

# CITY OF ALBUQUERQUE



May 29, 2015

Ronald Bohannon, PE  
Tierra West, LLC  
5571 Midway Park Place NE  
Albuquerque, NM 87109

**RE: Main Event, Albuquerque Carpenters Training Center, Pan American Freeway  
and Vassar Drive  
Grading Plan and Drainage Plan  
Engineer's Stamp Date 5-14-2015 (File: G16-D149)**

Dear Mr. Bohannon:

Based upon the information provided in your submittal received 5-19-15, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan in the construction sets when submitting for a building permit.

Prior to Certificate of Occupancy release, Engineer Certification per the DPM Checklist will be required.

If you have any questions, you can contact me at 924-3924.

Sincerely,

Jeanne Wolfenbarger, P.E.  
Senior Engineer, Planning Dept.  
Development Review Services

Orig: Drainage file  
c.pdf Addressee via Email

# TIERRA WEST, LLC

May 8, 2015

Jeanne Wolfenbarger, P.E.  
Senior Engineer Planning Dept.  
Development Review Services  
City of Albuquerque  
P.O. Box 1293  
Albuquerque, NM 87102

**RE: MAIN EVENT,  
PAN AMERICAN FREEWAY AND VASSAR DRIVE  
GRADING PLAN AND DRAINAGE PLAN  
ENGINEER'S STAMP DATE 3-27-2015 (FILE:G-D149)**

Dear Ms. Wolfenbarger:

Please find the following responses addressing your comments listed below:

1. Show computations for the first flush on this site, and explain how it will manage. The volume required to be retained is 0.34 inches times the impervious area. **The first flush calculations are now shown on Sheet C6.**
2. In the "Carpenters Training Center Drainage Report" where 159.55 fs was approved for discharged from the site that included 16.68 cfs from the Carpenter's Training Center, this amount was said to include "127.4 cfs from the existing retention pond, 13.01 cfs from I-25 and only 18.68 cfs from the existing retention pond, 13.04 cfs from I -25 and only 18.68 cfs from the Carpenter's Center". In your drainage narrative for this plan, include discussion of all on-site and off-site flows contributing to the downstream storm drain system that was constructed as part SAD 216. Include excerpts from previous drainage reports within the next submittal including the storm cad profiles from the Carpenters Training Center Report" (but with flows labeled on the profiles) and the original SAD 216 Map #4 and Table 1 Showing the analysis points and corresponding acceptable flows for the downstream system. Also explain difference between the 159.55 cfs versus the 101 cfs originally shown for SAD 216 at Analysis Point 3 for that report. Please put discussion into a report format for this large of a site. **As we discussed on the telephone this information was added to the drainage narrative on Sheet C5.**
3. On the "Drainage Plan", include map of all off-site basins. Label flow on the plan view for each of the new pipes that corresponds with the "Pipe Capacity Table". Label the existing storm drains sizes discharging to the site from off-site as well as the flows that are being conveyed from off-site. Show existing 48' pipe downstream of site along with capacity and total proposed discharge from onsite. **All of the off-site basins were added to the Basin Map and the pipes were labeled to correspond to the chart. The off-site flows entering the storm sewer system were added at their respective locations and the total amount of discharge across Interstate 25 is now shown as well.**
4. Include inlet capacity calculations within next submittal and inlet details. Show grate elevations for these inlets on the 'Grading Plan' which correspond to the 'Drainage Plan'.

There are a couple of discrepancies including and difference of about one foot between grate elevations and grade elevations at the same spot including two grates along the northwest side of the site that show grate elevations of 5063.75 and 5065.50. **These typographic errors were corrected and the grate elevations are labeled on the Grading Plan. The drop inlet calculations can now be found on Sheet C6.**

5. Check the middle entrance to the private drive south of the building with regard to grade elevations. A couple of new spot elevations are shown to be 3 feet off from existing spot elevations, creating a very steep drop. Include more existing spot elevations within the public and private roads surrounding the site. **There is no middle entrance. The existing entrance is being eliminated. A note was added to show that we are adding curb and gutter in this location to make it clearer.**

6. Include detail of the 8-foot modified manhole. **This detail was added to Sheet C17.**

7. It looks like an approximate 3:1 slope is being crated between the Pan American Freeway and the retaining wall along the parking lot. Provide Section A-A symbol on the plan view. There is an elevation discrepancy where the top of wall elevation is 5079.67, and there is an existing 5084.0 spot elevation as well as a 5086.90 for new manhole rim elevation within very short distance from the wall. **Section A-A was already shown for the cross-section on Vassar Drive so Section B-B was added on Sheet C5. The manhole rim elevation was corrected.**

8. Call for existing 24' stub to be removed on Drainage Plan on the southwest corner of the site. **The proposed storm sewer is connecting to the stub going to the east. The stub going north will be partially removed and a drop inlet will be constructed at the new end location. A note was added to call out the removal of this section of pipe.**

9. Specify elevations in parking lot to be at bottom of curb if this is the case. **A note was added to the Grading Plan stating that all spot elevations are at flow line unless otherwise specified.**

10. Show roof downspouts on smaller building similar to what you have shown for the larger building. **Two downspouts were added to the back of the building.**

11. Highlight site on overall vicinity map. **The site is now shown on the Vicinity Map.**

If you have any questions or need additional information regarding this matter, please do not hesitate to contact me.

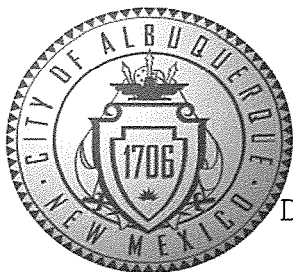
Sincerely,



Ronald R. Bohannon, PE

cc: Mike Winter

JN:2015015  
RRB/jn/cwg



# City of Albuquerque

Planning Department

Development & Building Services Division

## DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: Main Event City Drainage #: \_\_\_\_\_  
DRB#: 1006865 EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_  
Legal Description: Lots 2-A and 2-B SRCC Albuquerque Carpenters Training Center  
City Address: \_\_\_\_\_

Engineering Firm: Tierra West, LLC Contact: Jon Niski  
Address: 5571 Midway Park Place NE Albuquerque NM 87109  
Phone#: 505-858-3100 Fax#: 505-858-1118 E-mail: jniski@tierrawestllc.com

Owner: Southwest Regional Council of Carpenters Contact: \_\_\_\_\_  
Address: 533 S. Fremont Avenue, 9th Floor Los Angeles, CA 90071  
Phone#: 213-488-2957 Fax#: \_\_\_\_\_ E-mail: rsowell@swcarpenters.org

Architect: \_\_\_\_\_ Contact: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

Surveyor: TBD Contact: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

Contractor: TBD Contact: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

### TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT  
☐ DRAINAGE PLAN 1st SUBMITTAL  
☒ DRAINAGE PLAN RESUBMITTAL  
☐ CONCEPTUAL G & D PLAN  
☐ GRADING PLAN  
☐ EROSION & SEDIMENT CONTROL PLAN (ESC)  
☐ ENGINEER'S CERT (HYDROLOGY)  
☐ CLOMR/LOMR  
☐ TRAFFIC CIRCULATION LAYOUT (TCL)  
☐ ENGINEER'S CERT (TCL)  
☐ ENGINEER'S CERT (DRB SITE PLAN)  
☐ ENGINEER'S CERT (ESC)  
☐ SO-19  
☐ OTHER (SPECIFY) \_\_\_\_\_

### CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☐ SIA/FINANCIAL GUARANTEE RELEASE  
☐ PRELIMINARY PLAT APPROVAL  
☐ S. DEV. PLAN FOR SUB'D APPROVAL  
☐ S. DEV. FOR BLDG. PERMIT APPROVAL  
☐ SECTOR PLAN APPROVAL  
☐ FINAL PLAT APPROVAL  
☐ CERTIFICATE OF OCCUPANCY (PERM)  
☐ CERTIFICATE OF OCCUPANCY (TCL TEMP)  
☐ FOUNDATION PERMIT APPROVAL  
☒ BUILDING PERMIT APPROVAL  
☐ GRADING PERMIT APPROVAL  
☐ PAVING PERMIT APPROVAL  
☐ WORK ORDER APPROVAL  
☐ GRADING CERTIFICATION  
☐ SO-19 APPROVAL  
☐ ESC PERMIT APPROVAL  
☐ ESC CERT. ACCEPTANCE  
☐ OTHER (SPECIFY) \_\_\_\_\_

WAS A PRE-DESIGN CONFERENCE ATTENDED: ☐ Yes ☐ No ☐ Copy Provided

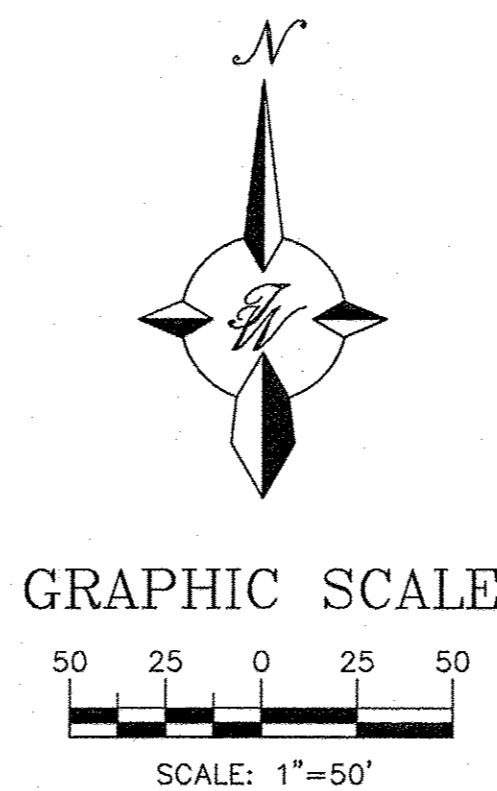
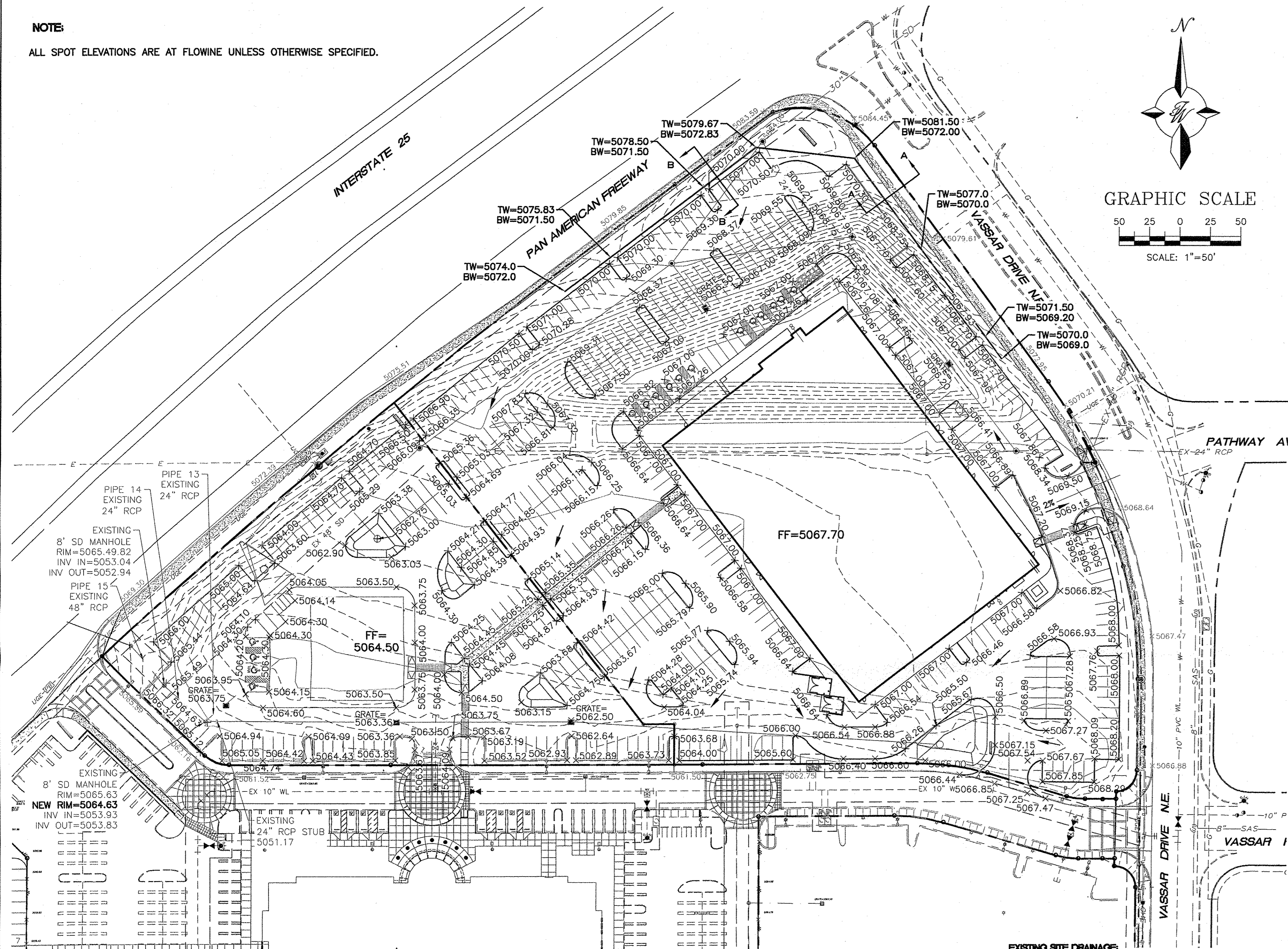
DATE SUBMITTED: 05/19/2015 By: Jonathan Niski

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development

# NOTE:

ALL SPOT ELEVATIONS ARE AT FLOWLINE UNLESS OTHERWISE SPECIFIED.

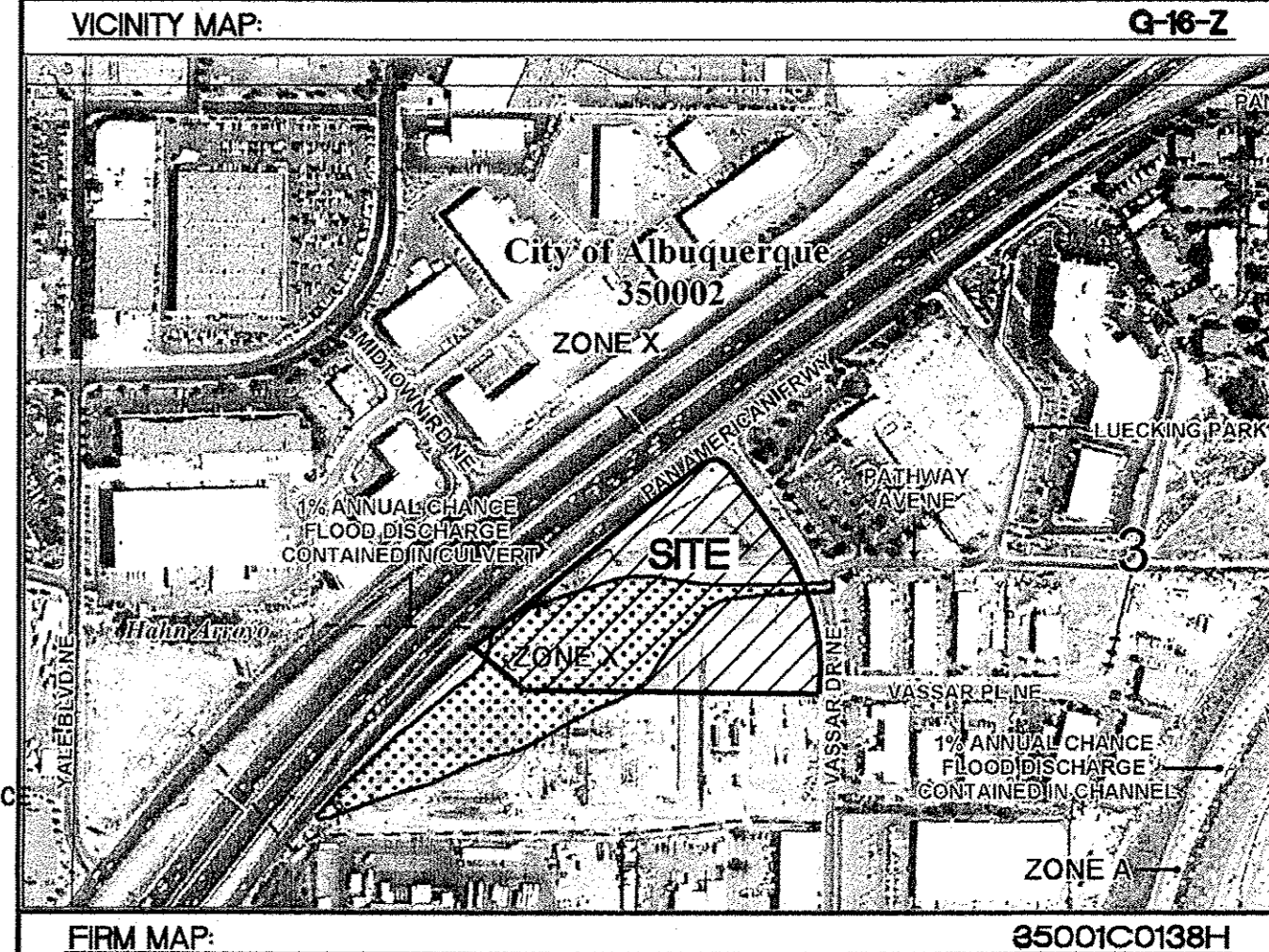
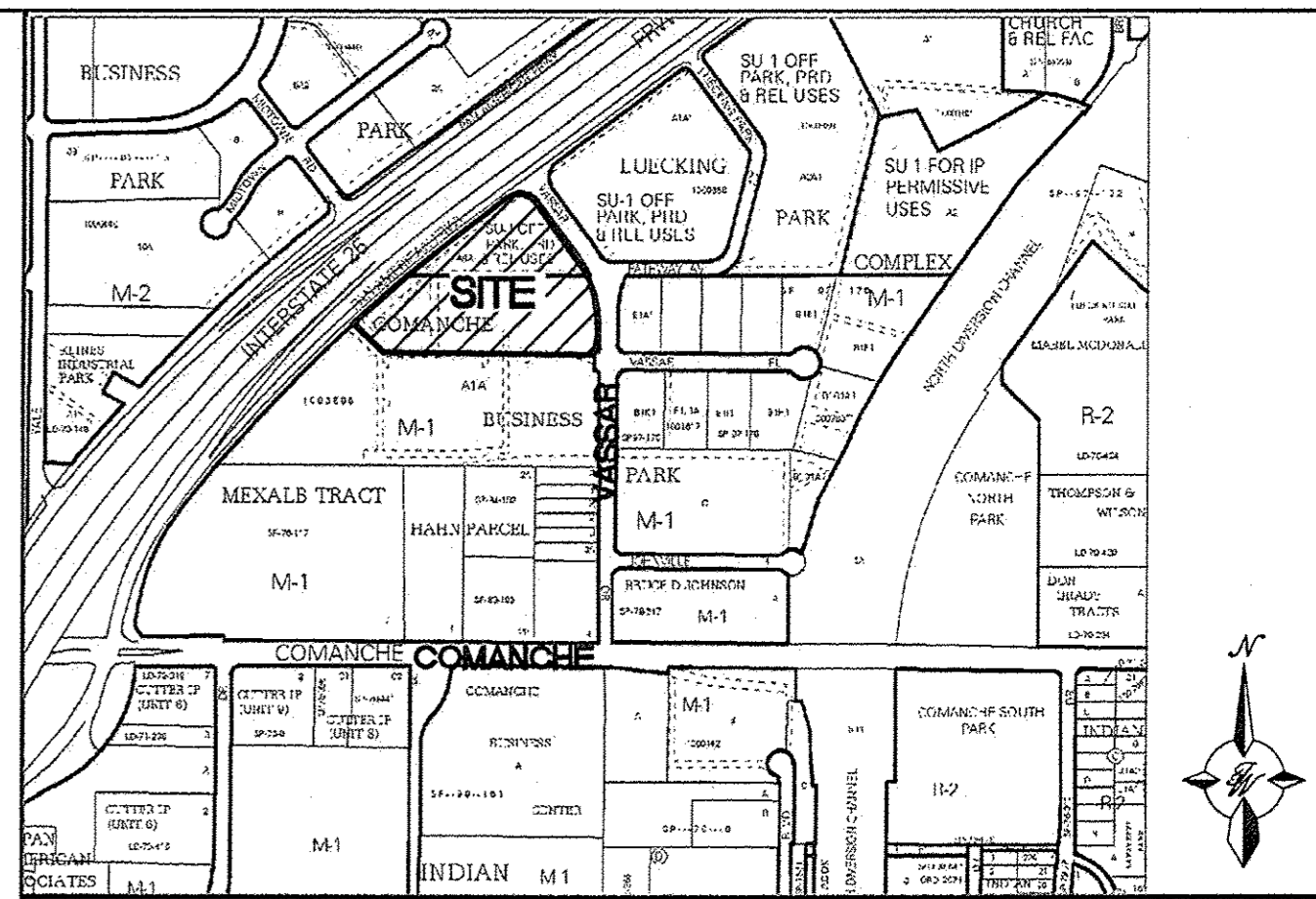


## LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- SCREEN WALL
- RETAINING WALL
- 5010 — CONTOUR MAJOR
- 5011 — CONTOUR MINOR
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- 5010 — EXISTING CONTOUR MAJOR
- 5011 — EXISTING CONTOUR MINOR
- x 5048.25 EXISTING SPOT ELEVATION

## EROSION CONTROL NOTES

- CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-ON SITE DURING CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
- REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.



## PROPOSED SITE DRAINAGE

THIS SITE WILL BE DEVELOPED WITH A ENTERTAINMENT/RESTAURANT BUILDING ON THE PAD ALONG VASSAR DRIVE AND A FUTURE RESTAURANT PAD SITE ALONG THE PAN AMERICAN FREEWAY. THE TEMPORARY RETENTION POND WILL BE ELIMINATED AND THE EXISTING 42-INCH PUBLIC STORM SEWER WILL BE REROUTED AND CONNECTED TO AN EXISTING 48-INCH PUBLIC STORM SEWER CONSTRUCTED WITH THE CARPENTERS TRAINING CENTER DEVELOPMENT (G16/D145). THE SITE WILL UTILIZE LOW IMPACT DEVELOPMENT (LID) WHERE POSSIBLE ALLOWING SURFACE STORM WATER TO FLOW THROUGH LANDSCAPED AREAS PRIOR TO DISCHARGING TO THE STORM SEWER. THERE ARE SEVEN PROPOSED BASINS AS SHOWN ON THE PROPOSED BASIN MAP ON SHEET C6.

BASIN A CONSISTS OF THE BUILDING WITH ALL OF THE ROOF DRAINAGE FLOWING TO THE BACK OF THE BUILDING AND CONVEYED TO THE PARKING LOT VIA EXTERNAL ROOF DRAINS. THESE FLOWS ALONG WITH THE PARKING LOT FLOWS WILL DRAIN TO A LANDSCAPED PONDING AREA WITH A STAND PIPE SO THAT TRASH AND SEDIMENT CAN BE CAPTURED PRIOR TO THE STORM WATER ENTERING A STORM SEWER SYSTEM. THIS BASIN WILL GENERATE A 100-YEAR PEAK FLOW OF 8.62 CFS.

BASIN B CONSISTS OF THE SOUTHWEST PARKING LOT WHERE SURFACE STORM WATER WILL BE ROUTED THROUGH LANDSCAPING PRIOR TO DISCHARGING TO A DROP INLET AT A 100-YEAR PEAK FLOW OF 5.11 CFS.

BASIN C CONSISTS OF A PART OF THE FUTURE RESTAURANT PAD. THIS BASIN WILL GENERATE A DEVELOPED 100-YEAR PEAK FLOW OF 1.54 CFS AND WILL DISCHARGE INTO A DROP INLET.

BASIN D CONSISTS OF A PORTION OF THE FUTURE RESTAURANT PAD AND WILL GENERATE A DEVELOPED 100-YEAR PEAK FLOW OF 1.46 CFS WHICH DISCHARGES INTO A DROP INLET.

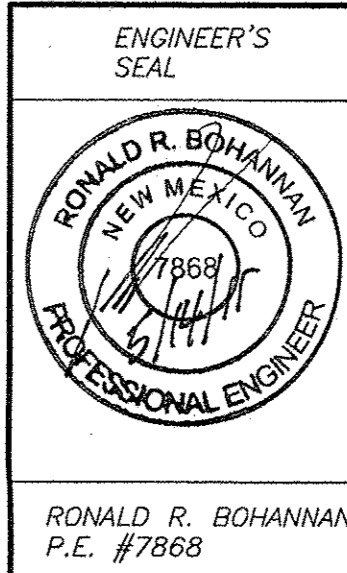
BASIN E CONSISTS OF A PARKING LOT WHERE THE TEMPORARY RETENTION POND IS BEING RECLAIMED. AN EXISTING 42-INCH PUBLIC STORM SEWER (93.4 CFS) ENTERS THIS BASIN FROM THE WEST AND WILL BE REALIGNED TO THE NORTH TO INTERCEPT AN EXISTING PUBLIC 24-INCH STORM SEWER (24.5 CFS) THAT ENTERS THE SITE FROM THE NORTH. THIS BASIN WILL GENERATE A 100-YEAR PEAK FLOW OF 3.45 CFS AND DISCHARGE TO A DROP INLET CONNECTED TO THE 42-INCH STORM SEWER.

BASIN F CONSISTS OF A PARKING LOT GENERATING A 100-YEAR PEAK FLOW OF 3.44 CFS WHICH DISCHARGES TO A DROP INLET.

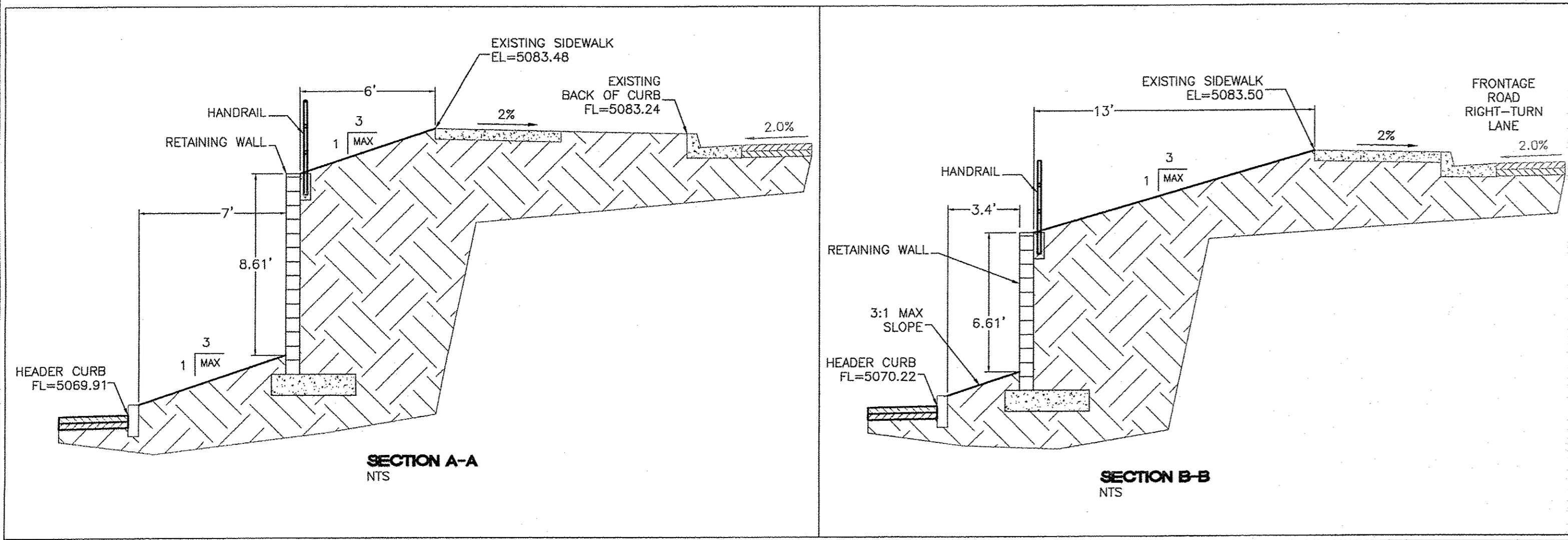
BASIN G CONSISTS OF A PARKING LOT AND THE REMAINING PORTION OF THE FUTURE RESTAURANT PAD. THE REALIGNED 42-INCH PUBLIC STORM SEWER WILL BE CONNECTED TO AN EXISTING 48-INCH PUBLIC STORM SEWER THAT WAS DESIGNED TO CONTAIN ALL OF THE DEVELOPED FLOW FROM THIS PROPERTY AS WELL AS FROM THE PATHWAY OFFICE PARK. THIS BASIN GENERATES A 100-YEAR PEAK FLOW OF 6.25 CFS.

ALL OF THE STORM SEWER CONSTRUCTED WITH THIS PROJECT WILL BE CONNECTED TO AN EXISTING 48-INCH STORM SEWER CONSTRUCTED WITH THE CARPENTERS TRAINING CENTER PROJECT. THE PREVIOUSLY APPROVED DRAINAGE REPORT FOR CARPENTERS CENTER ESTIMATED A TOTAL DEVELOPED DISCHARGE THROUGH THAT PIPE OF 159.55 CFS. THIS PROJECT WILL GENERATE A TOTAL DEVELOPED 100-YEAR FLOW OF 29.88 CFS AND COMBINED WITH THE 117.9 CFS FROM THE PATHWAY OFFICE PARK DEVELOPMENT WILL DISCHARGE A 100-YEAR FLOW OF 147.79 CFS WHICH IS LESS THAN THE 159.55 CFS PREVIOUSLY APPROVED. THE PROPOSED STORM SEWER WAS ANALYZED USING STORMCAD AND A PROFILE IS PROVIDED ON SHEET C6. AS SHOWN IN THAT PROFILE THE HGL FOR THE SYSTEM STAYS WELL WITHIN THE STORM SEWER.

IN ORDER TO MEET THE FIRST FLUSH REQUIREMENTS STORM WATER WILL BE ROUTED THROUGH LANDSCAPED AREAS WHERE POSSIBLE. THERE ARE SMALL RETENTION PONDS LOCATED IN BASINS A, B AND G TO RETAIN THE REQUIRED VOLUME BASED ON THE CALCULATIONS SHOWN SHEET C6.



MAIN EVENT		DRAWN BY
PAN AM FREEWAY AND VASSAR AV.		BJF
GRADING PLAN		DATE
		05/14/15
		2015015_GRB
		SHEET #
		C5
		JOB #
		2015015



## EXISTING SITE DRAINAGE

THE 6.82 ACRE SITE IS LOCATED AT THE SOUTHEAST CORNER OF PAN AMERICAN FREEWAY AND VASSAR DRIVE NE. THE SITE IS BOUNDED ON THE NORTH AND WEST BY PAN AMERICAN FREEWAY, ON THE EAST BY VASSAR DRIVE NE AND ON THE SOUTH BY AN INDUSTRIAL/MANUFACTURING DEVELOPMENT.

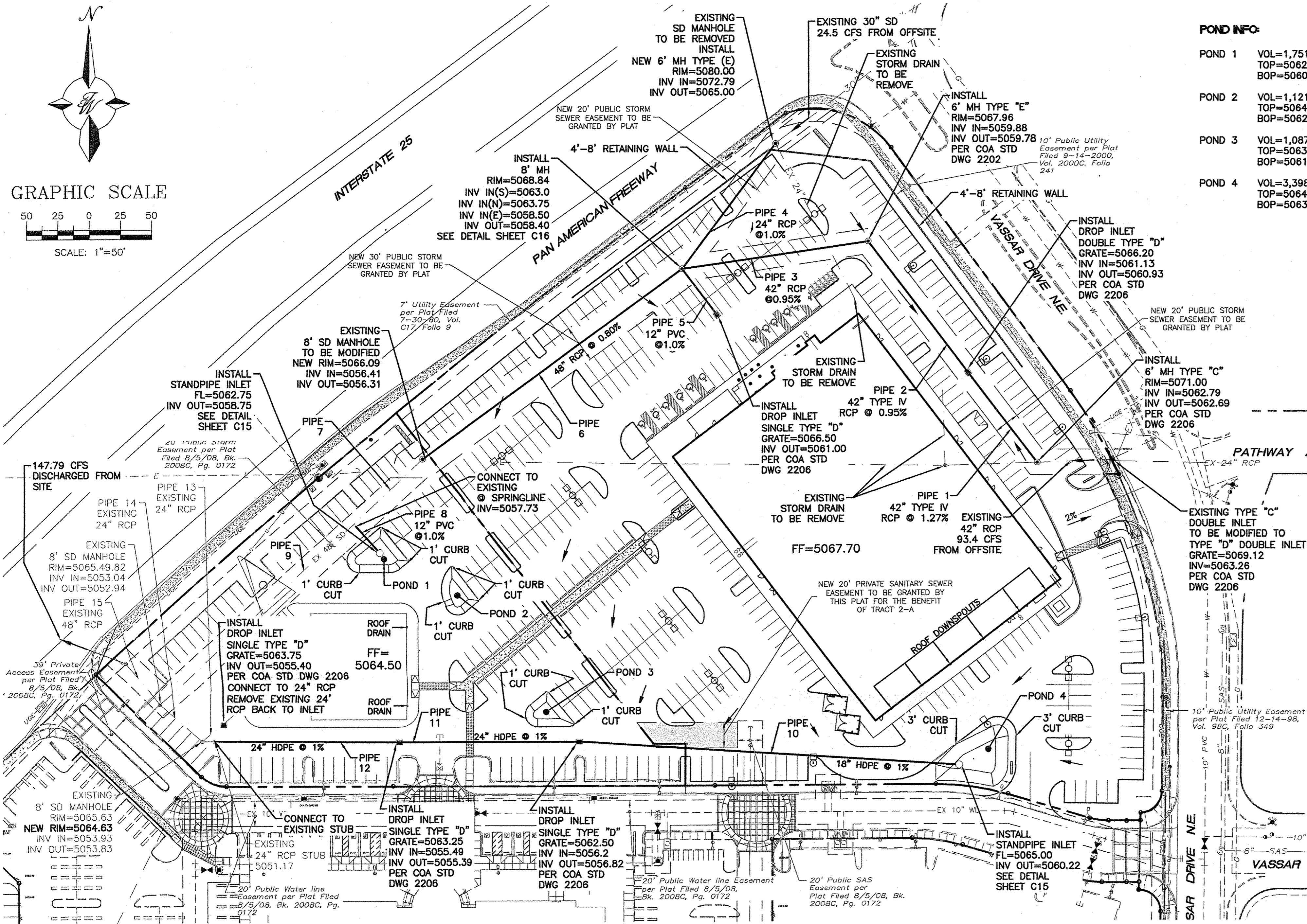
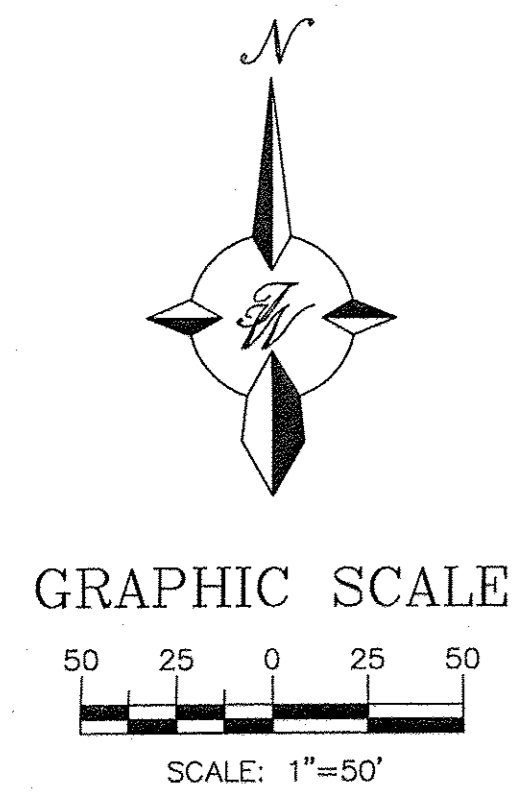
THE SITE IS CURRENTLY VACANT WITH ONE THIRD OF THE PROPERTY BEING A TEMPORARY RETENTION POND FOR THE PATHWAY OFFICE PARK (G16/D114) AND THE REMAINING TWO THIRDS DRAINING FROM EAST TO WEST TO A TEMPORARY DESILTING POND AND STORM SEWER INLET WHERE THE WATER IS THEN CONVEYED BY STORM SEWER AND OPEN CHANNEL TO THE GRIEGOS POND THAT WAS CONSTRUCTED WITH SAD 216.

THERE ARE OFF-SITE FLOWS ENTERING THE POND FROM THE PATHWAY OFFICE PARK DEVELOPMENT AS WELL AS MINIMAL FLOWS FROM THE PAN AMERICAN FREEWAY. THIS SITE IS LOCATED IN A SHADED "X" ZONE AS SHOWN ON FIRM MAP #35001C0138H.

BASED ON THE APPROVED DRAINAGE REPORT FOR THE CARPENTERS TRAINING CENTER (G16/D145) THIS PROJECT MAY DISCHARGE A TOTAL OF 159.55 CFS WHICH TAKES INTO ACCOUNT ALL OF THE STORM WATER ENTERING THE TEMPORARY RETENTION POND AS WELL AS FLOWS FROM INTERSTATE 25. PLEASE SEE THE BASIN MAP ON SHEET C6 FOR ALL OF THE BASINS DRAINING THROUGH THE PIPE UNDER INTERSTATE 25. THE INFORMATION PERTAINING TO THE AMOUNT OF DISCHARGE ALLOWED FROM THIS PARCEL IS DETAILED ON PAGE 12 OF THE CARPENTERS TRAINING CENTER REPORT. ALL OF THE FLOWS WILL PASS THROUGH AN EXISTING 48" RCP UNDER INTERSTATE 25 WHICH HAS A CAPACITY FOR 161 CFS. THIS PIPE DAYLIGHTS INTO A PONDING AREA WEST OF THE INTERSTATE AND EVENTUALLY DRAINS INTO THE GRIEGOS POND.

THE TEMPORARY RETENTION POND RECEIVES 24.5 CFS FROM A STORM SEWER THAT RUNS ALONG INTERSTATE 25 AND ANOTHER 93.4 CFS FROM THE STORM SEWER IN VASSAR DRIVE. ONCE A CONNECTION IS MADE BETWEEN THOSE STORM SEWERS AND THE ONE UNDER INTERSTATE 25 THE POND MAY BE RECLAIMED FOR DEVELOPMENT.

THE CARPENTERS TRAINING CENTER REPORT SHOWS A HIGHER FLOW RATE (159.55 CFS) THAN THE SAD 216 REPORT (101 CFS) DUE TO USING THE RAW BASIN DRAINAGE NUMBERS WITHOUT ROUTING THEM ALONG WITH A CHANGE IN THE PERCENTAGE OF LAND TREATMENTS FROM 15% "A", 15% "B", 70% "D" TO 20% "B" AND 80% "D". THE INCREASE IN FLOW PROVIDES A MORE CONSERVATIVE FLOW AMOUNT TO ENSURE ALL OF THE DOWNSTREAM DRAINAGE FACILITIES HAVE CAPACITY FOR THE UPLAND FLOWS AS IDENTIFIED IN SAD 216. THE CHANGE IN LAND TREATMENT NUMBERS DID INCREASE THE VOLUME GENERATED FROM THIS AREA AND THAT IS CAPTURED IN A PONDING AREA BETWEEN INTERSTATE 25 AND YALE BOULEVARD AS DISCUSSED ON PAGE 12 OF THE CARPENTERS TRAINING CENTER DRAINAGE REPORT.



#### LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- RETAINING WALL
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE

#### CAUTION:

ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS-BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS, PRIOR TO STARTING THE WORK. ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.

#### EROSION CONTROL NOTES:

- CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
- REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.

#### FIRST FLUSH CALCULATIONS:

5.93 ACRES OF IMPERVIOUS AREA = 258,311 SQ. FT  
258,311 SQ. FT \* (0.34"/12") = 7,319 CU. FT =  
0.168 AC-FT OF VOLUME REQUIRED  
TO BE RETAINED ON-SITE.

#### Capacity of a Single 'D' Storm Drop Inlet

Capacity of the grate:  
L = 40" - 2(2" ends) - 7(1/2" middle bars)  
= 32 1/2"  
= 2.7093'

W = 25" - 13(1/2" middle bars)  
= 18.5"  
= 1.54'

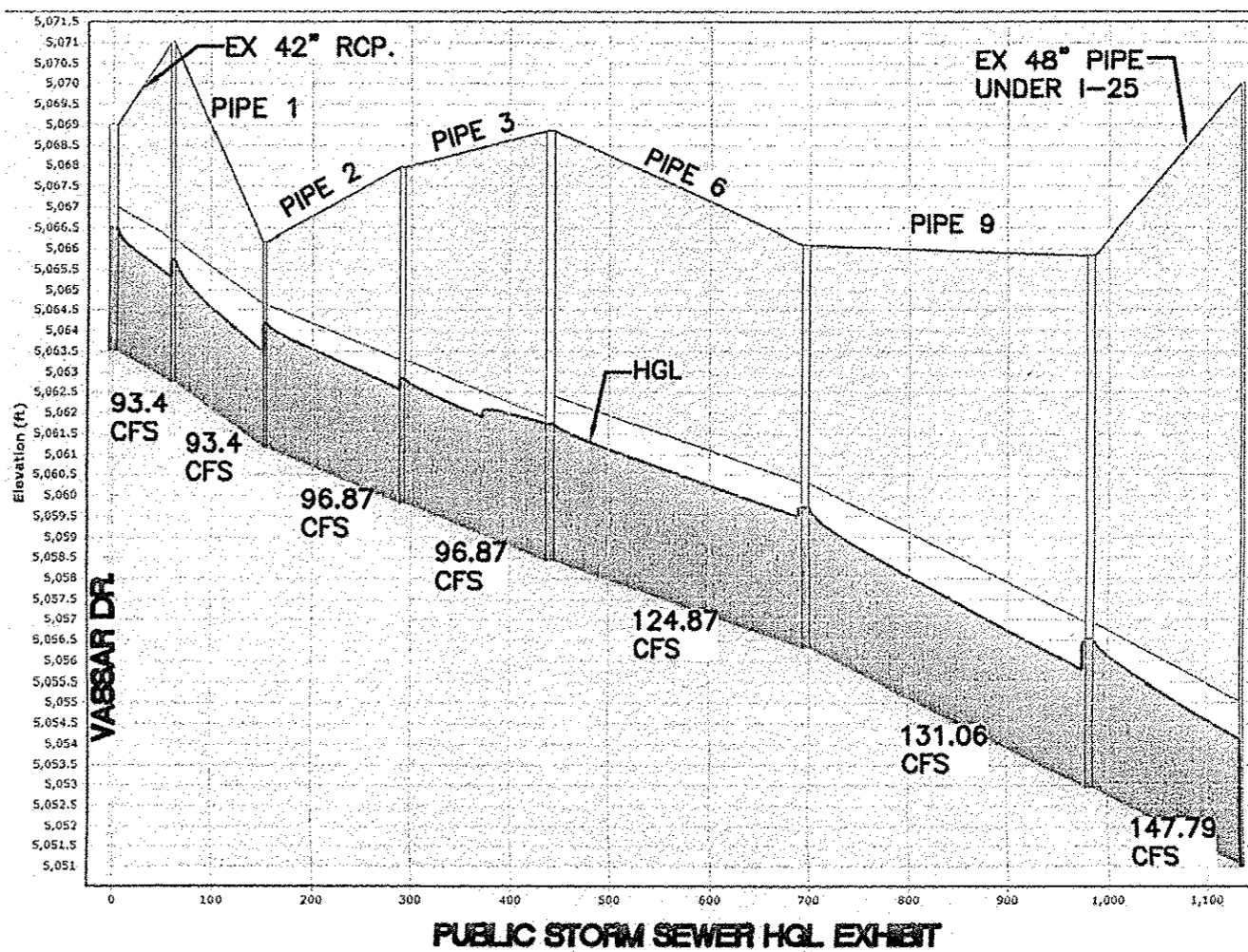
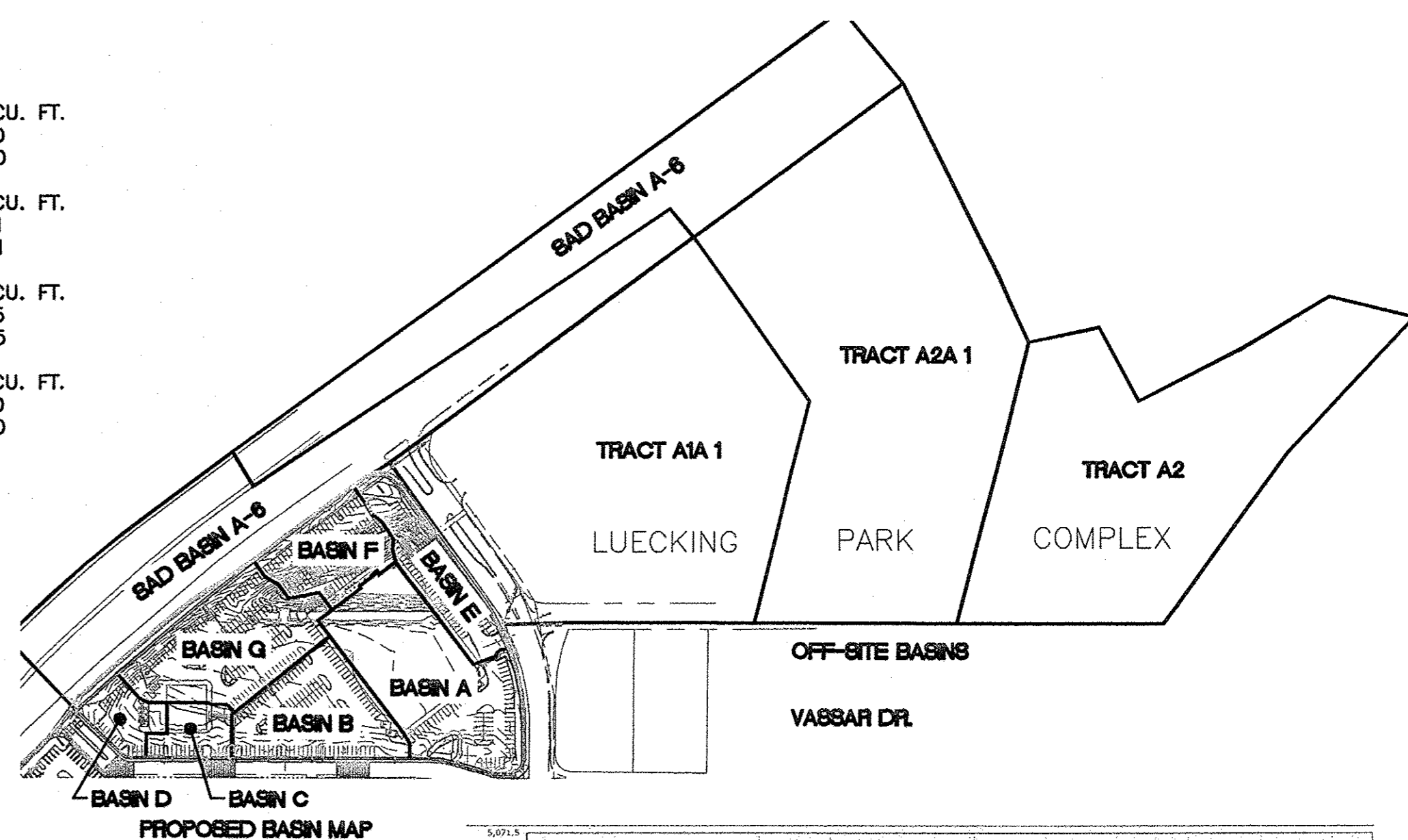
Area = 2.7093' x 1.54'  
= 4.18 ft<sup>2</sup>

Effective Area = 4.18 - 4.18 (0.5 clogging factor)  
= 2.09 ft<sup>2</sup> at the grate

Orifice Equation  
 $Q = CA \sqrt{2gh}$   
 $Q = 0.6 \times 2.09 \sqrt{2 \times 32.2 \times 0.67}$   
 $Q = 8.24 \text{ cfs}$

#### POND INFO:

- POND 1 VOL=1,751 CU. FT.  
TOP=5062.90  
BOP=5060.90
- POND 2 VOL=1,121 CU. FT.  
TOP=5064.21  
BOP=5062.21
- POND 3 VOL=1,087 CU. FT.  
TOP=5063.15  
BOP=5061.15
- POND 4 VOL=3,398 CU. FT.  
TOP=5064.00  
BOP=5063.00



#### Pipe Capacity

Pipe	D (in)	Slope (%)	Area (ft <sup>2</sup> )	R	Q Provided (cfs)	Q Required (cfs)	Velocity (ft/s)
1	42	1.27	9.62	0.875	113.69	93.40	9.71
2	42	0.95	9.62	0.875	98.33	96.87	10.07
3	42	0.95	9.62	0.875	98.33	96.87	10.07
4	24	1.25	3.14	0.500	25.36	24.50	7.80
5	12	1.00	0.79	0.250	3.57	3.44	4.38
6	48	0.80	12.57	1.000	128.82	124.81	9.93
7	48	1.17	12.57	1.000	155.79	124.81	9.93
8	12	3.40	0.79	0.250	6.59	6.25	7.96
9	48	1.17	12.57	1.000	155.79	131.06	10.43
10	18	1.00	1.77	0.375	10.53	8.62	4.88
11	24	1.00	3.14	0.500	22.68	13.73	4.37
12	24	1.00	3.14	0.500	22.68	15.27	4.86
13	24	6.97	3.14	0.500	59.89	1.46	0.46
14	24	1.98	3.14	0.500	31.92	16.73	5.33
15	48	2.65	12.57	1.000	234.46	147.79	11.76

#### Manning's Equation:

$$Q = 1.49 n \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

A = Area  
R = D/4  
S = Slope  
n = 0.013

#### Weighted E Method

##### On-Site Basins

Basin	Area (sf)	Area (acres)	Treatment A %	Treatment B %	Treatment C %	Treatment D %	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
A	83,352	1.91	0%	8%	0.15	0%	0.00	92%	1.76	2.013	0.321	8.62
B	49,888	1.15	0%	0%	10%	0.11	0%	0.00	90%	1.986	0.190	5.11
C	14,756	0.34	0%	0%	6%	0.02	0%	0.00	94%	2.040	0.058	1.54
D	15,034	0.35	0%	0%	19%	0.07	0%	0.00	81%	1.865	0.054	1.46
E	36,072	0.83	0%	0%	22%	0.18	0%	0.00	78%	1.825	0.126	3.45
F	34,539	0.79	0%	0%	15%	0.12	0%	0.00	85%	1.919	0.127	3.44
G	63,131	1.45	0%	0%	16%	0.23	0%	0.00	84%	1.906	0.230	6.25

##### Equations:

$$\text{Weighted E} = E_a \cdot A_a + E_b \cdot A_b + E_c \cdot A_c + E_d \cdot A_d / (\text{Total Area})$$

$$\text{Volume} = \text{Weighted E} \cdot \text{Total Area}$$

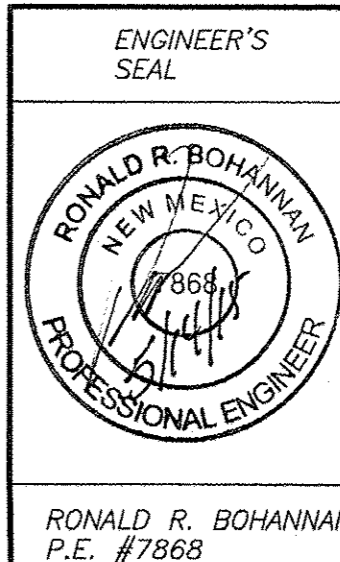
$$\text{Flow} = Q_a \cdot A_a + Q_b \cdot A_b + Q_c \cdot A_c + Q_d \cdot A_d$$

##### Excess Precipitation, E (inches)

Zone 2	100-Year	10-Year
E <sub>a</sub>	0.53	0.13
E <sub>b</sub>	0.78	0.28
E <sub>c</sub>	1.13	0.52
E <sub>d</sub>	2.12	1.34

##### Peak Discharge (cfs/acre)

Zone 2	100-Year	10-Year
Q <sub>a</sub>	1.56	0.38
Q <sub>b</sub>	2.28	0.95
Q <sub>c</sub>	3.14	1.71
Q <sub>d</sub>	4.70	3.14



#### MAIN EVENT

PAN AM FREEWAY AND VASSAR AV.

#### DRAINAGE PLAN

TIERRA WEST, LLC  
5571 MIDWAY PARK PLACE NE  
ALBUQUERQUE, NM 87109  
(505) 858-3100  
www.tierrawestllc.com

#### DRAWN BY

BJF

#### DATE

05/14/15

#### 2015015\_GRB

#### SHEET #

C6

#### JOB #

2015015