FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 1, 1990

Jake Bordenave, P.E.
Bordenave Designs
7100 Louisiana Boulevard, NE #A106
Albuquerque, New Mexico 87109

RE: DRAINAGE PLAN FOR SUNWEST BANK, (D-13/D1B)
ENGINEER'S STAMP DATED OCTOBER 20, 1990

Dear Mr. Bordenave:

Based on the information provided on your submittal of October 22, 1990, the referenced plan is approved for Certificate of Occupancy.

If you should have any questions, please do not hesitate to call me at 768-2650.

Cordially yours,

Gilbert Aldaz

Gilbert Aldaz, P.E. & L.S.
Civil Engineer/ Hydrology

GA
(WP+1152)

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 9, 1990

Jake Bordenave, P.E.
Bordenave Designs
7100 Louisiana Boulevard, NE #A106
Albuquerque, New Mexico 87109

RE: DRAINAGE PLAN FOR SUNWEST BANK, (D-13/D1B)
ENGINEER'S STAMP DATED DECEMBER 26, 1989

Dear Mr. Bordenave:

Based on the information provided on your submittal of January 3, 1990, the above referenced plan is approved for Building Permit.

Please be advised that a separate permit is required for construction within City right-of-way. A copy of this approval letter will be required when the contractor applies for his excavation permit.

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

Please be advised that prior to Certificate of Occupancy release, an Engineer's Certification per the D.P.M.'s Engineer's Certification Checklist will be required.

If you should have any questions, please do not hesitate to call me at 768-2650.

Cordially yours,

Gilbert Aldaz, P.E. & L.S.
Civil Engineer/ Hydrology

xc: Cliff Anderson, AMAFCA
G. Polk, Ron Brown & Associates
Darlene Saavedra

GA
(WP+1152)

FILE COPY

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

ENGINEERING GROUP

INTER-OFFICE CORRESPONDENCE January 24, 1990

TO: Desiderio Salas; Street Maintenance Division

FROM: Fred J. Aguirre, Hydrologist; Engineering Group/PWD

SUBJECT: PRIVATE DRAINAGE FACILITIES WITHIN PUBLIC RIGHTS-OF-WAY/EASEMENT
SUNWEST BANK - COORS BOULEVARD, NW (D-13/D1B)

Transmitted herewith, is a copy of the approved drainage plan for the referenced project incorporating the S.O. #19 design.

In accordance with the new process, this plan is being submitted to you for permitting and inspection. Please provide this section with a signed-off copy per the signature block upon construction and acceptance by your office.

As you are aware, the signed-off S.O. #19 is required by this office for Certificate of Occupancy release; hence your expeditious processing of this plan would be greatly appreciated and would avoid any unnecessary delay in the release of the Certificate of Occupancy.

Thank you for your cooperation, and if you should have any questions and/or comments regarding the process, please feel free to call me at 768-2650.

FJA/bsj

Attachment

CITY OF
Albuquerque

Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

March 12, 1997

Dan Aguirre
Wilson & Company
4775 Indian School Rd. NE Suite 200
Albuquerque, New Mexico 87110

RE: ENGINEER CERTIFICATION FOR PRECISION TUNE (D13-D18) CERTIFICATION
DATED 3/3/97

Dear Mr. Aguirre:

Based on the information provided on your March 10,1997 resubmittal, Engineer Certification for the above referenced site is acceptable.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Engineering Associate

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

September 6, 1995

Mark Goodwin
Mark Goodwin & Associates
P.O. Box 90606
Albuquerque, NM 87199

RE: PRECISION TUNE (D13-D1B) CONCEPTUAL GRADING & DRAINAGE PLAN FOR SITE DEVELOPMENT PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED 8-24-95.

Dear Mark:

Based on the information provided on your August 24, 1995 submittal, the above referenced project is approved for Site Development Plan for Building Permit.

Prior to Building Permit Approval, you must submitt relevant Master Plan data confirming free discharge.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

PER SE
ENGINEERING

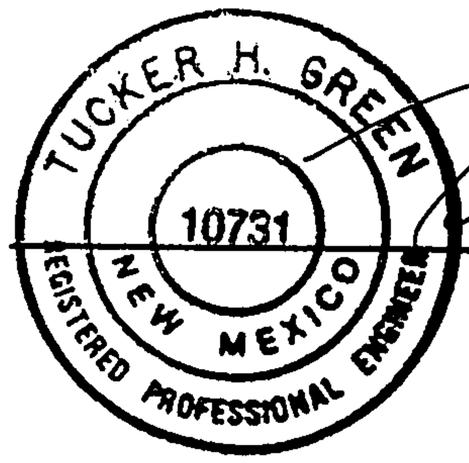
3041 Blake Road SW
Albuquerque, NM 87105

(505) 877-6163
Mobile 239-7855

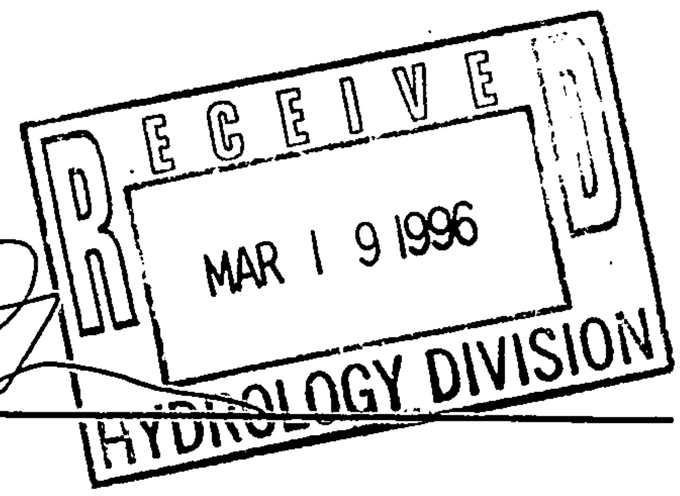
Drainage Report and Calculations
for
Precision Tune Site
Caminito Coors NW
Albuquerque NM

D-12, or D-13

Prepared by Per Se Engineering
March, 1996



3-18-96



Drainage, utilities, & site design

GRADING AND DRAINAGE PLAN
FOR
PRECISION TUNE SITE
CAMINITO COORS NW, ALBUQUERQUE NM (MAP D-13)

LEGAL DESCRIPTION: LOTS 8-A-1 & 8-A-2 (CURRENTLY LOT 8-A), BOSQUE DEL PUEBLO SUBDIVISION

FLOOD ZONE: THE SITE IS NOT IN A 100-YEAR FLOOD ZONE PER FEMA PANEL 8.

SITE DESCRIPTION: THE PROJECT SITE OCCUPIES APPROXIMATELY 1.1 ACRES IN A COMMERCIAL SUBDIVISION LOCATED ON THE EAST SIDE OF COORS BLVD NW, ROUGHLY ONE HALF MILE SOUTH OF PASEO DEL NORTE AND THREE FOURTHS OF A MILE WEST OF THE RIO GRANDE. THE SITE IS CURRENTLY UNDEVELOPED, MORE IN THE VACANT LOT SENSE THAN IN THE NATURAL VEGETATION SENSE. AS PART OF THE INITIAL DEVELOPMENT OF THE SUBDIVISION THE SITE WAS ROUGH-GRADED INTO A NEAR PLANE SURFACE THAT SLOPES DOWN FROM THE SOUTHWEST TO THE NORTHEAST. THE ORIGINAL DESIGNATION, FOR A SLIGHTLY SMALLER LOT, WAS LOT H. AN EXISTING SUNWEST BANK ADJOINS THE SITE ON THE NORTH, AN EXISTING ANIMAL HOSPITAL ADJOINS ON THE SOUTH. A GOODWILL INDUSTRIES STORE IS EAST ACROSS CAMINITO COORS AND COORS BLVD R.O.W. ADJOINS ON THE WEST. THE EAST PROPERTY LINE IS IN THE MIDDLE OF CAMINITO COORS, WHICH IS REALLY AN EASEMENT RATHER THAN A RIGHT OF WAY. SEE ALSO THE SITE PHOTOS.

PROPOSED DEVELOPMENT: WITH THIS PROJECT THE SITE IS BEING DIVIDED AND REPLATTED INTO 2 MORE OR LESS FLAG-SHAPED LOTS, WITH THE MAIN DIVIDING LINE BEING A NW-SE DIAGONAL WHICH IS ESSENTIALLY FLAT, GIVEN THE PREVIOUS GRADING OF THE SITE. A PRECISION TUNE AUTOMOTIVE TUNE-UP SHOP WILL OCCUPY THE SOUTHWEST PART OF THE SITE - LOT 8-A-2, WHICH CAN BE CALLED THE REAR LOT - AND A FUTURE OFFICE BUILDING WILL OCCUPY NORTHEAST/FRONT LOT, LOT 8-A-1. PUBLIC WATER AND SEWER ARE AVAILABLE AT THE SITE. APPROPRIATE EASEMENT AND COVENANTS FOR MUTUAL DRAINAGE AND ACCESS WILL BE PROVIDED SEPARATELY, PROBABLY ON THE FINAL PLAT.

OFFSITE FLOW: THE DESIGN OF EXISTING DEVELOPMENT ON THE NORTH AND SOUTH ESSENTIALLY ELIMINATES FLOW FROM THOSE DIRECTIONS, AND THE SITE DRAINS TOWARD THE EAST, SO NO FLOW COMES FROM THERE. ON THE WEST, RUNOFF FROM EAST OF THE MIDDLE OF COORS BLVD (INCLUDING PAVING AND SHOULDER) DOES ENTER THE SITE. THIS PROJECT IS ATYPICAL IN THAT IT MINGLES THE OFFSITE FLOW WITH THE ONSITE FLOW AND TREATS THEM TOGETHER.

DRAINAGE CRITERIA: THE PROJECT SITE LIES WITHIN WHAT WAS BASIN 13.2E IN THE NCDMP (NORTH COORS DRAINAGE MANAGEMENT PLAN, BY SCANLON FOR AMAFCA) AND IS SUBJECT TO THE REQUIREMENTS OF THE NCDMP. THE REQUIREMENTS RELATE PRIMARILY TO SEDIMENT REMOVAL AND PEAK FLOW RATE. BOSQUE DEL PUEBLO WAS DEVELOPED UNDER A MASTER PLAN CONFORMING TO THE NCDMP BUT THE BROADLY CONCEPTUAL NATURE OF THE BDP PLAN GIVES LITTLE PRACTICAL GUIDANCE TO THE PRESENT PROJECT, ESPECIALLY SINCE THE LOT BOUNDARIES HAVE CHANGED SINCE THE BDP WAS PREPARED.

THE OUTLET FOR BOSQUE DEL PUEBLO DRAINAGE IS THE CORRALES MAIN CANAL, OPERATED JOINTLY BY AMAFCA (ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY) AND MRGCD (MIDDLE RIO GRANDE CONSERVANCY DISTRICT) FOR BOTH IRRIGATION AND FOR DRAINAGE. TO AVOID HAVING SEDIMENT-LADEN RUNOFF REDUCE THE CAPACITY OF THE CANAL, THE NCDMP REQUIRES REMOVAL OF SEDIMENT PARTICLES LARGER THAN 0.031 MM (COARSE SILT) FOR FLOWS EQUAL TO HALF THE 100-YEAR PEAK RATE. THE SEDIMENT REMOVAL PARAMETERS ARE:

* REMOVE PARTICLES LARGER THAN 0.031 MM FOR Q = 0.5*Qp100
* ASSUME SEDIMENT FALL VELOCITY = 0.002 FT/SEC @ Q=0.5*Qp100
  SAME AS 500 SEC = 8-1/3 MIN PER FOOT OF FALL
* PROVIDE DETENTION TIME (SEC) = POND DEPTH (FT) / FALL VELOCITY
  ALTERNATIVELY, POND LENGTH = (DEPTH*REGULAR VELOCITY)/ FALL VELOCITY
* PROVIDE 0.0024 AC-FT (APX 105 CU FT) OF SEDIMENT STORAGE PER UPSTREAM ACRE

USING THE "OLD" SCS-BASED AHYMO (HYMO?) HYDROLOGY AND THE ASSUMPTION OF FREE DISCHARGE FOR SITES DEVELOPED AT 75% IMPERVIOUS AND 25% IRRIGATED-LAWN TYPE LANDSCAPING, THE NCDMP FOUND PEAK FLOW FOR BASIN 13.2E WOULD BE 3.07 CFS PER ACRE. "NEW" (E.G., AHYMO194) FLOW FOR SIMILAR DEVELOPMENT WOULD BE 15%-20% HIGHER. Lower.

IT APPEARS THAT THE PRECISION TUNE SITE MUST ACCEPT AND CONTROL NOT ONLY ONSITE FLOWS BUT ALSO FLOW FROM COORS BLVD R.O.W. EAST OF CENTERLINE, SINCE OTHERWISE THERE WOULD BE NO SEDIMENT REMOVAL FOR THOSE FLOWS. PART OF THE PRECISION TUNE SITE IS CAMINITO COORS PAVING AND SIDEWALK AND CANNOT BE CONTROLLED BY ONSITE DESIGN. (STREET FLOWS DO ENTER A SEDIMENT-TRAPPING INLET BEFORE ENTERING THE CORRALES MAIN CANAL.). THEREFORE THE PART OF THE SITE THAT CAN BE CONTROLLED MUST BE CONTROLLED MORE TIGHTLY IN ORDER TO ACHIEVE THE REQUIRED OVERALL PEAK RATE PER ACRE.

THE COMBINED AREA FOR THE TOTAL SITE PLUS OFFSITE CONTRIBUTING AREA IS APPROXIMATELY 1.628 ACRES, WHICH AT 3.07 CFS/AC MEANS A TOTAL ALLOWABLE PEAK FLOW OF 5.00 CFS. SEE SPREADSHEET PTUNHYD.WQ1 IN THE CALCULATIONS. FROM THE SAME SPREADSHEET, PEAK FLOW FROM THE UN-CONTROLLABLE PART OF THE SITE IS 0.62 CFS. AS A RESULT, PEAK FLOW FROM THE CONTROLLED AREA MUST BE NO MORE THAN 5.00 - 0.62 = 4.38 CFS.

DRAINAGE DESIGN: THE MAIN TECHNIQUES AVAILABLE TO LIMIT PEAK FLOWS TO THE "OLD" VALUES ARE CHANGING THE AMOUNT AND TYPE OF LANDSCAPING (MORE LANDSCAPING, MORE OF IT NATIVE), ROUTING FLOW THROUGH DETENTION PONDS OR CHANNELS, AND RETAINING (NO OUTLET) RUNOFF ONSITE. THESE TECHNIQUES ARE SIMILAR TO THOSE USED TO REMOVE SEDIMENT. TO ACHIEVE BOTH SEDIMENT AND FLOW REDUCTION THE PRECISION TUNE PROJECT USES 2 DETENTION CHANNELS (LINEAR PONDS) IN CONJUNCTION WITH LOW WATER USE "NATIVE" LANDSCAPING (EXCEPT ON THE BOTTOMS OF THE PONDS - MORE BELOW). HYDROLOGY ANALYSIS ASSUMES THAT HALF THE LANDSCAPING IS NATIVE-NATURAL AND THAT THE REST IS IRRIGATED-LAWN TYPE. GRADING AND ROOF DESIGN DIRECTS ALL POSSIBLE FLOWS TO THE UPSTREAM ENDS OF THE PONDS.

DESIGN OF THE PONDS REQUIRED ITERATIONS IN BOTH AHYMO HYDROLOGY AND CHANNEL HYDRAULICS. THE RESULTING COMBINED PEAK OUTFLOW IS 4.27 CFS, LESS THAN THE 4.38 ALLOWABLE. PEAK INFLOW TO THE PONDS (FROM THE CONTROLLABLE AREAS) IS 2.21 + 3.05 = 5.26 CFS.

IN AN ATTEMPT TO AVOID SOME UGLINESS ASSOCIATED WITH RETENTION, THE PONDS WERE DESIGNED AND ANALYZED AS NEARLY FLAT (SLOPE 0.18 PERCENT) CHANNELS RATHER THAN AS RESERVOIRS. SIMILAR REASONING LEAD TO THE CHOICE OF (LOW OR MEDIUM WATER USE) GRASS RATHER THAN ROCK FOR THE CHANNEL BOTTOMS. WITH PRIOR APPROVAL BY AMAFCA, MANNING'S n FOR ROUGHNESS OVER GRASS WAS CALCULATED USING PROCEDURES IN HEC-15, "DRAINAGE OF ROADSIDE CHANNELS WITH FLEXIBLE LININGS" (FHWA-IP-87-7). BERMUDA GRASS WAS USED TO REPRESENT THE GRASSES SPECIFIED ON THE PLAN. LACK

OF ROOM ONSITE REQUIRED VERTICAL SIDES TO THE CHANNEL/PONDS.

MAXIMUM DESIGN FLOW DEPTH IS SLIGHTLY LESS THAN 1 FT IN THE 4' "OUTLET" CHANNEL FROM THE NORTH POND. DEPTH IN THE SEDIMENTATION REACHES IS LESS. FOR BOTH PONDS THE MAXIMUM 100-YEAR FLOW DEPTH IS JUST AT THE ADJACENT TOP OF ASPHALT AT THE INLET, BASED ON FLOW DEPTH PLUS DESIGN SEDIMENT STORAGE DEPTH. OUTFLOW TO CAMINITO COORS IS VIA A PAIR OF CITY-STANDARD SIDEWALK CULVERTS IN THE NORTHEAST CORNER OF THE SITE. WITH AN ASSUMED AVAILABLE HEAD OF 0.57' THE COMBINED CAPACITY IS 5.16 CFS, MORE THAN THE 4.28 REQUIRED. AT THE SIDEWALK CULVERTS THERE IS A GAP IN THE CURB/WALL WHICH NORMALLY EXTENDS 6 INCHES ABOVE THE BACK OF SIDEWALK. THIS GAP PROVIDES AT LEAST 100% EXCESS CAPACITY IN CASE OF AN EXTREME STORM.

FOR THE CHANNEL ROUTING APPROACH THE VERTICAL FALL DISTANCE FOR SEDIMENT IS THE SUM OF THE WATER DEPTH PLUS THE ELEVATION CHANGE ALONG THE CHANNEL BOTTOM. FALL DEPTH, FALL VELOCITY, AND LINEAR VELOCITY CONTROL THE REQUIRED LENGTH OF THE DE-SEDIMENTING REACHES. SEDIMENT STORAGE DEPTH DEPENDS ON THE UPSTREAM AREA AND THE POND PLAN GEOMETRY. FOR THE NORTH CHANNEL THE REQUIRED SEDIMENT STORAGE IS A UNIFORM LAYER 0.09 FT (APX 1-1/8 INCH) THICK; FOR THE EAST POND THE THICKNESS IS 0.07 FT. FOR BOTH PONDS, 0.16 FT (2 INCHES) IS PROVIDED, CONTROLLED BY A SILL AT THE DOWNSTREAM END AS SHOWN ON THE PLANS.

file =CURBQTR4.wq1 written by Tucker Green 10-5-94 to calculate elevations
at points angularly spaced along a radiused curb, as at a street corner
"£" left of an item means enter that number, "ans" means an answer
*** NOTICE: ORIGINAL FORMULAS IN COLS AA-AD APPROX. DO NOT DISTURB! ***
02/28/96 03:47 PM

PRECSION TUNE	NE COR	SW COR
ans QP1E	98.05	98.27
ans QP2E	97.75	98.04
ans QP3E	97.52	97.92
£ KE1	98.40	98.59
£ KE2 (ELEV @ PI)	97.55	97.75
£ KE3	97.40	97.93
£ Degrees @ Curb	80.99	79.25
£ k(.5 for qtrpts)	0.5000	0.5000
DC/2 as RADIANS	0.70677	0.69159
kDC/2, RADIANS	0.35339	0.34579
LT	1.3150	1.2983
L1	0.5545	0.5281
L2	0.3768	0.3575
L2/L1	0.6795	0.6770
L3	0.3150	0.2983
V1	0.6494	0.6378
V2	0.3461	0.3389
POE	97.9000	98.2600
P1E	98.1275	98.3187
P2E	97.7878	98.0953
P3E	97.4481	97.8719
P1Y=P3Y	0.4412	0.4318

* DC=degrees of curb curve (NOT degrees of intersection of centerline)

* May be used for other than quarter points by changing k appropriately;
will always get the center point QPE2.

* Assumes a plane surface through the flowline PI and the 2 curb returns

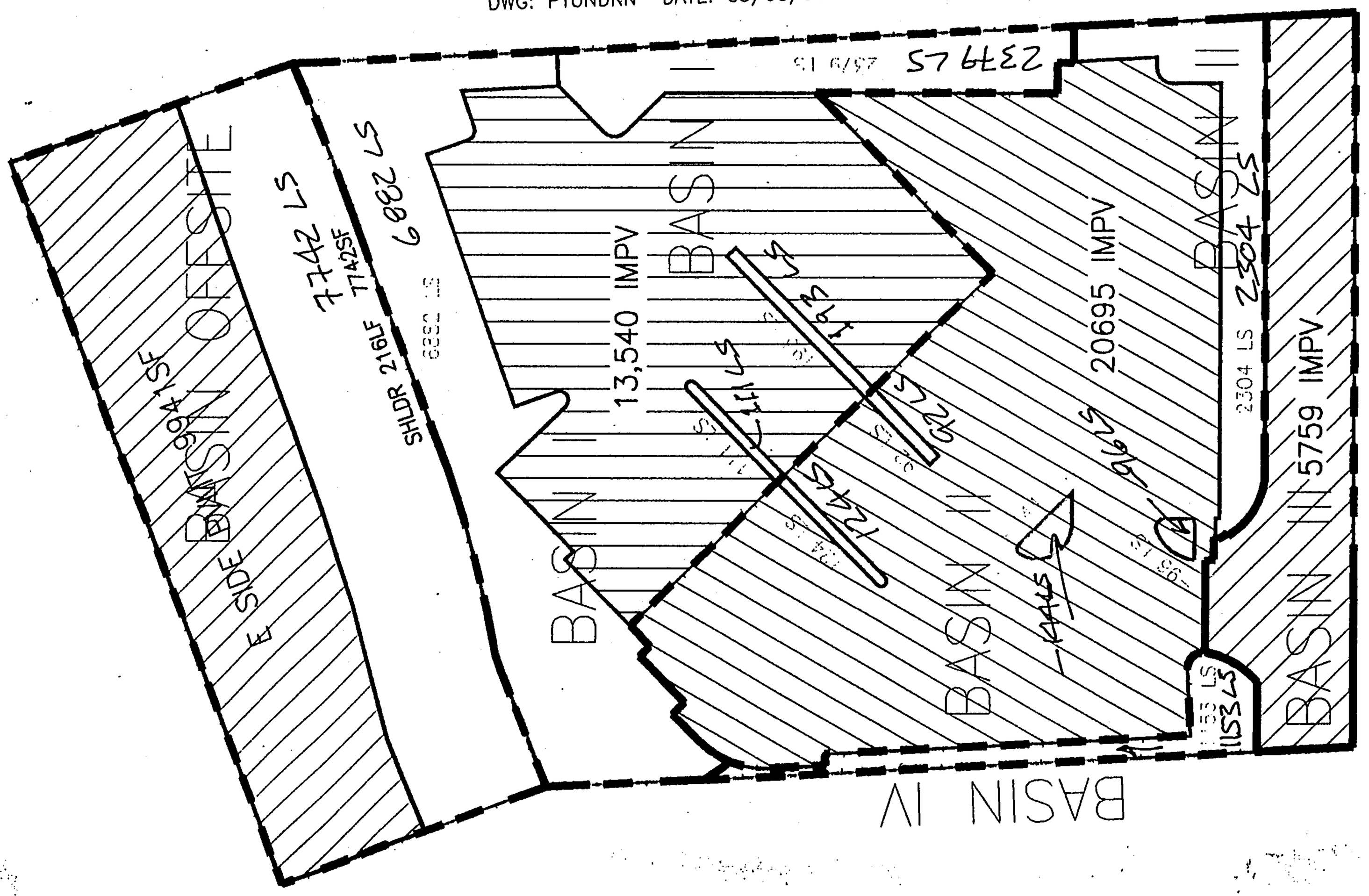
* KE1 is the Known Elevation at 1 CR, KE2 is the Known Elevation at the PI,
and KE3 is the Known Elevation of the other curb return.

* QPE1 is (the calculated elevation at) Quarter Point 1, between KE1 and
the PI, QPE2 is at midpoint, and QPE3 is between the PI and KE3.

* See the definition sketch, equations, and ssmple calc (all separate) for
other terms and additional information.

DWG: PTUNDRN DATE: 03/08/96 TIME: 09:59 T. GREEN

11



Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N.E. - ALBUQUERQUE, N.M. 87107
TELEPHONE (505) 884-2215

Mr. Tucker Green, P.E.
Per Se Engineering
3041 Blake Road SW
Albuquerque, NM 87105

RE: Precision Tune Site Located in Bosque del Pueblo, Drainage Report engineer stamped March 18, 1996, map # D-13

Dear Tucker:

I have reviewed the referenced report as it pertains to the sediment and allowable discharge issues affecting the La Orilla Outlet, also known as the Corrales Main Canal.

The lengthy linear channel ponds appear to be adequate for the sediment fallout and peak shaving that is crucial for this area.

City hydrology may have additional concerns or comments regarding details or on site issues. Please call me if you have any questions.

Sincerely,
AMAFCA

Kurt Browning, P.E.
Drainage Engineer

c: Fred Aguirre, COA Hydrology
John Curtin, COA Hydrology

03/08/96 11:36 AM Q&D, BASIN III, 100% IMPERVIOUS = "D" AC TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	0.00	0.0000	0.44	1.29	0.000	0.000	0.000	0.000	0.000	0.00
B	0.00	0.0000	0.67	2.03	0.000	0.000	0.000	0.000	0.000	0.00
C	0.00	0.0000	0.99	2.87	0.000	0.000	0.000	0.000	0.000	0.00
D	5759.00	0.1322	1.97	4.37	0.578	0.022	0.027	0.032	0.038	100.00
TOTAL	5759.00	0.1322	AVG Q/AC=	4.370	0.578	0.022	0.027	0.032	0.038	100.00
					CU FT	945	1166	1387	1651	

03/08/96 11:36 AM Q&D, BASIN III, 100% LANDSCAPE AS "50%" A, 50% "B" AC TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	576.50	0.0132	0.44	1.29	0.017	0.000	0.000	0.000	0.000	50.00
B	576.50	0.0132	0.67	2.03	0.027	0.001	0.001	0.001	0.001	50.00
C	0.00	0.0000	0.99	2.87	0.000	0.000	0.000	0.000	0.000	0.00
D	0.00	0.0000	1.97	4.37	0.000	0.000	0.000	0.000	0.000	0.00
TOTAL	1153.00	0.0265	AVG Q/AC=	1.660	0.044	0.001	0.001	0.001	0.001	100.00
					CU FT	53	53	53	53	

*

TOTAL Q_P = 3.003 + ~~4.014~~ 2.169 + 0.578 + 0.044 = 5.794
≈ 5.80 cfs

"CONTROLLABLE" = 3.003 + 2.169 = 5.172 cfs ~ 5.17 CFS

TOTAL AC = 40474 + 23519 + 5759 + 1153 SF
= 70 905 SF = 1.628 AC

ALTERNATE APPROACH

UNCONTROLLED =
.578 + .044 ~ .62 CFS
5.00 − .62 = 4.38
= ALLOWABLE OUTFLOW
USE

ALLOWABLE Q @ 3.07 CFS/AC
= 1.628 × 3.07 = 4.998
≃ 5.00 CFS

TOTAL − ALLOWABLE = 5.80 − 5.00 = 0.80 CFS

REDUCE "CONTROLLABLE" TO 5.17 − 0.80 = 4.37

$\frac{5.17 - 4.37}{5.17} = 0.155 \sim 15.5\%$ REDUCTION

USE "CHANNEL ROUTING IN ATTMO

* ATTMO WILL LIKELY YIELD HIGHER Q'S THAN

3-11-96

PRECISION TUNE

SEDIMENT STORAGE

0.0024 AC-FT/AC REQUIRED, = 105 FT^3/AC

NORTH POND

.9292 AC x 105 FT^3/AC = 97.6 FT^3

POND SURFACE AREA = 128' x 8.5' = 1088 SF

AV DEPTH REQ = $\frac{97.6}{1088}$ = 0.0897 ~ 0.090' ~ 1 1/16"

EAST POND

.5399 AC x 105 FT^3/AC = 56.7 FT^3

POND SURFACE AREA = 115 x 7 = 805 FT^2

$\frac{56.7}{805}$ = 0.0701' ~ 7/8" = AVG DEPTH REQ

3-11-96 North Pond B=8.5'

file=MANTRAP2.wq1, based on mantrap.wq1 for Manning's equation for normal flow in trapezoidal channels
b=bottom width (=0 for triangles), m=sideslope H:V (=0 for rectangles)
P=wetted perimeter; R=A/P; Q=flow(cfs); Ev=velocity energy; Fr=Froude no.
Es=specific energy=y+v^2/2g; Ms=specific momentum=Q^2/gA+A*ybar
** WARNING ** ORIGINAL EQNS IN COLS Y AND Z (+-). DO NOT DELETE OR ERASE **

** WARNING ** PRESS THE F9 KEY TO UPDATE R IN *COLUMN* W/ EQNS FOR n !! PRESS F9 !!

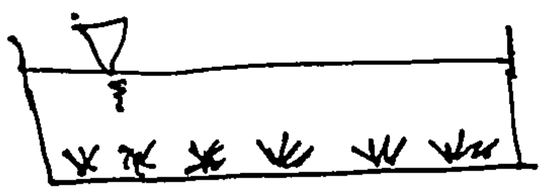
09:41 AM DESLITING PONDS FOR PRECSION TUNE, CAMINITO COORS NW, ALBUQUERQUE
09:41 AM NORTH POND AT PRECISION TUNE
03/11/96

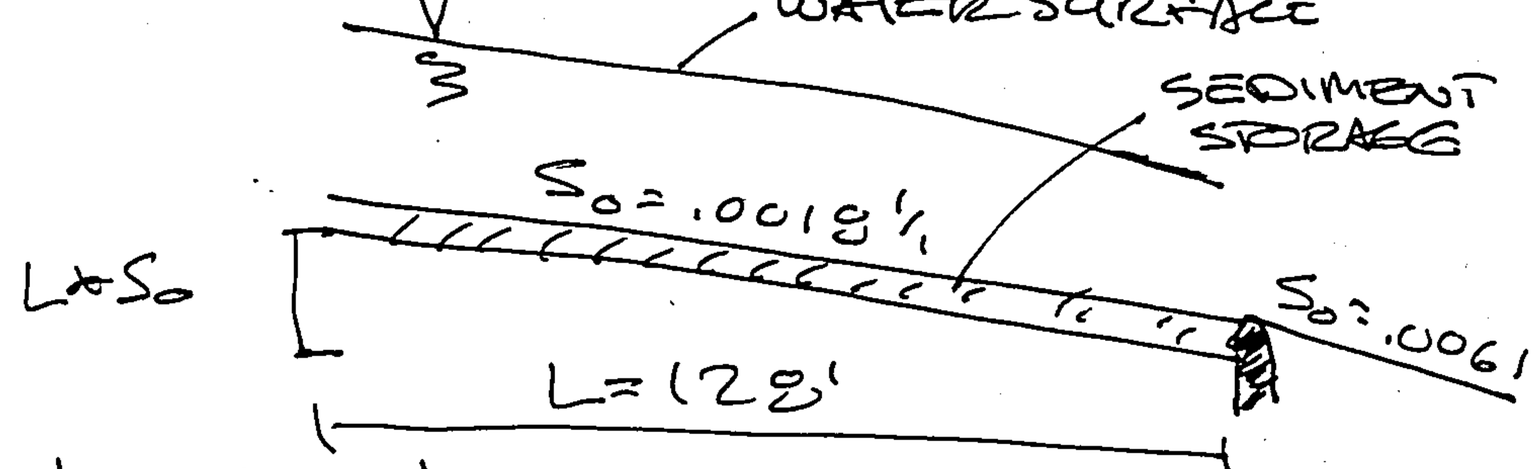
	N INLET W GRASS	N OUTLET W GRASS	N OUTLET W GRASS	N OUTLET W GRASS	Q2.47 QpOUT	Q3.05 QpIN	Q1.53 .5QpIN	QpOUT	QpIN	.5QpIN	MANNING'S n FOR VEGETATION FROM HEC-15 APPENDIX B (S & R FROM COLUMN B)
				BOTM=8'				BOTM=8.5'			
n	0.0669	0.0774	0.0767	0.0773	0.0980	0.0908	0.1200	0.0999	0.0921	0.1229	0.0773 CALC'D n
S	0.01000	0.00570	0.00650	0.00610	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180	0.00610 S
M1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.01200 MEI-APP B
M2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.13000 VG HT, ft
B	3.0000	4.0000	4.0000	4.0000	8.0000	8.0000	8.0000	8.5000	8.5000	8.5000	(~(5/8"))
Y	0.7500	0.6800	0.6500	0.6600	0.6900	0.7500	0.5750	0.6700	0.7300	0.5600	CALC n FROM
T	3.0000	4.0000	4.0000	4.0000	8.0000	8.0000	8.0000	8.5000	8.5000	8.5000	COLUMN =
A	2.2500	2.7200	2.6000	2.6400	5.5200	6.0000	4.6000	5.6950	6.2050	4.7600	E
P	4.5000	5.3600	5.3000	5.3200	9.3800	9.5000	9.1500	9.8400	9.9600	9.6200	
R	0.5000	0.5075	0.4906	0.4962	0.5885	0.6316	0.5027	0.5788	0.6230	0.4948	0.49624 R
Q	3.148	2.508	2.526	2.484	2.494	3.067	1.528	2.496	3.098	1.528	
V	1.40	0.92	0.97	0.94	0.45	0.51	0.33	0.44	0.50	0.32	MANNING'S n FOR GRAVEL & RIP
Ev	0.030	0.013	0.015	0.014	0.003	0.004	0.002	0.003	0.004	0.002	LIMERINOS EQUATION FOR d50
Es	0.78	0.69	0.66	0.67	0.69	0.75	0.58	0.67	0.73	0.56	AMAFCA SEDG EQ 3.18a, P 3-1
Fr (Y)	0.28	0.20	0.21	0.20	0.10	0.10	0.08	0.09	0.10	0.08	1.0000 d50, IN
Fr (A/T)	0.28	0.20	0.21	0.20	0.10	0.10	0.08	0.09	0.10	0.08	0.0833 (d50, FT)
Ms	0.98	1.00	0.92	0.94	1.94	2.30	1.34	1.94	2.31	1.35	0.0370 CALC'D n

FROM AHYMO 3.05 USE 2.47 1.53

QAIM 3.05 2.48/2.47 →

navg = 2.48 3.05 1.525 → 0.1075





Required desedimenting length @ Qp = 0.5*Qp100

$= \frac{(\text{depth} + L*S_o)\,V}{\text{Sed fall velocity}} = \frac{(0.56 + 128*.0018)(.32)}{.002} = \frac{(.79)(.32)(500)}{}$

= 126.4 < 128 PROVIDED OK

REVISED TO 127 PROVIDED
STILL OK 3-11-96

5-11-96

PRECISION TUNE

ELEVATION STRING FOR PONDS

ROAD SLOPE ~ 0.7% CAMINITO CCCRS

TC 1'S OF R = 97.27 SPOT ELE

℄ N SWC 5' FROM SPOT ELEV SWC= SIDEWALK CULVERT

TC SWC = 97.27 + 5x.007 ~97.31

FL@GUTTER = TC - 0.07 = 96.64

LIP OF SWC = FL + 0.04 = 96.68

BSW = TC + 4.5 x .02 = 97.31 + .09 = 97.40

INV @ BSW = LIP + 4.5 x .02 = 96.77

CHECK SWC CAPACITY - OK

AVAILABLE FOR FLOW = 97.40 - 96.77 - .04 PLATE W/BAR
= 0.59'

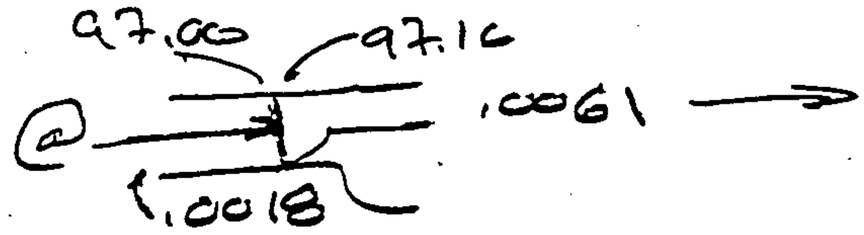
SINCE SOUTH SWC ~ 3x.007 = .02 HIGHER
USE AVAIL HEAD ~ 0.57

WEIR L=2', C=3 H=0.57 ⇒ Q = 2.58 CFS CULVERT CAPACITY OK

x 2 SWC = 2.58 x 2 = 5.16 > 4.26 REQ ⇒ OK

NORTH POND

- 64' @ .0061 = 0.39'



96.77 + 0.39 = 97.16

DROP 0.16 ~ 2" FOR SEDIMENT STORAGE

97.16 - .16 = 97.00 ACTUAL

- 125 LF @ 0.0018 = 0.23' 97 + .23 = 97.23 ACTUAL
- 18 LF @ 1% = .18 97.23 + .18 = 97.41 ℄ RUNDOWN
- 4 LF @ 1% B.W END CONC 97.45)

AT ℄ RUNDOWN TA = FL = 98.09, + CURB = 98.59

"EFFECTIVE" FLOW DEPTH = (0.73) + (0.16 SED STORE)
= 0.89'

file=MANTRAP2.wq1, based on mantrap.wq1 for Manning's equation for normal flow in trapezoidal channels
b=bottom width (=0 for triangles), m=sideslope H:V (=0 for rectangles)
P=wetted perimeter; R=A/P; Q=flow(cfs); Ev=velocity energy; Fr=Froude no.
Es=specific energy=y+v^2/2g; Ms=specific momentum=Q^2/gA+A*ybar
** WARNING ** ORIGINAL EQNS IN COLS Y AND Z (+-). DO NOT DELETE OR ERASE **

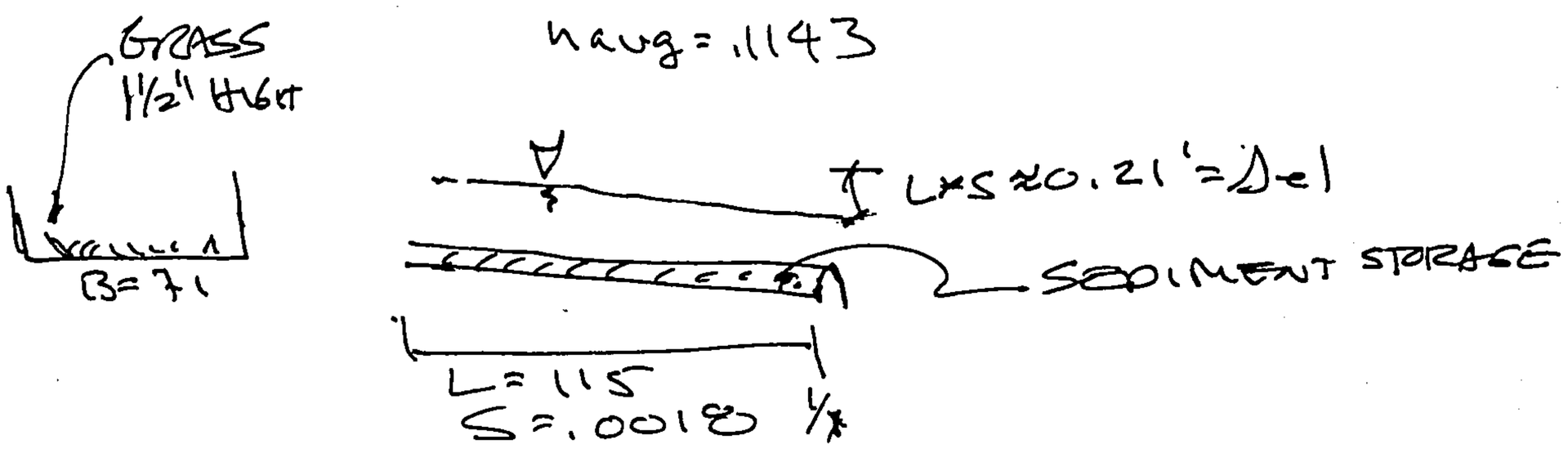
3-10-96
EAST POND
n for GRASS

** WARNING ** PRESS THE F9 KEY TO UPDATE R IN *COLUMN* W/ EQNS FOR n !! PRESS F9 !!

03:09 PM DESILTING PONDS FOR PRECISION TUNE, CAMINITO COORS NW, ALBUQUERQUE
03/10/96 CRITERIA FOR Q=.5*Qp100 & 0.31mm SILT W/ FALL VELOCITY=0.002 FPS,
Vmax=0.5fps, Tr=Y/.002 SEC, L=Tr*Vact=Y*Vact/.002 FT, .0024AC-FT=105CF SED STORAGE PER ACRE

EAST POND, 0.5399 AC CONTRIBUTING; 2.21 CFS Qp100 INFLOW PER AHYMO194
VERT SIDES, VEG BOTTOM W 1-1/2" BERMUDA GRASS, n grass PER HEC-15 VIA THIS SPREADSHEET

	BOTM=8'		BOTM=7'			BOTM=6'		
			Q1.79	Q2.21	Q1.12			MANNING'S n FOR VEGETATION
								FROM HEC-15 APPENDIX B
	QpOUT	QpIN	.5QpIN	QpOUT	QpIN	.5QpIN	QpOUT	QpIN	.5QpIN	(S & R FROM COLUMN B)
n		0.1383	0.1383	0.1067	0.0977	0.1309		0.0938	0.1236	ERR CALC'D n
S		0.00180	0.00180	0.00180	0.00180	0.00180		0.00180	0.00180	0.00000 S
M1		0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.01200 MEI-APP B
M2		0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.13000 VG HT, ft
B		8.0000	8.0000	7.0000	7.0000	7.0000		6.0000	6.0000	
Y		0.8000	0.5200	0.6500	0.7100	0.5500		0.7700	0.5900	CALC n FROM
T		8.0000	8.0000	7.0000	7.0000	7.0000		6.0000	6.0000	COLUMN =
A		6.4000	4.1600	4.5500	4.9700	3.8500		4.6200	3.5400	E
P		9.6000	9.0400	8.3000	8.4200	8.1000		7.5400	7.1800	
R		0.6667	0.4602	0.5482	0.5903	0.4753		0.6127	0.4930	0.00000 R
Q		2.226	1.130	1.801	2.257	1.129		2.240	1.127	
V		0.35	0.27	0.40	0.45	0.29		0.48	0.32	MANNING'S n FOR GRAVEL & RIPRA
Ev		0.002	0.001	0.002	0.003	0.001		0.004	0.002	LIMERINOS EQUATION FOR d50
Es		0.80	0.52	0.65	0.71	0.55		0.77	0.59	AMAFCA SEDG EQ 3.18a, P 3-15
Fr (Y)		0.07	0.07	0.09	0.10	0.07		0.10	0.07	1.5000 d50, IN
Fr (A/T)		0.07	0.07	0.09	0.10	0.07		0.10	0.07	0.1250 (d50, FT)
Ms		2.58	1.09	1.50	1.80	1.07		1.81	1.06	ERR CALC'D n



required desedimenting length @ Q = 0.5 Qp100

$= \frac{(\text{depth} + L \times S)(V)}{\text{fall velocity}} = \frac{(0.55 + .20)(0.29)}{(.002)} = 108.75 < 115$ OK

(115 PROVIDED)

3-11-96

PRECISION TUNE

ELEVATION STRING FOR PONDS.

INV @ BSW @ SWC (SIDEWALK CULVERT)

96.77

@ TOP OF RUNDOWN @ SEND E POND
97.83 EAST POND

DEPTH 0.71'

L x So = 118 x .0018 = 0.21'

0.71 + 0.21 = 0.92'

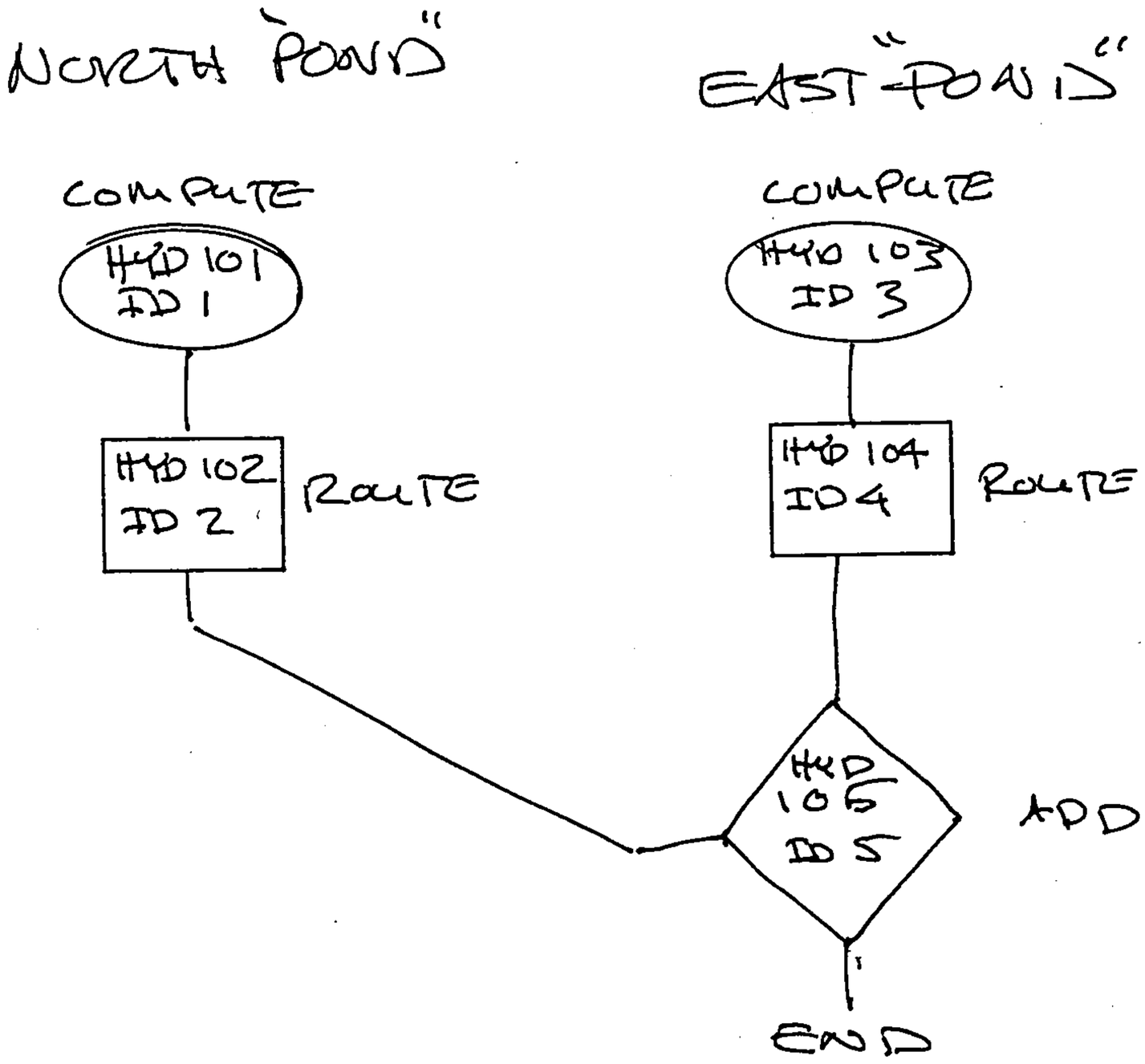
97.83 - 0.71 = 97.12 @ BOTTOM OF RUNDOWN

- 0.16 FOR SED = 96.96 ACTUAL

97.83 - .92 = 96.91 TOP OF LIP N END E POND

- 0.16 FOR SEDIMENT = 96.75 ACTUAL

3-9-96



PRECISION TUNE
ALTHMO SCHEMATIC

PTUN.SUM 3-11-96 6:58:31

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/11/1996
INPUT FILE = PTUN USER NO.= PERSENG.194

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
*S PRECISON TUNE, CAMINITO COORS NW, ALBUQUERQUE NM: DESILLTING AND FLOW										
*S REDUCTION PONDS. MAX COMBINED Qp100 @ 4.37 CFS PEAK ==> 3.07 CFS/AC IN										
*S ACCORD WITH NORTH COORS DRAINAGE MANAGEMENT PLAN FOR THE TOTAL AREA (INC										
*S COORS ROW EAST OF CL & 1/2 CAMINITO COORS PAVMT). INFLOW TO PONDS										
*S *NOT* BULKED FOR SEDIMENT. SEE DRAINAGE REPORT FOR DESILTING DISCUSSION										
*S MANNING n = AVG OF n @ Q100 & n @ 0.5*Q100 FROM PTUNPND1.WQ1, BASED ON										
*S METHODS IN FHwA HEC-15 FOR VEGETATION AND/OR AMAFCA SEDIMENT AND EROSION										
*S GUIDE FOR RIPRAP OR ROCK (LIMBRINOS EQN).										
*S										
*S TUCKER GREEN PE, 3-9-96										
RAINFALL TYPE= 1										RAIN6= 2.200
*S FLOW TO NORTH POND/CHANNEL FOLLOWS										
COMPUTE NM HYD	101.00	-	1	.00145	3.05	.106	1.37439	1.500	3.282	PER IMP= 58.00
*S ROUTE HYD 101 TO HYD 102 THROUGH N. POND 8.5' WIDE										
ROUTE MCUNGE	102.00	1	2	.00145	2.48	.106	1.37256	1.533	2.671	CCODE = .2
*S FLOW TO EAST POND/CHANNEL FOLLOWS										
COMPUTE NM HYD	103.00	-	3	.00084	2.21	.080	1.78286	1.500	4.100	PER IMP= 86.98
*S ROUTE HYD 103 TO HYD 104 THROUGH E. POND 7' WIDE										
ROUTE MCUNGE	102.00	3	4	.00084	1.79	.080	1.77031	1.533	3.321	CCODE = .2
ADD HYD	105.00	2& 4	5	.00230	4.28	.186	1.51858	1.533	2.910	
FINISH										

8.5' N POND
7' E POND

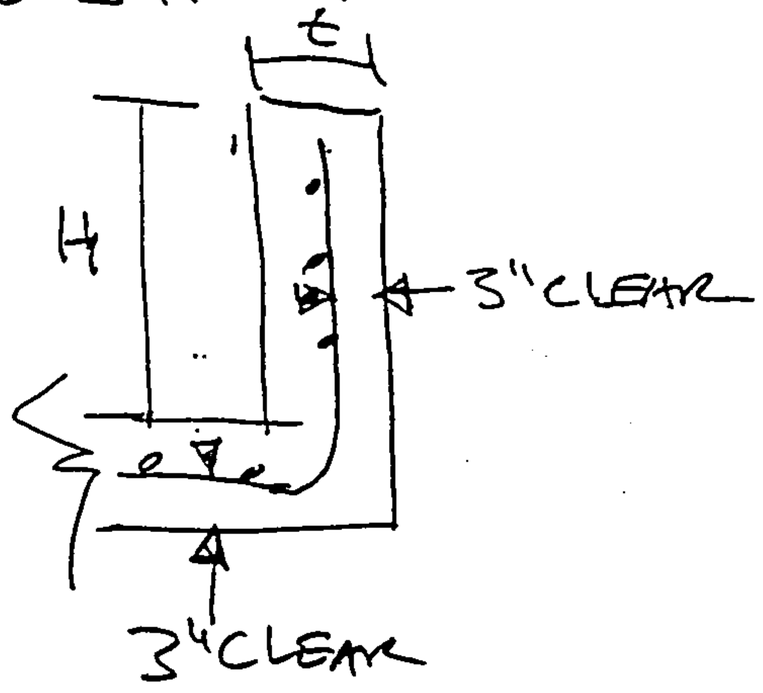
← COMBINED

FROM SPREADSHEET FILE PTUNHYD.WQ1 (FOR AREAS)

Q COMBINED ALLOWABLE = 4.37 CFS > 4.28 OK

PRECISION TUNE 3-16-96

REBAR FOR INLET WALL — NORTH POND 1/2



Hactual = 99.12 - 97.23 = 1.89'

sag = 2.50 = 30'

t = 8"

d ~ 4.75" sag 4"

f'c = 3000 psi use

(4000 psi spec

f_y = 40 000 psi = 40 ksi design

Minimum reinforcement ratio

1. walls - a: vertical: 0.0015 40ksi (.0012 60, ≤#5)

b: horizontal: 0.0025 40 ksi (.0020 60, ≤#5)

2. flexural strength - min of

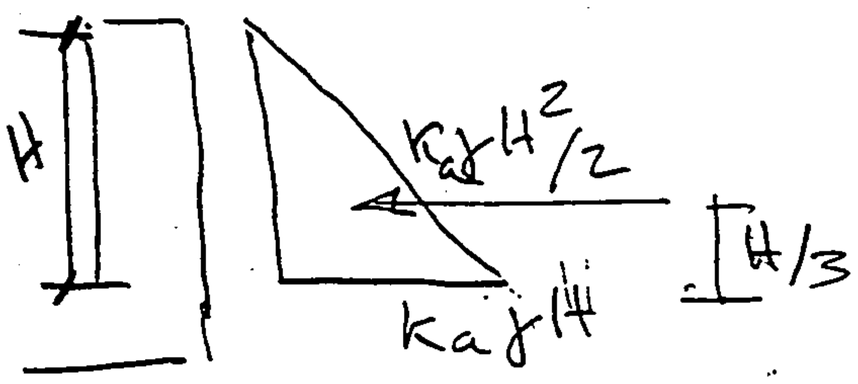
c 200/fy

d 1/3 more than required by design

Ref. Reinforced Concrete Design Wang & Salmon 3rd Ed

Assume $K_a = K_{active} = 1/3$ Soil γ = 135 pcf compacted

Soil moment factor = 1.7, no surcharge



$M_u = 1.7(K_a)(\gamma)(H^3/6)$

$= 1.7 \frac{(135)}{3} \frac{2.5^3}{6} = 199.22$ ft-lb ~ 2400 in-lb

Strength - Wang & Salmon eqns 3.6.4a, 3.6.4b, 3.6.5 (= 23.53 for 60 ksi)

$m = f_y/(.85 * f'_c) = 40/(.85 * 3) = 15.69$

$R_u = M/bd^2 = 2400/(12 \times 4^2) = 12.5$ b = 12" unit width calcs

$\rho_{req} = (1/m)[1 - \sqrt{1 - (2mR_u/f_y)}] = 0.00031$ (= 0.00021 60 ksi)

$= 0.00042$ (= 0.00029 ")

1/3 x ρ_{req} =

200/f_y = 0.005 40 ksi, = 0.0033 60 ksi

PRECISION TUNE – NORTH POND 3-16-96 2/2

REBAR PER INLET WALL, CONT

40 KSI

ρ strength = .00042 min (analysis x 4/3)
wall vert = .0015 min USE
" horiz = .0025 min USE

60 KSI, #5 & smaller bar

ρ strength = 0.00028 min (analysis x 4/3)
wall vert = 0.0012 min USE IF 60 KSI ≤ #5 bar
horiz = 0.0020 min USE IF " "

PRECISION TUNE – USE SAME BAR EACH WAY

40 KSI, ρ_{min} = .0025 #4 Bar A_s = 0.20 in²

$\rho = A_s / bx$ ... use b = 8"

$.0025 = \frac{0.20}{8x}$, $x = \frac{.20}{.0025 \times 8} \Rightarrow 10"$

#4 @ 10" OC EW USE EPOXY BAR

60 KSI ρ_{min} = 0.0020

$x = \frac{0.20}{.0020 * 8} = 12.5"$ use 12" for 60 KS