COPY

July 28, 1999

RECEIVED
AUG 04 1999
CITY ENGINEER

Mr. Marc Millis
Lowe's Home Centers, Inc.
1203 School Street
Wilkesboro, NC 28697

BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

fax 505.821.0892

Re: Minutes of Pre-Design Meeting with City Engineer regarding Hydrology Requirements - Albuquerque Site at Paseo del Norte and San Pedro

D18-D14

Dear Marc:

The purpose of this letter is to summarize the meeting held on Thursday, July 15, 1999 with Mr. Fred Aguirre, City Engineer and Chief Hydrologist. After an explanation of the project and goals, the following key issues and conditions were set forth for development of the property.

1. It is recommended that we confirm the capability of the site to discharge to the designed channel and box culvert.
2. We will be able to obtain building permits but not certificates of occupancy until the Phase 1 channel (eastern two-thirds of channel reach between San Pedro and I-25) is complete and accepted by the City.
3. A copy of the channel construction agreement between the City and the developer, along with the project drainage and grading plan, will be submitted to the City. A written summarization of the agreement, clearly stating that the agreement does not preclude building permit approvals for adjacent development, will be provided.
4. We will need to document City recognition of responsibility for the upstream LOMR (the Paseo del Norte drainage construction work), **and/or**
5. We must recognize that the project may be subject to flood insurance if the City delays or has difficulty obtaining a LOMR for the upstream LOMR, subsequently delaying our own LOMR request.
6. It is understood that the Lowe's project will change-order any necessary channel improvements needed to provide site drainage to the Lowe's project.

With adherence to the requirements and issues stated above, Mr. Aguirre believes the project will move forward without significant problems.

If we can answer any questions regarding these issues, please feel free to contact me at any time.

Sincerely,
Bohannan Huston, Inc.

James R. Topmiller, P.E.
Vice President, Community Development
and Planning Group

JRT/am
cc: Fred Aguirre, COA
Bruce Stidworthy, BHI

P:\00179\cdp\corres\Millis,ltr.doc

40 YEARS

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

December 12, 2000

Bruce Stidworthy, P.E.
Bohannan Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Grading and Drainage Certification – Lowe's Home Improv. Center (D-18/D014)

Engineer's Stamp dated 1-3-2000

Engineering Certification dated 12-12-2000

Dear Mr. Stidworthy:

Based upon the information provided in your submittal dated 12-12-2000, the above referenced site is approved for Certificate of Occupancy.

If I can be of further assistance, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: Teresa Martin
file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

February 11, 2000

Bruce Stidworthy, PE
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Lowes of NE Albuquerque Drainage Report
Engineer's Stamp dated 1-3-00 (D18/D14)

Dear Mr. Stidworthy,

Based upon the information provided in your submittal dated 2-10-00, the above Drainage Report is conditionally approved. Conditions of your approval require that NMSHTD permit be obtained prior to performing any work in the I-25 R/W. This will be a condition of DRC approval. You are approved for Building Permit and Grading Permit.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions about my comments, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE REPORT
FOR
LOWE'S OF NE ALBUQUERQUE

DECEMBER 15, 1999

Prepared for:

LOWE'S COMPANIES, INC.
HIGHWAY 268 EAST
NORTH WILKESBORO, NC 28659

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NM 87109

PREPARED BY:

BRUCE J. STIDWORTHY
NEW MEXICO
14523
REGISTERED PROFESSIONAL ENGINEER

Bruce Stidworthy 12/17/99 1/3/00

Bruce Stidworthy, P. E. Date

RECEIVED
FEB 1 0 2000
HYDROLOGY SECTION

A:\drainage report doc

I. INTRODUCTION

The purpose of this report is to provide a Drainage Management Plan for development of a Lowe's Home Improvement Store on the southwest corner of San Pedro and Paseo Del Norte in Northeast Albuquerque. The site is currently legally described as Los Angeles Center, Tract A-1, containing 31.77acres. The site is bounded on the north by Paseo Del Norte, on the east by San Pedro, on the south by The South Arroyo De Domingo Baca, and on the west by I-25.

The project is zoned M-1 and is not required to go through EPC or DRB. No platting is proposed at this time.

II. PURPOSE

This report and the final grading plan are submitted for Hydrology Division review for the purpose of obtaining rough grading and building permit approval. No variances are requested with this submittal. Should the Hydrology Division have comments which must be addressed prior to building permit approval, the owner requests that rough grading approval be granted separately, while the building permit comments are being addressed.

III. METHODOLOGIES AND REFERENCES

This report is prepared in accordance with City of Albuquerque Development Process Manual (DPM) criteria; specifically, the procedures outlined in DPM Section 22.2. No AHYMO analysis has been done for the site, as it is less than 40 acres and therefore could be analyzed using the method outlined in Part A.6 of Section 22.2 of the DPM. The site is allowed free discharge of developed flows.

IV. SITE LOCATION AND CHARACTERISTICS

This site is located on Paseo Del Norte between I-25 and San Pedro Blvd., within Zone Atlas Map No D-18. The entire site consists of about 32 acres, approximately 17 acres of which are being utilized by the Lowe's Home Improvement Center. The remaining portions of the site

may be developed in the future. Future development will require detailed grading and drainage plans for each building permit. With respect to land treatment percentages, this report assumes fully developed conditions for the entire site.

The site contains three FEMA floodplains. A CLOMR for removal of the floodplains from the site has been approved by FEMA. Most of the upstream improvements necessary for removal of the floodplains have been constructed. However, the improvements to Paseo Del Norte which are under construction between Wyoming and Tramway must be completed before a LOMR can be submitted to FEMA. Currently, it has not been determined which governmental agency (City, County or AMAFCA) will be responsible for preparation and submittal of the LOMR. Legally, the floodplains still exist, and the proposed building will most likely require flood insurance.

V. EXISTING CONDITIONS

Under existing conditions, there are no offsite flows which impact the site. The site discharges flows directly to the South Arroyo De Domingo Baca (hereafter referred to as the arroyo or the channel), and to two existing 60" CMP culverts under the frontage road. Prior to the Paseo Del Norte Improvements, both culverts were open. A small section of storm drain in Paseo, between the frontage road and San Pedro, was connected directly to the northern culvert, leaving only one culvert to accept surface flows.

The existing site is divided into two basins as shown on the Existing Conditions Basin Map in the Appendix of this report. Basin A (13.97ac, 37.2cfs) drains to the channel, while Basin B (17.81ac, 47.4cfs) drains to the 60" CMP culvert discussed above. Prior to the Paseo Del Norte improvements, the basin draining to the 60" culverts was much larger. That basin is not important for this report; however, this report assumes that the 100-year discharge for the basin was close to the capacity of the two 60" culverts (260cfs).

VI. PROPOSED CONDITIONS

A. Ultimate Development

The proposed development consists of a 115,000 square foot home improvement center with associated outdoor garden center, as well as parking and driveways. For analytical purposes, the proposed site was divided into 13 basins, labeled B1 – B13, as shown on the Proposed Conditions Basin Map in the Appendix of this report. All of the proposed drainage facilities described below were designed for the 100-year – 6-hour storm under fully developed conditions (flows from Basins B4 and B8 were calculated assuming 90% impervious area).

Basins B4 through B12 drain to a proposed private storm drain system which will drain to the channel. Surface flows drain to catch basins located as needed, while drainage from the roof of the building is piped directly to the proposed storm drain. Please see the Grading and Drainage plan for pipe sizes, inlet types, etc. Portions of the proposed private storm drain operate under slight pressure flows. A hydraulic grade line analysis and detailed hydraulic calculations for all of the proposed facilities are provided in the Appendix of this report.

Basins B2, B3, and B4 drain to a second private storm drain line located under the main east-west driveway in the parking lot. Surface flows for this storm drain are also collected in catch basins. Drainage from a small canopy area over the customer loading area is piped directly into this storm drain. This second storm drain daylights into a temporary swale just west of the west edge of the parking lot. For a discussion of the temporary swale, please see the next section of this report which describes 'interim' proposed conditions.

Note that flows from Basin B4 are included in the design analysis for both this storm drain and the one that discharges to the channel. This is a conservative assumption which was made in order to give Basin B4 the greatest flexibility for future development (future flows from Basin B4 could be discharged to either system, and both would have adequate capacity).

B. Interim Development

Interim Conditions refer to the portions of the site which are not being developed with the Lowe's store but are being graded with the rest of the site. These areas are Basins B1, B4, and B8. For interim conditions, those basins were modeled as 100% land treatment 'C'. The only drainage structures which were designed for interim flows are the temporary inlet structures which convey interim flows from Basins B4 and B8. Those temporary structures are detailed on sheets C5 and C6. These structures will be removed and disposed of as each parcel is developed in the future. Hydraulic calculations for the temporary inlets are provided in the Appendix of this report.

The temporary swale which crosses Basin B1 was designed to accommodate fully developed flows from Basins B2, B3, and B4, and interim flows from the portion of Basin B1 north of the swale. Details for the temporary swale and temporary inlet structure which conveys flows from the swale to the existing culvert are located on sheet C7.

C. Grading Within NMSH&TD Right-of-Way

The grading plan for this site calls for several feet of fill to be placed on the western edge of the site. The proposed fill extends beyond the site boundary onto NMSH&TD right-of-way. Currently, the intersection of the I-25 frontage road and Paseo Del Norte is significantly (±18') above the site. The proposed fill on the site (±5') will help the road and the site to relate to one another more favorably.

D. South Arroyo De Domingo Baca - Channel Construction

The South Arroyo De Domingo Baca borders the site on the south. The arroyo is currently concrete lined upstream of the site (east of San Pedro). West of San Pedro, the channel is currently rip-rap lined. Construction plans for concrete lining of the channel from San Pedro to the frontage road have been prepared by Easterling & Associates and approved by DRC (City Project #6050.91). Those plans call for open channel construction from San Pedro to a point approximately 1300' downstream. The remaining 700'± would be a Quad 10'x8' concrete box culvert. Construction of the channel improvements is contingent on final sign-off by the City of a cost-sharing agreement with the developer. Under the terms of the agreement, the developer

would pay for construction of the longer open-channel portion, and sometime in the future the City would pay for and construct the CBC portion. The grading plans submitted with this report assume construction of the open channel portion of the arroyo. The grading plan also assumes temporary improvements to the lower reach of the arroyo (the Easterling & Associates plans call for temporary rip-rap lining of a portion of the arroyo which will become Quad CBC when the City constructs its portion).

VII. CONCLUSION

This report has given a comprehensive drainage management plan for the proposed development that complies with the DPM and the drainage ordinance. It is recommended that Building Permit approval be granted with this submittal. However, should the Hydrology Division have comments that must be addressed prior to building permit approval, Lowe's Companies requests rough grading approval prior to full building permit approval. This would allow rough grading operations to begin without additional delay.

File D18/D14

Lowe's Home Improvement Warehouse

1" = 50'

25' Public Sanitary Sewer & Water Easement

10' Dry Utility Easement

QUAD-10'x8' CBC (EXISTING)

NEW QUAD-10'x8' CBC

MINIMUM AREA OF DRAINAGE EASEMENT TO BE RETAINED BY CITY OF ALBUQUERQUE APPROX.

N32°30'17"W 440.98'

N89°28'42"W 1343.96'

N10°33'06"E 123.70'

Drainage Right-of-Way City of Albuquerque

NMSH&TD Tract 19-2-NRW (Plotted by deed bearings & distances)

Interstate 25 Frontage Road

City Yards

Detention Pond

24"RCP

18"RCP

8" SAS

8"SAS

10"W

2"HPG

15"SAS

6"W (ABAN'D)

60' Utility Easement

(Aban'd)

NO.	REVISIONS	BY	DATE

SCALE: 1" = 50'

Designed By: XXX	Drawn By: HC-A	Checked By: CMC
File No. 2834	Date 9 SEPT. 2002	

Easterling & Associates, Inc.
CONSULTING ENGINEERS
2600 American Rd. SE, Suite 100
Rio Rancho, New Mexico 87124
(505) 898-8021 FAX (505) 898-8501

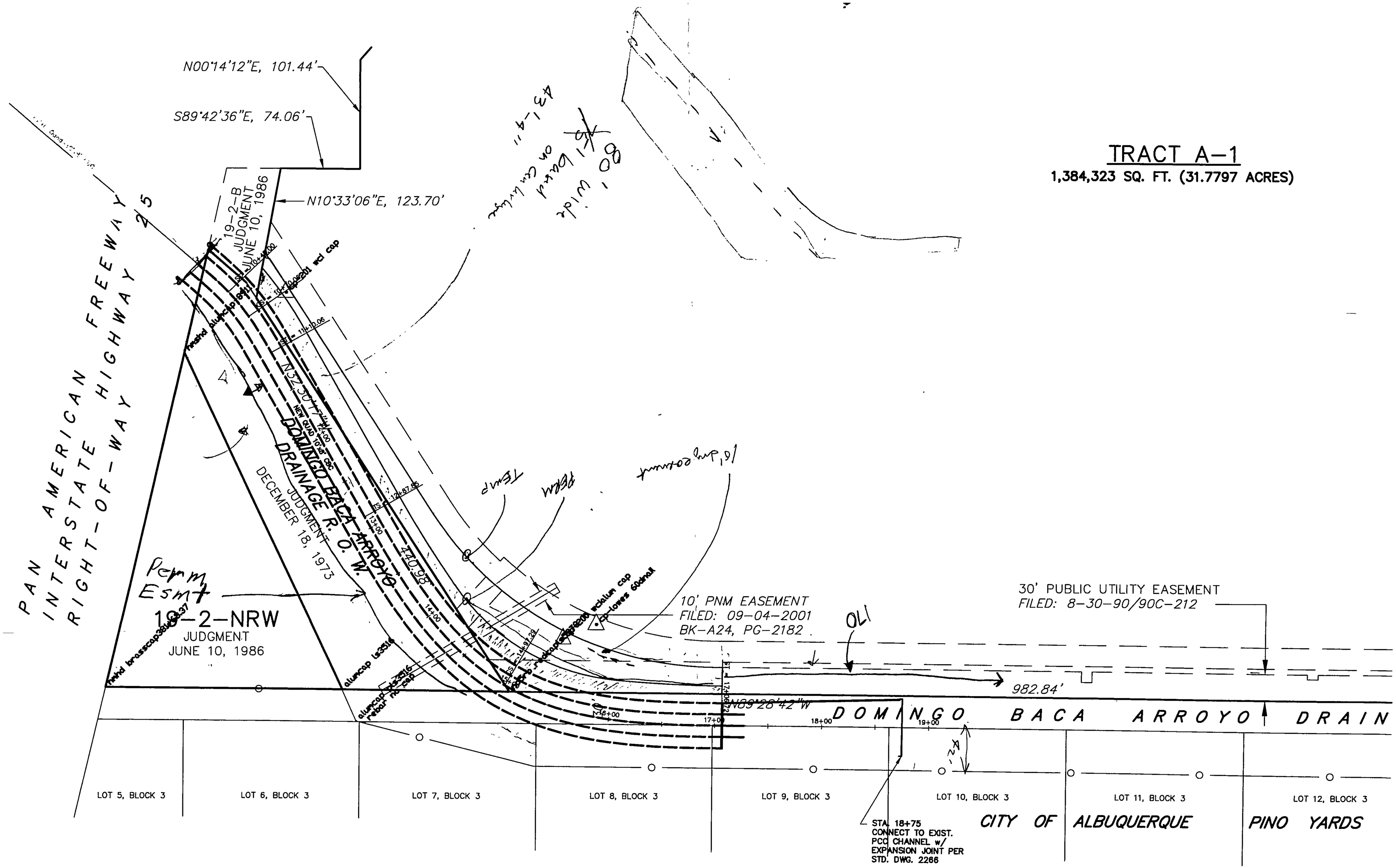
CITY OF ALBUQUERQUE, NM — City Proj. No. 6050.92

SOUTH ARROYO DE DOMINGO BACA CHANNEL IMPROVEMENTS

APPROXIMATE LAND AREAS TO BE NEGOTIATED

Sheet 1 of 1

D:\Land Projects 3\DBACA\dwg\DBACA5\EXHIBIT.dwg 05/30/2003 11:36:50 AM MDT

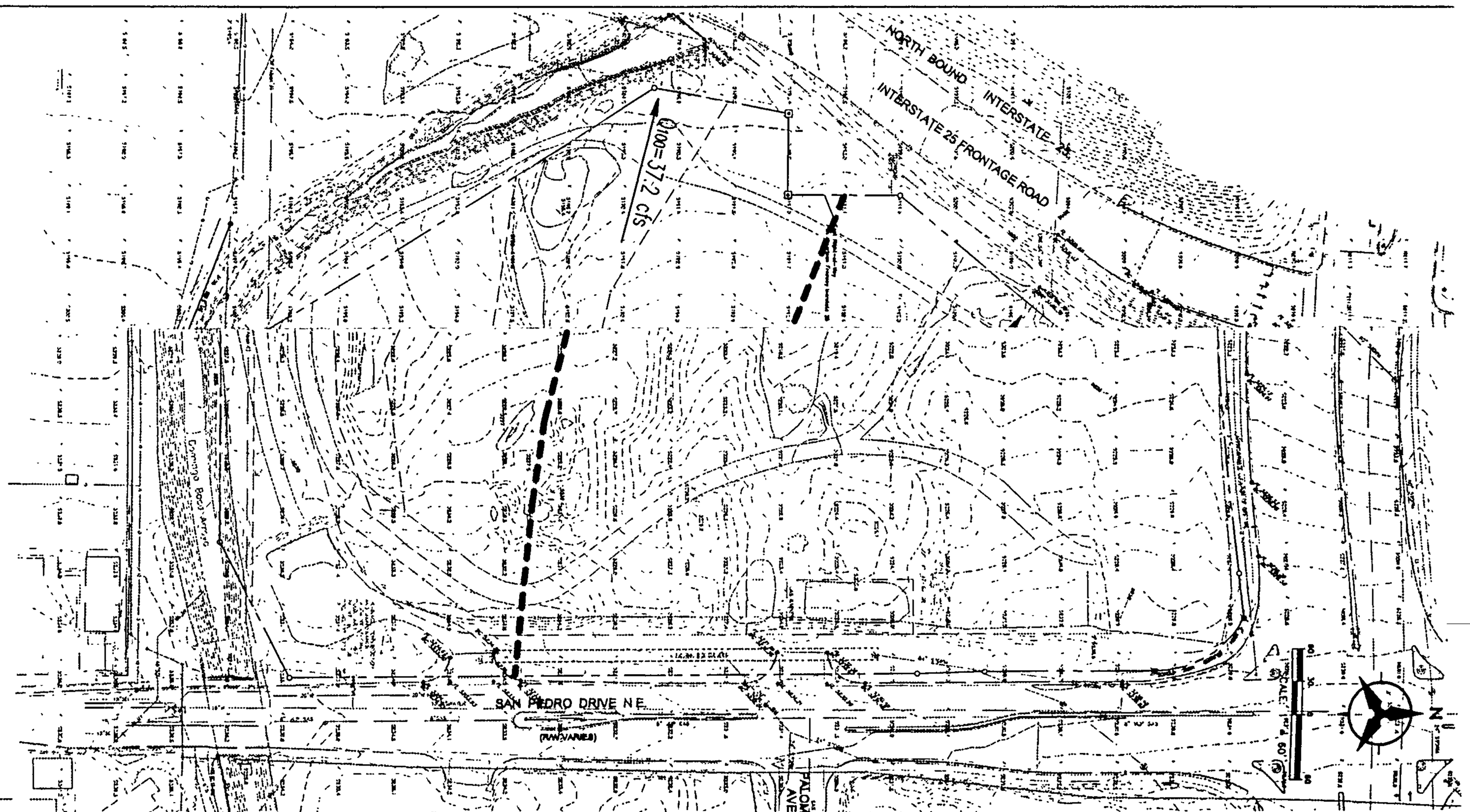

TRACT A-1
1,384,323 SQ. FT. (31.7797 ACRES)
N00°14'12"E, 101.44'
S89°42'36"E, 74.06'
N10°33'06"E, 123.70'
PAN AMERICAN FREEWAY
INTERSTATE HIGHWAY 25
RIGHT-OF-WAY
19-2-B
JUDGMENT
JUNE 10, 1986
19-2-NRW
JUDGMENT
JUNE 10, 1986
JUDGMENT
DECEMBER 18, 1973
DOMINGO BACA ARROYO
DRAINAGE R. O. W.
440.98'
10' PNM EASEMENT
FILED: 09-04-2001
BK-A24, PG-2182
30' PUBLIC UTILITY EASEMENT
FILED: 8-30-90/90C-212
982.84'
N89°28'42"W
DOMINGO BACA ARROYO DRAIN
LOT 5, BLOCK 3
LOT 6, BLOCK 3
LOT 7, BLOCK 3
LOT 8, BLOCK 3
LOT 9, BLOCK 3
LOT 10, BLOCK 3
LOT 11, BLOCK 3
LOT 12, BLOCK 3
STA. 18+75
CONNECT TO EXIST.
PCC CHANNEL w/
EXPANSION JOINT PER
STD. DWG. 2266
CITY OF ALBUQUERQUE
PINO YARDS

LOWE'S

Existing Conditions Basin Data Table

This table is based on the DPM Section 22.2, Zone: 3

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
A	477960	13.97	50.0%	0.0%	50.0%	0.0%	2.66	*37.16*	*0.98*	*38834*
B	86230	17.81	50.0%	0.0%	50.0%	0.0%	2.66	*47.37*	*0.98*	*7006*
Totals:		**31.78**						**84.53**		



EXISTING CONDITIONS BASIN MAP

REGISTERED PROFESSIONAL ENGINEER
BRUCE T. TRUMBLY
NEW MEXICO
14825

LOWE'S
Companies, Inc.
LOWE'S OF NORTH EAST
ALBUQUERQUE, NM.

No:	DATE:	REVISIONS:

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Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

Job No: 00 179
Date: MM/DD/YY
Scale: 1"=60'
Drawn: TTT
Checked: ZZ
Project No:
BUILDING PERMIT SUBMITTAL

DWG_NAME
MMDDYY

A 1-2

CAPACITY OF EXISTING 60" CMP CULVERS UNDER EXIST. COND.

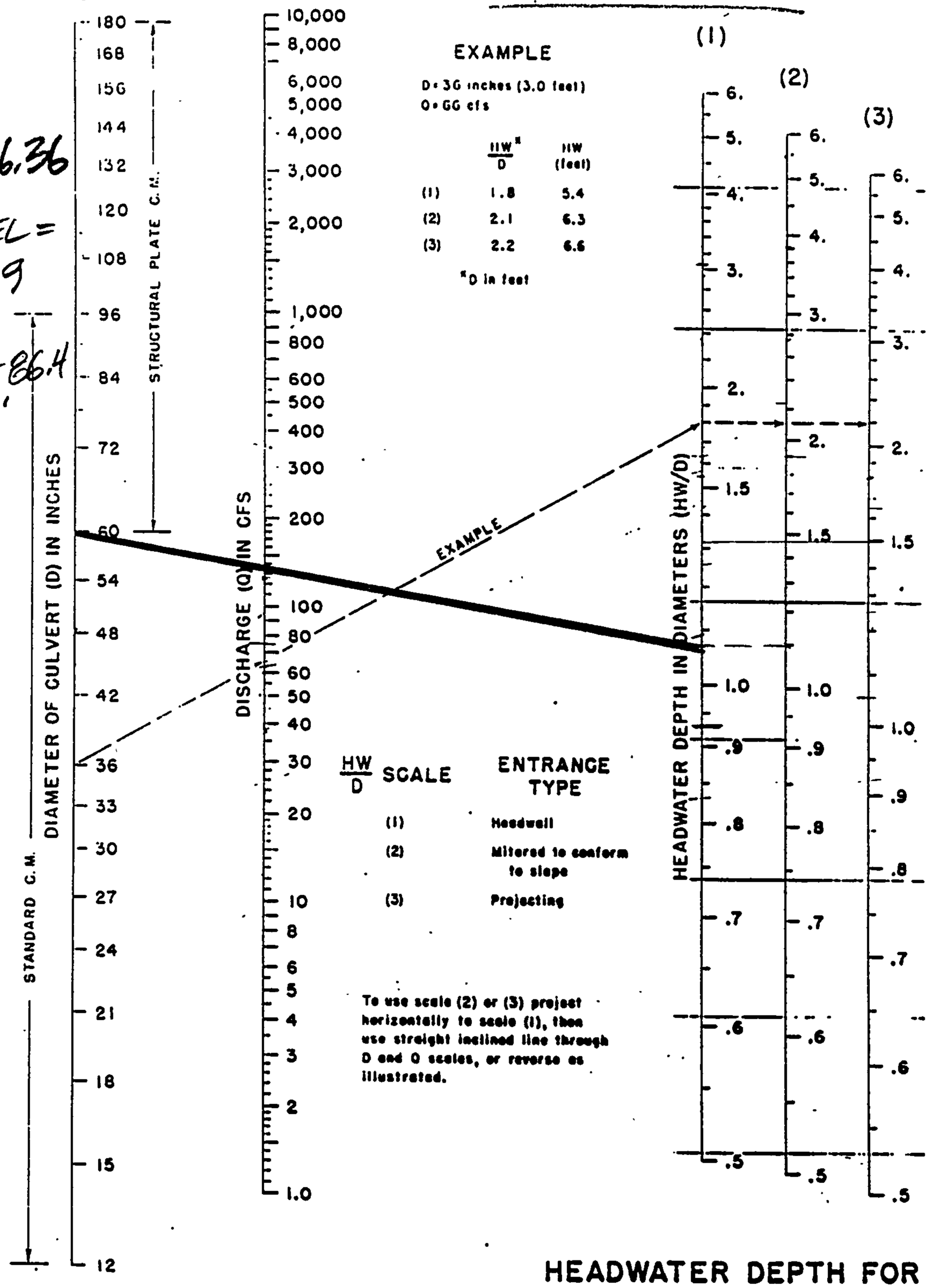
CHART 5

PIPE INV = 86.36

MAX WSEL = 90.9

HW = 90.9 - 86.4 = 5.5'

$\frac{HW}{D} = 1.1$



HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

CAPACITY UNDER EXISTING CONDITION = 130 cfs (for one pipe)

PRIOR TO PDN CONSTRUCTION, CAPACITY WOULD HAVE BEEN 260 cfs (130 cfs per pipe).

A1-3

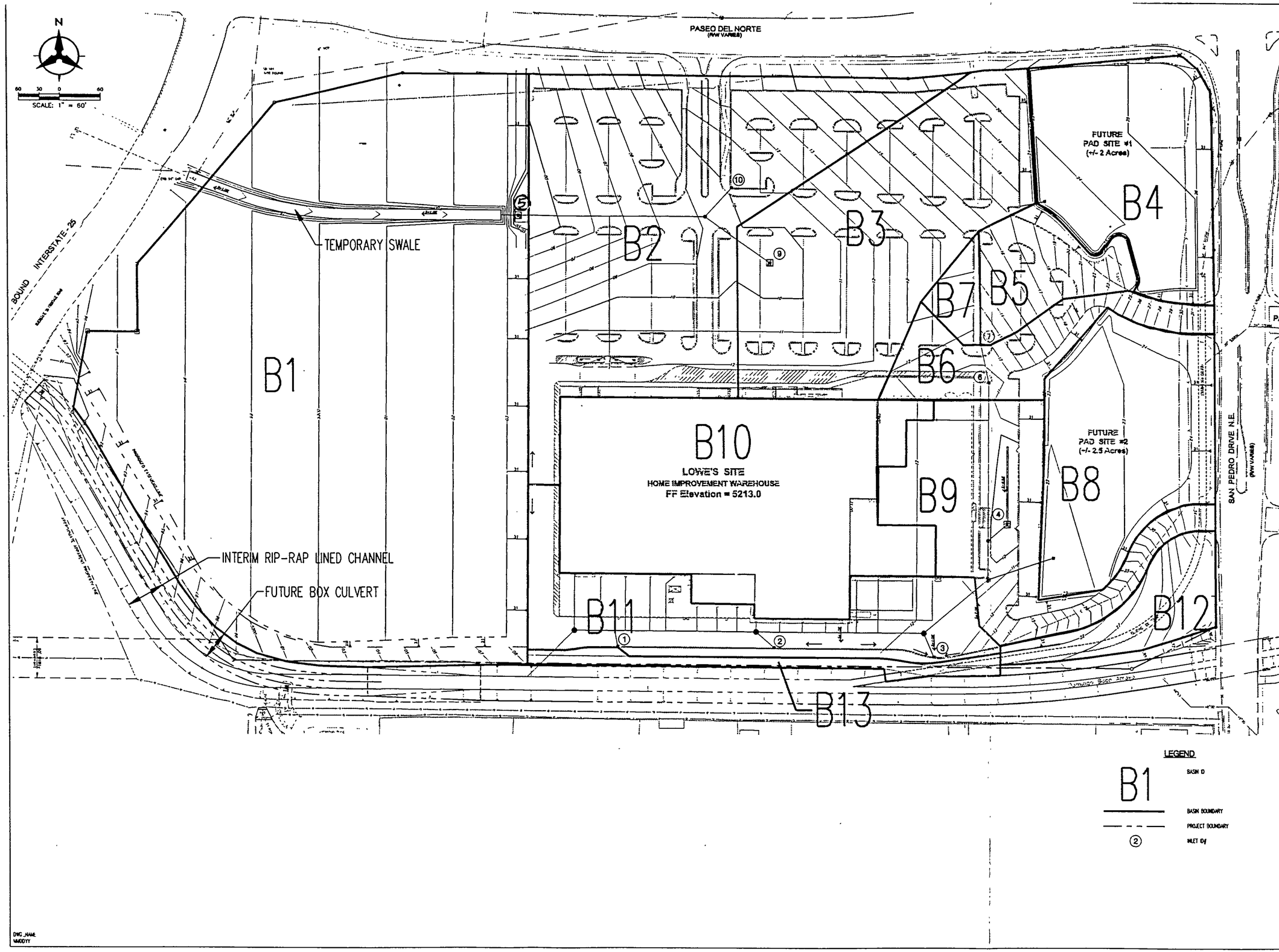
LOWE'S

Fully Developed Conditions Basin Data Table

This table is based on the DPM Section 22.2, Zone: 3

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
1	477960	10.97	0.0%	5.0%	5.0%	90.0%	4.82	*52.89*	*2.23*	*89000*
2	194160	4.46	0.0%	5.0%	7.0%	88.0%	4.79	*21.35*	*2.21*	*35808*
3	128440	2.95	0.0%	5.0%	5.0%	90.0%	4.82	*14.21*	*2.23*	*23917*
4	86230	1.98	0.0%	5.0%	5.0%	90.0%	4.82	*9.54*	*2.23*	*16057*
5	17589	0.40	0.0%	5.0%	5.0%	90.0%	4.82	*1.95*	*2.23*	*3275*
6	37120	0.85	0.0%	5.0%	5.0%	90.0%	4.82	*4.11*	*2.23*	*6912*
7	4400	0.10	0.0%	0.0%	0.0%	100.0%	5.02	*0.51*	*2.36*	*865*
8	85870	1.97	0.0%	5.0%	5.0%	90.0%	4.82	*9.50*	*2.23*	*15990*
9	78034	1.79	0.0%	0.0%	5.0%	95.0%	4.94	*8.85*	*2.31*	*14999*
10	151730	3.48	0.0%	0.0%	0.0%	100.0%	5.02	*17.49*	*2.36*	*29840*
11	77250	1.77	0.0%	5.0%	5.0%	90.0%	4.82	*8.55*	*2.23*	*14385*
12	29980	0.69	0.0%	33.3%	33.3%	33.3%	3.69	*2.54*	*1.52*	*3802*
13	15300	0.35	0.0%	0.0%	0.0%	100.0%	5.02	*1.76*	*2.36*	*3009*
Totals:		**31.77**						**153.25**		

A2-1



Bohannan • Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS ENVIRONMENTALISTS SURVEYORS SOFTWARE DEVELOPERS

No.	DATE	REVISIONS

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LOWE'S Companies, Inc.
LOWE'S OF NORTH EAST ALBUQUERQUE, N.M.

MARC L. STOWOLSKI
NEW MEXICO
14823
REGISTERED PROFESSIONAL ENGINEER

PROPOSED CONDITIONS
BASIN MAP

Job No. 00 179

Date: 12/8/99
Scale: 1"=60'
Drawn: LDR
Checked: PW

BUILDING PERMIT SUBMITTAL

DWG NAME
MAD01Y

A2-2

Lowe's Standard Type 'A' Inlet - (Simiar to CoA Type 'D'

Neenah R-3457-C

*Open Area (for orifice calc in sq. ft.): 6

*Length of Weir (feet): 14

Weir Coeficient : 2.68

*Note: Numbers are take from Neenah Catalog

Head (ft)	Head (in)	Weir Q	Orifice Q	Control Q
0.05	0.6	0.42	6.46	0.42
0.1	1.2	1.19	9.14	1.19
0.15	1.8	2.18	11.19	2.18
0.2	2.4	3.36	12.92	3.36
0.25	3	4.69	14.44	4.69
0.3	3.6	6.17	15.82	6.17
0.35	4.2	7.77	17.09	7.77
0.4	4.8	9.49	18.27	9.49
0.45	5.4	11.33	19.38	11.33
0.5	6	13.27	20.43	13.27
0.55	6.6	15.30	21.43	15.30
0.6	7.2	17.44	22.38	17.44
0.65	7.8	19.66	23.29	19.66
0.7	8.4	21.97	24.17	21.97
0.75	9	24.37	25.02	24.37
0.8	9.6	26.85	25.84	25.84
0.85	10.2	29.40	26.64	26.64
0.9	10.8	32.04	27.41	27.41
0.95	11.4	34.74	28.16	28.16
1	12	37.52	28.89	28.89

INLET CAPACITY TABLE

INLET ID#	CONTRIBUTING BASINS	RESIDUAL TO INLET	TOTAL Q_{100}	HEAD AVAILABLE	CAPACITY	OVERFLOW
4	B9, B12	4.93	16.32	>1.0'	>28.89	—
9	B3, B4	—	23.75	0.95'	28.16	—

Lowe's Standard Type 'B' Inlet - (Simiar to CoA Type 'C')

Neenah R-3246-F

*Open Area (for orifice calc in sq. ft.	1.8
*Length of Weir (feet):	5.9
Weir Coeficient :	2.68

*Note: Numbers are take from Neenah Catalog

Head (ft)	Head (in)	Weir Q	Orifice Q	Control Q
0.05	0.6	0.18	1.94	0.18
0.1	1.2	0.50	2.74	0.50
0.15	1.8	0.92	3.36	0.92
0.2	2.4	1.41	3.88	1.41
0.25	3	1.98	4.33	1.98
0.3	3.6	2.60	4.75	2.60
0.35	4.2	3.27	5.13	3.27
0.4	4.8	4.00	5.48	4.00
0.45	5.4	4.77	5.81	4.77
0.5	6	5.59	6.13	5.59
0.55	6.6	6.45	6.43	6.43
0.6	7.2	7.35	6.71	6.71
0.65	7.8	8.29	6.99	6.99
0.7	8.4	9.26	7.25	7.25
0.75	9	10.27	7.51	7.51
0.8	9.6	11.31	7.75	7.75
0.85	10.2	12.39	7.99	7.99
0.9	10.8	13.50	8.22	8.22
0.95	11.4	14.64	8.45	8.45
1	12	15.81	8.67	8.67

INLET CAPACITY TABLE

INLET ID#	BASINS	RESIDUAL TO INLET	TOTAL Q_{100}	HEAD AVAILABLE	CAPACITY	OVERFLOW
1	40% of B11	—	3.42	0.5	5.59	—
2	20% of B11	—	1.71	0.3	2.60	—
3	30% of B11	—	2.57	0.6	6.71	—
6	B6	6.41	10.52	0.5'	5.59	4.93
7	B4, B5, B7	—	12.00	0.5'	5.59	6.41
8	NOT	USED				
10	25% of B2	—	5.34	0.5	5.59	—
TRUCK WELL TRENCH DR.	10% of B11	—	0.86	>2.0'	DESIGN OF THIS INLET BY MECH. ENGR. FOR BLDG.	

INLET #5 - LOWE'S STANDARD - TYPE C

AVAILABLE HEAD = 0.67'

WIER LENGTH = 6'+6'+2'+2' = 16'

$$Q = 2.68 \cdot 16 \cdot 0.67^{2/3}$$

CAPACITY = 32.7 cfs

Q_{100} to the inlet = 75% of B2

= 16.0 cfs

32.7 > 16.0 ⇒ ok

Bohannan ▲ Huston

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS SOFTWARE DEVELOPERS

A2-5

LOWE'S

Interim Conditions Basin Data Table

NOTE: All basins other than 1,4, and 8 will be fully developed immediately (no interim condition exists)

This table is based on the DPM Section 22.2, Zone: 3

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
1	477960	10.97	0.0%	0.0%	100.0%	0.0%	3.45	*37.85*	*1.29*	*51381*
4	86230	1.98	0.0%	0.0%	100.0%	0.0%	3.45	*6.83*	*1.29*	*9270*
8	85870	1.97	0.0%	0.0%	100.0%	0.0%	3.45	*6.80*	*1.29*	*9231*

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

Temporary Lined Swale— CROSSING BASIN B1

INPUT DATA:
MANNING'S N= .017 SLOPE= .01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.89	3	7.50	0.00	5	15.00	0.89
2	0.00	0.22	4	15.00	0.22	6	0.00	0.00

SEE SECTION A, SHEET C7

OUTPUT DATA:

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.05	0.05	0.09	0.1	3.41	0.75	3.41	0.01	0.06
0.10	0.10	0.34	0.4	6.82	1.19	6.82	0.02	0.12
0.15	0.15	0.77	1.2	10.23	1.55	10.23	0.04	0.19
0.20	0.20	1.36	2.6	13.64	1.88	13.64	0.06	0.26
0.25	0.25	2.10	4.9	15.07	2.35	15.00	0.09	0.34
0.30	0.30	2.85	8.2	15.17	2.87	15.00	0.13	0.43
0.35	0.35	3.60	12.0	15.27	3.34	15.00	0.17	0.52
0.40	0.40	4.35	16.4	15.37	3.77	15.00	0.22	0.62
0.45	0.45	5.10	21.3	15.47	4.17	15.00	0.27	0.72
0.50	0.50	5.85	26.6	15.57	4.55	15.00	0.32	0.82
0.55	0.55	6.60	32.4	15.67	4.91	15.00	0.37	0.92
0.60	0.60	7.35	38.6	15.77	5.26	15.00	0.43	1.03
0.65	0.65	8.10	45.2	15.87	5.58	15.00	0.48	1.13
0.70	0.70	8.85	52.2	15.97	5.90	15.00	0.54	1.24
0.75	0.75	9.60	59.5	16.07	6.20	15.00	0.60	1.35
0.80	0.80	10.35	67.2	16.17	6.49	15.00	0.65	1.45
0.85	0.85	11.10	75.2	16.27	6.78	15.00	0.71	1.56
0.89	0.89	11.70	81.8	16.35	6.99	15.00	0.76	1.65

DESIGN Q_{100} = B2 + B3 + B4 + 0.20 * B1
= 21.35 + 14.21 + 9.54 + 0.2 * 37.85
= 52.7 cfs

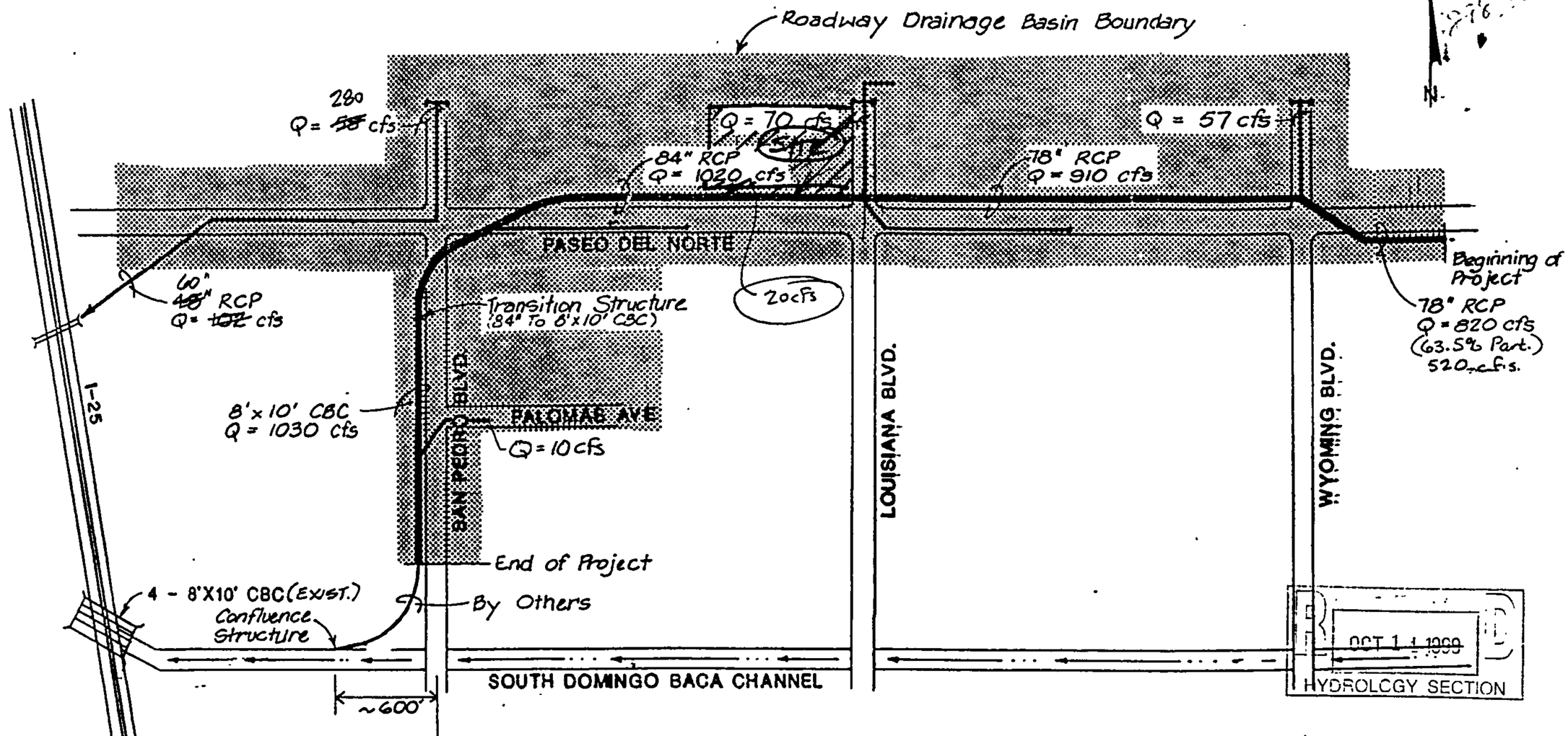
A2-29

Worksheet
Worksheet for Circular Channel

Project Description	
Project File	c:\flowma~1\lowes.fm2
Worksheet	b2-pipe
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.500000	%
Diameter	36.00	in

Results		
Depth	3.00	ft
Discharge	47.16	ft^3/s
Flow Area	7.07	ft^2
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.00	%
Critical Slope	0.006095	ft/ft
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	50.73	ft^3/s
Full Flow Capacity	47.16	ft^3/s
Full Flow Slope	0.005000	ft/ft



1030c.f.s	1020 c.f.s.	910 c.f.s.	820cfs	TOTAL Q
657 c.f.s. 64%	647 c.f.s. 63%	577 c.f.s. 62%	520cfs 63%	PART. Q

per County Calcs in Appendix

REV 7/8/92 SJM

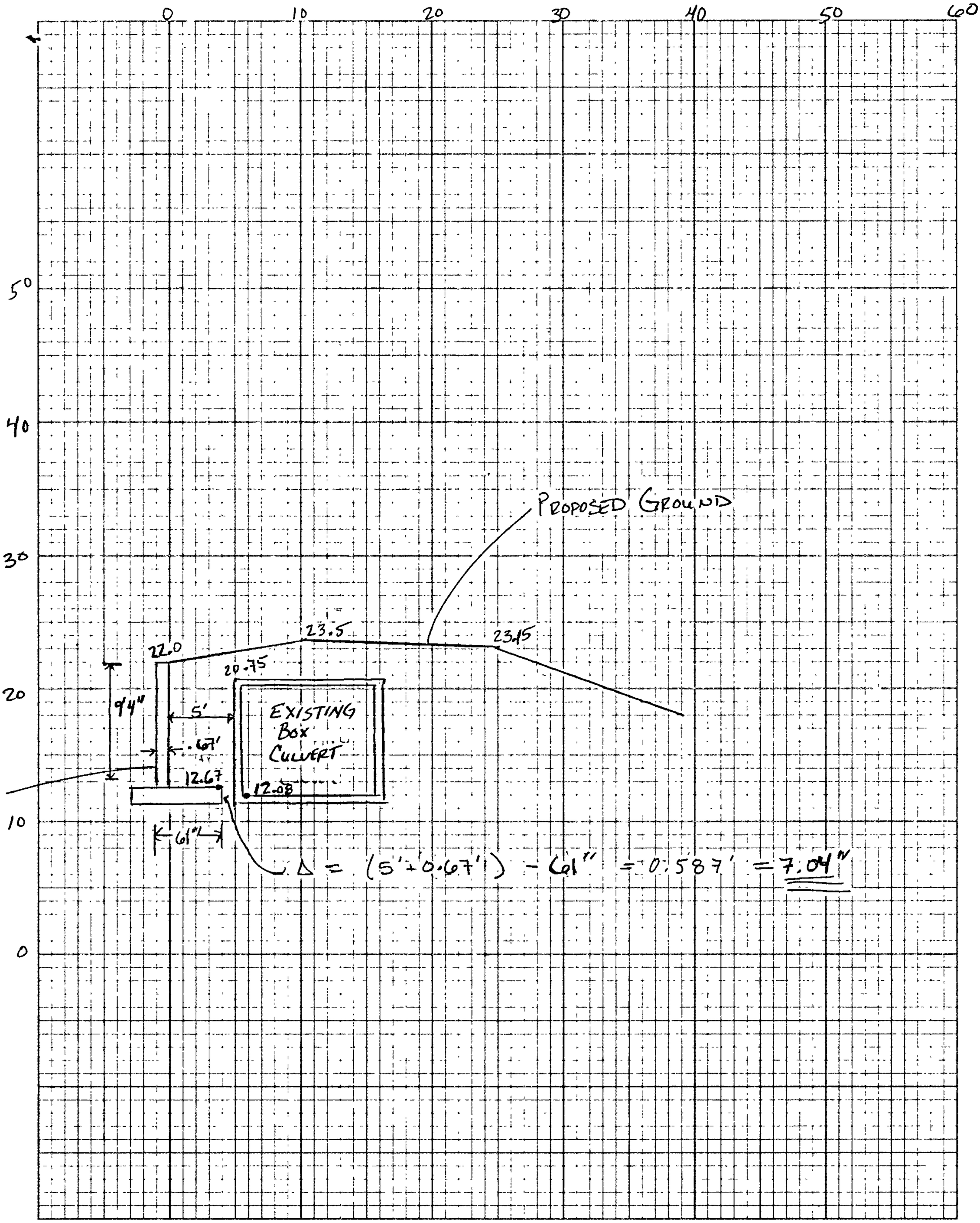
BASED ON ABOVE CALCS.
USE 63% Participating Share.
For

WILSON & COMPANY

PASEO DEL NORTE
DRAINAGE REPORT
PLATE 1

DSGN SJM	DR. KIS	CK.
FILE 90545	DATE MAY 91	SHEET

Attachment 2



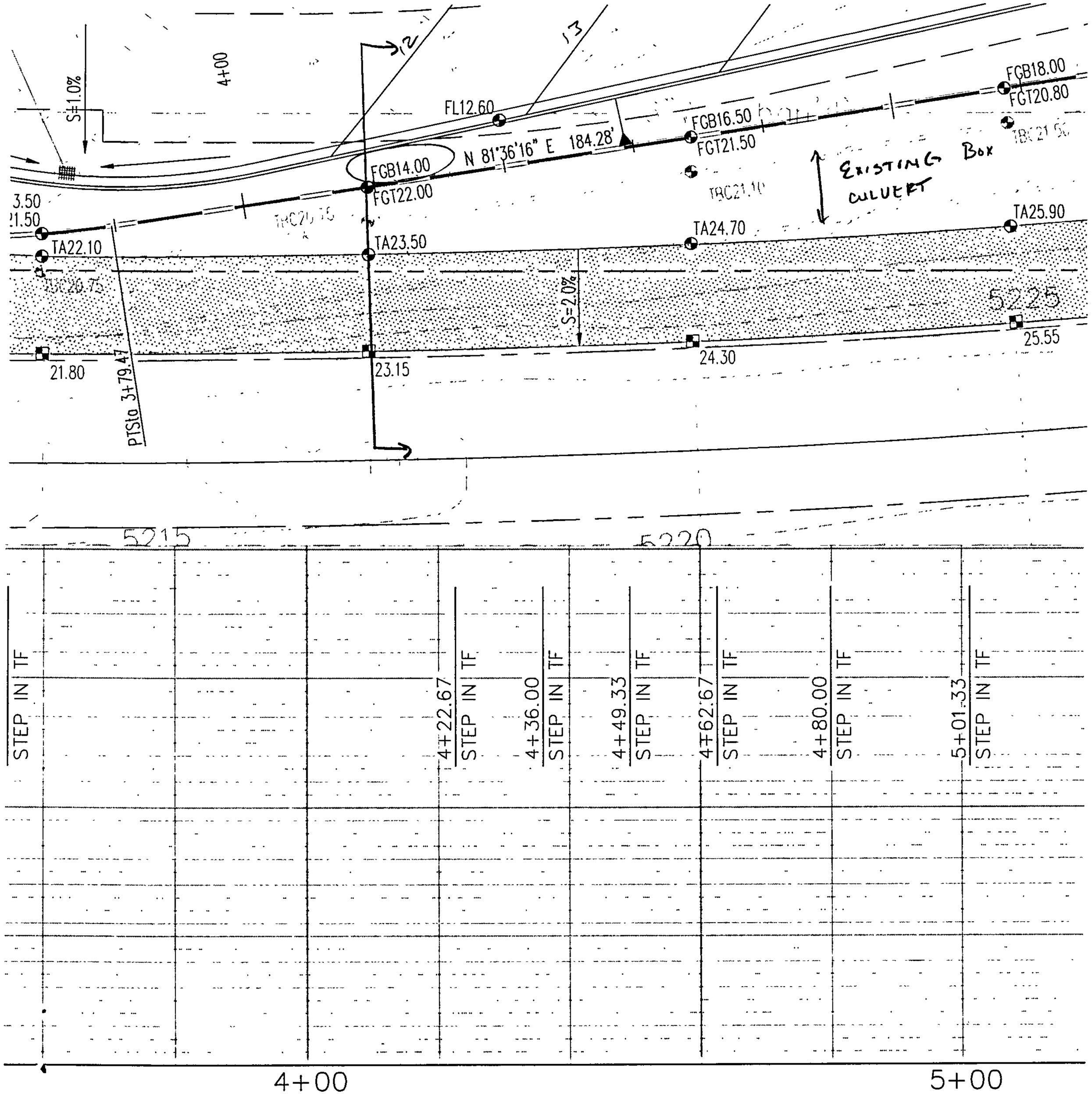
Bohannan Huston

PROJECT NAME Lowe's SHEET 1 OF 1

PROJECT NO. 00179 BY _____ DATE _____

SUBJECT RET. WALL / CULVERT CH'D _____ DATE _____

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS SOFTWARE DEVELOPERS



TB = TOP OF EXISTING BOX CULVERT

FGB - FINISHED GROUND BOTTOM OF WAL

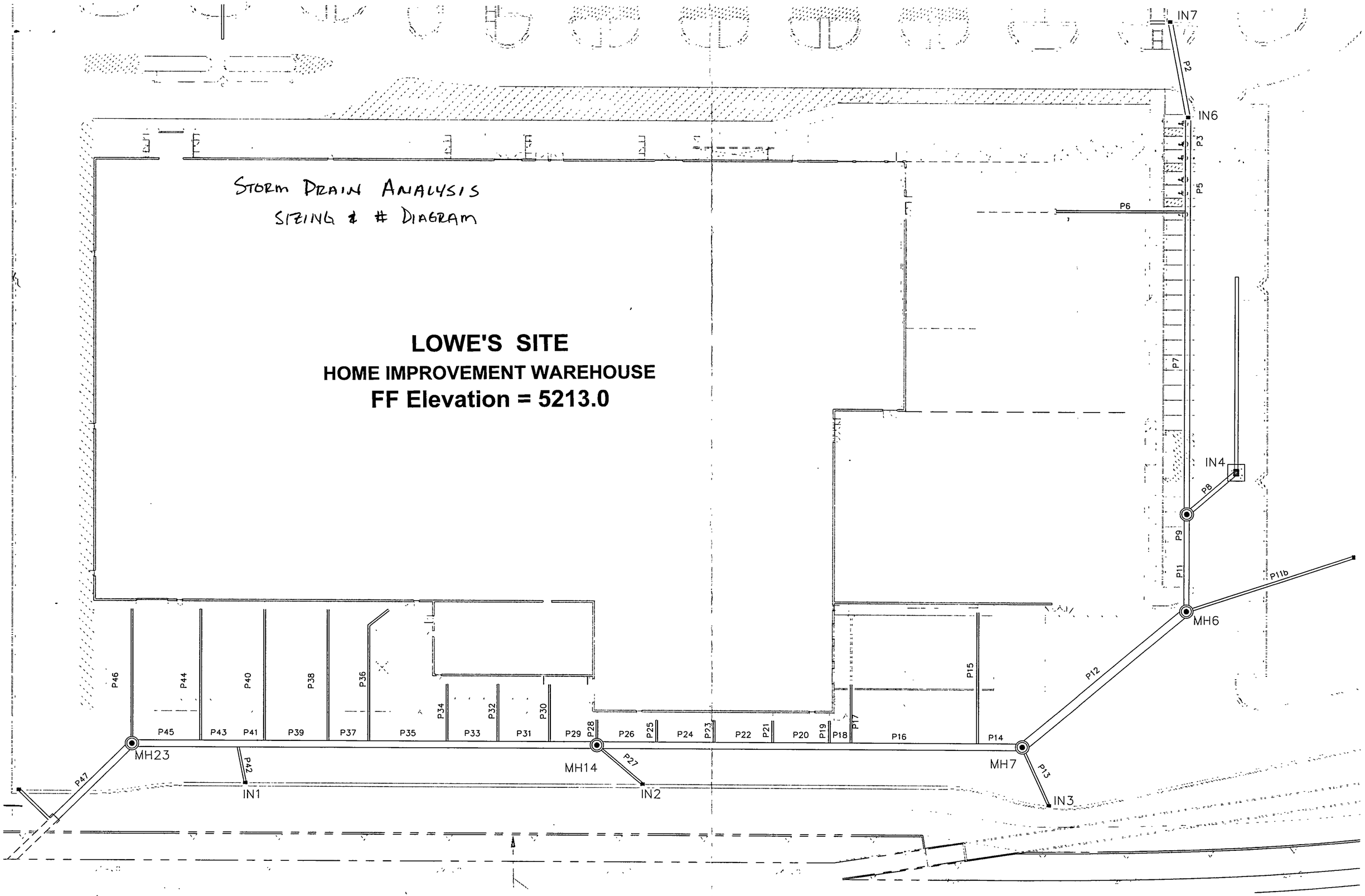
FGT = " TOP OF WAL

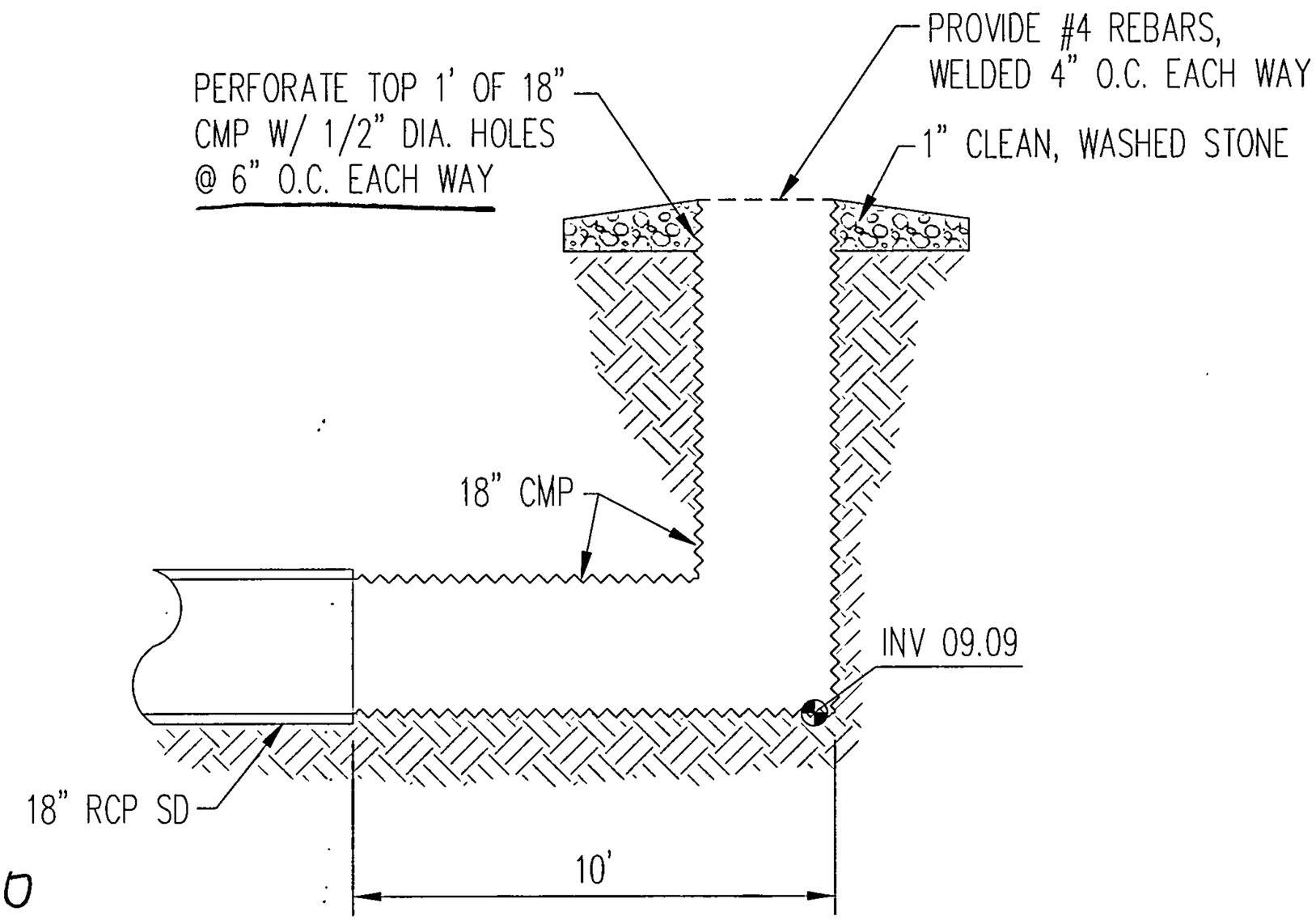
STORM DRAIN ANALYSIS
SIZING & # DIAGRAM

LOWE'S SITE

HOME IMPROVEMENT WAREHOUSE

FF Elevation = 5213.0





TEMPORARY INLET STRUCTURE

N.T.S.

COMMENT 3:

10-18-09