

I. INTRODUCTION AND EXECUTIVE SUMMARY

THIS PROJECT, LOCATED IN THE LOWER SOUTHEAST HEIGHTS JUST NORTH OF THE AIRPORT AND EAST OF I-25, REPRESENTS A MODIFICATION TO AN EXISTING COMMERCIAL SITE WITHIN AN INFILL AREA. THE SITE IS CHARACTERIZED BY TWO PREVIOUSLY DEFINED DRAINAGE BASINS. THE PROPOSED IMPROVEMENTS ARE CONFINED TO BASIN A-1 THAT DISCHARGES TO WILMOORE DRIVE SE, CONSTRUCTED BY SAD 221. IN 1992, IT WAS PROPOSED TO TEMPORARILY RETAIN THE RUNOFF GENERATED BY BASIN A-1 UNTIL THE COMPLETION OF SAD 221 WHEN FREE DISCHARGE WOULD BE PERMISSIBLE (115/040), 02-08-93. THE DRAINAGE CONCEPT WILL BE TO REMOVE THE TEMPORARY POND AND FREE DISCHARGE BASIN A-1 TO WILMOORE DRIVE SE VIA A SIDEWALK CULVERT AND A NEW DRIVEPAD.

THIS SUBMITTAL IS MADE IN SUPPORT OF SO#19 AND BUILDING PERMIT APPROVALS FOR THE PROPOSED BUILDING ADDITION AND DRAINAGE MODIFICATIONS.

II. PROJECT DESCRIPTION

AS SHOWN BY THE VICINITY MAP, THE SITE IS LOCATED ON THE WEST SIDE OF YALE BLVD. SE NORTH OF GIBSON BLVD. SE. THE CURRENT LEGAL DESCRIPTION IS LOTS 18, 19 AND 20, PLUS TRACT B1, BLOCK 12, CLAYTON HEIGHTS. AS SHOWN BY PANEL 361 OF 825 OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAPS PUBLISHED BY FEMA FOR BERNALILLO COUNTY, NEW MEXICO, SEPTEMBER 20, 1996, THIS SITE DOES NOT LIE WITHIN OR ADJACENT TO A DESIGNATED FLOOD HAZARD ZONE. THE SITE DOES, HOWEVER, CONTRIBUTE RUNOFF TO WILMOORE DRIVE SE CONSTRUCTED BY THE CITY OF ALBUQUERQUE ALONG WITH STORM DRAINAGE IMPROVEMENTS THAT ALLOW FOR THE FREE DISCHARGE OF BASIN A-1.

III. BACKGROUND DOCUMENTS

RESEARCH WAS CONDUCTED AT THE CITY ENGINEER'S OFFICE REVEALING PRIOR DRAINAGE SUBMITTALS FOR THIS SITE. THOSE SUBMITTALS WERE PREPARED BY THIS OFFICE. THE ORIGINAL GRADING AND DRAINAGE PLAN DATED 02/08/93 WAS APPROVED 02/18/93. THE COMPLETED GRADING AND DRAINAGE WAS CERTIFIED 01/23/95 AND ACCEPTED BY THE CITY 01/31/95. THESE PRIOR SUBMITTALS ESTABLISH THE REQUIREMENT FOR REMOVING THE TEMPORARY RETENTION POND AND CONSTRUCTING THE SIDEWALK CULVERT AND CONNECTING PRIVATE STORM DRAIN FOLLOWING THE COMPLETION OF SAD 221.

IV. EXISTING CONDITIONS

AT PRESENT, THE SITE IS ALREADY DEVELOPED. BASIN A-1 CURRENTLY DRAINS FROM EAST TO WEST INTO AN EXISTING RETENTION POND CONSTRUCTED IN ACCORDANCE WITH THE PREVIOUSLY APPROVED PLANS REFERENCED ABOVE.

V. DEVELOPED CONDITIONS

THE PROPOSED CONSTRUCTION CONSISTS OF A BUILDING ADDITION AT THE SOUTHWEST CORNER OF THE EXISTING FACILITY. THE ADDITION WILL REQUIRE REMOVAL OF THE EXISTING RETENTION POND. THIS REQUIRES THAT THE EXISTING PRIVATE STORM DRAIN SYSTEM BE MODIFIED AND EXTENDED. THE 8" PVC PRIVATE STORM DRAIN WILL DISCHARGE INTO THE BACK OF A PROPOSED SIDEWALK CULVERT TO FACILITATE DRAINING TO THE STREET. THE BUILDING ADDITION WILL DRAIN ONTO THE PROPOSED DRIVEWAY AND THEN OUT TO WILMOORE DRIVE SE THROUGH THE NEW DRIVEPAD AS SHOWN ON THE GRADING PLAN.

VI. GRADING PLAN

THE GRADING PLANS THAT APPEARS HEREWITH SHOWS 1.) EXISTING GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'-0". 2.) PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 12'-0" INTERVALS. 3.) THE LIMIT AND CHARACTER OF THE EXISTING IMPROVEMENTS. 4.) THE LIMIT AND CHARACTER OF THE PROPOSED IMPROVEMENTS, AND 5.) CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES. AS SHOWN BY THESE PLANS, THE MAJORITY OF THE SITE IS ALREADY DEVELOPED. THE PROPOSED IMPROVEMENTS AFFECT ONLY THE WEST SIDE OF THE SITE. THE PLAN FURTHER ILLUSTRATES THAT THE DRAINAGE PATTERNS DESCRIBED IN THE SECTIONS ABOVE WILL BE ACCOMPLISHED BY REGRADEING THE EXISTING RETENTION POND AND THE SURROUNDING AREA.

VII. CALCULATIONS

CALCULATIONS ANALYZING THE EXISTING AND DEVELOPED CONDITIONS FOR THE 100-YEAR, 6-HOUR RAINFALL EVENT FOR BASIN A-1 HAVE BEEN PREPARED AND APPEAR HEREON. CALCULATIONS FOR BASIN A-2 HAVE NOT BEEN PREPARED BECAUSE NO CHANGES ARE PROPOSED WITHIN THAT BASIN. THE PROCEDURE FOR 40 ACRE AND SMALLER BASINS, AS SET FORTH IN THE REVISION OF SECTION 22.2, HYDROLOGY OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 2, DESIGN CRITERIA, DATED JANUARY, 1993, HAS BEEN USED TO QUANTIFY THE PEAK RATE OF DISCHARGE AND VOLUME OF RUNOFF GENERATED. AS SHOWN BY THE RESULTS PRESENTED HEREON, THERE WILL BE AN INCREASE IN THE PEAK DISCHARGE AND RUNOFF VOLUME GENERATED BY BASIN A-1 AND DISCHARGED TO WILMOORE DRIVE SE.

VIII. CONCLUSION

THE PROPOSED GRADING AND DRAINAGE PLAN IS APPROPRIATE FOR SO#19 AND BUILDING PERMIT APPROVAL DUE TO THE FOLLOWING FACTORS:

1. MODIFICATION TO AN EXISTING SITE WITHIN AN INFILL AREA
2. MINOR INCREASE IN DEVELOPED RUNOFF DISCHARGING FROM THE SITE TO PUBLIC RIGHT-OF-WAY
3. APPARENT DOWNSTREAM CAPACITY
4. NEGLIGIBLE IMPACT ON DOWNSTREAM CONDITIONS
5. THE PROPOSED IMPROVEMENTS WILL COMPLY WITH PRIOR REQUIREMENTS TO REMOVE THE TEMPORARY RETENTION POND
6. THE PROPOSED DRAINAGE SCHEME IS CONSISTENT WITH THAT ESTABLISHED BY PREVIOUS SUBMITTALS. ALL ONSITE IMPROVEMENTS ARE OWNED, OPERATED AND MAINTAINED BY THE UNDERLYING PROPERTY OWNERS. THE DOWNSTREAM STREETS AND STORM DRAINAGE SYSTEMS ARE OWNED, OPERATED AND MAINTAINED BY THE CITY PUBLIC WORKS DEPARTMENT.

PRECIPITATION ZONE = 2

II. $P_{6,100} = P_{360} = 2.35$

III. TOTAL AREA (A_T) = 33720 SF / 0.77 AC

IV. EXISTING LAND TREATMENT

TREATMENT	AREA (SF/AC)	%
1. BASIN A-1 (19150 SF / 0.44 AC)		
B	1150/0.03	06
C	11830/0.27	62
D	6170/0.14	32

V. DEVELOPED LAND TREATMENT

TREATMENT	AREA (SF/AC)	%
1. BASIN A-1 (19150 SF / 0.44 AC)		
B	1150/0.03	06
C	10250/0.24	54
D	7750/0.18	40

VI. EXISTING CONDITION

1. BASIN A-1

A. VOLUME

$$E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$$

$$E_w = [0.78(0.03) + 1.13(0.27) + 2.12(0.14)] / 0.44 = 1.42 \text{ IN}$$

$$V_{100,6-HR} = (E_w / 12) A_T$$

$$V_{100,6-HR} = (1.42 / 12) 0.44 = 0.0521 \text{ AC-FT} = 2270 \text{ CF}$$

B. PEAK DISCHARGE

$$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$

$$Q_p = Q_{100} = 2.28(0.03) + 3.14(0.27) + 4.70(0.14) = 1.6 \text{ CFS}$$

VII. DEVELOPED CONDITION

1. BASIN A-1

A. VOLUME

$$E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$$

$$E_w = [0.78(0.03) + 1.13(0.24) + 2.12(0.18)] / 0.44 = 1.54 \text{ IN}$$

$$V_{100} = (E_w / 12) A_T$$

$$V_{100} = (1.54 / 12) 0.44 = 0.0564 \text{ AC-FT} = 2450 \text{ CF}$$

B. PEAK DISCHARGE

$$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$

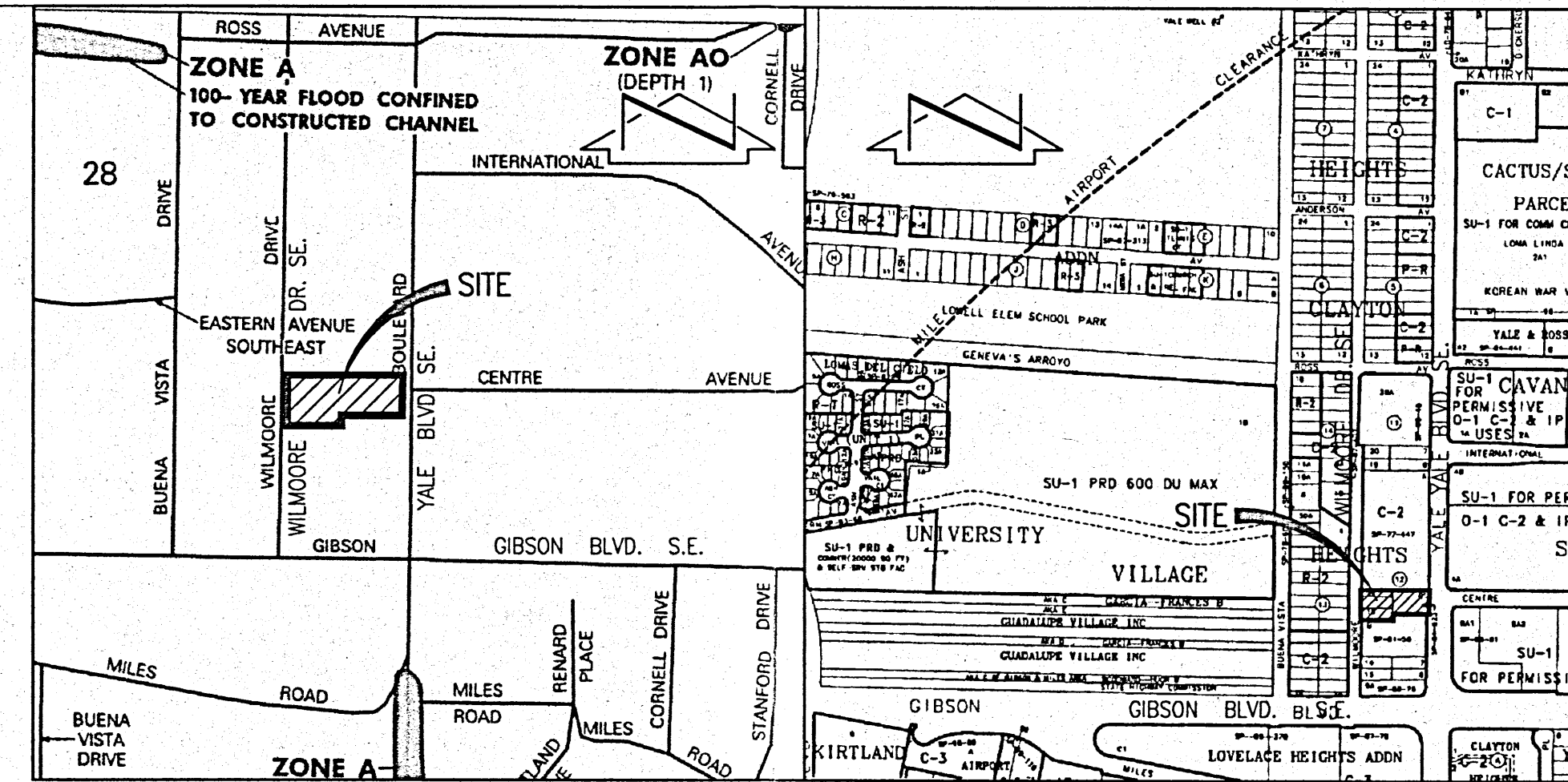
$$Q_p = Q_{100} = 2.28(0.03) + 3.14(0.24) + 4.70(0.18) = 1.7 \text{ CFS}$$

VIII. COMPARISON

1. BASIN A-1

$$\Delta V_{100} = 2450 - 2270 = 180 \text{ CF (INCREASE)}$$

$$\Delta Q_{100} = 1.7 - 1.6 = 0.1 \text{ CFS (INCREASE)}$$



FLOODPLAIN MAP

SCALE: 1" = 500'±

PANEL 361 OF 825

VICINITY MAP

SCALE: 1" = 750'±

LEGAL DESCRIPTION

LOTS 18, 19 AND SOUTH 1/2 LOT 20, BLOCK 12 AND TRACT B-1, CLAYTON HEIGHTS, ALBUQUERQUE

PROJECT BENCHMARK

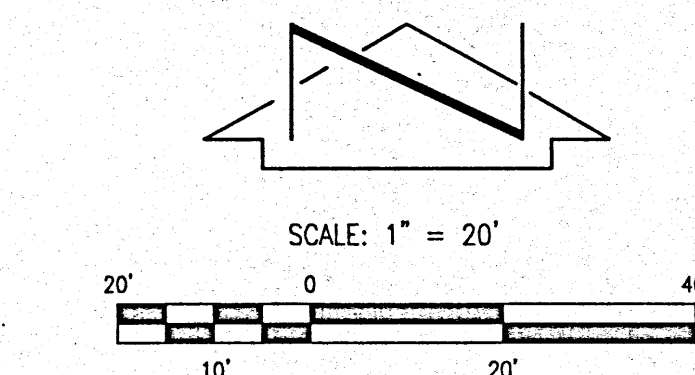
STATION IS A STANDARD BRASS TABLET STAMPED "ACS 1-M16, 1984", SET FLUSH WITH THE CONCRETE PAVEMENT; STATION IS LOCATED 16 FEET SOUTH OF THE INTERSECTION OF GIBSON BLVD. SE. AND YALE BLVD. SE. ELEVATION: 5189.85 FEET (NGVD 29)

T.B.M.

TOP OF STORM INLET GRATE LOCATED AT THE NORTHWEST CORNER OF THE EXISTING PARKING AREA NORTH OF THE EXISTING BUILDING. ELEVATION = 5178.73 FEET

LEGEND

TC	TOP OF CURB, TOP OF CONCRETE
TA	TOP OF ASPHALT
FL	FLOWLINE
SD	STORM DRAIN
+	EXISTING FENCE
+ 83.19	EXISTING SPOT ELEVATION
+ 83.50	PROPOSED SPOT ELEVATION
83	PROPOSED CONTOUR
---	PROPOSED FLOWLINE
----	PROPOSED CONCRETE



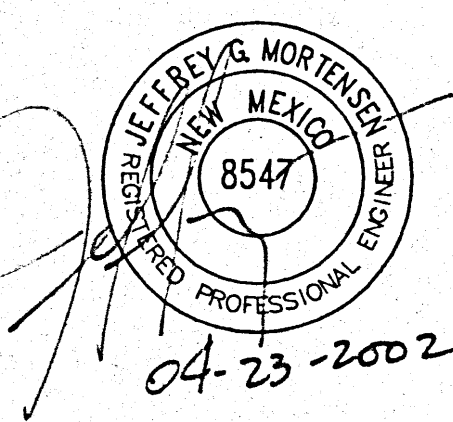
EROSION CONTROL MEASURES:

1. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC RIGHT-OF-WAY OR ONTO PRIVATE PROPERTY.
2. THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY SO THAT THE EXCAVATED MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.
3. THE CONTRACTOR SHALL SECURE "TOPSOIL DISTURBANCE PERMIT" PRIOR TO BEGINNING CONSTRUCTION.

CONSTRUCTION NOTES:

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM 260-1990 (ALBUQUERQUE AREA), 1-800-321-ALERT(2537) (STATEWIDE), FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERPRETATIONS IT MAKES WITHOUT FIRST CONTACTING THE ENGINEER AS REQUIRED ABOVE.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.
5. IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NONE ARE SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS CONDUCTED ONLY PRELIMINARY INVESTIGATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES. THIS INVESTIGATION IS NOT CONCLUSIVE, AND MAY NOT BE COMPLETE, THEREFORE, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE LINES AND FACILITIES.
6. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY. AN APPROVED COPY OF THESE PLANS MUST BE SUBMITTED AT THE TIME OF APPLICATION FOR THIS PERMIT.
7. BACKFILL COMPACTION SHALL BE ACCORDING TO RESIDENTIAL STREET USE.
8. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
9. THE DESIGN OF PLANTERS AND LANDSCAPED AREAS IS NOT PART OF THIS PLAN. PLANTERS AND LANDSCAPED AREAS ADJACENT TO THE BUILDING(S) SHALL BE PROVIDED WITH POSITIVE DRAINAGE TO AVOID ANY PONDING ADJACENT TO THE STRUCTURE. FOR CONSTRUCTION DETAILS, REFER TO LANDSCAPING PLAN.
10. ALL FILL SHALL BE CLEAN AND FREE OF DELETERIOUS MATERIAL AND DEBRIS.
11. ALL FILL SHALL BE COMPACTED TO A MINIMUM 95% ASTM D-1557 UNLESS A GREATER COMPACTION IS REQUIRED OR OTHERWISE SPECIFIED.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFELY OBTAINING THE REQUIRED COMPACTION. THE CONTRACTOR SHALL SELECT AND USE METHODS THAT SHALL NOT BE INJURIOUS OR DAMAGING TO THE EXISTING FACILITIES, UTILITIES AND STRUCTURES THAT SURROUND THE WORK AREAS.

BOLTON ANIMAL HOSPITAL
6001 PAN AMERICAN FREEWAY NE ALBUQUERQUE NM
JON ANDERSON ARCHITECT AIA
912 ROMA AVENUE NW
ALBUQUERQUE NEW MEXICO 87102
505 764-8306 FAX: 764-2879
WWW.JONANDERSONARCHITECT.COM



APPROVALS	NAME	DATE
HYDROLOGY		
SIDEWALK INSPECTOR		
STORM DRAIN MAINTENANCE		

DATE: APRIL, 2002

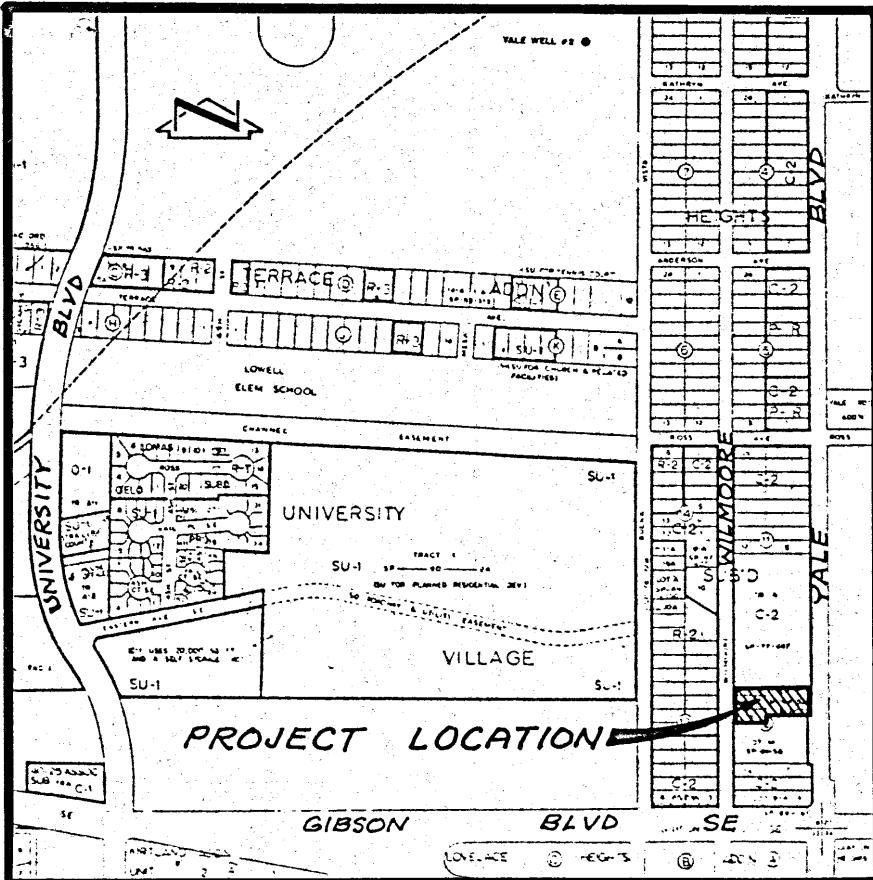
PROJECT NUMBER:
DRAWN BY: S.G.H.
SHEET TITLE:
GRADING AND DRAINAGE PLAN
SHEET NUMBER:

921094

Jonar

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS/CIT. SURVEYORS (605) 345-4250
FAX: 505 345-4254 E-MAIL: jmortensen@jma.com

NOTE:
THIS IS NOT A BOUNDARY SURVEY. APPARENT PROPERTY CORNERS ARE SHOWN FOR ORIENTATION ONLY. TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN TAKEN FROM RECORD DRAWING PREPARED BY THIS OFFICE DATED 01/23/95.



VICINITY MAP
SCALE: 1"=800' (APPROX.)

LEGAL DESCRIPTION
LOTS 18, 19 & S. 1/2 20, BLOCK 12 & TRACT B-1, CLAYTON HEIGHTS, ALBUQUERQUE

PROJECT BENCHMARK
STATION IS A STANDARD BRASS TABLET STAMPED "ACS, 1-M 1/4, 1984", SET FLUSH WITH THE CONCRETE PAVEMENT; STATION IS LOCATED 16' SOUTH OF THE INTERSECTION OF GIBSON BLVD. SE & YALE BLVD. SE.
ELEVATION: 5189.85 FEET (MSLD)

T.B.M.
TOP OF REBAR AT SW CORNER OF PROPERTY AS SHOWN ON DRAWING BELOW.
ELEVATION: 5173.82 FEET (MSLD)

LEGEND

+	EXIST. SPOT ELEVATION
— 82 —	EXIST. CONTOUR
+	PROPOSED SPOT ELEVATION
— 82 —	PROPOSED CONTOUR
▨	PROPOSED CONCRETE
▨	PROPOSED ASPHALT
—	EXIST. CHAINLINK FENCE
—	PROPOSED FLOWLINE
— OE —	EXIST. OVERHEAD ELECTRIC
— W —	EXIST. WATER
TC	TOP OF CURB, TOP OF CONCRETE
TA	TOP OF ASPHALT
FL	FLOWLINE
SD	STORM DRAIN

STORM DRAIN HYDRAULICS

1. ENTRANCE CONDITIONS (Orifice Equation)

a. Pipe
 $Q = CA(2gh)^{1/2} = 8.7 > Q_{100}, A-1$
Where $C = 0.8$
 $A = 0.7854 \text{ sf (12" dia)}$
 $h = 32.2 \text{ ft/sec}^2$
 $h = 79.10 - 75.60 - 0.5 = 3.0$

b. Inlet
 $Q = C_{eff}(2gh)^{1/2} = 3.8 \text{ cfs} > Q_{100}$
Where $C = 0.6$
 $A = 1.5 \times 1.5 = 2.25 \text{ sf}$
 $C_{eff} = AK_{clog} = 1.12 \text{ sf}$
 $K_{clog} = 0.50$
 $g = 32.2 \text{ ft/sec}^2$
 $h = 79.10 - 78.60 = 0.5$

2. PIPE FLOW
Using Feild's Hydraulics
Calculator for gravity flow in pipes (Manning Equation)
For $d = 12"$
 $n = 0.013$
 $S = 0.043$
 $Q_{capacity} = 7.4 \text{ cfs} > Q_{100}, A-1$
For $d = 8"$
 $n = 0.013$
 $S = 0.030 \text{ (min.)}$
 $Q_{capacity} = 2.1 \text{ cfs} > Q_{100}, A-1$

3. FUTURE SIDEWALK CULVERT
(Will act as open channel due to 8" S.D. Connection)
 $Q = (1.49/n)AR^{2/3}S^{1/2}$
 $n = 0.013$
 $A = 1.0(0.6) = 0.6 \text{ sf}$
 $R = A/P = 0.27; R^{2/3} = 0.42$
 $P = 0.6 + 1.0 + 0.6 = 2.2 \text{ ft}$
 $S = 0.02 \text{ (min.)}$
 $Q_{capacity} = 4.1 \text{ cfs} > Q_{100}, A-1$

CALCULATIONS

Site Characteristics

1. Precipitation Zone	2	2.35; $P_{10 \text{ days}} = 3.95$
2. $P_{6,100} = P_{360} =$		33,720 SF = 0.77
3. Total Area (A_T)		
4. Existing Land Treatment		
Treatment	Area (sf/ac)	%
A	0	0
B	20,000 (0.05)	5.9
C	20,220 (0.46)	60.0
D	11,500 (0.26)	34.1

5. Developed Land Treatment

a. Basin A-1 (19,150 sf)

Treatment	Area (sf/ac)	%
A	0	0
B	1150 (0.03)	6.0
C	11,830 (0.27)	61.8
D	6170 (0.14)	32.2

b. Basin A-2 (14,570 sf)

Treatment	Area (sf/ac)	%
A	0	0
B	3390 (0.26)	23.3
C	0	0
D	11,180 (0.26)	76.7

CONSTRUCTION NOTES:

- Two (2) working days prior to any excavation, contractor must contact New Mexico One Call System 260-1990, for location of existing utilities.
- Prior to construction, the contractor shall excavate and verify the horizontal and vertical location of all potential obstructions. Should a conflict exist, the contractor shall notify the engineer in writing so that the conflict can be resolved with a minimum amount of delay.
- All work on this project shall be performed in accordance with applicable federal, state and local laws, rules and regulations concerning construction safety and health.
- All construction within public right-of-way shall be performed in accordance with applicable City of Albuquerque Standards and Procedures.
- If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has conducted only preliminary investigation of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.

Existing Condition

1. Volume
 $E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$
 $E_w = 0 + 0.72(0.059) + 1.07(0.60) + 2.08(0.341) = 1.39$
 $V_{100} = (E_w/12)A_T = (1.39/12)(0.77) = 0.09 \text{ ac. ft.}$

2. Peak Discharge
 $Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
 $Q_p = Q_{100} = 0 + 2.17(0.05) + 3.02(0.46) + 4.70(0.26) = 0.11 + 1.39 + 1.22 = 2.7 \text{ cfs}$

Developed Condition

a. Basin A-1

1. Volume
 $E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$
 $E_w = 0 + 0.72(0.060) + 1.07(0.618) + 2.08(0.322) = 1.37$
 $V_{100} = (1.37/12)(0.34) = 0.04 \text{ ac. ft.}$
 $V_{10 \text{ day}} = V_{100} + A_D (P_{10 \text{ day}} - P_{360})/12 = 3250 \text{ cf}$
 $V_{pond} = 1/2[(A_{73} + A_{73.5})(73.5 - 73) + (A_{72} + A_{73})(73 - 72) + (A_{71} + A_{72})(72 - 71)]$
 $= 1/2[(1745 + 2000)(0.5) + (1410 + 1745)(1) + (1040 + 1410)(1)]$
 $= 1/2(1002 + 1578 + 1040) = 3620 \text{ cf}$
 $V_{pond} = 3620 \text{ cf} > V_{10 \text{ day}} = 3250 \text{ cf}$

2. Peak Discharge
 $Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
 $Q_p = Q_{100} = 0 + 2.17(0.03) + 3.02(0.27) + 4.70(0.14) = 0.06 + 0.82 + 0.66 = 1.5 \text{ cfs}$

b. Basin A-2

1. Volume
 $E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$
 $E_w = 0 + 0.72(0.233) + 0 + 2.08(0.767) = 1.76$
 $V_{100} = (E_w/12)A_T = (1.76/12)(0.33) = 0.05 \text{ ac. ft.}$

2. Peak Discharge
 $Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
 $Q_p = Q_{100} = 0 + 2.17(0.08) + 0 + 4.70(0.26) = 1.4 \text{ cfs}$

Comparison

a. Basin A-1 (Discharge to Wilmore)

1. $\Delta V_{100} = 0.09 - 0.04 = 0.05 \text{ ac. ft. (decrease)}$
2. $\Delta Q_{100} = 2.7 - 1.5 = 1.2 \text{ cfs (decrease)}$

(Note: Due to interim retention, discharge to Wilmore is temporarily decreased to nil)

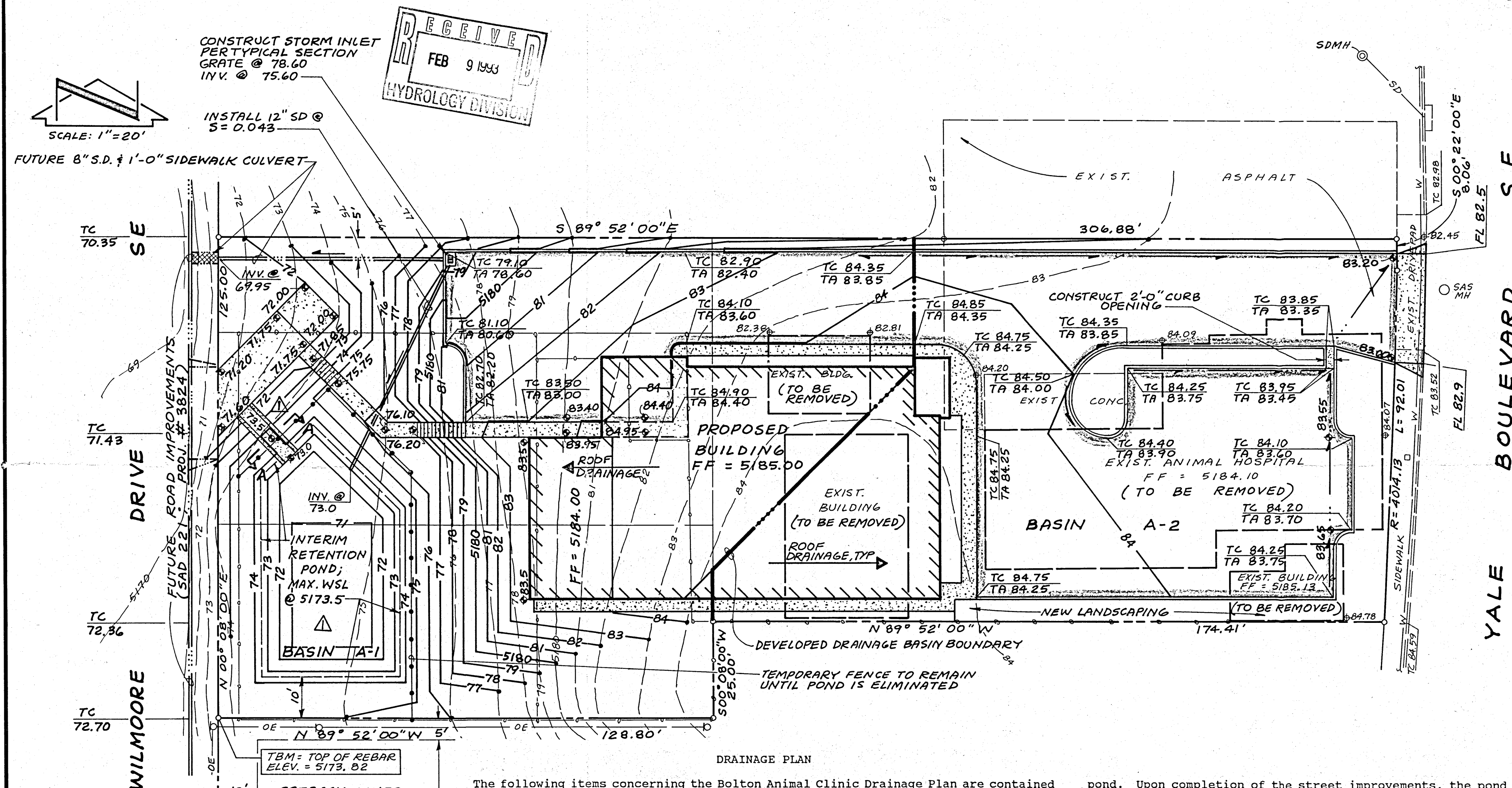
b. Basin A-2

1. $\Delta V_{100} = 0.04 - 0 = 0.04 \text{ ac. ft. (increase)}$
2. $\Delta Q_{100} = 1.4 - 0 = 1.4 \text{ cfs (increase)}$

APPROVALS	NAME	DATE
A.C.E. / DESIGN		
INSPECTOR		
A.C.E. / FIELD		

Erosion Control Measures

- The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.
- The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.
- The contractor shall secure "Topsoil Disturbance Permit" prior to beginning construction.



The following items concerning the Bolton Animal Clinic Drainage Plan are contained hereon:

- Vicinity Map
- Grading Plan
- Calculations
- Typical Storm Inlet Section

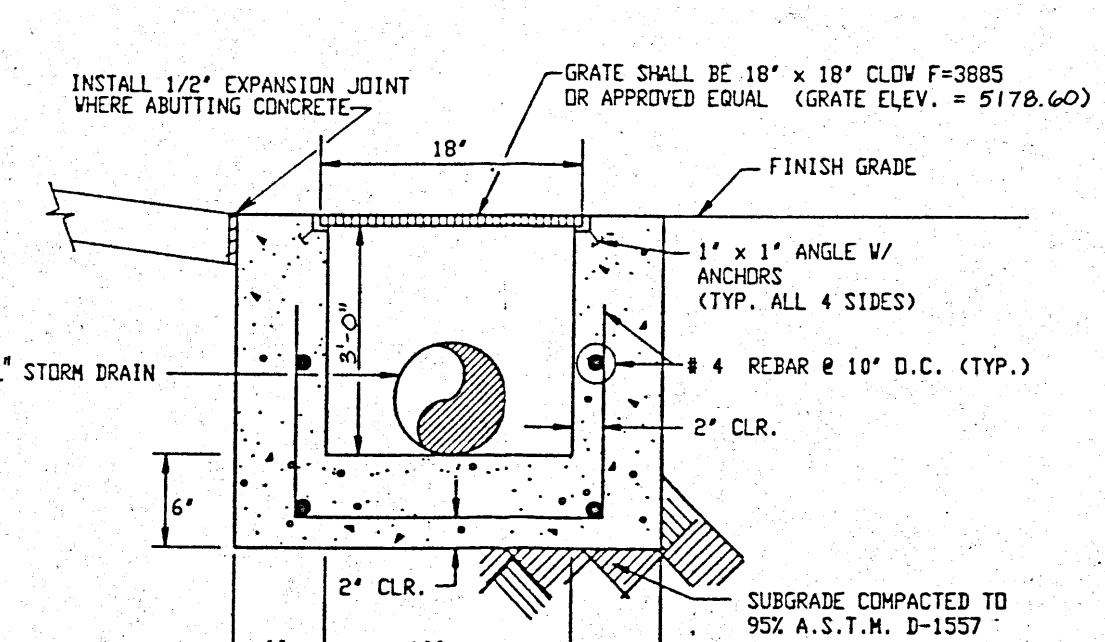
As shown by the Vicinity Map, the site is located on the west side of Yale Boulevard S.E. just north of the intersection with Gibson Boulevard S.E. At present, the site is developed as a veterinary clinic. The proposed development will remove the existing paving and building improvements and construct a new building along with associated paving, landscaping, and grading.

As shown by Panel 35 of 50 of the National Flood Insurance Program Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, this site does not lie within a designated flood hazard zone. Furthermore, it does not appear that this site discharges to a designated flood hazard zone. The Geneva's Arroyo is situated downstream from the site and appears to be the outfall for the watershed in which this site lies.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, 4) the limit and character of the future improvements, and 5) continuity between existing and proposed grades. As shown by this plan, the proposed development consists of the demolition of existing site improvements, construction of a new building and associated paving, landscaping and grading, and the construction of an interim stormwater retention pond. At present, the site drains from east to west toward Wilmore Drive S.E. At present, Wilmore Drive S.E. is an unpaved street. Special Assessment District 221 (City Project No. 3824), per plans prepared by Wilson & Company bearing the date of 11-3-92, will construct Wilmore Drive S.E. The future paving improvements, which are scheduled for construction during the summer of 1991, will consist of curb and gutter, paving, public waterline and public storm drainage improvements. Upon completion of that project, this site will freely discharge a portion of its developed runoff to the public right-of-way. Until such time as the improvements are constructed, that runoff generated by Basin A-1, which is the westerly portion of the site, will drain to an interim stormwater retention

pond. Upon completion of the street improvements, the pond will be eliminated and the drainage from Basin A-1 will be freely discharged to Wilmore Drive S.E. From that point, the runoff will flow in a northerly direction to public storm drain improvements shown by the SAD 221 plans to be just south of the intersection with Ross Avenue S.E. Basin A-2, on the other hand, will free discharge its runoff to Yale Boulevard S.E. via a new driveway. From that point of discharge, runoff will flow in a northerly direction within Yale Boulevard S.E. to existing public storm drain improvements within Yale Boulevard S.E. In each case, the discharge rate of the developed runoff is minimal.

The calculations which appear hereon analyze the existing and developed conditions for the 6-hour, 100-year rainfall event. These calculations have been prepared in accordance with Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, dated January 1991. Although not formally adopted, this design criteria has been used in order to adequately address the required volume of ponding within the interim retention pond. That volume has been calculated using the 10-day storm runoff as set forth in the above referenced design criteria. As shown by these calculations, minimal runoff is generated by this site. In fact, the implementation of this plan will result in a decrease in the discharge of runoff to the west onto the presently undeveloped Wilmore Drive S.E., thereby representing a net improvement in the existing drainage pattern of the area. The volume of ponding provided has been analyzed using the Average End Area Method. The private storm drain hydraulics have been evaluated using the Orifice Equation for System Entrance Conditions and the Manning Equation for flow within the system. As shown by these calculations, the private storm drain has adequate capacity for the runoff being discharged to it.



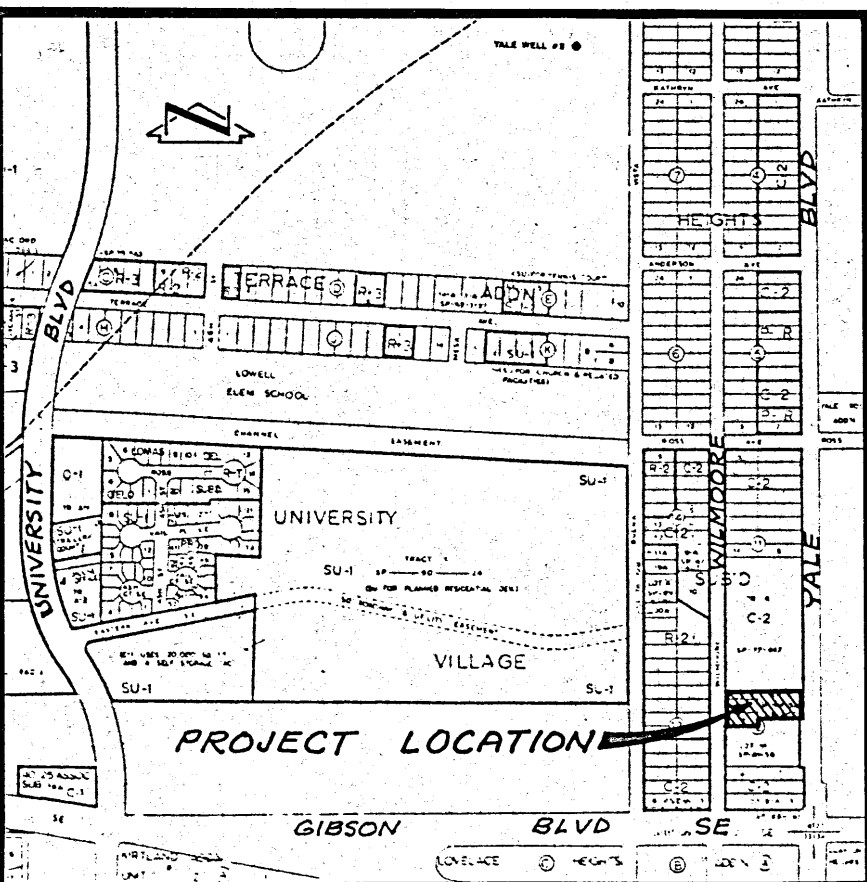
TYPICAL STORM INLET SECTION
NOT TO SCALE

GRADING AND DRAINAGE PLAN PREPARED UNDER THE SUPERVISION OF

JEFF G. MORTENSEN
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER
8547

12-08-93

TOPOGRAPHIC SURVEY PREPARED BY OTHERS AND PROVIDED BY OWNER. ITS ACCURACY IS HEREBY DISCLAIMED AS IT RELATES TO THIS DRAWING.



VICINITY MAP
SCALE: 1" = 800' (APPROX.)

LEGAL DESCRIPTION
LOTS 16, 19 & S 1/2 20, BLOCK 12 & TRACT B-1, CLAYTON HEIGHTS, ALBUQUERQUE

PROJECT BENCHMARK
STATION IS A STANDARD BRASS TABLET STAMPED VACS, 1-M 16, 1984, SET FLUSH WITH THE CONCRETE PAVEMENT. STATION IS LOCATED 16' SOUTH OF THE INTERSECTION OF GIBSON BLVD. SE & YALE BLVD. SE.
ELEVATION: 5189.85 FEET (MSLD)

TBM
TOP OF REBAR AT SW CORNER OF PROPERTY AS SHOWN ON DRAWING BELOW.
ELEVATION: 5173.82 FEET (MSLD)

- LEGEND**
- EXIST. SPOT ELEVATION
 - EXIST. CONTOUR
 - PROPOSED SPOT ELEVATION
 - PROPOSED CONTOUR
 - PROPOSED CONCRETE
 - PROPOSED ASPHALT
 - EXIST. CHAINLINK FENCE
 - PROPOSED FLOWLINE
 - EXIST. OVERHEAD ELECTRIC
 - EXIST. WATER
 - TOP OF CURB, TOP OF CONCRETE
 - TOP OF ASPHALT
 - FLOWLINE
 - STORM DRAIN

STORM DRAIN HYDRAULICS

1. ENTRANCE CONDITIONS (Orifice Equation)

a. Pipe

$$Q = CA(2gh)^{1/2} = 8.7 > Q_{100}, A-1$$

Where $C = 0.8$
 $A = 0.7854 \text{ sf (12" dia)}$
 $g = 32.2 \text{ ft/sec}^2$
 $h = 79.10 - 75.60 - 0.5 = 3.0$

b. Inlet

$$Q = C A_{eff}(2gh)^{1/2} = 3.8 \text{ cfs} > Q_{100}$$

Where $C = 0.6$
 $A = 1.5 \times 1.5 = 2.25 \text{ sf}$
 $A_{eff} = AK_{clog} = 1.12 \text{ sf}$
 $K_{clog} = 0.50$
 $g = 32.2 \text{ ft/sec}^2$
 $h = 79.10 - 78.60 = 0.5$

2. PIPE FLOW

Using Feild's Hydraulics Calculator for gravity flow in pipes (Manning Equation)

For $d = 12"$
 $n = 0.013$
 $S = 0.043$

$$Q_{capacity} = 7.4 \text{ cfs} > Q_{100}, A-1$$

For $d = 8"$
 $n = 0.013$
 $S = 0.030 \text{ (min.)}$

$$Q_{capacity} = 2.1 \text{ cfs} > Q_{100}, A-1$$

3. FUTURE SIDEWALK CULVERT

(Will act as open channel due to 8" S.D. Connection)

$$Q = (1.49/n)AR^{2/3}S^{1/2}$$

$n = 0.013$
 $A = 1.0(0.6) = 0.6 \text{ sf}$
 $R = A/P = 0.27; P^{2/3} = 0.42$
 $P = 0.6 + 1.0 + 0.6 = 2.2 \text{ ft}$
 $S = 0.02 \text{ (min.)}$

$$Q_{capacity} = 4.1 \text{ cfs} > Q_{100}, A-1$$

CALCULATIONS

Site Characteristics

Treatment	Area (sf/ac)	%
1. Precipitation Zone	2	
2. $P_{6,100} = P_{360} = 2.35; P_{10 \text{ days}} = 3.95$		
3. Total Area (A_T)	33,720 sf = 0.77	
4. Existing Land Treatment		
A	0	0
B	2000 (0.05)	5.9
C	20,220 (0.46)	60.0
D	11,500 (0.26)	34.1

5. Developed Land Treatment

a. Basin A-1 (19,150 sf)

Treatment	Area (sf/ac)	%
A	0	0
B	1150 (0.03)	6.0
C	11,830 (0.27)	61.8
D	6170 (0.14)	32.2

b. Basin A-2 (14,570 sf)

Treatment	Area (sf/ac)	%
A	0	0
B	3390 (0.26)	23.3
C	0	0
D	11,180 (0.26)	76.7

CONSTRUCTION NOTES:

- Two (2) working days prior to any excavation, contractor must contact New Mexico One Call System 260-1990, for location of existing utilities.
- Prior to construction, the contractor shall excavate and verify the horizontal and vertical location of all potential obstructions. Should a conflict exist, the contractor shall notify the engineer in writing so that the conflict can be resolved with a minimum amount of delay.
- All work on this project shall be performed in accordance with applicable federal, state and local laws, rules and regulations concerning construction safety and health.
- All construction within public right-of-way shall be performed in accordance with applicable City of Albuquerque Standards and Procedures.
- If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has conducted only preliminary investigation of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.

Existing Condition

1. Volume

$$E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$$
$$E_w = 0 + 0.72(0.059) + 1.07(0.60) + 2.08(0.341) = 1.39$$
$$V_{100} = (E_w/12) A_T = (1.39/12)(0.77) = 0.09 \text{ ac. ft.}$$

2. Peak Discharge

$$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.05) + 3.02(0.46) + 4.70(0.26) = 3.25 \text{ cfs}$$
$$Q_{100} = 0.11 + 1.39 + 1.22 = 2.7 \text{ cfs}$$

3. Developed Condition

a. Basin A-1

1. Volume

$$E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$$
$$E_w = 0 + 0.72(0.060) + 1.07(0.618) + 2.08(0.322) = 1.37$$
$$V_{100} = (1.37/12)(0.34) = 0.04 \text{ ac. ft.}$$
$$V_{10 \text{ day}} = V_{100} + A_D (P_{10 \text{ day}} - P_{360}) / 12 = 0.08 \text{ ac. ft.}$$
$$V_{pond} = 1/2[(A_{T1} + A_{T2}) (73.5 - 73) + (A_{T2} + A_{T3}) (73 - 72) + (A_{T1} + A_{T2}) (72 - 71)]$$
$$= 1/2[(1745 + 2000)(0.5) + (1410 + 1745)(1) + (1040 + 1410)(1)]$$
$$= 1/2(1002 + 1578 + 1040) = 3620 \text{ cf}$$
$$V_{pond} = 3620 \text{ cf} > V_{10 \text{ day}} = 3250 \text{ cf}$$

2. Peak Discharge

$$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.03) + 3.02(0.27) + 4.70(0.14) = 1.5 \text{ cfs}$$
$$Q_{100} = 0.06 + 0.82 + 0.66 = 1.5 \text{ cfs}$$

b. Basin A-2

1. Volume

$$E_w = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / A_T$$
$$E_w = 0 + 0.72(0.233) + 0 + 2.08(0.767) = 1.76$$
$$V_{100} = (E_w/12) A_T = (1.76/12)(0.33) = 0.05 \text{ ac. ft.}$$

2. Peak Discharge

$$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.08) + 0 + 4.70(0.26) = 1.4 \text{ cfs}$$

Comparison

a. Basin A-1 (Discharge to Wilmore)

1. $\Delta V_{100} = 0.09 - 0.04 = 0.05 \text{ ac. ft. (decrease)}$

2. $\Delta Q_{100} = 2.7 - 1.5 = 1.2 \text{ cfs (decrease)}$

(Note: Due to interim retention, discharge to Wilmore is temporarily decreased to nil)

b. Basin A-2

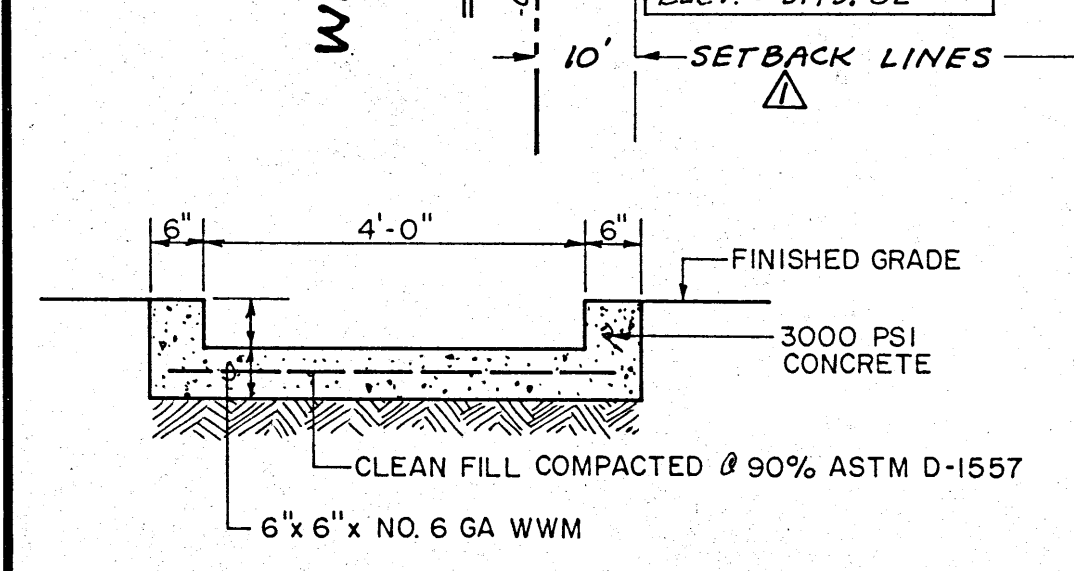
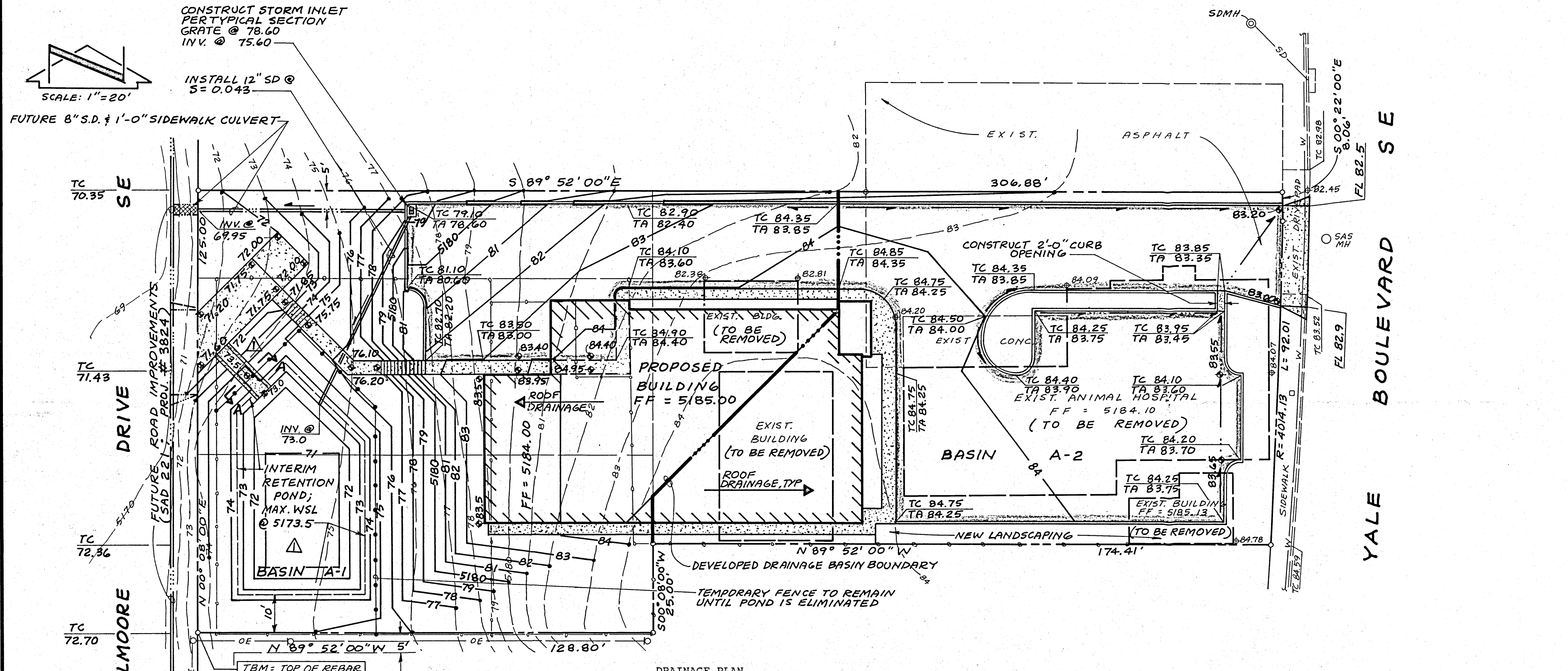
1. $\Delta V_{100} = 0.04 - 0 = 0.04 \text{ ac. ft. (increase)}$

2. $\Delta Q_{100} = 1.4 - 0 = 1.4 \text{ cfs (increase)}$

APPROVALS	NAME	DATE
A.C.E. / DESIGN		
INSPECTOR		
A.C.E. / FIELD		

Erosion Control Measures

- The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.
- The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.
- The contractor shall secure "Topsoil Disturbance Permit" prior to beginning construction.



The following items concerning the Bolton Animal Clinic Drainage Plan are contained hereon:

- Vicinity Map
- Grading Plan
- Calculations
- Typical Storm Inlet Section

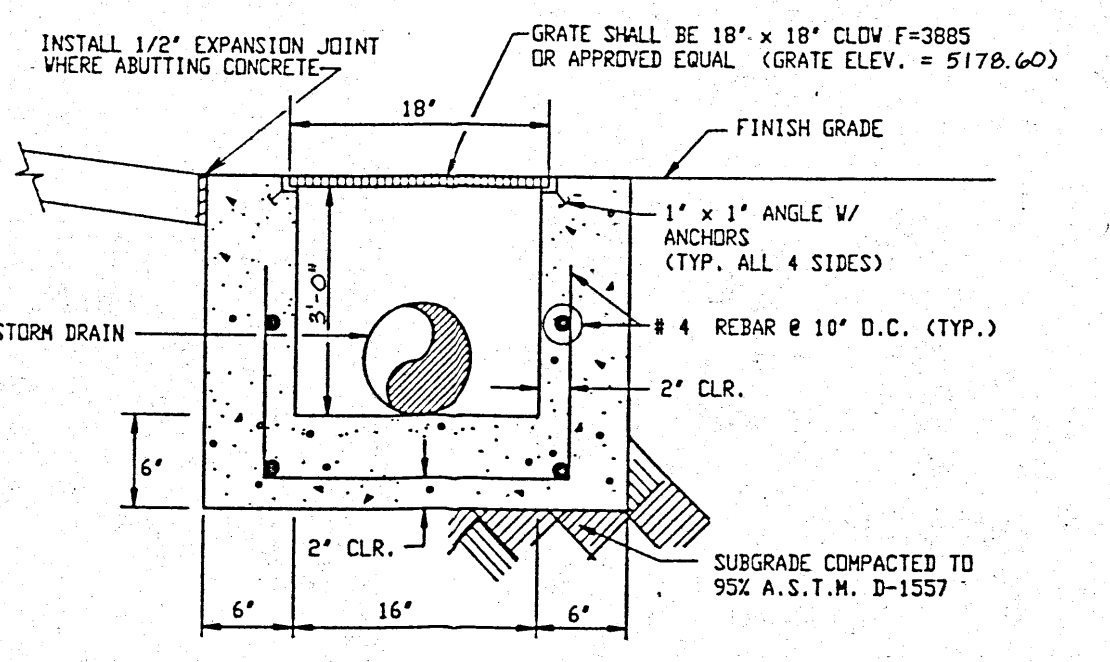
As shown by the Vicinity Map, the site is located on the west side of Yale Boulevard S.E. just north of the intersection with Gibson Boulevard S.E. At present, the site is developed as a veterinary clinic. The proposed development will remove the existing paving and building improvements and construct a new building along with associated paving, landscaping, and grading.

As shown by Panel 35 of 50 of the National Flood Insurance Program Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, this site does not lie within a designated flood hazard zone. Furthermore, it does not appear that this site discharges to a designated flood hazard zone. The Geneva's Arroyo is situated downstream from the site and appears to be the outfall for the watershed in which this site lies.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, 4) the limit and character of the future improvements, and 5) continuity between existing and proposed grades. As shown by this plan, the proposed development consists of the demolition of existing site improvements, construction of a new building and associated paving, landscaping and grading, and the construction of an interim stormwater retention pond. At present, the site drains from east to west toward Wilmore Drive S.E. At present, Wilmore Drive S.E. is an unpaved street. Special Assessment District 221 (City Project No. 3824), per plans prepared by Wilson & Company bearing the date of 11-3-92, will construct Wilmore Drive S.E. The future paving improvements, which are scheduled for construction during the summer of 1993, will consist of curb and gutter, paving, public waterline and public storm drainage improvements. Upon completion of that project, this site will freely discharge a portion of its developed runoff to the public right-of-way. Until such time as the improvements are constructed, that runoff generated by Basin A-1, which is the westerly portion of the site, will drain to an interim stormwater retention

pond. Upon completion of the street improvements, the pond will be eliminated and the drainage from Basin A-1 will be freely discharged to Wilmore Drive S.E. From that point, the runoff will flow in a northerly direction to public storm drain improvements shown by the SAD 221 plans to be just south of the intersection with Ross Avenue S.E. Basin A-2, on the other hand, will free discharge its runoff to Yale Boulevard S.E. via a new driveway. From that point of discharge, runoff will flow in a northerly direction within Yale Boulevard S.E. to existing public storm drain improvements within Yale Boulevard S.E. In each case, the discharge rate of the developed runoff is minimal.

The calculations which appear hereon analyze the existing and developed conditions for the 6-hour, 100-year rainfall event. These calculations have been prepared in accordance with Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, dated January 1991. Although not formally adopted, this design criteria has been used in order to adequately address the required volume of ponding within the interim retention pond. That volume has been calculated using the 10-day storm runoff as set forth in the above referenced design criteria. As shown by these calculations, minimal runoff is generated by this site. In fact, the implementation of this plan will result in a decrease in the discharge of runoff to the west onto the presently undeveloped Wilmore Drive S.E., thereby representing a net improvement in the existing drainage pattern of the area. The volume of ponding provided has been analyzed using the Average End Area Method. The private storm drain hydraulics have been evaluated using the Orifice Equation for System Entrance Conditions and the Manning Equation for flow within the system. As shown by these calculations, the private storm drain has adequate capacity for the runoff being discharged to it.



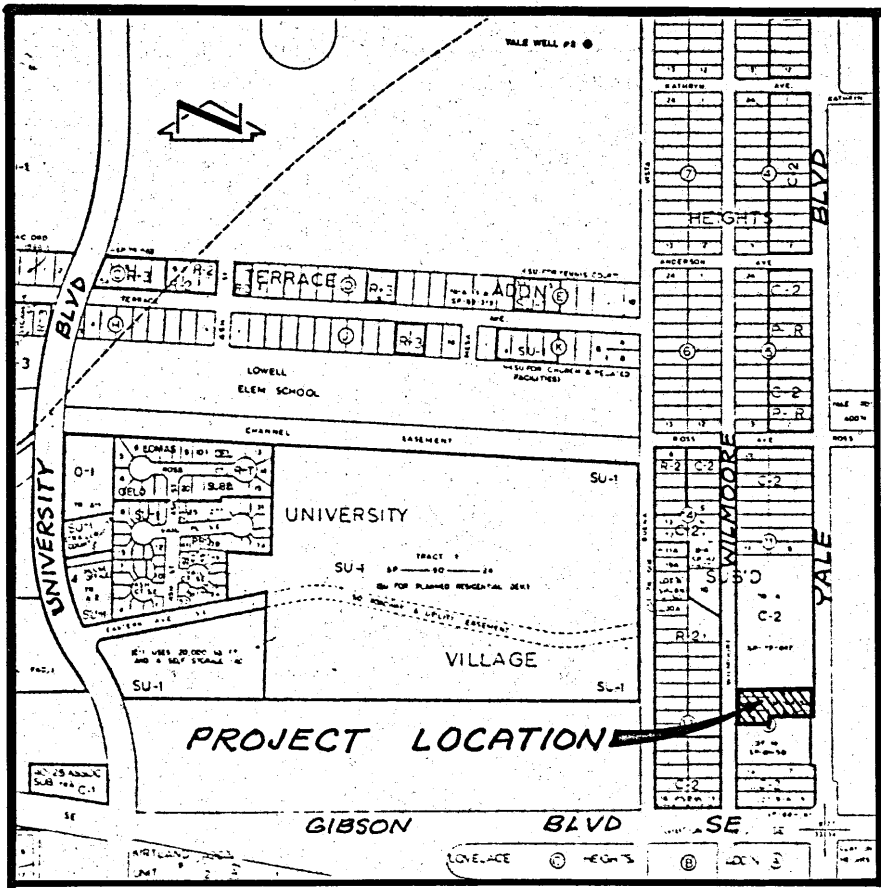
TYPICAL STORM INLET SECTION
NOT TO SCALE

GRADING AND DRAINAGE PLAN PREPARED UNDER THE SUPERVISION OF

JEFF C. MORTENSEN
REGISTERED PROFESSIONAL ENGINEER
NEW MEXICO
12-08-93

TOPOGRAPHIC SURVEY PREPARED BY OTHERS AND PROVIDED BY OWNER. ITS ACCURACY IS HEREBY DISCLAIMED AS IT RELATES TO THIS DRAWING.

DESIGNED BY	NO.	DATE	BY	REVISIONS	JOB NO.
JGM	1	02/93	JGM	REGRADE POND; ADD SPILLWAY; REVISE CALCS; SHOW SET-BACKS	921091
DRAWN BY					DATE
CEN					12 - 92
APPROVED BY					SHEET
JGM					1 OF 1

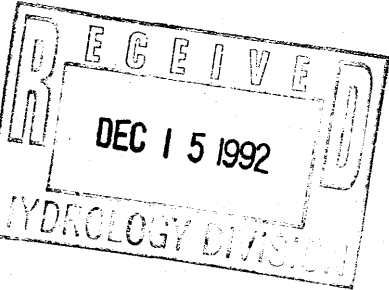


VICINITY MAP
SCALE: 1"=800' (APPROX.)

LEGAL DESCRIPTION
LOTS 16, 19 & S. 1/2 20, BLOCK 12 & TRACT B-1,
CLAYTON HEIGHTS, ALBUQUERQUE

PROJECT BENCHMARK
STATION IS A STANDARD BRASS TABLET STAMPED
"ACS, 1-M 10, 1984", SET FLUSH WITH THE
CONCRETE PAVEMENT; STATION IS LOCATED
16' SOUTH OF THE INTERSECTION OF GIBSON
BLVD. SE & YALE BLVD. SE.
ELEVATION: 5189.85 FEET (MSLD)

TBM
TOP OF REBAR AT SW CORNER OF PROPERTY
AS SHOWN ON DRAWING BELOW.
ELEVATION: 5173.82 FEET (MSLD)



- LEGEND**
- EXIST. SPOT ELEVATION
 - EXIST. CONTOUR
 - PROPOSED SPOT ELEVATION
 - PROPOSED CONTOUR
 - PROPOSED CONCRETE
 - PROPOSED ASPHALT
 - EXIST. CHAINLINK FENCE
 - PROPOSED FLOWLINE
 - EXIST. OVERHEAD ELECTRIC
 - EXIST. WATER
 - TOP OF CURB, TOP OF CONCRETE
 - TOP OF ASPHALT
 - FLOWLINE
 - STORM DRAIN

STORM DRAIN HYDRAULICS

1. ENTRANCE CONDITIONS (Orifice Equation)
- a. Pipe
- $$Q = CA(2gh)^{1/2} = 8.7 > Q_{100}, A-1$$
- Where C = 0.8
A = 0.7854 sf (12" dia)
g = 32.2 ft/sec²
h = 79.10 - 75.60 - 0.5 = 3.0
- b. Inlet
- $$Q = C A_{eff} (2gh)^{1/2} = 3.8 \text{ cfs} > Q_{100}$$
- Where C = 0.6
A = 1.5 x 1.5 = 2.25 sf
A_{eff} = AK_{c100} = 1.12 sf
K_{c100} = 0.50
h = 79.10 - 78.60 = 0.5

2. PIPE FLOW

Using Feild's Hydraulics Calculator for gravity flow in pipes
(Manning Equation)

For d = 12"
n = 0.013
S = 0.043

Q_{capacity} = 7.4 cfs > Q₁₀₀

CALCULATIONS

Site Characteristics

- Precipitation Zone
- P₆₋₁₀₀ = P₆₀ = 2.35; P_{10 days} = 3.95
- Total Area (A_T)
- 33,720 sf = 0.77
- Existing Land Treatment

Treatment	Area (sf/ac)	%
A	0	0
B	2000 (0.05)	5.9
C	20,220 (0.46)	60.0
D	11,500 (0.26)	34.1

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
a. Basin A-1 (19,150 sf)		
A	0	0
B	1150 (0.03)	6.0
C	11,830 (0.27)	61.8
D	6170 (0.14)	32.2

Treatment	Area (sf/ac)	%
b. Basin A-2 (14,570 sf)		
A	0	0
B	3390 (0.26)	23.3
C	0	0
D	11,180 (026)	76.7

Existing Condition

1. Volume

$$E_w = (E_p A_p + E_{pA} A_{pA} + E_{pC} A_{pC} + E_{pD} A_{pD}) / A_T$$
$$E_w = 0 + 0.72(0.060) + 1.07(0.60) + 2.08(0.341) = 1.39$$
$$V_{100} = (E_w / 12) A_T = (1.39 / 12) (0.77) = 0.09 \text{ ac. ft.}$$

2. Peak Discharge

$$Q_p = Q_{pA} A_A + Q_{pB} A_B + Q_{pC} A_C + Q_{pD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.05) + 3.02(0.46) + 4.70(0.26) = 2.7 \text{ cfs}$$

Developed Condition

a. Basin A-1

1. Volume

$$E_w = (E_p A_p + E_{pA} A_{pA} + E_{pC} A_{pC} + E_{pD} A_{pD}) / A_T$$
$$E_w = 0 + 0.72(0.060) + 1.07(0.618) + 2.08(0.322) = 1.37$$
$$V_{100} = (E_w / 12) A_T = (1.37 / 12) (0.34) = 0.04 \text{ ac. ft.}$$
$$V_{10 \text{ day}} = V_{100} + A_D (P_{10 \text{ day}} - P_{360}) / 12 = 0.08 \text{ ac. ft.} = 3250 \text{ cf}$$

2. Peak Discharge

$$Q_p = Q_{pA} A_A + Q_{pB} A_B + Q_{pC} A_C + Q_{pD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.03) + 3.02(0.27) + 4.70(0.14) = 1.5 \text{ cfs}$$

$$V_{pond} = 1/2 [(A_{T3} + A_{T4}) (74 - 73) + (A_{T2} + A_{T3}) (73 - 72)]$$
$$= 1/2 [(1780 + 2220) + (1320 + 1780)]$$
$$= 1/2 (4000 + 3100) = 3550 \text{ cf}$$
$$V_{pond} = 3550 \text{ cf} > V_{10 \text{ day}} = 3250 \text{ cf}$$

b. Basin A-2

1. Volume

$$E_w = (E_p A_p + E_{pA} A_{pA} + E_{pC} A_{pC} + E_{pD} A_{pD}) / A_T$$
$$E_w = 0 + 0.72(0.233) + 0 + 2.08(0.767) = 1.76$$
$$V_{100} = (E_w / 12) A_T = (1.76 / 12) (0.33) = 0.05 \text{ ac. ft.}$$

2. Peak Discharge

$$Q_p = Q_{pA} A_A + Q_{pB} A_B + Q_{pC} A_C + Q_{pD} A_D$$
$$Q_p = Q_{100} = 0 + 2.17(0.08) + 0 + 4.70(0.26) = 1.4 \text{ cfs}$$

Comparison

a. Basin A-1 (Discharge to Wilmoore)

- $\Delta V_{100} = 0.09 - 0.04 = 0.05 \text{ ac. ft. (decrease)}$
- $\Delta Q_{100} = 2.7 - 1.5 = 1.2 \text{ cfs (decrease)}$

(Note: Due to interim retention, discharge to Wilmoore is temporarily decreased to nil)

b. Basin A-2

- $\Delta V_{100} = 0.04 - 0 = 0.04 \text{ ac. ft. (increase)}$
- $\Delta Q_{100} = 1.4 - 0 = 1.4 \text{ cfs (increase)}$

pond. Upon completion of the street improvements, the pond will be eliminated and the drainage from Basin A-1 will be freely discharged to Wilmoore Drive S.E. From that point, the runoff will flow in a northerly direction to public storm drain improvements shown by the SAD 221 plans to be just south of the intersection with Ross Avenue S.E. Basin A-2, on the other hand, will free discharge its runoff to Yale Boulevard S.E. via a new driveway. From that point of discharge, runoff will flow in a northerly direction within Yale Boulevard S.E. to existing public storm drain improvements within Yale Boulevard S.E. In each case, the discharge rate of the developed runoff is minimal.

The calculations which appear hereon analyze the existing and developed conditions for the 6-hour, 100-year rainfall event. These calculations have been prepared in accordance with Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, dated January 1991. Although not formally adopted, this design criteria has been used in order to adequately address the required volume of ponding within the interim retention pond. That volume has been calculated using the 10-day storm runoff as set forth in the above referenced design criteria. As shown by these calculations, minimal runoff is generated by this site. In fact, the implementation of this plan will result in a decrease in the discharge of runoff to the west onto the presently undeveloped Wilmore Drive S.E., thereby representing a net improvement in the existing drainage pattern of the area. The volume of ponding provided has been analyzed using the Average End Area Method. The private storm drain hydraulics have been evaluated using the Orifice Equation for System Entrance Conditions and the Manning Equation for flow within the system. As shown by these calculations, the private storm drain has adequate capacity for the runoff being discharged to it.

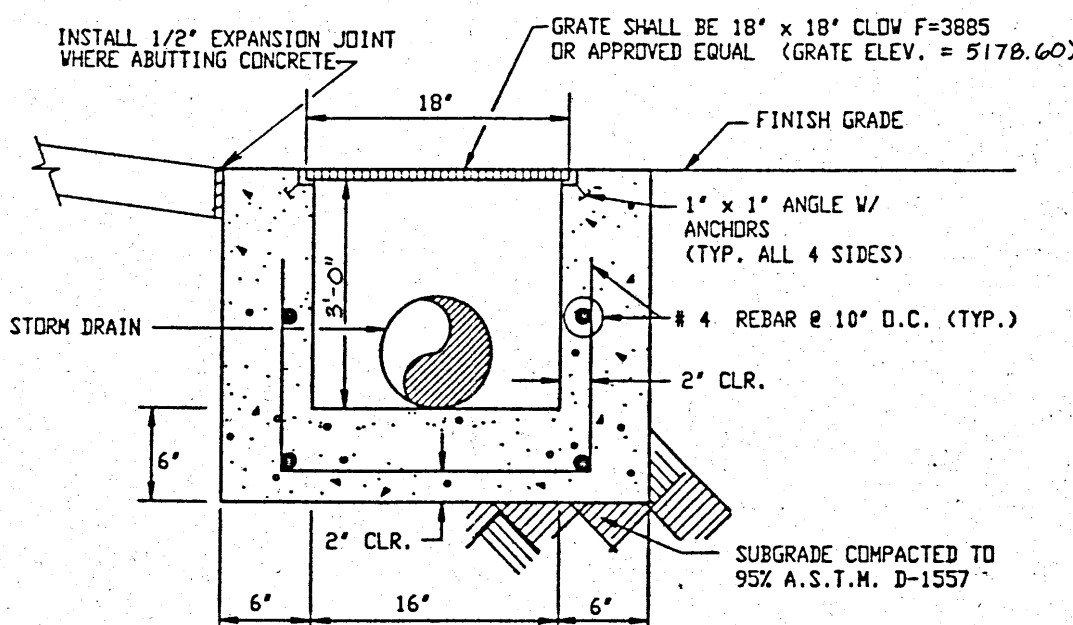
The following items concerning the Bolton Animal Clinic Drainage Plan are contained hereon:

- Vicinity Map
- Grading Plan
- Calculations
- Typical Storm Inlet Section

As shown by the Vicinity Map, the site is located on the west side of Yale Boulevard S.E. just north of the intersection with Gibson Boulevard S.E. At present, the site is developed as a veterinary clinic. The proposed development will remove the existing paving and building improvements and construct a new building along with associated paving, landscaping, and grading.

As shown by Panel 35 of 50 of the National Flood Insurance Program Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, this site does not lie within a designated flood hazard zone. Furthermore, it does not appear that this site discharges to a designated flood hazard zone. The Geneva's Arroyo is situated downstream from the site and appears to be the outfall for the watershed in which this site lies.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, 4) the limit and character of the future improvements, and 5) continuity between existing and proposed grades. As shown by this plan, the proposed development consists of the demolition of existing site improvements, construction of a new building and associated paving, landscaping and grading, and the construction of an interim stormwater retention pond. At present, the site drains from east to west toward Wilmoore Drive S.E. At present, Wilmoore Drive S.E. is an unpaved street. Special Assessment District 221 (City Project No. 3824), per plans prepared by Wilson & Company bearing the date of 11-3-92, will construct Wilmoore Drive S.E. The future paving improvements, which are scheduled for construction during the summer of 1993, will consist of curb and gutter, paving, public waterline and public storm drainage improvements. Upon completion of that project, this site will freely discharge a portion of its developed runoff to the public right-of-way. Until such time as the improvements are constructed, that runoff generated by Basin A-1, which is the westerly portion of the site, will drain to an interim stormwater retention



TYPICAL STORM INLET SECTION

NOT TO SCALE

Construction Notes:

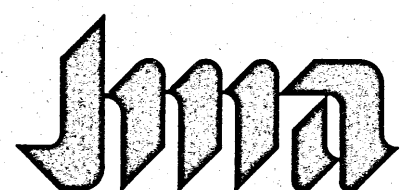
- Two (2) working days prior to any excavation, contractor must contact New Mexico One Call System 260-1990, for location of existing utilities.
- Prior to construction, the contractor shall excavate and verify the horizontal and vertical location of all potential obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
- All work on this project shall be performed in accordance with applicable federal, state and local laws, rules and regulations concerning safety and health.
- All construction within public right-of-way shall be performed in accordance with applicable City of Albuquerque Standards and Procedures.
- If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has undertaken no field verification of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.
- The design of planters and landscaped areas is not part of this plan. All planters and landscaped areas adjacent to the building(s) shall be provided with positive drainage to avoid any ponding adjacent to the structure. For construction details, refer to landscaping plan.

Erosion Control Measures:

- The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.
- The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.
- The contractor shall secure "topsoil disturbance permit" Prior to beginning construction.

GRADING AND DRAINAGE PLAN PREPARED UNDER THE SUPERVISION OF

JEFF G. MORTENSEN
NEW MEXICO
18547
TOPOGRAPHIC SURVEY PREPARED BY OTHERS AND PROVIDED BY OWNER. ITS ACCURACY IS HEREBY DISCLAIMED AS IT RELATES TO THIS DRAWING.



JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87109
ENGINEERS & SURVEYORS (505)345-4250

GRADING & DRAINAGE PLAN
BOLTON ANIMAL CLINIC

DESIGNED BY	JGM	NO.	DATE	BY	REVISIONS	JOB NO.	921091
DRAWN BY	CEN					DATE	12 - 92
APPROVED BY	JGM					SHEET	OF 1