment be vacated without a vacating action?

7. Should Louisiana be "rededicated" or reserved from the north R/W line of Elena, north to the Sandia Pueblo Grant?

8. What, if any, additional R/W for turning lanes is required for the street intersections?

   What form should the transitions/tapers in R/W take?

9. What off-site road and drainage improvements are required for Louisiana south of the site?

10. What is the status and effect of the County Assessment District for San Pedro, in light of the annexation?

11. What is the Citys preference regarding cash in lieu vs. land for fulfilling the Parks Dedication Ordinance?

12. What is the status of the Water/Sanitary Sewer Availability request to Water Resources dated June 4, 1985?

13. What additional drainage submittals are required for preliminary plat submittal? Final plat approval?

14. The developer is proposing to place substantial landscaping within the major streets R/W. Can an agreement be made with the City for maintenance?

file 6945

MEMORANDUM

RECEIVED
SEP 20 1985
ESPEY, HUSTON & ASSOC.

FROM: MICHIAL M. EMERY MME

RE: CORONADO AIRPORT PROJECT MEETING

JOB NO.: 5 238 4

DATE: SEPTEMBER 18, 1985

On the morning of September 12, 1985, a meeting was held at 7:30 a.m. at the AMFAC Hotel. Those present at the meeting were:

Carl Rodolph	Vern Hagen
C. Dwayne Sheppard	Rich Leonard
Greg Olson	Jim Leymon
Randy Traynor	Mike Emery
Mel Dahlberg	

Following is a short description of the discussions and decisions made during the meeting:

- Carl Rodolph felt that City participation in the crossing structures could not be detailed until CIP fund cleanup and redistribution in February, 1986; however, interest on the drainage bond funds and the redistribution may cover the costs. If not, a future reimbursement to Manorwood is an alternative.

- If AMAFCA and the City can agree with the infrastructure costs prepared by Bohannan-Huston, Inc. and Espey, Huston & Associates, they will sign the plat without final plans being available.

- Manorwood's financial surety shall go to the City. A separate agreement will be written between AMAFCA and the City for distribution of funds to the contractor.

- A standard subdivision agreement will be drafted between Manorwood and the City.

- It was tentatively agreed that it was appropriate for AMAFCA to manage the channel and crossing structure portion of the project if the AMAFCA Board concurs.

- Rich Leonard feels a compromise may be reached with respect to a construction time extension beyond one year, as required by AMAFCA resolution.

If anyone should have any questions about or corrections to this Memorandum, please feel free to call me.

cc: Mr. Carl Rodolph
Mr. Vern Hagen
Mr. C. Dwayne Sheppard
Mr. Rich Leonard
Mr. Greg Olson
Mr. Jim Leymon
Mr. Randy Traynor
Mr. David Bolton
Mr. Terry Jones
Mr. Mel Dahlberg

MHD/cs

November ~~13~~ 7, 1985

Michial Emery, P.E. President
Bohannan-Huston, Inc.
4125 Carlisle Blvd., NE
Albuquerque, New Mexico 87107

RE: CORONADO AIRPORT PROPERTY DRAINAGE MANAGEMENT PLAN
(B-18/D3) (DRB-85-325)

Dear Mr. Emery:

I am hereby responding to your letter dated October 14, 1985, and subsequent action that has taken place since.

Specifically, I have been directed to identify the requirements necessary to obtain the appropriate approvals for the proposed development.

We have not received a comprehensive drainage report for me to specifically address. Therefore, my comments will be based upon the information we have thus far.

If you refer back to my letter dated July 5, 1985, I did not grant any approvals for drainage. I did identify that Hydrology did not have any objections to the request for annexation and zoning.

In response to your comment, in your letter, stating that I had not informed you of the requirement for obtaining downstream easements, I do confess that I was not specific in my statement. However, I did state that the developer would be required to provide <u>all</u> rights-of-way and easements necessary for the proposed development. The required easements include off-site, as well, which is a standard

3. Since there is opposition to providing the necessary easements for the discharges west of I-25 and south of the North El Camino Arroyo from the proposed development, it is recommended that the extentions of ~~San Diego avenue~~, Venice Avenue ~~and Elena Drive~~ west of ~~st of San Pedro Drive to I-25~~ be changed from public to private access. If this is done, the discharge will be from private property to private property and consequently, become a private matter. Justification for this is that the watershed upstream of San Pedro Drive will be intercepted by this same street and routed to another location whereby, the only discharge across I-25 will be from those tracts adjacent to the I-25 east right-of-way. The amount or rate should be substantially reduced from the existing.

4. At the present time, no right-of-way or easement exists for the North camino arroyo west of I-25. Therefore, the requirement for use of this facility for discharge of public waters generated by the development on the east side of I-25 will be the acquisition of an easement/Right-of-Way for the arroyo across the private property to the west between I-25 and the North Diversion Channel. The reasons for this requirement have been previously stated.

practice by this section and of Fred Aguirre, representing the City Engineer. This policy is of particular attention when it involves discharging public water across private property. To allow public water to cross private property without the appropriate easements or rights-of-way would be in violation of City's Drainage Ordinance (Sections 3.C.2., 7.B., 9.d., 12.g.). It is also the belief of this section that the City cannot dictate to the downstream property owner that he is required to accept discharge from an upstream property in a manner differenet to existing conditions without his concurrence.

With regard to the requirements for further approvals, I hereby forward the following comments:

1. Downstream capacity has not been adequately addressed. The Conceptual Drainage Plan for this development uses the I-25/Richfield Sector Plan for reference as to the capacities of the I-25 crossing structures. The above referenced report identifies that with inlet modification, the structure for the combined South El Camino and La Cueva Arroyos crossing can convey 5,500 cfs. The current plan for this development shows a discharge of 7000 cfs resulting in a substantial difference or exceedence of downstream capacity.
2. The plan also identifies several storm sewers to be constructed on-site to accommodate the proposed development. However, no hydraulic calculations have been provided to show that they have adequate capacity to convey the proposed development flow.

EH&A: Espey, Huston & Assoc., Inc.
B-H: Bohannan-Huston, Inc.

CORONADO JOINT VENTURE
INFRASTRUCTURE LISTING
~~10/31/85~~ 11/12/85

ITEM	FROM	TO	DESCRIPTION	CONST. COST
I. PAVING (on-site - EH&A)				
a. Louisiana	Elena	350 ft. south of Elena	350 L.F. full width minor arterial. 66' roadway width (curb & gutter, 6' sidewalks, median curb & right turn lane at Elena)	$60,257.48
b. Louisiana	350 ft. south of Elena	Centerline of Glendale (excluding that portion between Beverly Hills and San Diego)	2600 L.F. half width minor arterial. 24' roadway width (curb & gutter, 6' sidwalk, ½ median curb & right turn lane at Elena)	$131,570.18
c. San Pedro	North Project Boundary	200 ft. south of San Diego	3400 L.F. full width collector 66' roadway width (curb & gutter, 6' sidewalks, median curb & right turn lane at San Diego)	$495,610.96
d. San Pedro	200 ft. south of San Diego	Centerline of Glendale	800 L.F. half width collector. 24' roadway width (curb & gutter and 6' sidewalk)	$57,413.33

ITEM	FROM	TO	DESCRIPTION	CONST. COST
e. Elena	West Project Boundary	250 ft. east of Louisiana	2900 L.F. full width minor arterial. 66' roadway width (curb & gutter, 6' sidewalks & median curb)	$434,474.82
f. Elena	250 ft. east of Louisiana	East 1000 ft.	1000 L.F. half width minor arterial. 24' roadway width (curb & gutter, 6' sidewalk & ½ median curb)	$414,580.00
g. San Diego	West Project Boundary	450 ft. west of Louisiana	2400 L.F. full width collector. 66' roadway width (curb & gutter, 6' sidewalks & median curb)	$349,957.77
h. San Diego	450 ft. west of Louisiana	Louisiana	450 L.F. half width collector. 24' roadway width (curb & gutter, 6' sidewalk & ½ median curb)	$32,809.00
i. Glendale	San Pedro	Louisiana	2600 L.F. half width major local. 24' roadway width (curb & gutter, 6' sidewalk)	$175,599.67
j. Venice	West Project Boundary	San Pedro	485 L.F. full width major local. (curb & gutter, 6' sidewalks & median curb)	$57,798.45

ITEM	FROM	TO	DESCRIPTION	CONST. COST
2. PAVING (off-site - EH&A)				
a. Louisiana	Beverly Hills	San Diego	600 L.F. Temporary. 24' roadway width	$10,040.00
b. Louisiana	Glendale	Los Angeles	5855 L.F. Temporary. 24' roadway width	$97,972.85
3. WATER (on-site - EH&A)				
a. Louisiana	Glendale	San Diego	1050 L.F. 16 in.	$45,423.00
b. Louisiana	San Diego	Elena	1980 L.F. 14 in.	$64,005.00
c. San Pedro	North Project Boundary	Glendale	4170 L.F. 12 in.	$119,995.00
d. Elena	San Pedro	Louisiana	2180 L.F. 12 in.	$66,230.00
e. Elena	Louisiana	1350 L.F. east of Louisiana	1350 L.F. 14 in.	$49,317.50
f. San Diego	San Pedro	Louisiana	2600 L.F. 12 in.	$78,940.00
g. Glendale	San Pedro	Louisiana	2650 L.F. 12 in.	$80,812.50

DEFERRED CONST.

ITEM	FROM	TO	DESCRIPTION	CONST. COST
4. WATER (off-site - EH&A)				
a. Louisiana	Glendale	Corona	2100 L.F. 20 in.	$89,400.00
b. Louisiana	Corona	Eagle Rock	2650 L.F. 18 in.	$96,800.00
c. Louisiana	Eagle Rock	Glendale	1070 L.F. 16 in.	$35,984.00
d. San Pedro	Corona	Eagle Rock	2650 L.F. 14 in.	$75,250.00
e. San Pedro	Eagle Rock	Glendale	1070 L.F. 12 in.	$25,660.00
f. Corona	Louisiana	1470 L.F. west of Louisiana	1470 L.F. 10 in.	$30,300.00

ITEM	FROM	TO	DESCRIPTION	CONST. COST
5. SANITARY SEWER (on-site - EH&A)				
a. Louisiana	Elena	Glendale	3050 L.F. 8 in.	$61,250.00
b. San Pedro	North Project Boundary	Glendale	4200 L.F. 12 in.	$88,450.00
c. Elena	San Pedro	1250 ft. east of Louisiana	3400 L.F. 8 in.	$62,300.00
d. San Diego	West Project Boundary	Louisiana	2850 L.F. 12 in.	$60,887.50
e. Glendale	San Pedro	Louisiana	2600 L.F. 8 in.	$48,000.00
f. I-25 East Frontage Road	North Project Boundary	San Diego	3300 L.F. 8 in.	$61,850.00
6. SANITARY SEWER (off-site)				
None				
7.0 MINOR CROSSING STRUCTURES (on-site - EH&A)				
a. Box Culvert at	Louisiana	Across Louisiana	100 L.F. 2 - 4'x8' box ✓	$44,724.00
b. Miscellaneous	Minor Crossing Structures on Louisiana @ Various Locations	Individual 80' Swales	2900 L.F. ~~24" RCP - 48" RCP~~ (including headwalls) 1-24" RCP 1-36" RCP 2-48" RCP 1-24" RCP 1-24" RCP 1 - ? crossing Glendale Ave	$188,200.00

Minor Crossing San Pedro 1-24" RCP
San Diego
Elena

ITEM	FROM	TO	DESCRIPTION	CONST. COST
7.1 MAJOR CROSSING STRUCTURES (on-site - B-H)				
a. South Camino Channel	At Louisiana			$77,100.00
b. North LaCueva Channel	At Louisiana			$302,750.00
c. North LaCueva Channel	At San Pedro			$176,300.00
d. North Camino Channel	At San Pedro			$88,200.00
e. North Camino Channel	At Louisiana			$94,700.00
8.0 MINOR CHANNEL STRUCTURES (on-site - EH&A)				
a. Drainage Swale	North Camino Arroyo	South 1800 ft. & East 900 ft.	Low Flow Concrete Channel	$208,494.00
b. Drainage Swale	North Camino Arroyo	Southeast 900 ft. Across Lot 5	Low Flow Concrete Channel	$67,142.20
c. Drainage Swale	South El Camino Arroyo	North 1000 ft.	Low Flow Concrete Channel	$77,743.60

d. Temporary Lined swale along I-25
San Diego to La Cueva in Tract 19

e. Temporary Lined swale along I-25
Elena to North Camino in Tract 2

f. Venice to Paradise

ITEM	FROM	TO	DESCRIPTION	CONST. COST
8.1 MAJOR CHANNEL STRUCTURES (on-site - B-H)				
a. South Camino Channel	Confluence of N. LaCueva	Louisiana	Trap. Concrete Channel	$276,146.00
b. North Camino Channel	West Project Boundary	1250 ft. east of Louisiana	Trap. Concrete Channel	$851,917.00
c. North LaCueva Channel	I-25	Louisiana	Rectangular Concrete/ Trap. Channel	$1,375,548.00

ITEM	FROM	TO	DESCRIPTION	CONST. COST
9. STORM SEWER (within on-site street system, EH&A)				
a. San Pedro	Elena	North El Camino	600 L.F. 42 in.	$51,835.00
b. San Pedro	1200 ft. North of San Diego	Combined Channels	1700 L.F. 66 in. ? 60"	$261,950.00
c. Elena	San Pedro	East 450 ft. ?	450 L.F. 24 in. ?	$25,979.50
d. San Diego	San Pedro	East 880 ft. ?	880 L.F. 24 in. ?	$53,333.00
e. ~~San Diego~~	La Cueva		72" RCP	

where Not shown?
" " " ?
" " ?

ESTIMATED
CONSTRUCTION COSTS SUMMARY

		Est. Const. Cost	[redacted]	[redacted]
1.	Paving (on-site - EH&A)	$2,210,071.15		
2.	Paving (off-site - EH&A)	$ 108,012.85		
3.	Water (on-site - EH&A)	$ 504,723.00		
4.	Water (off-site - EH&A)	$ 353,394.00		
5.	Sanitary Sewer (on-site - EH&A)	$ 382,737.50		
6.	Sanitary Sewer (off-site)	-0-		
7.0	Minor Crossing Structures (on-site - EH&A)	$ 232,924.00		
7.1	Major Crossing Structures (on-site - B-H)	$ 739,050.00		
8.0	Minor Channel Structures (on-site - EH&A)	$ 353,379.80		
8.1	Major Channel Structures (on-site - B-H)	$2,503,690.00		
9.	Storm Sewer (EH&A)	$ 393,097.50		
	TOTAL	$7,781,080.10		

CORONADO JOINT VENTURE
INFRASTRUCTURE LISTING

DRB-85-_____
S-85-_____

Approved on _____, 1985 by the Development Review Board

_____
Planning Division Date

_____
Water Utilities Department Date

_____
Traffic Engineering Date

_____
Parks & Recreation Date

_____
City Engineer/AMAFCA Date

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

November 25, 1985

Brian Burnett
Bohannan-Huston, Inc.
4125 Carlisle Blvd., NE
Albuquerque, New Mexico 87107

RE: CORONADO AIRPORT PROPERTY DRAINAGE MANAGEMENT PLAN
(B-18/D3) (DRB-85-325)

Dear Brian:

As per our meeting on Thursday, November 21, 1985, I am hereby responding in writing as to the information needed to obtain further approvals for the subject submittal.

The information received for the Conceptual Drainage Management Plan is hereby approved for the purposes of granting Preliminary Plat approval.

For DRB Preliminary Plat approval, an approved infrastructure listing is required. The listing submitted to DRB on November 12, 1985 is incorrect for the following reasons:

1. The infrastructure listing is not to show quantities or cost because the Board cannot approve these items. These specific items are determined by development of the actual construction plans which the DRB members typically never see. It is the responsibility of DRC to verify these project specifics.

2. The infrastructure listing does not include the necessary drainage items as shown on the drainage plan. There are many crossing structures for Louisiana blvd. and other streets that have been deleted from the listing. Also, the major crossing structures have not been identified, nor have all the proposed storm sewers been included. The listing includes a 66 inch storm drain but, the

plans do not match. I could not locate the 24 inch storm drains identified to be located in Elena or San Diego Streets on the drainage plan in our files. Please refer to the returned marked-up list for more specific items.

3. Per discussion in the above referenced meeting three (3) additional items will need to be included in the listing; 1) temporary lined swale along I-25 from San Diego Drive south to La Cueva Arroyo in Tract 19, and 2) a temporary lined swale along I-25 from Elena drive north to North Camino Arroyo in Tract 2, and 3) a temporary lined swale along I-25 from Venice to the I-25 crossing structure at Paradise Boulevard. These inclusions will be for the purpose of conveying public water from the said public streets and will also require temporary sediment ponds at the ends. When the adjacent tracts develop, permanent facilities will be required.

For Final Plat an Engineer's estimate is to submitted to the City Engineer and a Subdivision Improvements Agreement is required.

Prior to Work Order approval, a comprehensive drainage report will need to be submitted for review and approval. The following are some items that will need to be included in this report:

1. The I-25/Richfield Sector Development Plan identifies that with inlet modifications, the existing crossing structure for the La Cueva - South Camino Arroyo can accommodate 5,500 cfs. The subject plan calls for this structure to convey 7,000 cfs. Please address how this exceedence in capacity is to be handled.

2. The plan also shows several storm sewers to be constructed with this project. Please provide all the appropriate data needed to show that the sizes shown will adequately convey the proposed discharge. The data shall include the hydraulic calculations to identify the Q, V, and HGL for each section of storm sewer. Also, the design profile should be provided and have the above items shown for the purposes of justifying that the systems will work in accordance with the criteria set forth in the DPM.

3. The storm flows from Elena Drive are intended to be diverted to North Camino Arroyo across Tract 2. The hydraulics and temporary materials for accomplishing this diversion will need to be provided. The same information

will need to be provided for the other two locations as identified in previous discussions for infrastructure requirements.

4. The flows will need to be balanced to equal the existing historic for the basins contributing to Tracts 8 & 10. The developed discharge will have to equal as closely as possible the existing discharge through the I-25 crossing structure.

5. Confirmation of the location, if possible, of the existing 24 inch RCP to verify the discharge within City dedicated Right-of-Way is needed.

6. Should the outlet of the above referenced structure not fall within City dedicated Right-of-Way and an easement cannot be obtained, it shall be determined if the drainage easement on the east side of I-25 can contain the volume of runoff generated by Venice Drive.

7. The plan shall attempt to divert Basin 11 into San Pedro and eliminate the crossing structure currently shown.

8. Appropriate covenants for the temporary drainage swales are to be provided prior to the Work Order issuance.

In response to your letter, dated November 19, 1985, I have the following comments:

1. In paragraph 3, the word major should be changed to minor when used with "major infrastructure".

2. On page 2, first paragraph, the sentence should read "improvements shall be approved by AMAFCA and the City".

3. Paragraph 2, we are not requiring any easement from I-25 to the North Diversion Channel. It would be appropriate but, is not required.

4. Page 3, paragraph 1, the deferral of the required comprehensive drainage report is only until prior to submittal of the construction plans for the Work Order process.

Should you have any questions or comments regarding this project, please call me at 766-7644.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, P.E.
C.E./Design Hydrology Section

cc: David Bolton; Coronado Joint Venture
Randy Traynor; Espey, Huston & Associates, Inc.

FJA:BJG:mrk

B18/D3

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
4801 INDIAN SCHOOL ROAD, N.E., SUITE 204
ALBUQUERQUE, N.M. 87110
(505) 255-1625

CORPORATE OFFICE
P.O. BOX 519
AUSTIN, TEXAS 78767

February 5, 1986

RECEIVED
FEB 06 1986
HYDROLOGY SECTION

Mr. Richard Dineen, Chairman
& Members of the Development Review Board
Planning Division
City of Albuquerque
One Civic Plaza
Albuquerque, New Mexico 87103

SUBJECT: Coronado Industrial Park (DRB-85-370/S-85-53)
EH&A Job No. 6965

Dear Richard:

As we have recently discussed, there are two issues that Coronado Joint Venture needs corrected and/or clarified as they relate to the Plat of Coronado Industrial Park. First, while preparing the Subdivision Improvements Agreement, it has come to our attention that the bridge identified on the attached infrastructure listing (Item 7.1.b.) should have been deleted. Since paving of Louisiana, north of Elena was excluded from the infrastructure listing and since any improvement on Louisiana, north of Elena is dependent upon on-going negotiations with the Sandia Pueblo, we believe that Item 7.1.b. of the infrastructure list approved on 11/26/85 should be deleted. Future improvements shall be through additional platting and through supplemental improvements agreements.

Also, due to the extent of and complexity of this particular Subdivision Improvements Agreement, a problem has been identified with the length of the effective period of the Agreement itself. The standard length of a Subdivision Improvement Agreement allows for a 12-month construction period and, if approved by the City Engineer, an additional 12-month extension to complete construction. Due to the extent of this project, and the desire to perform all construction in one phase, we have proposed a 24-month construction period and, if approved by the City Engineer, an additional 12-month extension to complete construction. The intent of proposing a 24/12 construction schedule is to recognize the impossibility of constructing this much infrastructure within a total of 24 months. We have estimated at least an 18 month construction period, which is an aggressive schedule.

ESPEY, HUSTON & ASSOCIATES, INC.

Mr. Dwayne Sheppard, City Engineer, has requested that we ask the DRB to consider this matter for a variance to the time limitations established by the Subdivision Ordinance. The Subdivision Ordinance identifies a two-year limitation on Subdivision Improvements Agreements (reference: Sec. 6.C. of Subdivision Ordinance). Coronado Joint Venture, in recognition of the scope of this project, is requesting a variance to the limitations of the Subdivision Ordinance to allow a 24-month initial construction period and, if approved by the City Engineer, an additional 12-month extension for a total of 3 years.

Your consideration of these matters is greatly appreciated. If you or any member of the DRB requires additional information, please call me at 255-1625.

Sincerely,

Randy L. Traynor
Senior Planner

/kh

Enclosures

cc: Steve Bowman
Brian Burnett
David Bolton

EH&A: Espey, Huston & Assoc., Inc.
B-H: Bohannan-Huston, Inc.

CORONADO JOINT VENTURE
INFRASTRUCTURE LISTING
11/26/85

ITEM	FROM	TO	DESCRIPTION
I. PAVING (on-site - EH&A)			
a. Louisiana	Elena	350 ft. south of Elena	350 L.F. full width minor arterial. 66' roadway width (curb & gutter, 6' sidewalks, median & curb, & right turn lane at Elena)
b. Louisiana	350 ft. south of Elena	Centerline of Glendale (excluding that portion between Beverly Hills and San Diego)	2600 L.F. half width minor arterial. 24' roadway width (curb & gutter, 6' sidewalk, ½ median & curb, & right turn lane at Elena)
c. San Pedro	North Project Boundary	200 ft. south of San Diego	3400 L.F. full width collector. 66' roadway width (curb & gutter, 6' sidewalks, median & curb, & right turn lane at San Diego)
d. San Pedro	200 ft. south of San Diego	Centerline of Glendale	800 L.F. half width collector. 24' roadway width (curb & gutter and 6' sidewalk)
e. Elena	West Project Boundary	250 ft. east of Louisiana	2900 L.F. full width minor arterial. 66' roadway width (curb & gutter, 6' sidewalks, median & curb)
f. Elena	250 ft. east of Louisiana	East 1000 ft.	1000 L.F. half width minor arterial. 24' roadway width (curb & gutter, 6' sidewalk & ½ median & curb)

ITEM	FROM	TO	DESCRIPTION
g. San Diego	West Project Boundary	450 ft. west of Louisiana	2400 L.F. full width collector. 66' roadway width (curb & gutter, 6' sidewalks, median & curb)
h. San Diego	450 ft. west of Louisiana	Louisiana	450 L.F. half width collector. 24' roadway width (curb & gutter, 6' sidewalk & ½ median & curb)
i. Glendale	San Pedro	Louisiana	2600 L.F. half width major local. 24' roadway width (curb & gutter, 6' sidewalk)
j. Venice	West Project Boundary	San Pedro	485 L.F. full width major local. (curb & gutter, 6' sidewalks, median & curb)
k. Beverly Hills (Item Lk. to be deferred to a later date.)	Louisiana	465 ft. west of Louisiana	465 L.F. half width residential. (curb & gutter, 6' sidewalk one side, & off set cul-de-sac)

ITEM	FROM	TO	DESCRIPTION
2. PAVING (off-site - EH&A)			
a. Louisiana	Beverly Hills	San Diego	600 L.F. Temporary. 24' roadway width
b. Louisiana (Item 2.b. to be deferred to later date.)	Glendale	Los Angeles	5855 L.F. Temporary. 24' roadway width
3. WATER (on-site - EH&A) Including Appurtenances			
a. Louisiana	Glendale	San Diego	1050 L.F. 16 in.
b. Louisiana	San Diego	Elena	1980 L.F. 14 in.
c. San Pedro	North Project Boundary	Glendale	4170 L.F. 12 in.
d. Elena	San Pedro	Louisiana	2180 L.F. 12 in.
e. Elena	Louisiana	1350 L.F. east of Louisiana	1350 L.F. 14 in.
f. San Diego	San Pedro	Louisiana	2600 L.F. 12 in.
g. Glendale	San Pedro	Louisiana	2650 L.F. 12 in.
h. Elena	West Project Boundary	San Pedro	397 L.F. 10 in.
i. Venice	West Project Boundary	San Pedro	398 L.F. 10 in.
j. San Diego	West Project Boundary	San Pedro	398 L.F. 10 in.

ITEM	FROM	TO	DESCRIPTION
4. WATER (off-site - EH&A)			
a. Louisiana	Los Angeles	Corona	2100 L.F. 20 in.
b. Louisiana	Corona	Eagle Rock	2650 L.F. 18 in.
c. Louisiana	Eagle Rock	Glendale	1070 L.F. 16 in.
d. San Pedro	Corona	Eagle Rock	2650 L.F. 14 in.
e. San Pedro	Eagle Rock	Glendale	1070 L.F. 12 in.
f. Corona	Louisiana	1470 L.F. west of Louisiana	1470 L.F. 10 in.

ITEM	FROM	TO	DESCRIPTION
5. SANITARY SEWER (on-site - EH&A) Line sizes may be subject to change.			
a. Louisiana	Elena	Glendale	3050 L.F. 10 in.
b. San Pedro	San Diego	Glendale	1050 L.F. 24 in.
c. San Pedro	North Project Boundary	San Diego	3150 L.F. 21 in.
d. Elena	San Pedro	1250 ft. east of Louisiana	3400 L.F. 15 in.
e. San Diego	~~West Project Boundary~~ San Pedro	Louisiana	~~2850~~ 2330 L.F. 15 in.
f. Glendale	San Pedro	Louisiana	2600 L.F. 15 in.
g. I-25 East Frontage Road	North Project Boundary	Elena	1090 L.F. 10 in.
h. I-25 East Frontage Road	Elena	San Diego	2210 L.F. 12 in.
i. San Diego	West Project Boundary	San Pedro	5500 L.F. 24 in.
6. SANITARY SEWER (off-site)			
None			

ITEM	FROM	TO	DESCRIPTION
7.0 MINOR CROSSING STRUCTURES (on-site - EH&A)			
a. Box Culvert at	Louisiana	Across Louisiana	100 L.F. 2 - 4'x8' box
b. Culvert at	Louisiana	West to 80 ft. Swale	600 L.F. 1 - 24 in. RCP (including headwalls)
c. Culvert at	Louisiana	West to 80 ft. Swale	600 L.F. 1 - 36 in. RCP (including headwalls)
d. Culvert at	Louisiana	West to 80 ft. Swale	550 L.F. 2 - 48 in. RCP (including headwalls)
e. Culvert at	Louisiana and	San Diego	100 L.F. 1 - 24 in. RCP (including headwalls)
f. Culvert at	Louisiana	West & South to La Cueva Arroyo	100 L.F. 1 - 24 in. RCP (including headwalls)
g. Box Culverts at	Elena and	80 ft. Swale	86 L.F. 2 - 6' x 6' Box (including headwalls)
h. Culvert at	San Diego and	80 ft. Swale	100 L.F. 2 - 48 in. RCP (including headwalls)
i. Culvert at	San Pedro	Between Pasadena and Venice	100 L.F. 1 - 24 in. RCP (including headwalls)

ITEM	FROM	TO	DESCRIPTION
7.1 MAJOR CROSSING STRUCTURES (on-site - B-H)			
a. South Camino Channel	At Louisiana		Bridge
b. North LaCueva Channel	At Louisiana		Bridge
c. North LaCueva Channel	At San Pedro		Bridge
d. North Camino Channel	At San Pedro		Bridge
e. North Camino Channel	At Louisiana		Bridge

ITEM	FROM	TO	DESCRIPTION
8.0 MINOR CHANNEL STRUCTURES (on-site - EH&A)			
a. Drainage Swale	North Camino Arroyo	South 1800 ft. & East 900 ft.	Low Flow Concrete Channel
b. Drainage Swale	North Camino Arroyo	Southeast 900 ft.	Low Flow Concrete Channel
c. Drainage Swale	South El Camino Arroyo	North 1000 ft.	Low Flow Concrete Channel
d. Temp. Drainage Swale	Elena	North Camino Arroyo	250 L.F. Temp. Asphalt Lined Swale
e. Temp. Drainage Swale	Venice	North approximately 370 feet	370 L.F. Temp. Asphalt Lined Swale
f. Temp. Drainage Swale	San Diego	La Cueva Arroyo	350 L.F. Temp. Asphalt Lined Swale
8.1 MAJOR CHANNEL STRUCTURES (on-site - B-H)			
a. South Camino Channel	Confluence of N. LaCueva	Louisiana	Trap. Concrete Channel
b. North Camino Channel	West Project Boundary	1250 ft. east of Louisiana	Trap. Concrete Channel
c. North LaCueva Channel	I-25	Louisiana	Rectangular Concrete/Trap. Channel

ITEM	FROM	TO	DESCRIPTION
9. STORM SEWER (within on-site street system, EH&A)			
a. San Pedro	Elena	North El Camino	600 L.F. 42 in.
b. San Pedro	Venice	South 1025 ft.	1025 L.F. 60 in.
c. San Pedro	San Diego	Combined Channels	420 L.F. 72 in.

CORONADO JOINT VENTURE
INFRASTRUCTURE LISTING

DRB-85- 370
S-85- 53

Approved on November 26, 1985 by the Development Review Board

Richard Bruce — 11/26/85
Planning Division — Date

Jon E. Eitzgaard — 11/26/85
Water Utilities Department — Date

Robert M. Forman — 11-26-85
Traffic Engineering — Date

Janet Sievers — 11-26-85
Parks & Recreation — Date

Fred Logan — 11/26/85
for City Engineer/AMAFCA — Date

B18/D3

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

RECEIVED FEB 18 1986 DH 6h9 HYDROLOGY SECTION

February 14, 1986

Mr. Randy Traynor
Espey, Huston & Associates
4801 Indian School Road N.E., Suite 204
Albuquerque, NM 87110

RE: CORONADO INDUSTRIAL PARK, CITY PROJECT NO. 2804, DRB CASE #85-370

Dear Randy:

We are reviewing the draft Subdivision Improvements Agreement for this project and will be forwarding comments through Denise Wilcox very soon. To facilitate that review and upcoming Design Review Committee (DRC) record keeping, I have assigned City Project No. 2804 to this project. When the construction plans are submitted, this number should be included on them.

Due to the large scope of this project, it is possible that the developer may prefer to break the project into more than one work order. If so, we will use 2804 on the first portion reviewed and assign additional project numbers to any following portions received. If you anticipate construction phasing, please advise the DRC as early as possible to avoid possible delays in the approval process.

Attached is the DPM Application form used to establish the project number. Please complete the highlighted sections that I was not able to complete and return the Application to Terri Martin, Master Scheduler, for our files.

If you have any questions on the DRC approval process, please contact Terri or Andre Houle at 768-2540.

Very truly yours,

Greg Olson

Gregory R. Olson, P.E.
Assistant City Engineer, Design

GRO/tsl
Attachment

cc: Fred Aguirre, Design Hydrologist
Project File

FIGURE 2

APPLICATION FOR DESIGN AND CONSTRUCTION OF INFRASTRUCTURE IMPROVEMENTS

INSTRUCTIONS: PRINT OR TYPE IN BLACK INK ONLY. Use additional sheets, if necessary.

1. APPLICANT INFORMATION:

a. Developer: CORONADO JOINT VENTURE Date: 2-13-86

Mailing Address: 1713 Broadmoor, Suite 204 Bryan, Texas Zip Code: 77802

b. Owner's Name: SAME Phone (409) 775-1180

Mailing Address: _____ Zip Code: _____

c. Consulting Engineer: Espey, Huston & Assoc. Inc.

Mailing Address: 4801 Indian School NE Suite 204 Albuquerque Zip Code: 87110

d. Person to call regarding this application Randy Traynor

Phone No. 255-1625 Firm: Espey, Huston

2. LOCATION OF REQUEST:

Map Key No. B-18 MRGCD Map No. (If applicable) N/A

in CORONADO INDUSTRIAL PARK Subdivision/Addition DRB Case #: 85-370

IF FINAL PLAT NOT YET APPROVED, DATE PRELIMINARY PLAT EXPIRES: 11-26-86

Date Plat Approved: _____ Date Plat Recorded: _____

3. IMPROVEMENTS TO BE DESIGNED BY: ☒ Developer's Consulting Engineer ☐ City.

4. DESCRIPTION OF IMPROVEMENTS PROPOSED: (Give Street Names Where Applicable)

See Attached Infrastructure Listing ("Subdivision Improvements")

(Use additional sheets, if needed)

Master Plan water line to be constructed? X YES ___ NO ___ UNKNOWN

Master Plan sanitary sewer line to be constructed? X YES ___ NO ___ UNKNOWN

Application for Design and Construction of Infrastructure Improvements.
Page 1 of 2

Project No. 2804
(To be filled in by Engineering Division)

Rev. 10/85
ID3900D

5. LEVEL OF SUBMITTAL: Applicant requests entry into the Design Development process as indicated below, and has included appropriate submittals required: Project No. for Subdiv. Imp. Agreement.

[X] Pre-Design (Orientation) [ ] Design Review (Preliminary=65%-95%)

[ ] Pre-Design w/Submittals [ ] Design Review (Final=95% Complete)

Applicant requests consideration for Partial Acceptance. [X] YES ___ NO

Drainage Submittal is being prepared by: ?

6. PROPOSED METHODS TO CONSTRUCT

- Public Improvements will be built by:

[X] Private Contractor (Procedure A or B)

[_] City Contractor (Procedure C)

- Public Improvements will be constructed

[_] Under one contract (single Plan set)

[_] Under separate contracts for portions of the work (This requires separate plan sets for each contract)

7. REQUEST PRE-DESIGN CONFERENCE NOT LATER THAN: _____

8. REQUIRED ATTACHMENTS (SEE PRE-DESIGN PHASE).

SIGNATURE: _____ APPLICANT/AGENT SIGNATURE: _____ OWNER

****

ENGINEERING DIVISION INTERNAL USE ONLY

Application Received by: GREG OLSON Date: 2/13/86

Application Reviewed by: GREG OLSON Date: 2/13/86

Design Engineer Assigned: ANDRE HOULE (Name)

Pre-Design Conference Date: _____

Copy Distribution: Applicant/Agent
File/Log
Assigned Engineer

Application for Design and Construction of Infrastructure Improvements
Page 2 of 2

Project No. 2804

Rev. 10/85
ID3900D

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Coronado Industrial Park ZONE ATLAS/DRNG. FILE #: B18-D3

LEGAL DESCRIPTION: Coronado Industrial Park

CITY ADDRESS: Glenlale at San Pedro N.E.

ENGINEERING FIRM: Bohannan-Huston Inc. CONTACT: Mel Dahlberg

ADDRESS: 4125 Carlisle Blvd. NE PHONE: 881-2000

OWNER: Coronado Joint Venture CONTACT: David Bolton

ADDRESS: 1913 Broadmoor Suite 204 Bryan, TX 77802 PHONE: 409-775-5252

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

RECEIVED APR 14 1986 HYDROLOGY SECTION

PRE-DESIGN MEETING:

___ YES

✓ NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. -85-325

EPC NO. Z-85-75 / AX-85-18

PROJ. NO. 2804

TYPE OF SUBMITTAL:

✓ DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

✓ OTHER Drainage Rpt. Approval (SPECIFY)

DATE SUBMITTED: 4/11/86

BY: Mel Dahlberg

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000
UNIVERSITY PLAZA 330 GARFIELD SUITE 104 SANTA FE, N. M. 87509 505 988-7671
6713 VISCOUNT BLVD. EL PASO, TEXAS 79925 915 778-4491

April 9, 1986

RECEIVED
APR 14 1986
HYDROLOGY SECTION

Mr. Fred J. Aguirre
Civil Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Coronado Industrial Park Drainage Report

Dear Mr. Aguirre:

Enclosed are two copies of the drainage report for development of the Coronado Industrial Park. This report deals in detail with the major channels and in general with the entire site. A supplement to this report dealing in detail with the infrastructure drainage will be presented to you at a later date.

If you have any questions or comments, please call our office.

Sincerely,

Melvin Dahlberg

Melvin H. Dahlberg, P.E.
Project Engineer

Enclosures

cc: Mr. Harold Cliver

TH/bl
Job No. 6 139 0

PRINCIPALS
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.

BOHANNAN–HUSTON INC.

4125 Carlisle Blvd. NE Albuquerque, New Mexico 87107
(505) 881-2000

Transmittal

RECEIVED
APR 14 1986
HYDROLOGY SECTION

- ☐ Parcel Post
- ☒ Messenger
- ☐ First Class
- ☐ UPS
- ☐ Express Mail
- ☐ Air Freight
- ☐ Bus
- ☐ _____

To: CITY OF ALBUQ.
123 CENTRAL NW
2ND FLOOR
CITY ENGR

Attention: FRED AGUIRRE

Date: 4-9-86 Our job number: 61390

Your job number:

Job: CORONADO INDUSTRIAL PARK

We are enclosing:	For:
2 ea. DRAINAGE REPORTS	REVIEW

Comments:

By: Tom Nothman

thank you

4/14/86

Rec'd by:

Date: 4/9/86

☒ Please Return Signed Yellow Copy

returned for info sheet & engineers stamp 2/1/84

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 1, 1986

Howard Stone
Bohannan-Huston, Inc.
7500 Jefferson Street, NE
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT FOR CORONADO INDUSTRIAL PARK
(B-18/D3) RECEIVED APRIL 14, 1986

Dear Mr. Stone:

A preliminary review of the subject submittal has been conducted and I have the following comments to forward back to you.

The report is incomplete and for me to further my review at this time is not of the most efficient use.

Consequently, I strongly recommend that you wait until you have completed the report for submittal and request for approval.

Specifically, I am looking for a detailed drainage report with street grades (top-of-curb and flowline elevations), complete plan and profile sheets for all the storm sewer facilities (channels, crossing structures and storm sewers) along with the complete hydraulic calculation (Q, V, HGL and any other pertinent information).

Also, you will need to identify what approval you wish to receive with the approval of the drainage report.

Should you have any questions or comments, please call me.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, P.E.
C.E./Hydrology Section

BJG/bsj

[redacted]

[redacted] ENGINEERING DIVISION Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER

FILE COPY

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE REF. NO._____

May 5, 1986

TO: Jim Fink, Planning & Programming Hydrology

FROM: Billy Goolsby, Hydrology Section BJG

SUBJECT: CORONADO INDUSTRIAL PARK DRAINAGE REPORT (B-18/D3)

Attached is the subject Drainage Report as submitted by Bohannan-Huston, Inc.

I request that you review and forward any comments you may have so that I can include them with my response to Howard C. Stone, of Bohannan-Huston, Inc.

BJG/bsj

Attachment

ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

COURTYARD I, 7500 JEFFERSON STREET, N.E. ALBUQUERQUE, NEW MEXICO 87109 (505) 823-1000
UNIVERSITY PLAZA, SUITE 104, 330 GARFIELD SANTA FE, NEW MEXICO 87501 (505) 988-7671
6713 VISCOUNT BLVD EL PASO, TEXAS 79925 (915) 778-4491

May 22, 1986

Mr. Billy Goolsby
City County Flood Plain Administrator
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
MAY 30 1986
HYDROLOGY SECTION

Re: Wave Analysis in a Contraction

Dear Billy:

Enclosed you will find an analysis done by "hand" for the North La Cueva Contraction upstream of San Pedro.

The hand analysis does not show the trial and error solution of equation 3 but if the solved β is inserted in the equation you will see that it balanced.

The hand analysis pointed out a small program error in solving for the distance of wave pileup. This has been corrected. The correction was minor and caused very little change in the final "total depth" values. However, the updated analysis have been enclosed for completeness.

The procedure used here is the same procedure that has been advanced by Dr. Heggen and was first used in the 7-Bar Channel project in order to obtain Soil Conservation Services' approval. I hope this explains the method and as you can see the solution of equation 3 lends itself to an "iterative program" procedure. Should you have any further comments or questions, please call.

Sincerely,

Howard C. Stone

Howard C. Stone, P.E.
Water Resources Manager

Enclosures

HCS/bl
Job No. 6 139 0

PRINCIPALS
LARRY W. HUSTON
MICHIAL M. EMERY, P.E.
DANA C. WOOD, P.E.
ANDRES ARAGON VIAMONTE
DARRELL L. WADE, P.E.
JAMES V. DOMENICK, P.E.
BRIAN G. BURNETT, P.E.

B18/D3

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

RECEIVED MAY 28 1986 HYDROLOGY SECTION

INTER-OFFICE CORRESPONDENCE May 23, 1986

REF. NO.

MEMORANDUM

TO: Bill Otto, Assistant Director, Planning Group, PWD

FROM: Dwayne Sheppard, Manager, Hydrology Division, PWD

RE: Sandia Pueblo/Coronado Airport Agreements

A review of the subject proposed agreements has resulted in the following observations:

1. Drainage Management Concerns.

   No design has been done or been considered for drainage management within the Sandia Pueblo lands affected by the agreement.

   It appears that, for all drainage management other than the proposed street extensions for Louisianna and San Pedro, on-site private systems can and should collect and convey runoff to either the proposed North Camino Channel or to the existing 48" dia. culverts under the freeway and ramps. There should be no public responsibility for installations or maintenance of these systems.

   Drainage management of runoff from the proposed street extensions will be handled either on the roadway surface or in existing roadside ditches along Tramway and thus should have negligible maintenance impact.

   The agreement should be more carefully worded with respect to the extent of Pueblo property to be served. The draft agreement that was reviewed (draft #4, March 26, 1986) referred to, but did not contain, an exhibit "A" which may be intended to describe or portray the limits of the lands to be served.

2. Financing Concerns

   Although this agreement does not specifically address funding responsibilities among the City and Coronado joint venture, it is important to note that the City's position with respect to funding of drainage management facilities in whole Coronado development has been that all costs except for arterial sheet crossing structures of major arroyos the developer's responsibility. AMAFCA intends participating in a minor amount on a short reach of the South Camino Arroyo which lies off the

Coronado property. The developer has been informed since the inception of the project that although the major arroyo crossings are eligible for public funding, no such funding has been programmed nor is any excess funding available at present. Capital Improvement funds for Crossing structures are fully committed and the City Council deleted requested funding from the '85 general obligations bond issue. The developer has been informed that, under the provisions of the Drainage Ordinance, the developer may advance the funds for crossing structure construction and seek reimbursement through the Capital Improvements Program process. This is not a guarantee of reimbursement, since such reimbursement would have to compete for funding just as any other project under consideration for general obligation bond funding. NOTE: Although the provision for reimbursement exists in the Drainage Ordinance, it has never been used to date.

3. Easement Concerns

Limiting of the street easements to "Surface" easements seems too constraining. Since most public and franchised utilities and services will be underground within the limits of the proposed street easements, it would seem more practical to seek more inclusive rights within the street easements (i.e. rights to install and maintain necessary facilities.)

4. Additional Concerns

If it is determined that the City has or will assume any responsibility for any of the capital improvements on the Pueblo lands which would normally be funded from general obligation bond funds, the legality of expenditure of such City general obligation funds on Indian lands should be verified.

With respect to the provision of Fire Fighting Services, it is not clear whether the expense of such services includes the capital costs of installation of water lines, fire hydrants, and appurtenances.

The agreements both contain arbitration clauses. Previous City Attorneys have consistently required us to remove arbitration clauses from agreements.

DS/sp

cc: Jim Fink, Principal Engineer/Hydrology, PWD
Fred Aguirre

DRAINAGE INFORMATION SHEET

B18/D3

PROJECT TITLE: CORONADO AIRPORT ZONE ATLAS/DRNG. FILE #: B-18/19

LEGAL DESCRIPTION: CORONADO INDUSTRIAL PARK, LOTS 1, 2, 3A, 4A, 5A, 6A, 7, 8 AND 9

CITY ADDRESS: N.A.

ENGINEERING FIRM: BOHANNAN-HUSTON, INC. CONTACT: DAN GROCHOWSKI
ADDRESS: 4125 CARLISLE NE ALBUQUERQUE, NM 87107 PHONE: 881-2000

OWNER: CORONADO JOINT VENTURE CONTACT: DAVID BOLTON
ADDRESS: 1713 BROADMOOR, SUITE 204 BRYAN, TX 77802 PHONE: 409-775-1180

ARCHITECT: MORRIS-AUBRY ARCHITECTS CONTACT: JON HAVLAK
ADDRESS: 3355 WEST ALABAMA (P.O. Box 22715) HOUSTON, TX 77227 PHONE: 713-622-1180

SURVEYOR: ESPEY HUSTON & ASSOCIATES, INC. CONTACT: JIM LEYMON
ADDRESS: 4801 INDIAN SCHOOL RD. NE STE. 204 ALBUQUERQUE, NM 87110 PHONE: 255-1625

CONTRACTOR: CONTACT:
ADDRESS: PHONE:

RECEIVED
JUN 07 1985
HYDROLOGY SECTION

PRE-DESIGN MEETING:

___ YES
X NO
___ COPY OF CONFERENCE RECAP SHEET PROVIDED

85-370 - 5/28/85
DRB NO. 85-325 - 3/14/85
EPC NO. Z-85-75/AX-85-18
PROJ. NO. _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
___ GRADING PLAN
___ EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION
X DRAINAGE MANAGEMENT PLAN

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
___ GRADING/PAVING PERMIT APPROVAL
X OTHER DEVELOPMENT PLAN (SPECIFY)

DATE SUBMITTED: _____
BY: Dan Grochowski

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

June 13, 1986

Mr. Howard Stone
Bohannan-Huston, Inc.
7500 Jefferson Street NE, Courtyard I
Albuquerque, NM 87109

REF; DRAINAGE REPORT FOR CORONADO INDUSTRIAL PARK - WITH UPDATE
PROVIDED MAY 30, 1986 (B18/D3)

Dear Mr. Stone:

I have reviewed the above referenced report and hereby give conceptual approval.

The report provided is more specific to the major arroyos and does not particularly address the proposed development. Therefore, prior to any construction work in the development a detailed grading and drainage plan will be required.

The preliminary plans provided for the proposed channel construction do not exactly match the report. Please provide an update, if necessary when the final plans are ready for DRC approval.

Also, I have been advised to inform you that the City does not have any funds available for crossing structures. Consequently, the developer will be responsbile for these structures and may be reimbursed at a later date.

Should you have any questions or comments, please call.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, PE
CE/Hydrology

BJG:mrk

Department AMAFCA 6/26/85

SD-78-3-2
AX-85-19
Z-85-79

JON Messick

Herbert M. Denish and Associates, agents for Seven Bar Land and Cattle Company and V.T. Inc., requests the following:

1) Amendment of the Seven Bar Sector Development Plan's land use plan to permit an auto park in a Planned Commercial Development

2) Annexation and simultaneous establishment of:
   a. RT zoning for Parcel K
   b. SU-1 for a Planned Residential Development (R-2 uses) for Parcel L
   c. SU-1 for a Planned Commercial Development (Auto Park) for Parcels N-1 and N-2

for an unplatted parcel situated in the W1/2 of Sec. 7, T11N, R3E, and located north of the Calabacillas Arroyo and south of Cibola High School, containing approximately 130 acres. (B-13)

AX-85-19, Z-85-79, SD-78-3-2

1. Amendment of 7-Bar Sector Development Plan
   No Adverse Comment
2. Annexation & Zoning - No Adverse Comment
   However as a condition of plat approval Easements acceptable to AMAFCA are required for the entire reach of the Calabacillas Arroyo within the Sector Development Plan area.

The Calabacillas Arroyo is the largest arroyo on the West side, and adequate easements are necessary for drainage management. Recommend that the granting of acceptable easements be a condition of approval.

Fred Aguirre

Z-85-75
AX-85-18

I. The following annexations and establishment of zoning are requested:

A. Espey, Huston and Associates, Inc. agents for Coronado Joint Venture request annexation and simultaneous establishment of IP and SU-1 zoning and Site Development Plan approval, for Lots 1, 2, 3A, 4A, 5A, 6A, 7, 8 and 9, Coronado Industrial Park presently zoned County M-1 and A-1 and located north of Glendale Ave. between I-25 and Louisiana Blvd. and containing approximately 260.477 acres.

B. The City of Albuquerque expands the above request to include annexation and simultaneous establishment of RD zoning for Lots 14 thru 19, Block 22; Lot 23, Block 24; a portion of Lots 17, 18, 19, Block 6; Lots 14 thru 19 and a portion of Lots 13 and 20, Block 7; Lots 13 thru 20, Block 8; all of Block 25 and 26; Lots 1 thru 10, 23 thru 32, in Blocks 27, 28, 29 and 31, Lots 1 thru 10, 23 thru 31, Block 30; Lots 32B and 32A, SP-80-424, those portions of Blocks 9 thru 15 east of I-25 all in Tract A, Unit B, North Albuquerque Acres and containing approximately 261.00 acres.

DAN/PHIL

C. The City of Albuquerque also expands the request in A above to include annexation of the following street right-of-way: Elena, Pasadena, Venice, Beverly Hills, San Diego, Florence, Glendale, Alameda, Eagle Rock, Oakland, Richfield, Signal, Wilshire, Corona, Anaheim Avenues, San Pedro Street, and Louisiana Boulevard adjacent to the tracts described in A and B above, all of which are located east of I-25 Pan American Freeway and containing approximately 41.87 acres. (B&C-18&19)

Landowners, engineers and planners have coordinated well with AMAFCA. Recommend approval subject to:

1. The proposed diversion requires AMAFCA Board approval of modification of the Northeast Heights Drainage Management Pl
2. Landowners agreement to grant drainage easements acceptable to AMAFCA as conceptually shown on Sector Developmen Plan Sheet #5
3. Easements are granted prior to or at the same time as any subdivision or development (including grading) occurs in any principal basin.
4. Landowner recognizes responsibility to construct channel improvements across Sector Plan area.
5. Landowner agrees to paying 50% of design and construction cost for combined La Cueva - South Camino Channel between San Pedro Drive and I-25 culverts.

#6

PURPOSE: DETERMINE SIZE & LENGTH OF ENCLOSED CHANNEL FOR NORTH CAMINO FROM I-25 to ABOVE SAN PEDRO

METHOD: SEE CALCS

REFERENCES:

1.) "Precast Box Culverts"; pamphlet by Carder Concret Products.
2.) "Fluid Mechanics"; by Streeter & Wylie; McGraw-Hill 1979

PROJECT NAME _____ SHEET 1 OF 11
PROJECT NO. _____ BY TH DATE 3-24-86
SUBJECT _____ CH'D RCL DATE 4/7/86

CALCULATIONS:

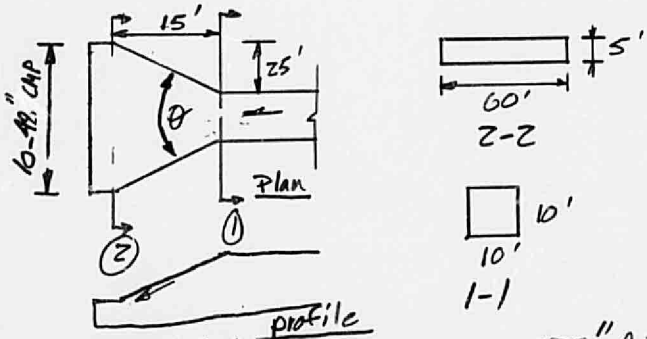
The existing crossing at I-25 consists of 10-48"Ø RCP's with ~2' of 48" CMP Extentions. The design flow for the North Camino channel is 2000 cfs. Using ref 1 nomograph inlet control requires a headwater depth of ~12' (outlet control is 10'). Since the existing frontage road at the inlet to the pipes is about 2' above the top of the pipes 15' of head water is not available.

An alternate to ponding 12' of water at the pipes is to enclose the channel in a CBC and push the water into the pipes as pressure flow. An in depth econimic anlaysis was performed using the idea that if a 10x10 CBC was built the land over the box could be

recoved and used for parking. The econimics made the enclosed box a good alternate.

- Assume flow from the N. Camino open channel will enter a 10x10 cbc as super critical flow. The flow will remain super critical in the box untill encountering the hydralic grade line due to pressure flow at the pipes. Then flow in the box will consist of inlet control at the pipes, losses in the expanision from box to pipe, and losses due to full conduit friction in the box.

FIND LOSS DUE TO EXP USING EQUIV. PIPES



From pamphlet 10x10 Eq = 138" ϕ PIPE
(see chart pg.11 ref.1)

$A_{10x10} = 100\,SF \quad A_{138"\phi} = 103.8$

$A_{5x60} = 300 = \pi r_e^2 \quad r_e = \sqrt{\frac{300}{\pi}} = 9.77'$

$\Rightarrow$ EQUIV. DIA @ (2) = 19.5'

for exp loss use (Fig 5.55 pg 245 ref.2)

$H_e = K \frac{(V_1 - V_2)^2}{2g}$ K is based on θ

$\theta = 2\left(\tan^{-1}\left(\frac{25}{15}\right)\right) = 118^\circ$

PROJECT NAME _____ SHEET 4 OF 11
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

$$\frac{D_2}{D_1} = \frac{19.5'}{138/12} = 1.7$$

From fig $k = 1.07$

$Q = 2000$ cfs

$V_1 = 2000/100 = 20$ ft/s

$V_2 = 2000/300 = 6.67$

Check sudden exp. = 4.75'

$$\text{EXP } H_e = 1.07 \frac{(20-6.67)^2}{64.4} = \underline{\underline{2.95'}}$$

FIND Friction Slope IN 10X10

USING Hazen Williams $C = 130$ $Q = 900000$ gpm

from computer program 138 Eq.

$$H_f = \frac{3.07'}{600'} \qquad S_f = 0.00512$$

Velocity head in 10X10

$$V = 19.3 \qquad \frac{V^2}{2g} = 5.97$$

PROJECT NAME _____ SHEET 5 OF 11

PROJECT NO. _____ BY _____ DATE _____

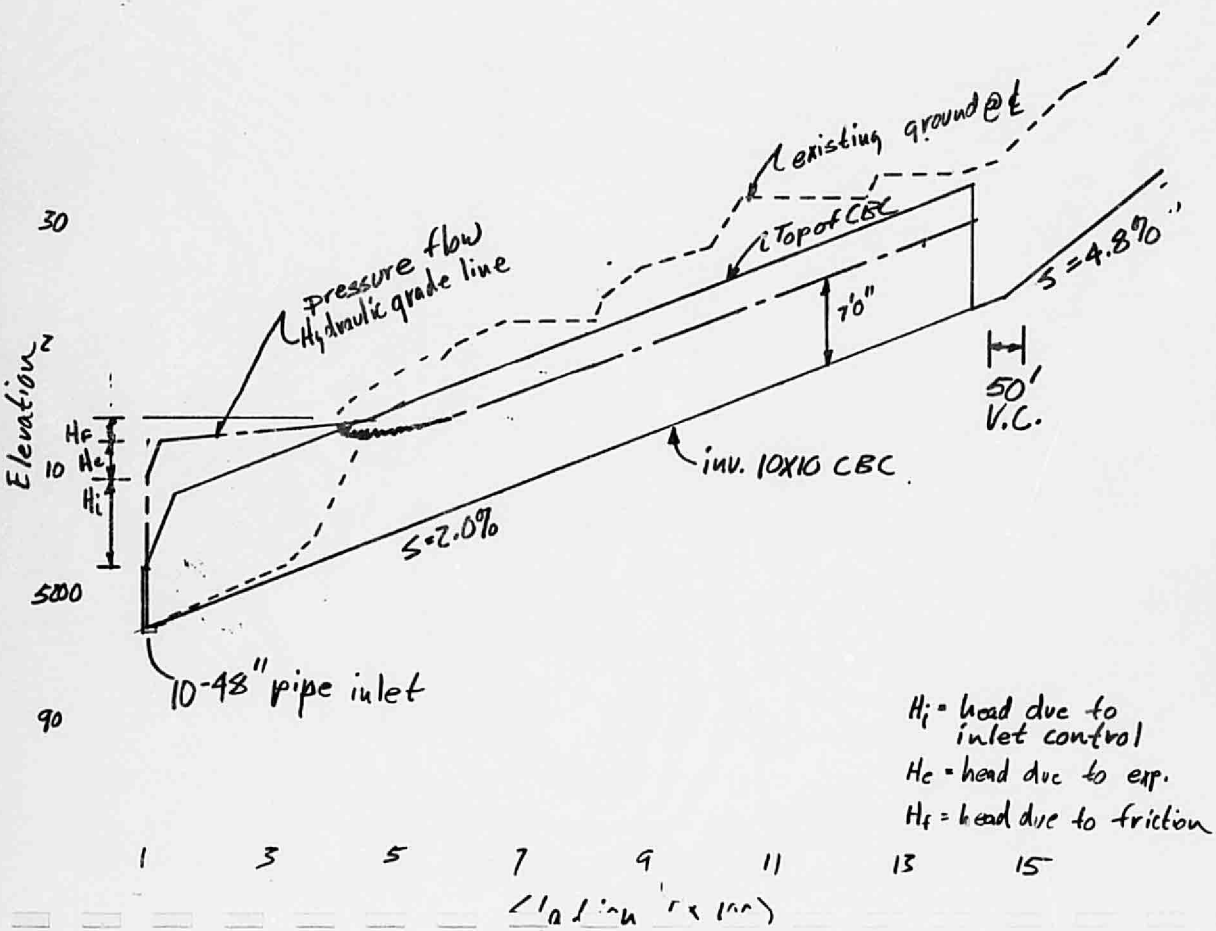
SUBJECT _____ CH'D _____ DATE _____

From sketch pg 7, the total head req'd is projected upstream from the pipe inlet with the friction slope. Somewhere upstream of where the sequent depth of the supercritical flow intersects the pressure flow hydraulic grade line and downstream of where the pressure flow hydraulic grade line goes below the top of the box, is where the hydraulic jump will form (between sta 4+00 and 6+00)

To allow for a factor of safety the box will be extended to sta. 14+00.

INLET INTO CBC:

A 100' long vertical wall transition was modeled using HEC-2. The channel slope entering the transition was 6.0%. The vert. trans begins at the upstream face of the box



PROJECT NAME _____ SHEET 7 OF 11

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

From HEC-2 (pg 10) the water depth at the box is 6.14' adding wave height of 0.86' gives a total depth of ~7'0" in the box.

$\boxed{\therefore \text{ USE } 10 \times 10 \text{ CBC to sta } 14+00}$

SECND	ELEV	TOPWD	VCH	CHREF	CHINS	EG	DCH	DEPTH	RECHSI
2000.000	5250.75	25.74	24.37	5254.20	5247.23	5246.70	2000.00	3.95	-22.50
1900.000	5247.77	25.70	24.51	5251.71	5254.75	5244.33	2000.00	3.94	-24.80
1800.000	5247.00	24.49	32.03	5245.67	5248.97	5241.55	2000.00	3.67	-53.70
1700.000	5234.00	23.74	34.51	5239.44	5243.00	5237.03	2000.00	3.44	-60.00
1600.000	5233.00	23.29	36.16	5233.12	5236.96	5233.63	2000.00	3.32	-60.00
1550.000	5227.00	23.13	36.28	5230.28	5233.96	5231.28	2000.00	3.28	-60.00
1520.000	5225.38	23.08	36.93	5228.65	5232.34	5229.83	2000.00	3.27	-54.00
1510.000	5224.92	23.11	36.91	5228.19	5231.88	5229.35	2000.00	3.27	-46.00
1500.000	5224.50	23.11	36.85	5227.78	5231.46	5228.86	2000.00	3.28	-41.49
1495.000	5224.30	23.12	36.81	5227.58	5231.26	5228.62	2000.00	3.28	-40.04
1490.000	5224.10	23.13	36.76	5227.40	5231.07	5228.38	2000.00	3.30	-39.94
1485.000	5223.90	23.14	36.71	5227.22	5230.90	5228.14	2000.00	3.32	-40.04
1480.000	5223.78	23.18	36.62	5227.08	5230.74	5227.90	2000.00	3.30	-24.02
1475.000	5223.60	23.18	36.55	5226.92	5230.58	5227.67	2000.00	3.32	-35.94
1470.000	5223.48	23.22	36.46	5226.79	5230.44	5227.43	2000.00	3.31	-24.02
1465.000	5223.30	23.22	36.38	5226.64	5230.22	5227.20	2000.00	3.34	-36.04
1460.000	5223.20	23.25	36.28	5226.53	5230.05	5226.96	2000.00	3.33	-19.92
1455.000	5223.10	23.29	36.17	5226.42	5229.91	5226.73	2000.00	3.32	-20.02
1450.000	5223.00	23.32	36.06	5226.33	5229.80	5226.50	2000.00	3.33	-20.02
1445.000	5222.90	23.35	35.93	5226.24	5229.73	5226.28	2000.00	3.34	-20.02
1440.000	5222.80	23.38	35.81	5226.14	5229.69	5226.05	2000.00	3.34	-20.02
1435.000	5222.70	23.42	35.69	5226.05	5229.69	5225.83	2000.00	3.35	-19.92
1430.000	5222.60	22.00	35.57	5225.97	5229.74	5225.62	2000.00	3.37	-20.02
1425.000	5222.50	20.00	35.41	5225.95	5229.86	5225.42	2000.00	3.45	-20.02
1420.000	5222.40	18.00	35.19	5226.00	5230.02	5225.23	2000.00	3.60	-20.02
1415.000	5222.30	16.00	34.88	5226.17	5230.41	5225.06	2000.00	3.87	-20.02

North Camino

24-MAR-86 09:47:55

RSCHD	VEL*IN	TOP*IP	VCH	CWSPL	CRIWS	FG	QCH	DEPTH	RSCHSL
1410.000	5222.20	14.00	34.43	5226.49	5230.40	5244.40	2000.00	4.24	-14.42
1405.000	5222.10	12.00	33.71	5227.08	5231.54	5244.74	2000.00	4.48	-20.02
1400.000	5222.00	10.00	32.56	5228.14	5234.48	5244.60	2000.00	6.14	-20.02
1390.000	5221.80	10.00	32.46	5227.96	5234.72	5244.37	2000.00	6.16	-20.02
1380.000	5221.60	10.00	32.37	5227.78	5234.53	5244.05	2000.00	6.18	-19.93
1300.000	5220.00	10.00	31.69	5226.31	5232.74	5241.90	2000.00	6.31	-20.00
1200.000	5218.00	10.00	31.00	5224.45	5230.78	5239.37	2000.00	6.45	-20.00
1000.000	5214.00	10.00	30.01	5220.66	5226.78	5234.85	2000.00	6.66	-20.00
800.000	5210.00	10.00	29.41	5216.91	5222.77	5230.24	2000.00	6.81	-20.00
600.000	5206.00	10.00	29.06	5212.89	5218.77	5226.01	2000.00	6.89	-20.00
500.000	5204.00	10.00	28.96	5210.90	5216.77	5223.93	2000.00	6.90	-20.00

North Camino

10 of 11

ARCHD	FLOWIN	TOPWID	WCH	CWSEL	CRIWS	FG	QCH	DEPTH	ARCHSL
1410.000	5222.20	14.00	34.43	5226.49	5230.40	5244.40	2000.00	4.24	-19.42
1405.000	5222.14	12.00	33.71	5227.08	5231.54	5244.74	2000.00	4.48	-20.02
1400.000	5222.00	10.00	32.56	5228.14	5234.48	5244.60	2000.00	6.14	-20.02
1390.000	5221.80	10.00	32.46	5227.96	5234.32	5244.32	2000.00	6.16	-20.02
1380.000	5221.60	10.00	32.37	5227.78	5234.53	5244.05	2000.00	6.18	-19.97
1300.000	5220.00	10.00	31.69	5226.31	5232.74	5241.90	2000.00	6.31	-20.00
1200.000	5218.00	10.00	31.00	5224.45	5230.78	5239.37	2000.00	6.45	-20.00
1000.000	5214.00	10.00	30.01	5220.66	5226.78	5234.65	2000.00	6.66	-20.00
800.000	5210.00	10.00	29.41	5216.81	5222.77	5230.24	2000.00	6.81	-20.00
600.000	5206.00	10.00	29.06	5212.89	5218.77	5226.01	2000.00	6.89	-20.00
500.000	5204.00	10.00	28.96	5210.90	5216.77	5223.93	2000.00	6.90	-20.00

X

North Camino

10 of 11

BOX CULVERT EQUIVALENTS

Box Culvert	Circular Pipe	Elliptical Pipe	Box Culvert	Circular Pipe	Elliptical Pipe
3 x 2	33		8 x 4	78	63 x 98
3 x 3	39		8 x 5	84	68 x 106
4 x 2	36	29 x 45	8 x 6	96	77 x 121
4 x 3	42	38 x 60	8 x 7	102	82 x 128
4 x 4	54	43 x 68	8 x 8	108	87 x 136
5 x 3	48	38 x 60	9 x 5	90	72 x 113
5 x 4	60	48 x 76	9 x 6	102	82 x 128
5 x 5	66	53 x 83	9 x 7	108	87 x 136
6 x 3	60	48 x 76	9 x 8	114	92 x 143
6 x 4	66	53 x 83	9 x 9	120	97 x 151
6 x 5	78	63 x 98	10 x 5	96	77 x 121
6 x 6	84	68 x 106	10 x 6	108	87 x 136
7 x 4	72	58 x 91	10 x 7	114	92 x 143
7 x 5	78	63 x 98	10 x 8	120	97 x 151
7 x 6	90	72 x 113	10 x 9	132	106 x 166
7 x 7	96	77 x 121	10 x 10	138	116 x 180

ASTM C-789—PRECAST REINFORCED CONCRETE BOX SECTIONS

Span (ft.)	Rise (ft.)	Thickness (in.) Wall	Waterway Area (sq. ft.)	Approx. Weight (lbs./ft.)
3	2	4	5.8	600
3	3	4	8.8	700
4	2	5	7.7	910
4	3	5	11.7	1030
4	4	5	15.7	1160
5	3	6	14.5	1430
5	4	6	19.5	1580
5	5	6	24.5	1730
6	3	7	17.3	1880
6	4	7	23.3	2060
6	5	7	29.3	2230
6	6	7	35.3	2410
7	4	8	27.1	2600
7	5	8	34.1	2800
7	6	8	41.1	3000
7	7	8	48.1	3200
8	4	8	31.1	3800
8	5	8	39.1	3000
8	6	8	47.1	3200
8	7	8	55.1	3400
8	8	8	63.1	3600
9	5	9	43.9	3660
9	6	9	52.9	3880
9	7	9	61.9	4110
9	8	9	70.9	4330
9	9	9	79.9	4560
10	5	10	48.6	4380
10	6	10	58.6	4630
10	7	10	68.6	4880
10	8	10	78.6	5130
10	9	10	88.6	5380
10	10	10	98.6	5630

#7

PURPOSE: Determine concrete channel depths based on freeboard and super elevation requirements.

METHOD: Based on HEC-2 runs use DPM requirements from p. 61.1 Section 22.3 (freeboard) and p. 59 Section 22.3 (superelevation) All cases are developed conditions

PROJECT NAME CORONADO SHEET 1 OF 23
PROJECT NO. BY JH DATE 3-14-86
SUBJECT Channel depths CH'D DATE

La Cueva

Sta 37+00 (Upstream of V. trans.)

$d = 5.9'$ $V = 30.1$ ft/s $b = 15'$

Freeboard = F.B. = $0.7\left[2.0 + 0.025 V (d)^{\frac{1}{3}}\right]$

$F.B. = 0.7\left[2 + 0.025(30.1)(5.9)^{\frac{1}{3}}\right] = 2.35'$

No super $\Rightarrow d_{REQ'D} = 5.9 + 2.35 = 8.25'$

USE 8'3"

Sta 36+00 → 37+00

$d = 5.16$ $V = 28.81$

@ 36+30

$FB = 0.7\left[2 + 0.025(28.81)(5.16)^{\frac{1}{3}}\right] = 2.27$

$d_{req'd} = 5.16 + 2.27 = 7.43$

Since channel is transistioning to 10'0" CBC Sta 37+00 channel depth will transition from 8'3" to 10'0"

Sta 33+90 (V. trans.)

$d = 5.28'$ $V = 36.12$

$FB = 0.7\left[2 + 0.025(36.12)(5.28)^{\frac{1}{3}}\right] = 2.50'$

$d_{req'd} = 7.78'$

USE 7'9"

Curve Sta ~32+00 → 25+00

$$S = 1.3\,\frac{V^2(b + 2zd)}{gr} \qquad z = 2 \qquad b = 15'$$

$R = 1222'$ $d_{avg} = 5.3$ $V_{avg} = 34$

$$S_{req'd} = 1.3\left[\frac{(35)^2(15 + 2(2)(5.3))}{32.2\,(1222)}\right]$$

$S_{req'd} = 1.47'$ USE 1'6"

$FB = 0.7\left[2 + 0.025(35)(5.3)^{\frac{1}{3}}\right] = 2.47$

$5.3 + 2.47 = 7.77$ USE 7'9"

PROJECT NAME _____ SHEET 3 OF 28

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Sta 26+00 → 24+00

$V_{avg} = 35$ $d_{avg} = 5'$ $R = 1222'$

$b = 17'0''$

$$S = 1.3\left[\frac{(35)^2(17 + 2(2)(5))}{32.2\,(1222)}\right] = 1.5'$$

USE 1'6"

$$FB = 0.7\left[2 + 0.025(35)(5)^{1/3}\right] = 2.45'$$

$d_{req'd} = 5.0 + 2.45 = 7.45$ USE 7'9"

Curve Sta 20+00 → 13+40

$R = 2632'$ $V_{avg} = 42.2$ $d_{avg} = 5.5$
$b = 20'$

$$S = 1.3\left[\frac{(42.2)^2(20 + 2(2)(5.5))}{32.2\,(2632)}\right] = 0.88$$

USE 1'0"

$$F.B = 0.7\left[2 + 0.025(42.2)(5.5)^{\frac{1}{3}}\right] = 2.70'$$

$$d\ REQ'D = 2.7 + 5.5 = 8.2$$

USE 8'3"

Sta 12+00 → 8+50

$V_{avg} = 41.95$ d_{avg} 5.5

$$FB = 0.7\left[2 + 0.025(41.9)(5.5)^{\frac{1}{3}}\right] = 2.69$$

$$d_{req'd} = 5.5 + 2.69 = 8.19$$

USE 8'3"

6+50 ⇒ 7+00 (RECT. SECTION)

$v = 41$ $d = 5.2'$ $b = 32'$ rect channel
$r = 443$

$$S = \frac{V^2 b}{9r} = \frac{(41)^2(32)}{32.2(443)} = 3.77'$$

USE 3'9"

$$F.B. = 0.7\left[2 + 0.025(41)(5.2)^{\frac{1}{3}}\right] = 2.64'$$

$$D_{req'd} = 2.64 + 5.2 + 3.77 = 11.6'$$

USE 11'6"
BOTH SIDES

CONFLUENCE

Downstream
$V = 28.7$ $d = 7.0$

$$0.7\left[2 + 0.025(28.7)(7.0)^{\frac{1}{3}}\right] = 2.36'$$

$$d_{req'd} = 7.0 + 2.4 = 9.4$$

USE 9'3"
Throughout confluence

PROJECT NAME _____ SHEET 6 OF 23
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

SOUTH CAMINO

Sta 15+40

$V = 26.1 \quad d = 4.72$

$FB = 0.7\left[2 + 0.025(26.1)(4.72)^{\frac{1}{3}}\right] = 2.17'$

$D_{req'd} = 4.72 + 2.17 = 6.89$

USE 7'0"

Sta 11+00

$V = 26.3 \quad d = 4.07$

$FB = 0.7\left[2 + 0.025(26.3)(4.07)^{\frac{1}{3}}\right] = 2.13$

$D_{req'd} = 6.20$

Sta 13+00

$V = 25.4 \quad d = 3.86$

$FB = 0.7\left[2 + 0.025(25.4)(3.86)^{\frac{1}{3}}\right] = 2.10$

$D_{req'd} = 5.96$

USE 6'3"

13+00 → 11+00

Sta 9+00

$V = 26.90 \quad d = 4.23'$

$FB = 0.7\left[2 + 0.025(26.9)(4.23)^{\frac{1}{3}}\right] = 2.16$

$D_{req'd} = 6.39'$

curve 10+50 → 8+00 r = 3142

$$S = 1.3\left[\frac{(26.9)^2\left(10 + 2(2)(4.23)\right)}{32.7(3142)}\right] = 0.25'$$

sta 5+00 → 7+00

$V_{avg} = 32$ $d_{avg} = 4.4$

$$F.B = 0.7\left[2 + 0.025(32)(4.4)^{\frac{1}{3}}\right] = 2.31$$

$$d_{req'd} = 4.4 + 2.3 = 6.7'$$

USE 6'6" From Louisiana to confluence both sides

N. Camino

Sta 35+00 → 27+00

$V = 31.2 \quad d = 3.7'$

$F.B. = 0.7\left[2 + 0.025(31.2)(3.7)^{1/3}\right] = 2.24'$

$d_{req'd} = 2.24 + 3.7 = 5.94$

USE 6'0"

Sta 27+00 → 19+00

$V = 29 \quad d = 3.9$

$FB = 0.7\left[2 + 0.025(29)(3.9)^{1/3}\right] = 2.2$

$3.9 + 2.2 = 6.1$

USE 6'0"

Sta 19+00 → 15+00

$V = 34.5 \quad d = 3.44$

$FB = 0.7\left[2 + 0.025(34.5)(3.44)^{1/3}\right] = 2.31$

$3.44 + 2.31 = 5.75$

USE 6'0"

CURVE STA 19+ → 10+

$V_{max} = 36.9 \quad d = 3.27 \quad r = 1492$

$$S = 1.3\left[\frac{(36.9)^2(10+2(2)(3.27))}{32.2(1492)}\right] = 0.85$$

USE 1'0"

BOX 14+00 → 8+00

$V = 28.6 \quad d = 7.0 \quad r = 1492$

rect chan

$$S = \frac{V^2 b}{gr} = \frac{(28.6)^2(10)}{32.2(1492)} = 0.17$$

$$F.B = 0.7\left[2+0.025(28.6)(7.0)^{\frac{1}{3}}\right] = 2.35$$

X5
LoC

THIS RUN EXECUTED 19-MAR-86 13:47:26

```
*****************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR. 1980
  ERROR CODE -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
*****************************************
```

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

3-10X10CBC,2-10X10CBC,50

SUMMARY PRINTOUT

	SECNO	ELMIN	TOPWID	VCH	CWSEL	CRIWS	EG	QCH	DEPTH	K*CNSL
*	4400.000	5303.80	57.80	14.43	5313.33	5313.33	5316.48	4617.40	9.53	0.00
	4300.000	5301.80	45.15	21.90	5309.34	5311.32	5316.18	4760.00	7.54	-20.00
	4200.000	5299.80	42.75	23.76	5306.74	5309.45	5315.50	4760.00	6.94	-20.00
	4100.000	5297.80	41.34	25.66	5304.39	5307.49	5314.61	4760.00	6.59	-20.00
	4000.000	5295.80	40.39	27.08	5302.15	5305.46	5313.53	4760.00	6.35	-20.00
	3900.000	5293.80	39.71	28.18	5299.99	5303.46	5312.31	4760.00	6.19	-20.00
	3850.000	5292.80	39.42	28.66	5298.90	5302.46	5311.65	4760.00	6.10	-20.00
	3800.000	5291.80	39.18	29.07	5297.85	5301.46	5310.97	4760.00	6.05	-20.00
	3750.000	5290.80	38.97	29.44	5296.79	5300.46	5310.25	4760.00	5.99	-20.00
	3720.000	5290.20	38.86	29.64	5296.17	5299.87	5309.81	4760.00	5.97	-19.99
	3710.000	5289.92	38.78	29.81	5295.86	5299.58	5309.66	4760.00	5.94	-28.03
	3700.000	5289.50	38.58	30.14	5295.40	5299.16	5309.51	4760.00	5.90	-41.99
	3695.000	5289.20	38.51	30.45	5295.03	5298.82	5309.43	4760.00	5.83	-59.96
	3690.000	5288.90	38.46	30.78	5294.63	5298.43	5309.35	4760.00	5.73	-60.06
	3685.000	5288.58	38.44	31.13	5294.22	5298.05	5309.26	4760.00	5.64	-63.96
	3680.000	5288.20	38.34	31.53	5293.74	5297.62	5309.18	4760.00	5.54	-75.98
	3675.000	5287.80	38.27	31.94	5293.24	5297.18	5309.09	4760.00	5.44	-80.08

LaCueva Ultimate

11 of 23

BECWD	ELWIN	TOPWID	VCN	CWSEL	CRIWS	EG	OCH	DEPTH	R*CHBL
3670,000	5287,40	38,21	32,34	5292,75	5296,76	5308,99	4760,00	5,35	-79,98
3665,000	5287,00	37,90	32,72	5292,27	5296,36	5308,89	4760,00	5,27	-79,98
3660,000	5286,60	36,60	33,09	5291,79	5295,97	5308,79	4760,00	5,19	-79,98
3655,000	5286,20	35,30	33,44	5291,33	5295,61	5308,69	4760,00	5,13	-79,98
3650,000	5285,80	34,00	33,77	5290,89	5295,26	5308,59	4760,00	5,09	-80,08
3645,000	5285,40	32,70	34,07	5290,46	5294,93	5308,49	4760,00	5,06	-79,98
3640,000	5285,00	31,40	34,35	5290,07	5294,64	5308,39	4760,00	5,07	-79,98
3635,000	5284,60	30,10	34,59	5289,71	5294,39	5308,29	4760,00	5,11	-79,98
3630,000	5284,27	28,81	34,76	5289,43	5294,22	5308,19	4760,00	5,16	-66,02
3625,000	5283,97	27,50	34,84	5289,24	5294,11	5308,08	4760,00	5,27	-59,96
3620,000	5283,70	26,20	34,87	5289,11	5294,12	5307,99	4760,00	5,41	-54,00
3615,000	5283,47	24,90	34,80	5289,09	5294,31	5307,89	4760,00	5,62	-46,00
3610,000	5283,28	23,60	34,64	5289,16	5294,65	5307,79	4760,00	5,88	-38,09
3605,000	5283,10	22,30	34,39	5289,33	5295,14	5307,70	4760,00	6,23	-35,94
3600,000	5283,00	21,00	33,83	5289,70	5295,81	5307,47	4760,00	6,70	-20,02
3580,000	5282,60	21,00	33,88	5289,29	5295,42	5307,11	4760,00	6,69	-20,00
3560,000	5282,20	21,00	33,93	5288,88	5295,01	5306,75	4760,00	6,68	-20,00
3540,000	5281,80	21,00	33,97	5288,47	5294,61	5306,40	4760,00	6,67	-20,02
3520,000	5281,40	21,00	34,02	5288,06	5294,21	5306,03	4760,00	6,66	-20,00
3500,000	5281,00	21,00	34,06	5287,65	5293,81	5305,67	4760,00	6,65	-20,00
3480,000	5280,60	21,00	34,10	5287,25	5293,41	5305,31	4760,00	6,65	-20,00
3460,000	5280,20	21,00	34,14	5286,84	5293,01	5304,94	4760,00	6,64	-20,00
3440,000	5279,80	21,00	34,18	5286,43	5292,62	5304,57	4760,00	6,63	-20,02
3435,000	5279,70	24,00	35,02	5285,44	5290,78	5304,48	4760,00	5,74	-19,92
3430,000	5279,60	27,00	35,50	5284,81	5289,73	5304,38	4760,00	5,21	-20,02
3425,000	5279,50	30,00	35,75	5284,43	5289,17	5304,27	4760,00	4,93	-20,02

La Cueva Ultimate

12 of 23

SECND	FLWIN	TOPMID	VCH	CWBFL	CRIWR	EG	OCH	DEPTH	K*CHRL
3420.000	5279.40	33.00	35.84	5284.21	5288.92	5304.15	4760.00	4.81	-20.02
3415.000	5279.30	36.00	35.81	5284.12	5288.52	5304.03	4760.00	4.82	-20.02
3410.000	5279.20	37.00	35.71	5284.10	5288.43	5303.90	4760.00	4.90	-19.92
3405.000	5279.10	36.77	35.60	5284.09	5288.35	5303.78	4760.00	4.99	-20.02
3400.000	5279.00	36.54	35.50	5284.09	5288.33	5303.65	4760.00	5.09	-20.02
3395.000	5278.90	36.32	35.39	5284.08	5288.38	5303.53	4760.00	5.18	-20.02
3390.000	5278.80	36.12	35.28	5284.08	5288.48	5303.41	4760.00	5.28	-20.02
3380.000	5278.60	36.13	35.24	5281.89	5288.27	5303.17	4760.00	5.29	-19.97
3360.000	5278.20	36.16	35.17	5283.49	5287.87	5302.69	4760.00	5.29	-20.00
3330.000	5277.60	36.21	35.05	5282.91	5287.27	5301.99	4760.00	5.31	-20.00
3300.000	5277.0[illegible]	36.26	34.95	5282.32	5286.66	5301.28	4760.00	5.32	-20.00
3250.000	5276.00	36.33	34.79	5281.33	5285.67	5300.13	4760.00	5.33	-20.00
3200.000	5275.00	36.39	34.64	5280.35	5284.67	5298.98	4760.00	5.35	-20.00
3150.000	5274.00	36.45	34.50	5279.37	5283.66	5297.85	4760.00	5.37	-20.00
3100.000	5273.00	36.51	34.38	5278.38	5282.66	5296.73	4760.00	5.38	-20.00
3050.000	5272.00	36.56	34.26	5277.39	5281.66	5295.63	4760.00	5.39	-20.00
3000.000	5271.00	36.60	34.16	5276.41	5280.66	5294.53	4760.00	5.41	-20.00
2900.000	5269.00	36.68	33.98	5274.43	5278.66	5292.35	4760.00	5.43	-20.00
2800.000	5267.00	36.75	33.82	5272.45	5276.66	5290.21	4760.00	5.45	-20.00
2700.000	5264.99	36.80	33.71	5270.45	5274.65	5288.09	4760.00	5.46	-20.10
2670.000	5264.39	36.81	33.68	5269.85	5274.02	5287.46	4760.00	5.46	-20.00
2650.000	5263.99	36.82	33.66	5269.45	5273.65	5287.04	4760.00	5.46	-20.00
2640.000	5263.79	36.80	33.69	5269.20	5273.44	5286.83	4760.00	5.41	-20.02
2630.000	5263.58	37.09	33.77	5268.91	5273.23	5286.62	4760.00	5.33	-21.00
2620.000	5263.34	37.28	33.86	5268.60	5272.92	5286.40	4760.00	5.26	-24.02
2610.000	5263.07	37.35	33.97	5268.27	5272.60	5286.18	4760.00	5.20	-27.00

La Cueva Ultimate

SECND	FLMIN	TOPMID	VCN	CWBEL	CRIWB	EG	GCN	DEPTH	K*CHBL
2600.000	5262.78	37.48	34.09	5267.91	5272.25	5285.96	4760.00	5.13	-29.00
2580.000	5262.11	37.40	34.33	5267.21	5271.54	5285.51	4760.00	5.10	-33.50
2550.000	5261.09	37.24	34.68	5266.15	5270.43	5284.82	4760.00	5.06	-34.00
2500.000	5259.40	37.03	35.18	5264.41	5268.75	5283.63	4760.00	5.01	-33.80
2450.000	5257.70	36.85	35.64	5262.67	5267.06	5282.39	4760.00	4.97	-33.99
2400.000	5256.00	36.68	36.05	5260.92	5265.37	5281.11	4760.00	4.92	-34.00
2300.000	5252.60	36.40	36.76	5257.45	5261.97	5278.43	4760.00	4.85	-34.00
2200.000	5249.20	36.19	37.32	5254.00	5258.58	5275.62	4760.00	4.80	-34.00
2100.000	5245.80	48.40	28.09	5252.90	5256.52	5265.15	6820.00	7.10	-34.00
2000.000	5242.40	46.45	31.05	5249.01	5251.42	5263.98	6820.00	6.61	-34.00
1900.000	5239.00	45.15	33.29	5245.79	5248.42	5262.50	6820.00	6.29	-34.00
1800.000	5236.10	44.48	34.57	5242.22	5246.23	5260.77	6820.00	6.12	-29.00
1700.000	5233.20	43.96	35.61	5239.20	5243.80	5258.88	6820.00	6.00	-29.00
1600.000	5230.30	43.54	36.47	5236.19	5240.93	5256.84	6820.00	5.89	-29.00
1500.000	5227.40	43.21	37.19	5233.21	5238.15	5254.68	6820.00	5.81	-29.00
1400.000	5224.50	42.94	37.78	5230.23	5235.25	5252.40	6820.00	5.73	-29.00
1300.000	5221.60	42.73	38.27	5227.29	5230.65	5250.04	6820.00	5.69	-29.00
1200.000	5218.70	42.54	38.69	5224.34	5227.77	5247.59	6820.00	5.64	-29.00
1100.000	5215.80	42.40	39.04	5221.40	5224.80	5245.07	6820.00	5.60	-29.00
1000.000	5212.90	42.28	39.33	5218.47	5222.46	5242.49	6820.00	5.57	-29.00
950.000	5211.45	42.18	39.46	5217.01	5221.51	5241.19	6820.00	5.56	-28.99
900.000	5210.00	42.17	39.58	5215.54	5220.42	5239.87	6820.00	5.54	-29.00
850.000	5208.55	42.17	39.69	5214.08	5219.17	5238.54	6820.00	5.53	-29.00
840.000	5208.26	42.09	39.70	5213.80	5218.98	5238.27	6820.00	5.54	-29.00
830.000	5207.97	42.09	39.72	5213.51	5218.69	5238.01	6820.00	5.54	-28.96
825.000	5207.80	42.35	39.81	5213.27	5218.46	5237.87	6820.00	5.47	-34.08

14 of 22

La Cueva Ultimate

SECND	FLMIN	TOPNID	VCN	CWBEL	CRIWB	EG	DCH	DEPTH	KPCHBL
820.000	5207.68	42.64	39.88	5213.04	5218.21	5237.74	6820.00	5.36	-23.93
815.000	5207.50	42.88	39.96	5212.81	5217.91	5237.60	6820.00	5.31	-36.04
810.000	5207.39	43.19	40.02	5212.59	5217.67	5237.46	6820.00	5.20	-21.97
805.000	5207.20	43.44	40.09	5212.36	5217.43	5237.32	6820.00	5.16	-37.99
800.000	5207.10	43.77	40.15	5212.15	5217.22	5237.17	6820.00	5.05	-20.02
795.000	5206.96	44.11	40.19	5211.94	5217.04	5237.03	6820.00	4.98	-28.03
790.000	5206.80	44.38	40.27	5211.70	5216.83	5236.88	6820.00	4.90	-32.03
785.000	5206.67	44.74	40.30	5211.51	5216.67	5236.73	6820.00	4.84	-25.98
780.000	5206.50	44.00	40.37	5211.27	5216.50	5236.58	6820.00	4.77	-33.98
775.000	5206.38	42.80	40.40	5211.10	5216.38	5236.43	6820.00	4.72	-24.02
770.000	5206.20	41.60	40.43	5210.90	5216.25	5236.29	6820.00	4.70	-35.94
765.000	5206.08	40.40	40.44	5210.75	5216.18	5236.14	6820.00	4.67	-24.02
760.000	5205.90	39.20	40.45	5210.60	5216.10	5236.00	6820.00	4.70	-36.04
755.000	5205.79	38.00	40.42	5210.50	5216.08	5235.86	6820.00	4.71	-21.97
750.000	5205.60	36.80	40.38	5210.40	5216.08	5235.72	6820.00	4.80	-37.99
745.000	5205.50	35.60	40.31	5210.36	5216.13	5235.59	6820.00	4.86	-20.02
740.000	5205.36	34.40	40.21	5210.35	5216.25	5235.46	6820.00	4.99	-28.03
735.000	5205.20	33.20	40.11	5210.34	5216.38	5235.33	6820.00	5.14	-31.93
730.000	5205.07	32.00	28.30	5212.60	5216.63	5225.04	6820.00	7.53	-26.07
720.000	5204.78	32.00	28.62	5212.23	5216.34	5224.94	6820.00	7.45	-29.00
700.000	5204.20	32.00	29.21	5211.50	5215.76	5224.75	6820.00	7.30	-28.99
650.000	5202.75	32.00	30.54	5209.73	5214.30	5224.21	6820.00	6.98	-29.00
600.000	5201.30	32.00	31.68	5208.03	5212.86	5223.60	6820.00	6.73	-29.00
550.000	5199.85	32.00	32.64	5206.38	5211.40	5222.93	6820.00	6.53	-28.99
500.000	5198.40	32.00	33.51	5204.76	5209.97	5222.20	6820.00	6.36	-29.00
450.000	5196.95	32.00	34.27	5203.18	5208.51	5221.42	6820.00	6.23	-28.99

La Cueva Ultimate

15 of 25

X5
N.C

THIS RUN EXECUTED 24-MAR-86 14133140

```
*****************************************
 HFC2 RELEASE DATED NOV 76 UPDATED APR. 1980
 ERROR CODE - 01,02,03,04
 MODIFICATION - 50,51,52,53,54
*****************************************
```

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100 V.TRANS

SUMMARY PRINTOUT

	SECNO	ELMIN	TOPMID	VCH	CWSEL	CRINS	EG	OCH	DEPTH	R*CHSL
*	3700.000	5298.00	37.84	12.02	5304.96	5304.96	5307.20	2000.00	6.96	0.00
	3600.000	5294.80	29.02	21.55	5299.56	5301.78	5306.77	2000.00	4.76	-32.00
	3500.000	5291.60	27.32	24.75	5295.93	5299.57	5305.44	2000.00	4.33	-32.00
	3400.000	5288.40	26.41	26.78	5292.50	5295.36	5303.64	2000.00	4.10	-32.00
	3300.000	5285.20	25.85	28.17	5289.17	5292.17	5301.49	2000.00	3.97	-32.00
	3200.000	5282.00	25.47	29.16	5285.87	5288.97	5299.08	2000.00	3.87	-32.00
	3100.000	5278.80	25.21	29.87	5282.60	5285.78	5296.45	2000.00	3.80	-32.00
	3000.000	5275.60	25.04	30.37	5279.36	5282.58	5293.68	2000.00	3.76	-32.00
	2900.000	5272.40	24.91	30.74	5276.13	5279.38	5290.80	2000.00	3.73	-32.00
	2800.000	5269.20	24.82	31.00	5272.91	5276.19	5287.83	2000.00	3.71	-32.00
	2700.000	5266.00	24.75	31.20	5269.69	5272.99	5284.81	2000.00	3.69	-32.00
	2600.000	5263.75	25.00	30.40	5267.51	5270.75	5281.86	2000.00	3.76	-22.50
	2500.000	5261.50	25.24	29.79	5265.31	5268.48	5279.10	2000.00	3.81	-22.50
	2400.000	5259.25	25.38	29.33	5263.11	5266.24	5276.47	2000.00	3.86	-22.50
	2300.000	5257.00	25.54	28.98	5260.89	5263.98	5273.93	2000.00	3.89	-22.50
	2200.000	5254.75	25.61	28.71	5258.67	5261.73	5271.47	2000.00	3.92	-22.50
	2100.000	5252.50	25.71	28.52	5256.44	5259.48	5269.06	2000.00	3.94	-22.50

N. Camino Ultimate

16 of 25

SECND	FLMIN	TOPMID	TCH	CWBEL	CRING	EG	QCH	DEPTH	R*CHSL
2000.000	5250.25	25.74	28.37	5254.20	5257.23	5264.70	2000.00	3.95	-22.50
1900.000	5247.77	25.70	28.51	5251.71	5254.75	5264.33	2000.00	3.94	-24.80
1800.000	5242.00	24.49	32.03	5245.62	5248.97	5261.55	2000.00	3.62	-57.70
1700.000	5236.00	23.74	34.51	5239.44	5243.00	5257.93	2000.00	3.44	-60.00
1600.000	5230.00	23.29	36.16	5233.32	5236.96	5253.63	2000.00	3.32	-60.00
1550.000	5227.00	23.13	36.78	5230.28	5233.96	5251.28	2000.00	3.28	-60.00
1520.000	5225.38	23.08	36.93	5228.65	5232.34	5249.83	2000.00	3.27	-54.00
1510.000	5224.92	23.11	36.91	5228.19	5231.88	5249.35	2000.00	3.27	-46.00
1500.000	5224.50	23.11	36.88	5227.78	5231.46	5248.86	2000.00	3.28	-41.99
1495.000	5224.30	23.12	36.81	5227.58	5231.26	5248.62	2000.00	3.28	-40.04
1490.000	5224.10	23.13	36.76	5227.40	5231.07	5248.38	2000.00	3.30	-39.96
1485.000	5223.90	23.14	36.71	5227.22	5230.90	5248.14	2000.00	3.32	-40.04
1480.000	5223.78	23.18	36.62	5227.08	5230.74	5247.90	2000.00	3.30	-24.02
1475.000	5223.60	23.18	36.55	5226.52	5230.58	5247.67	2000.00	3.32	-35.94
1470.000	5223.48	23.22	36.46	5226.79	5230.44	5247.43	2000.00	3.31	-24.02
1465.000	5223.30	23.22	36.38	5226.64	5230.22	5247.20	2000.00	3.34	-36.04
1460.000	5223.20	23.25	36.28	5226.53	5230.05	5246.96	2000.00	3.33	-19.92
1455.000	5223.10	23.29	36.17	5226.42	5229.91	5246.73	2000.00	3.32	-20.02
1450.000	5223.00	23.32	36.04	5226.33	5229.80	5246.50	2000.00	3.33	-20.02
1445.000	5222.90	23.35	35.93	5226.24	5229.73	5246.28	2000.00	3.34	-20.02
1440.000	5222.80	23.38	35.81	5226.14	5229.69	5246.05	2000.00	3.34	-20.02
1435.000	5222.70	23.42	35.69	5226.05	5229.69	5245.83	2000.00	3.35	-19.92
1430.000	5222.60	22.00	35.57	5225.97	5229.74	5245.62	2000.00	3.37	-20.02
1425.000	5222.50	20.00	35.41	5225.95	5229.86	5245.42	2000.00	3.45	-20.02
1420.000	5222.40	18.00	35.19	5226.00	5230.07	5245.23	2000.00	3.60	-20.02
1415.000	5222.30	16.00	34.88	5226.17	5230.41	5245.06	2000.00	3.87	-20.02

N. Camino Ultimate

17 of 23

24-MAR-86 14:32:53

SKCND	ELMIN	THPMIN	VCH	CHSEL	CRIWS	EG	QCH	DEPTH	R*CHSL
1410.000	5222.20	14.00	34.43	5226.49	5230.90	5244.90	2000.00	4.29	-19.92
1405.000	5222.10	12.00	33.73	5227.08	5231.54	5244.74	2000.00	4.98	-20.02
1400.000	5222.00	10.00	28.57	5229.00	5234.98	5241.68	2000.00	7.00	-20.02
1390.000	5221.80	10.00	28.56	5228.81	5234.69	5241.48	2000.00	7.01	-20.02
1380.000	5221.60	10.00	28.57	5228.60	5234.31	5241.28	2000.00	7.00	-19.97
1300.000	5220.00	10.00	28.57	5227.00	5232.77	5239.68	2000.00	7.00	-20.00
1200.000	5218.00	10.00	28.58	5225.00	5230.77	5237.68	2000.00	7.00	-20.00
1000.000	5214.00	10.00	28.59	5221.00	5226.77	5233.69	2000.00	7.00	-20.00
800.000	5210.00	10.00	28.59	5217.00	5222.77	5229.69	2000.00	7.00	-20.00
600.000	5206.00	10.00	28.59	5213.00	5218.77	5225.69	2000.00	7.00	-20.00
500.000	5204.00	10.00	28.59	5210.99	5216.77	5223.69	2000.00	6.99	-20.00

N. Camino Ultimate

18 of 23

THIS RUN EXECUTED 24-MAR-88 09:06:17

```
*****************************************************
  HEC2 RELEASE DATED MAY 76 UPDATED APR. 1980
  PROGR CORR - 01.02.03.04
  MODIFICATION - 40.41.42.43.44
*****************************************************
```

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10' RECT-10' TRAP 211, A

SUMMARY PRINTOUT

	SECNO	FLOWIN	TOPWID	VCH	CWSEL	CRIWS	FC	QCH	DEPTH	ARCHSL
*	2000.000	5302.00	49.16	12.29	5309.03	5309.03	5311.36	2051.74	7.03	0.00
*	2000.000	5302.00	43.44	12.71	5309.61	5309.61	5312.04	2172.17	7.61	0.00
	1950.000	5301.00	32.59	13.12	5306.65	5308.03	5311.20	2060.00	5.65	-20.00
	1950.000	5301.00	34.76	13.60	5307.13	5308.62	5311.94	2400.00	6.13	-20.00
	1900.000	5300.00	31.12	16.97	5305.28	5307.03	5310.87	2060.00	5.28	-20.00
	1900.000	5300.00	32.45	16.48	5305.73	5307.60	5311.62	2400.00	5.73	-20.00
	1850.000	5299.00	30.20	20.30	5304.05	5306.03	5310.45	2060.00	5.05	-20.00
	1850.000	5299.00	31.68	20.81	5304.50	5306.62	5311.22	2400.00	5.50	-20.00
	1800.000	5298.00	29.54	21.44	5302.88	5305.05	5309.96	2060.00	4.88	-20.00
	1800.000	5298.00	31.27	21.87	5303.32	5305.62	5310.74	2400.00	5.32	-20.00
	1750.000	5297.00	29.04	22.18	5301.76	5304.06	5309.40	2060.00	4.76	-20.00
	1750.000	5297.00	30.73	22.74	5302.18	5304.64	5310.21	2400.00	5.18	-20.00
	1700.000	5296.00	28.64	22.87	5300.66	5303.03	5308.79	2060.00	4.66	-20.00
	1700.000	5296.00	30.31	23.46	5301.08	5303.61	5309.62	2400.00	5.08	-20.00
	1650.000	5295.00	28.33	23.45	5299.59	5302.02	5308.13	2060.00	4.59	-20.00
	1650.000	5295.00	29.96	24.07	5299.99	5302.60	5308.99	2400.00	4.99	-20.00
	1600.000	5294.00	28.08	23.93	5298.53	5301.02	5307.47	2060.00	4.53	-20.00
	1600.000	5294.00	29.68	24.59	5298.93	5301.60	5308.31	2400.00	4.93	-20.00
	1550.000	5293.00	27.99	24.13	5298.10	5300.63	5307.13	2060.00	4.50	-20.00
	1550.000	5293.00	29.58	24.77	5298.51	5301.20	5308.03	2400.00	4.91	-20.00
	1500.000	5293.17	27.85	24.32	5297.65	5300.20	5306.83	2060.00	4.48	-21.51
	1500.000	5293.17	29.43	25.00	5298.04	5300.78	5307.74	2400.00	4.87	-21.51

South Camino
Ultimate Design

19 of 23

SECND	ELEVN	THETD	VCH	CWSEL	CRIWS	FG	UCH	DEPTH	ASCHSL
1540.000	5292.14	27.30	25.43	5296.47	5299.15	5306.51	2060.00	4.33	-51.49
1540.000	5292.14	28.05	26.10	5296.86	5299.75	5307.44	2400.00	4.72	-51.49
1535.000	5291.75	27.18	25.64	5296.06	5298.76	5306.42	2060.00	4.31	-78.03
1535.000	5291.75	28.73	26.50	5296.44	5299.16	5307.15	2400.00	4.69	-78.03
1530.000	5291.30	26.97	26.36	5295.54	5298.26	5305.33	2060.00	4.24	-90.04
1530.000	5291.30	28.46	27.03	5295.92	5298.80	5307.26	2400.00	4.62	-90.04
1525.000	5290.80	26.68	26.90	5295.00	5297.75	5306.24	2060.00	4.20	-100.00
1525.000	5290.80	28.21	27.57	5295.37	5298.40	5307.17	2400.00	4.57	-100.00
1520.000	5290.27	26.47	27.50	5294.39	5297.20	5306.13	2060.00	4.12	-105.96
1520.000	5290.27	27.96	28.15	5294.77	5297.87	5307.07	2400.00	4.50	-105.96
1515.000	5289.67	26.21	28.15	5293.72	5296.61	5306.02	2060.00	4.05	-120.02
1515.000	5289.67	27.72	28.79	5294.10	5297.29	5306.97	2400.00	4.43	-120.02
1510.000	5289.00	25.88	28.81	5293.02	5296.01	5305.91	2060.00	4.02	-131.98
1510.000	5289.00	26.80	29.45	5293.39	5296.68	5306.86	2400.00	4.39	-131.98
1505.000	5288.40	25.60	29.43	5292.34	5295.45	5305.79	2060.00	3.94	-120.02
1505.000	5288.40	25.60	30.06	5292.72	5296.11	5306.75	2400.00	4.32	-120.02
1500.000	5287.80	24.40	30.00	5291.68	5294.90	5305.66	2060.00	3.88	-120.02
1500.000	5287.80	24.40	30.62	5292.07	5295.56	5306.61	2400.00	4.27	-120.02
1495.000	5287.17	23.20	30.56	5291.03	5294.37	5305.51	2060.00	3.86	-125.98
1495.000	5287.17	23.20	31.16	5291.44	5295.04	5306.51	2400.00	4.27	-125.98
1490.000	5286.50	22.00	31.11	5290.37	5293.84	5305.39	2060.00	3.87	-131.98
1490.000	5286.50	22.00	31.69	5290.80	5294.52	5306.39	2400.00	4.30	-131.98
1485.000	5285.90	20.80	31.59	5289.76	5293.36	5305.26	2060.00	3.86	-120.02
1485.000	5285.90	20.80	32.16	5290.21	5294.05	5306.27	2400.00	4.31	-120.02
1480.000	5285.30	19.60	32.05	5289.17	5292.86	5305.12	2060.00	3.87	-120.02
1480.000	5285.30	19.60	32.59	5289.65	5293.63	5306.14	2400.00	4.35	-120.02
1475.000	5284.70	18.40	32.44	5288.64	5292.46	5304.98	2060.00	3.96	-119.97
1475.000	5284.70	18.40	32.96	5289.14	5293.26	5306.02	2400.00	4.44	-119.97
1470.000	5284.17	17.20	32.71	5288.22	5292.16	5304.84	2060.00	4.05	-106.05
1470.000	5284.17	17.20	33.21	5288.76	5293.02	5305.89	2400.00	4.59	-106.05
1465.000	5283.69	16.00	32.90	5287.90	5291.96	5304.70	2060.00	4.21	-96.00
1465.000	5283.69	16.00	33.37	5288.47	5292.89	5305.76	2400.00	4.78	-96.00
1460.000	5283.27	14.80	32.97	5287.59	5291.87	5304.57	2060.00	4.42	-83.98
1460.000	5283.27	14.80	33.34	5288.33	5292.93	5305.64	2400.00	5.06	-83.98

South Camino
Ultimate Design

STCHO	FLMIN	TOPWID	VCH	CHSFL	CRTWS	FC	OCH	DEPTH	RECHSL
1455.000	5282.90	11.00	32.88	5287.64	5291.97	5304.43	2060.00	4.74	-34.02
1455.000	5282.90	13.60	31.75	5288.34	5293.68	5305.51	2400.00	5.44	-34.02
1450.000	5282.60	12.40	32.63	5287.76	5292.13	5304.30	2060.00	5.16	-59.98
1450.000	5282.60	12.40	32.94	5288.55	5294.76	5305.39	2400.00	5.95	-59.98
1445.000	5282.30	11.20	32.15	5288.12	5293.64	5304.17	2060.00	5.74	-44.04
1445.000	5282.30	11.20	32.55	5289.02	5295.58	5305.27	2400.00	6.44	-44.04
1440.000	5282.20	10.00	31.36	5288.77	5295.23	5304.04	2060.00	6.57	-35.94
1440.000	5282.20	10.00	31.40	5289.44	5298.58	5305.15	2400.00	7.24	-35.94
1430.000	5281.90	10.00	31.43	5288.45	5297.14	5303.79	2060.00	6.55	-30.03
1430.000	5281.90	10.00	31.50	5289.57	5301.93	5304.92	2400.00	7.67	-30.03
1420.000	5281.60	10.00	31.49	5288.13	5294.64	5303.54	2060.00	6.54	-29.98
1420.000	5281.60	10.00	31.59	5289.20	5295.71	5304.60	2400.00	7.60	-29.98
1410.000	5281.30	10.00	31.56	5287.83	5294.33	5303.29	2060.00	6.53	-30.03
1410.000	5281.30	10.00	31.68	5288.88	5295.41	5304.46	2400.00	7.58	-30.03
1400.000	5281.00	10.00	31.67	5287.51	5294.03	5303.04	2060.00	6.51	-29.98
1400.000	5281.00	10.00	31.76	5288.56	5295.11	5304.22	2400.00	7.56	-29.98
1390.000	5280.70	10.00	31.67	5287.20	5293.73	5302.78	2060.00	6.50	-29.98
1390.000	5280.70	10.00	31.84	5288.24	5294.81	5303.98	2400.00	7.54	-29.98
1380.000	5280.40	10.00	31.73	5286.89	5293.44	5302.52	2060.00	6.49	-30.03
1380.000	5280.40	10.00	31.93	5287.97	5294.50	5303.75	2400.00	7.52	-30.03
1370.000	5280.10	10.00	31.78	5286.58	5293.14	5302.27	2060.00	6.48	-29.98
1370.000	5280.10	10.00	32.01	5287.60	5294.17	5303.50	2400.00	7.50	-29.98
1360.000	5279.80	10.00	31.84	5286.27	5292.84	5302.01	2060.00	6.47	-30.03
1360.000	5279.80	10.00	32.08	5287.28	5293.91	5303.26	2400.00	7.48	-30.03
1350.000	5279.50	10.00	31.89	5285.96	5292.53	5301.75	2060.00	6.46	-29.98
1350.000	5279.50	10.00	32.15	5286.96	5293.67	5301.02	2400.00	7.46	-29.98
1345.000	5279.35	12.40	31.28	5284.42	5288.89	5301.61	2060.00	5.07	-29.98
1345.000	5279.35	12.40	31.80	5285.16	5291.50	5302.80	2400.00	5.81	-29.98
1340.000	5279.20	14.80	34.02	5283.50	5287.81	5301.47	2060.00	4.29	-29.98
1340.000	5279.20	14.80	34.69	5284.08	5288.87	5302.76	2400.00	4.88	-29.98
1335.000	5279.05	17.20	34.40	5282.94	5287.08	5301.32	2060.00	3.88	-24.02
1335.000	5279.05	17.20	35.15	5283.44	5287.87	5302.62	2400.00	4.35	-24.02
1330.000	5278.90	19.60	34.60	5282.56	5286.49	5301.15	2060.00	3.66	-18.04
1330.000	5278.90	19.60	35.41	5282.99	5287.26	5302.46	2400.00	4.09	-18.04

South Camino
Ultimate Design

21 of 23

24-MAY-86 09:04:29 PAGE 51

SPCHD	FLMIN	TOPWID	VCH	CWSEL	CWTWS	FG	VCH	DEPTH	ASCHSL
1325.000	5278.80	22.00	34.63	5282.34	5286.09	5300.97	2060.00	3.54	-20.02
1325.000	5278.80	22.00	35.51	5282.71	5286.75	5302.79	2400.00	3.91	-20.02
1320.000	5278.70	24.00	34.58	5282.21	5285.78	5300.78	2060.00	3.51	-19.92
1320.000	5278.70	24.00	35.51	5282.54	5286.44	5302.17	2400.00	3.84	-19.92
1315.000	5278.60	24.04	34.48	5282.11	5285.55	5300.58	2060.00	3.51	-20.02
1315.000	5278.60	25.14	35.43	5282.44	5286.22	5301.93	2400.00	3.84	-20.02
1310.000	5278.50	24.07	34.38	5282.02	5285.41	5300.38	2060.00	3.52	-20.02
1310.000	5278.50	25.36	35.35	5282.34	5286.08	5301.74	2400.00	3.84	-20.02
1305.000	5278.40	24.09	34.30	5281.92	5285.35	5300.19	2060.00	3.52	-20.02
1305.000	5278.40	25.59	35.26	5282.25	5286.99	5301.55	2400.00	3.85	-20.02
1300.000	5278.30	24.12	34.20	5281.83	5285.32	5300.00	2060.00	3.53	-20.02
1300.000	5278.30	25.42	35.17	5282.16	5285.90	5301.37	2400.00	3.86	-20.02
1295.000	5278.20	24.18	34.01	5281.65	5284.54	5299.61	2060.00	3.55	-19.92
1295.000	5278.20	25.47	35.00	5281.98	5284.85	5301.00	2400.00	3.88	-19.92
1290.000	5277.90	24.23	33.84	5281.46	5284.36	5299.24	2060.00	3.56	-20.02
1290.000	5277.90	25.52	34.84	5281.79	5284.73	5300.64	2400.00	3.89	-20.02
1285.000	5277.70	24.28	33.33	5280.90	5283.93	5298.14	2060.00	3.60	-20.00
1285.000	5277.70	25.66	34.38	5281.22	5284.35	5299.57	2400.00	3.92	-20.00
1280.000	5276.30	24.62	32.55	5279.95	5283.16	5296.41	2060.00	3.65	-20.00
1280.000	5276.30	25.89	33.58	5280.27	5283.63	5297.88	2400.00	3.97	-20.00
1100.000	5274.30	25.04	31.26	5278.06	5281.28	5291.24	2060.00	3.76	-20.00
1100.000	5274.30	26.39	32.48	5278.37	5281.79	5294.76	2400.00	4.07	-20.00
1000.000	5272.30	25.39	30.26	5276.14	5279.36	5290.17	2060.00	3.84	-20.00
1000.000	5272.30	26.63	31.53	5276.46	5279.94	5291.90	2400.00	4.16	-20.00
900.000	5270.06	25.54	29.73	5273.96	5277.12	5287.69	2060.00	3.90	-22.40
900.000	5270.06	26.77	31.02	5274.27	5277.[illegible]	5289.22	2400.00	4.21	-22.40
800.000	5266.68	25.28	30.53	5270.50	5273.1[illegible]	5284.98	2060.00	3.82	-33.80
800.000	5266.68	26.52	31.78	5270.82	5274.31	5286.50	2400.00	4.14	-33.80
790.000	5266.34	25.17	30.54	5270.22	5273.46	5284.70	2060.00	3.88	-34.03
790.000	5266.34	26.49	31.79	5270.53	5274.05	5286.22	2400.00	4.19	-34.03
780.000	5266.00	24.99	30.53	5268.95	5273.20	5284.42	2060.00	3.95	-33.98
780.000	5266.00	26.24	31.78	5270.26	5273.79	5285.95	2400.00	4.26	-33.98
770.000	5265.66	24.81	30.52	5269.67	5272.94	5284.14	2060.00	4.01	-33.98
770.000	5265.66	26.07	31.78	5269.99	5273.54	5285.67	2400.00	4.33	-33.98

22 of 25

South Camino
Ultimate Design

24-MAR-86 09:04:29 PAGE 52

ARCND	FLMIN	TOPWID	VCH	CWSEL	CRIWS	FG	UCH	DEPTH	ESCHSL
760.000	5265.12	25.07	40.57	5269.35	5272.54	5283.46	2000.00	4.03	-34.03
760.000	5265.12	25.16	41.43	5269.66	5273.18	5285.19	2400.00	4.34	-34.03
750.000	5264.98	24.56	30.52	5269.13	5272.41	5283.59	2000.00	4.15	-33.98
750.000	5264.98	25.83	31.77	5269.44	5273.02	5285.12	2400.00	4.46	-33.98
700.000	5263.28	24.43	30.88	5267.40	5270.71	5282.20	2000.00	4.12	-34.00
700.000	5263.28	25.71	32.13	5267.72	5271.33	5283.73	2400.00	4.44	-34.00
600.000	5259.88	24.23	31.46	5263.94	5267.31	5279.31	2000.00	4.06	-34.00
600.000	5259.88	25.51	32.88	5264.27	5267.81	5280.85	2400.00	4.39	-34.00
500.000	5256.48	24.08	31.88	5260.51	5263.92	5276.29	2000.00	4.03	-34.00
500.000	5256.48	25.36	33.11	5260.83	5264.52	5277.85	2400.00	4.35	-34.00
400.000	5253.08	23.98	32.19	5257.08	5260.51	5273.18	2000.00	4.00	-34.00
400.000	5253.08	25.25	33.43	5257.40	5261.12	5274.76	2400.00	4.32	-34.00
300.000	5249.68	23.91	32.42	5253.66	5257.12	5269.99	2000.00	3.98	-34.00
300.000	5249.68	25.16	33.68	5253.98	5257.72	5271.54	2400.00	4.30	-34.00
200.000	5246.28	23.85	32.59	5250.25	5253.72	5266.75	2000.00	3.97	-34.00
200.000	5246.28	25.10	33.86	5250.57	5254.32	5268.37	2400.00	4.29	-34.00

South Camino
Ultimate Design

23 of 23

#8

PURPOSE: SIZE EARTHEN BERM AND CHANNEL ENTRANCE TO NORTH CAMINO CONCRETE CHANNEL. DETERMINE RIP RAP REQUIREMENTS.

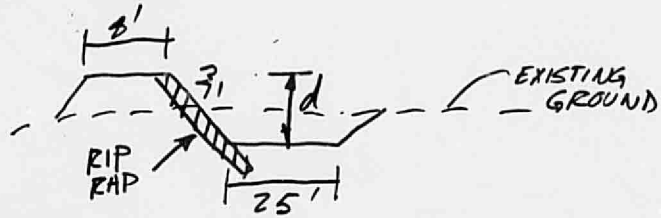
REFERENCES

1. "Design Guidelines & Criteria, Channels & Hydraulic structures on Sandy Soil"; Simons, Li & Associates; 1981

PROJECT NAME CORONADO SHEET 1 OF 3
PROJECT NO. BY TH DATE 3-25-86
SUBJECT Earth Berm + Channel CH'D DATE

SLOPE = 2.4%

TYP SECT:



FROM MANNINGS (PG 3)

d = depth = 3.3' @ 1350 cfs

d = 4.0 @ 2000 cfs V = 13.5 ft/s
P = 50.3 A = 148

Provide 3.0' freeboard

⇒ Depth to top of Berm
= 4 + 3 = 7'0"

From Table 5-5 (ref 1)

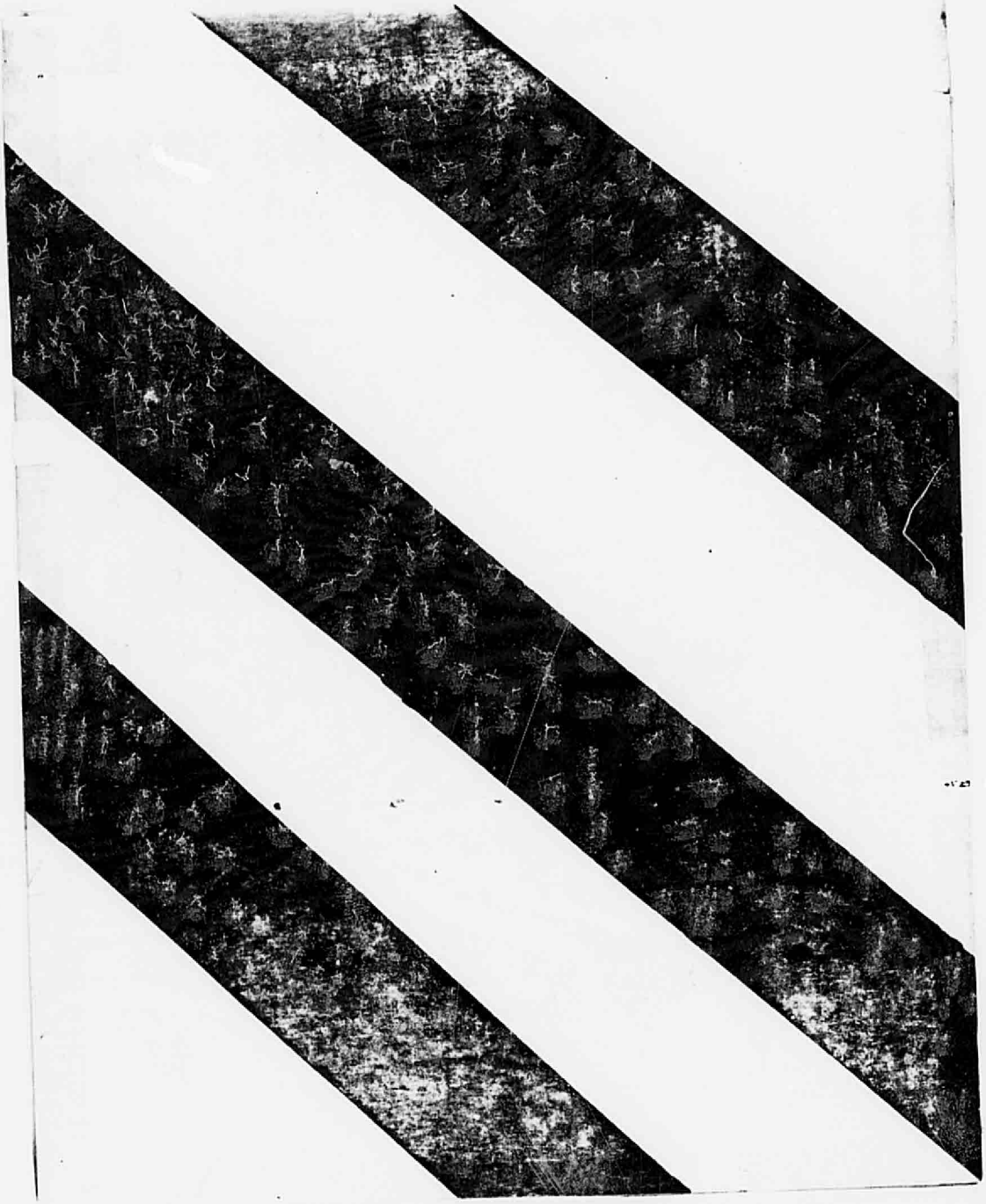
$$V^2/R^{1/3} = \frac{(13.5)^2}{\left[\frac{148}{50.3}\right]^{1/3}} = 127$$

with 3:1 side slopes
NEED TYPE M RIP-RAP 3'0" thick

PROJECT NAME _____ SHEET 2 OF 3
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

EARTH BERM AND CHANNEL-NORTH CANING

MANNINGS N=.0350 SLOPE =.0240

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	6.00	3	43.00	0.00			
2	18.00	0.00	4	61.00	6.00			

WSEL FT.	DEPTH IDC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID FLOS DESTRUCTIONS
0.10	0.10	2.53	3.55	25.63	1.40	25.60
0.20	0.20	5.12	11.32	26.26	2.21	26.20
0.30	0.30	7.77	22.33	26.90	2.87	26.80
0.40	0.40	10.48	36.21	27.53	3.45	27.40
0.50	0.50	13.25	52.72	28.16	3.98	28.00
0.60	0.60	16.08	71.72	28.79	4.46	28.60
0.70	0.70	18.97	93.11	29.43	4.91	29.20
0.80	0.80	21.92	116.81	30.06	5.33	29.80
0.90	0.90	24.93	142.75	30.69	5.73	30.40
1.00	1.00	28.00	170.90	31.32	6.10	31.00
1.10	1.10	31.13	201.21	31.96	6.46	31.60
1.20	1.20	34.32	233.66	32.59	6.81	32.20
1.30	1.30	37.57	268.23	33.22	7.14	32.80
1.40	1.40	40.88	304.91	33.85	7.46	33.40
1.50	1.50	44.25	343.67	34.49	7.77	34.00
1.60	1.60	47.68	384.52	35.12	8.06	34.60
1.70	1.70	51.17	427.45	35.75	8.35	35.20
1.80	1.80	54.72	472.45	36.38	8.63	35.80
1.90	1.90	58.33	519.53	37.02	8.91	36.40
2.00	2.00	62.00	568.69	37.65	9.17	37.00
2.10	2.10	65.73	619.92	38.28	9.43	37.60
2.20	2.20	69.52	673.24	38.91	9.68	38.20
2.30	2.30	73.37	728.64	39.55	9.93	38.80
2.40	2.40	77.28	786.14	40.18	10.17	39.40
2.50	2.50	81.25	845.75	40.81	10.41	40.00
2.60	2.60	85.28	907.46	41.44	10.64	40.60
2.70	2.70	89.37	971.29	42.08	10.87	41.20
2.80	2.80	93.52	1037.28	42.71	11.09	41.80
2.90	2.90	97.73	1105.36	43.34	11.31	42.40
3.00	3.00	102.00	1175.60	43.97	11.53	43.00
3.10	3.10	106.33	1248.01	44.61	11.74	43.60
3.20	3.20	110.72	1322.60	45.24	11.95	44.20
3.30	3.30	115.17	1399.36	45.87	12.15	44.80
3.40	3.40	119.68	1478.32	46.50	12.35	45.40
3.50	3.50	124.25	1559.49	47.14	12.55	46.00
3.60	3.60	128.88	1642.88	47.77	12.75	46.60
3.70	3.70	133.57	1728.50	48.40	12.94	47.20
3.80	3.80	138.32	1816.37	49.03	13.13	47.80
3.90	3.90	143.13	1906.50	49.67	13.32	48.40
4.00	4.00	148.00	1998.90	50.30	13.51	49.00
4.10	4.10	152.93	2093.59	50.93	13.69	49.60
4.20	4.20	157.92	2190.58	51.56	13.87	50.20
4.30	4.30	162.97	2289.88	52.20	14.05	50.80
4.40	4.40	168.08	2391.51	52.83	14.23	51.40
4.50	4.50	173.25	2495.49	53.46	14.40	52.00
4.60	4.60	178.48	2601.83	54.09	14.58	52.60
4.70	4.70	183.77	2710.53	54.73	14.75	53.20
4.80	4.80	189.12	2821.62	55.36	14.92	53.80
4.90	4.90	194.53	2935.11	55.99	15.09	54.40
5.00	5.00	200.00	3051.02	56.62	15.26	55.00
5.10	5.10	205.53	3169.36	57.26	15.42	55.60
5.20	5.20	211.12	3290.14	57.89	15.58	56.20
5.30	5.30	216.77	3413.38	58.52	15.75	56.80
5.40	5.40	222.48	3539.09	59.15	15.91	57.40
5.50	5.50	228.25	3667.28	59.79	16.07	58.00
5.60	5.60	234.08	3798.00	60.42	16.23	58.60
5.70	5.70	239.97	3931.22	61.05	16.38	59.20
5.80	5.80	245.92	4066.97	61.68	16.54	59.80
5.90	5.90	251.93	4205.28	62.31	16.69	60.40
6.00	6.00	258.00	4346.14	62.95	16.85	61.00