

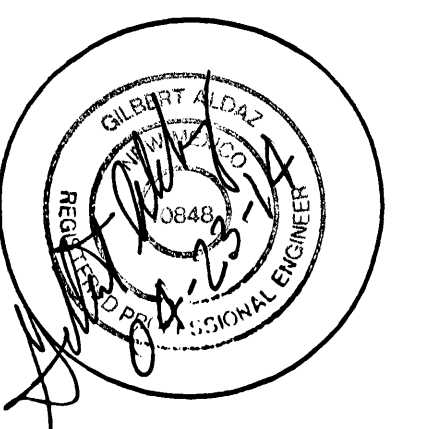
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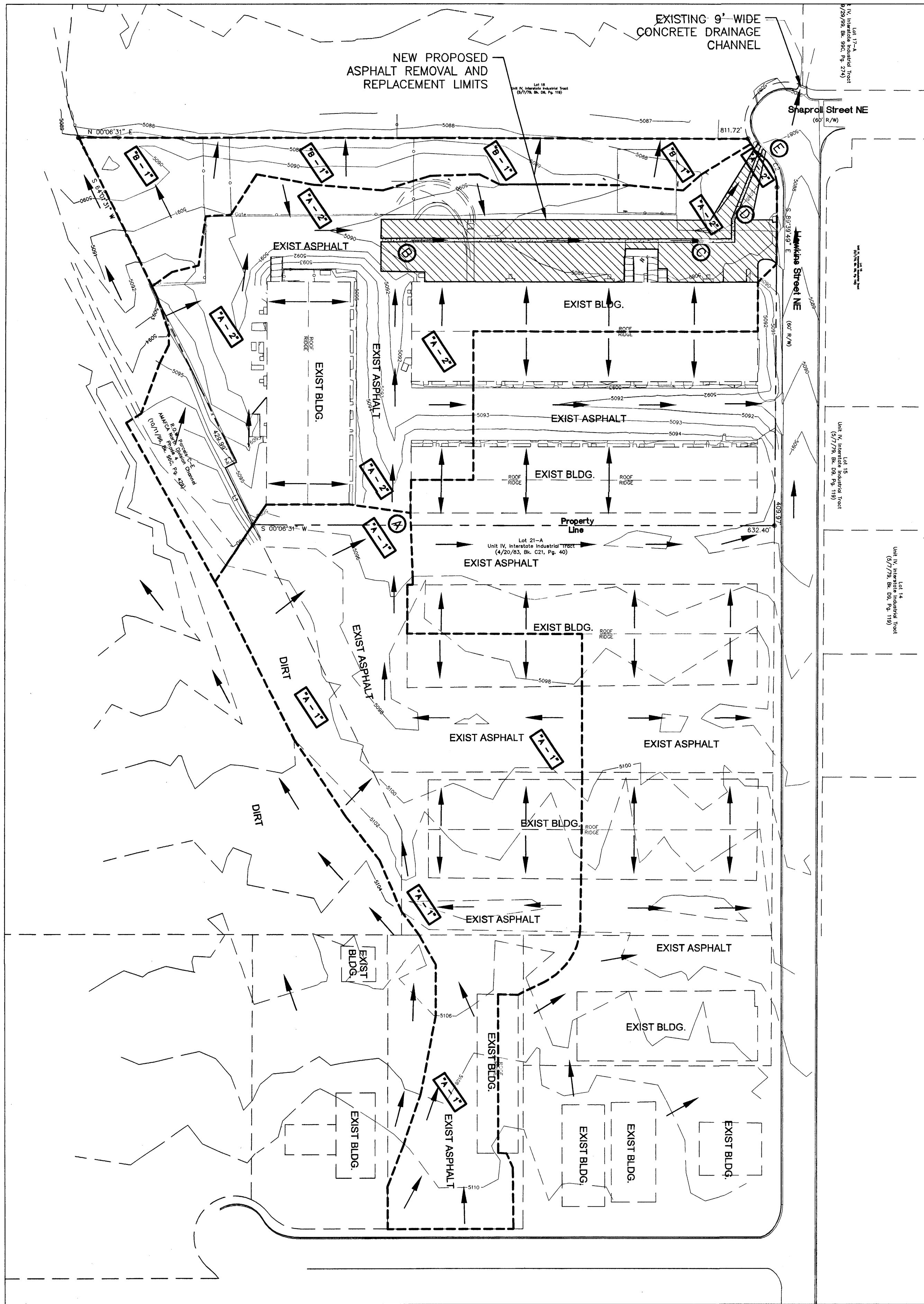
3768 HAWKINS PAVING IMPROVEMENTS
ALBUQUERQUE, NEW MEXICO

MARK	DATE	DESCRIPTION

PROJECT NUMBER: 140101 HAWKINS
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SHEET TITLE
PROPOSED GRADING/ DRAINAGE IMPROVEMENTS

SHEET NUMBER
C100



DRAINAGE BASIN BOUNDARY MAP

SCALE: 1" = 80'



DRAINAGE PLAN

THE FOLLOWING ITEMS ARE IN REFERENCE TO PROPOSED PAVING IMPROVEMENTS TO AN EXISTING WAREHOUSE DEVELOPMENT LOCATED AT 3768 HAWKINS STREET NE IN A PORTION OF LOT 19, INTERSTATE INDUSTRIAL TRACT UNIT IV, ALBUQUERQUE, NEW MEXICO. GRADING AND DRAINAGE PLAN ARE CONTAINED HEREON:

1. DRAINAGE CALCULATIONS
2. VICINITY MAP (D-17)
3. FLOOD INSURANCE RATE MAP 35001C0136 G
4. GRADING PLAN

EXISTING CONDITIONS

AS SHOWN BY THE VICINITY MAP, THE SITE CONTAINS APPROXIMATELY 7.90 ACRES AND IS LOCATED AT THE SOUTHEAST CORNER OF SNAPROLL STREET NE AND HAWKINS STREET NE (SEE ATTACHED VICINITY MAP D-17). THIS DEVELOPMENT IS CLASSIFIED AS AN INFILL SITE, PER CITY CRITERIA, SINCE THE SURROUNDING AREA IS COMPLETELY DEVELOPED.

THE SITE'S EXISTING TOPOGRAPHY SLOPES FROM AN EAST TO WEST DIRECTION AT A SLOPE OF APPROXIMATELY 1.2%. THE SITE CURRENTLY HAS EXISTING BUILDINGS THAT CONTAINS ABOUT 2.56ACRES AND EXISTING ASPHALT PAVING CONTAINING ABOUT 3.20ACRES WITH THE REMAINDER OF THE SITE CONSISTING OF COMPACTED BASECOURSE CONTAINING 2.13ACRES. THE MAJORITY OF THE LOT DRAINS IN A WESTERLY DIRECTION TO THE WESTSIDE OF THE MOST WESTERLY BUILDING THAN MEANDERS IN A NORTHERLY DIRECTION AND EVENTUALLY OUTFALLS INTO THE CUL-DE-SAC AT THE INTERSECTION OF SNAPROLL STREET NE AND HAWKINS STREET NE THROUGH A 5'-6" WIDE CURB OPENING IN THE EXISTING CURB. THIS FLOW THEN GOES WEST ACROSS THE CUL-DE-SAC INTO AN EXISTING 9' WIDE CONCRETE CHANNEL THAT OUTFALLS AND CONNECTS INTO THE EAST SIDE OF THE AMAFCA NORTH DIVERSION CHANNEL.

THE MOST WESTERLY PORTION OF LOT 19 SHEETFLOWS IN A WESTERLY DIRECTION ONTO LOT 18 AS SHOWN ON BASIN "B-1".

THE SITE IS LOCATED ON FRM MAP 35001C0136 G AND IS NOT LOCATED WITHIN A 100-YEAR FLOODPLAIN.

PROPOSED CONDITIONS

AS SHOWN BY THE GRADING PLAN PREPARED FOR THIS SITE, THE INTENT IS TO REMOVE EXISTING ASPHALT PAVING AND REGRADE THE NEW ASPHALT PAVING ALONG THE WESTERLY BUILDING IN ORDER TO FLOW IN THE SAME DIRECTION AS IT CURRENTLY EXIST TODAY. DUE TO MINIMAL SLOPES IN A SOUTH TO NORTH DIRECTION A CONCRETE VALLEY GUTTER WILL BE PROVIDED TO BETTER DIRECT THE ONSITE FLOWS FROM BASIN A-2 AND OFFSITE BASIN A-1 TO THE NORTHWEST END OF THE SITE AND DISCHARGE INTO THE EXISTING CURB CUT AT THE CUL-DE-SAC AT SNAPROLL STREET NE AND HAWKINS STREET NE.

THE CALCULATIONS WHICH APPEAR HEREON, ANALYZE BOTH THE EXISTING AND DEVELOPED CONDITIONS FOR THE 100-YEAR, 6 HOUR RAINFALL RUNOFF FOR PEAK FLOWS AND STORM DURATION FOR VOLUME REQUIREMENTS. THE PROCEDURE FOR 40 ACRE AND SMALLER BASINS AS SET FORTH IN THE REVISION OF SECTION 22.7 HYDROLOGY OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 2, DESIGN CRITERIA, DATED JANUARY 1993. THIS D.P.M. PROCEDURE IS USED FOR ANALYZING ONSITE FLOWS.

DOWNSTEAM CAPACITY

THE OVERALL PROPOSED PEAK FLOW AND VOLUME IS EQUIVALENT TO THE EXISTING CONDITIONS AS THEY EXIST TODAY SINCE THIS PROJECT IS ONLY REPAVING AND REGRADING THE PROPOSED NEW PAVED AREA. OTHER EXISTING ASPHALT AREAS ON THE SITE WILL BE PATCHED ON AREAS THAT ARE ALLIGATOR CRACKED WITH NO CHANGES IN EXISTING GRADING AND RESEALING OF EXISTING ASPHALT. BASED ON THIS ANALYSIS THIS REPAVING DOES NOT AGGRAVATE THE EXISTING DOWNSTEAM CAPACITY SINCE THERE IS NO INCREASE IN FLOWS, ALSO THIS SITE IS ADJACENT TO THE AMAFCA NORTH DIVERSION CHANNEL.

OFFSITE FLOWS

BASED ON A FIELD VISIT AND TOPOGRAPHIC CONTOUR INFORMATION WE HAVE OFFSITE FLOWS THAT DRAIN FROM THE EAST ONTO THE REFERENCED LOT (SEE OFFSITE BASIN A-1). IT IS THE INTENT OF THIS DRAINAGE STUDY TO IMPROVE ONSITE DRAINAGE IMPROVEMENTS TO ACCEPT THESE FLOWS AND ALLOW THESE FLOWS TO CONTINUE DRAINING TO THE AMAFCA NORTH DIVERSION CHANNEL AS THEY CURRENTLY DRAIN TODAY.

AT ANALYSIS POINT "A" SHOWN ON THE DRAINAGE BASIN MAP IT APPEARS THAT THE FLOWS SPLIT IN HALF AT THIS LOCATION BASED ON THE TOPOGRAPHIC INFORMATION AND FIELD VERIFICATION. FIFTY (50%) PERCENT OF OFFSITE BASIN "A-1" WILL BE ACCOMMODATED INTO BASIN "A-2". THE OTHER 50% FLOWS NORTH IN THE EXISTING ASPHALT SWALE TO THE NORTH AND DISCHARGES INTO HAWKINS STREET NE.

EROSION CONTROL

TEMPORARY EROSION CONTROL WILL BE REQUIRED DURING THE CONSTRUCTION PHASE TO PROTECT DOWNSTEAM DRAINAGE INFRASTRUCTURE FROM SEDIMENT AND UNCONTROLLED RUNOFF (SEE THE EROSION CONTROL PLAN). IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY MAINTAIN THE EROSION CONTROL RECOMMENDATIONS (BMP'S) DURING THE ENTIRE CONSTRUCTION PHASE OF THE PROJECT UNTIL SUCH TIME OF CITY OR ENGINEERS ACCEPTANCE.

DRAINAGE CALCULATIONS

1. PRECIPITATION ZONE = 2
2. DESIGN STORM = DEPTH (INCHES) AT 100-YEAR STORM
6-HOUR = 2.35 INCHES
24-HOUR = 2.75 INCHES
10 DAY = 3.95 INCHES
3. PEAK DISCHARGE (CFS/ACRE) FOR 100-YEAR, ZONE 2, TABLE A-9:
Q = 1.56 CFS/ACRE SOIL UNCOMPACTED "A"
Q = 2.28 CFS/ACRE LANDSCAPED "B"
Q = 3.14 CFS/ACRE COMPACTED SOIL "C"
Q = 4.70 CFS/ACRE IMPERVIOUS AREA "D"
FOR WATERSHEDS LESS THAN OR EQUAL TO 40 ACRES
4. EXCESS PRECIPITATION, E (INCHES), FOR 100-YEAR, 6 HOUR STORM, ZONE 2, TABLE A-8:
E = 0.53 INCHES SOIL UNCOMPACTED "A"
E = 0.78 INCHES LANDSCAPED "B"
E = 1.13 INCHES COMPACTED SOIL "C"
E = 2.12 INCHES IMPERVIOUS AREA "D"
5. EXCESS PRECIPITATION, E (INCHES), FOR 10-YEAR, 6 HOUR STORM, ZONE 2, TABLE A-8:
E = 0.13 INCHES SOIL UNCOMPACTED "A"
E = 0.28 INCHES LANDSCAPED "B"
E = 0.52 INCHES COMPACTED SOIL "C"
E = 1.34 INCHES IMPERVIOUS AREA "D"
6. EXISTING CONDITIONS FLOWS BASIN A-2 (ONSITE TO CUL-DE-SAC)
TOTAL AREA = 4.90ACRES
TYPE "D" TREATMENT = EXISTING ROOF AREAS (27,184SF + 29,744SF + 2,991SF) = 1.38AC
PROPOSED CONCRETE AND PAVED AREAS (99,920SF) = 2.29AC
TYPE "B" TREATMENT = LANDSCAPED AREAS (0SF) = 0.00AC
TYPE "C" TREATMENT = REMAINING COMPACTED GRAVEL AND DISTURBED AREAS COMPACTED BY HUMAN ACTIVITY = 4.90AC - 1.38AC - 2.29AC = 1.23AC
TREATMENT AREA(ACRES)
A 0
B 0
C 1.23
D 3.67

Q(EXISTING-6HR) = (3.14 X 1.20) + (4.70 X 3.70)
= 21.11CFS (6HR) EXISTING ONSITE FLOW INTO CUL-DE-SAC
V(EXISTING-6HR) = ((1.13 X 1.20) + (2.12 X 3.70)) / 12
= 0.77AC-FT = 33.396CFS EXISTING VOLUME INTO CUL-DE-SAC

7. EXISTING CONDITIONS FLOWS BASIN "A-1" (OFFSITE)
TOTAL AREA = 4.33ACRES
TYPE "D" TREATMENT = EXISTING ROOF AREAS (13,535SF + 22,423SF + 5,103SF) + EXISTING CONCRETE AND PAVED AREAS (127,814SF) = 168,875SF = 3.88AC
TYPE "B" TREATMENT = LANDSCAPED AREAS (0SF) = 0.00AC
TYPE "C" TREATMENT = REMAINING COMPACTED GRAVEL AND DISTURBED AREAS COMPACTED BY HUMAN ACTIVITY = 4.33AC - 3.88AC = 0.45AC
TREATMENT AREA(ACRES)
A 0
B 0
C 0.45
D 3.88

Q(EXISTING-6HR) = (3.14 X 0.45) + (4.70 X 3.88)
= 19.65CFS (6HR) EXISTING ONSITE FLOW
50% INTO BASIN "A-2" = 0.50 X 19.65CFS = 9.82CFS ONTO BASIN "A-2"
V(EXISTING-6HR) = ((1.13 X 0.45) + (2.12 X 3.88)) / 12
= 0.73AC-FT = 31.705CFS EXISTING ONSITE VOLUME
50% INTO BASIN "A-2" = 0.50 X 0.73AC-FT = 0.37AC-FT = 15.899CFS

8. EXISTING CONDITIONS ONSITE FLOWS INTO CUL-DE-SAC AT HAWKINS STREET THEN INTO AMAFCA NORTH DIVERSION CHANNEL DRAINAGE BASIN A-2 (ONSITE) AND BASIN (A-1) OFFSITE ANALYSIS POINT "C"
Q = 21.11CFS + 9.82CFS = 30.93CFS
V = 0.77AC-FT + 0.37AC-FT = 1.14AC-FT

9. EXISTING CONDITIONS FLOWS BASIN "B-1" (INTO ADJACENT LOT 18)
TOTAL AREA = 1.26ACRES
TYPE "C" TREATMENT = COMPACTED GRAVEL AND DISTURBED AREAS COMPACTED BY HUMAN ACTIVITY = 1.26AC
TREATMENT AREA(ACRES)
A 0
B 0
C 1.26
D 0

Q(EXISTING-6HR) = (3.14 X 1.26) = 3.97CFS (6HR) EXISTING ONSITE FLOW
V(EXISTING-6HR) = ((1.13 X 1.26) / 12)
= 0.12AC-FT = 5.227CFS EXISTING ONSITE VOLUME

10. PROPOSED CONDITIONS FLOWS BASIN A-2 (ONSITE)
TOTAL AREA = 4.90ACRES
TYPE "D" TREATMENT = EXISTING ROOF AREAS (27,184SF + 29,744SF + 2,991SF) = 1.38AC
PROPOSED CONCRETE AND PAVED AREAS (99,920SF) = 2.29AC
TYPE "B" TREATMENT = LANDSCAPED AREAS (0SF) = 0.00AC
TYPE "C" TREATMENT = REMAINING COMPACTED GRAVEL AND DISTURBED AREAS COMPACTED BY HUMAN ACTIVITY = 4.90AC - 1.38AC - 2.29AC = 1.23AC
TREATMENT AREA(ACRES)
A 0
B 0
C 1.23
D 3.67

Q(PROPOSED-6HR) = (3.14 X 1.23) + (4.70 X 3.67)
= 21.11CFS (6HR) PROPOSED ONSITE FLOW INTO CUL-DE-SAC
V(EXISTING-6HR) = ((1.13 X 1.23) + (2.12 X 3.67)) / 12
= 0.76AC-FT = 33.106CFS EXISTING VOLUME INTO CUL-DE-SAC

11. PROPOSED CONDITIONS ONSITE FLOWS INTO CUL-DE-SAC AT HAWKINS STREET THEN INTO AMAFCA NORTH DIVERSION CHANNEL DRAINAGE BASIN A-2 (ONSITE) AND BASIN (A-1) OFFSITE ANALYSIS POINT "C"
Q = 21.11CFS + 9.82CFS = 30.93CFS
V = 0.76AC-FT + 0.37AC-FT = 1.13AC-FT

12. IMPACT OF THIS PAVING ON DOWNSTEAM CAPACITY (100-YEAR, 6 HOUR STORM)
Q (EXISTING-6HR) RELEASE RATE FOR SITE = 21.11CFS
Q (PROPOSED-6HR) RELEASE RATE FOR SITE = 21.11CFS
Q (DIFFERENCE-6HR) = 21.16CFS - 21.11CFS = 0.05CFS DECREASE TO DOWNSTEAM CAPACITY

V (EXISTING-6HR) RUNOFF VOLUME FOR SITE = 33.396CFS
V (PROPOSED-6HR) RUNOFF VOLUME FOR SITE = 33.106CFS
V (DIFFERENCE-6HR) = 33.396CFS - 33.106CFS = 290CFS DECREASE TO DOWNSTEAM CAPACITY

13. SEE HYDRAULIC ANALYSIS SHEET C102

DRAINAGE LEGEND

"A - 1"

DRAINAGE BASIN ID NUMBER

DRAINAGE BASIN BOUNDARY

(B)

DRAINAGE ANALYSIS POINT

→

DRAINAGE BASIN FLOW DIRECTION

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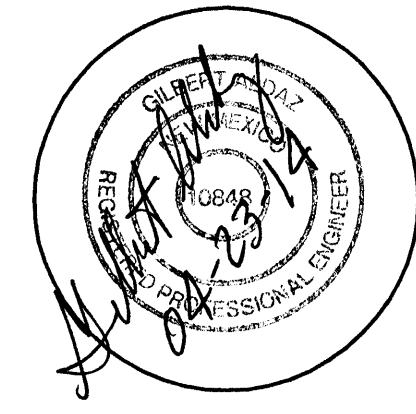
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SHEET NUMBER
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Hydraulic Analysis Report

Channel Analysis: Channel Analysis South Cross Section
(ANALYSIS POINT "B")

Input Parameters

Channel Type: Cross Section at South End

Cross Section Data

Station ft	Elevation ft	Manning's n
0.00	89.50	0.0170
25.00	88.90	0.0170
75.00	89.20	0.0170
75.10	93.20	-----

Longitudinal Slope: 0.0039 ft/ft

Flow: 23.4800 cfs

Result Parameters

Depth: 0.3527 ft
Area of Flow: 12.7251 ft²
Wetted Perimeter: 64.7526 ft
Hydraulic Radius: 0.1965 ft
Average Velocity: 1.8452 ft/s
Top Width: 64.6961 ft
Froude Number: 0.7332
Critical Depth: 0.3140 ft
Critical Velocity: 2.2892 ft/s
Critical Slope: 0.0077 ft/ft
Critical Top Width: 63.0856 ft
Calculated Max Shear Stress: 0.0858 lb/ft²
Calculated Avg Shear Stress: 0.0478 lb/ft²
Composite Manning's n Equation: Lottor method
Manning's n: 0.0170

Channel Analysis: Channel Analysis North Cross Section
(ANALYSIS POINT "C")

Input Parameters

Channel Type: Triangular
Side Slope 1 (Z1): 41.6700 ft/ft
Side Slope 2 (Z2): 31.6500 ft/ft
Longitudinal Slope: 0.0039 ft/ft
Manning's n: 0.0170
Flow: 30.9300 cfs

Result Parameters

Depth: 0.5905 ft
Area of Flow: 12.7821 ft²
Wetted Perimeter: 43.3104 ft
Hydraulic Radius: 0.2951 ft
Average Velocity: 2.4198 ft/s
Top Width: 43.2940 ft
Froude Number: 0.7848
Critical Depth: 0.5380 ft
Critical Velocity: 2.9154 ft/s
Critical Slope: 0.0064 ft/ft
Critical Top Width: 40.1937 ft
Calculated Max Shear Stress: 0.1437 lb/ft²
Calculated Avg Shear Stress: 0.0718 lb/ft²

Channel Analysis: Channel Analysis at North Turn
(ANALYSIS POINT "D")

Input Parameters

Channel Type: Triangular
Side Slope 1 (Z1): 31.2500 ft/ft
Side Slope 2 (Z2): 27.8600 ft/ft
Longitudinal Slope: 0.0039 ft/ft
Manning's n: 0.0170
Flow: 30.9000 cfs

Result Parameters

Depth: 0.6400 ft
Area of Flow: 12.1043 ft²
Wetted Perimeter: 37.8499 ft
Hydraulic Radius: 0.3198 ft
Average Velocity: 2.5528 ft/s
Top Width: 37.8282 ft
Froude Number: 0.7953
Critical Depth: 0.5843 ft
Critical Velocity: 3.0621 ft/s
Critical Slope: 0.0063 ft/ft
Critical Top Width: 34.6532 ft
Calculated Max Shear Stress: 0.1557 lb/ft²
Calculated Avg Shear Stress: 0.0778 lb/ft²

Channel Analysis: Channel Analysis at Cul-De-Sac
(ANALYSIS POINT "E")

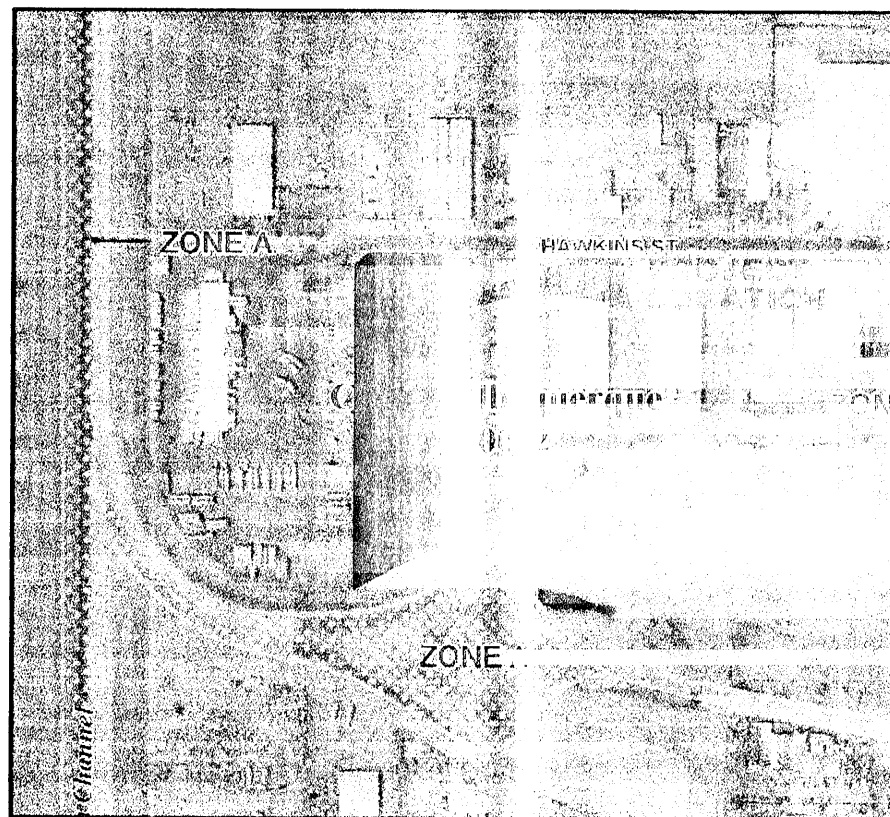
Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.2400 ft/ft
Side Slope 2 (Z2): 2.2400 ft/ft
Channel Width: 10.5000 ft
Longitudinal Slope: 0.0039 ft/ft
Manning's n: 0.0170
Depth: 0.6700 ft

Result Parameters

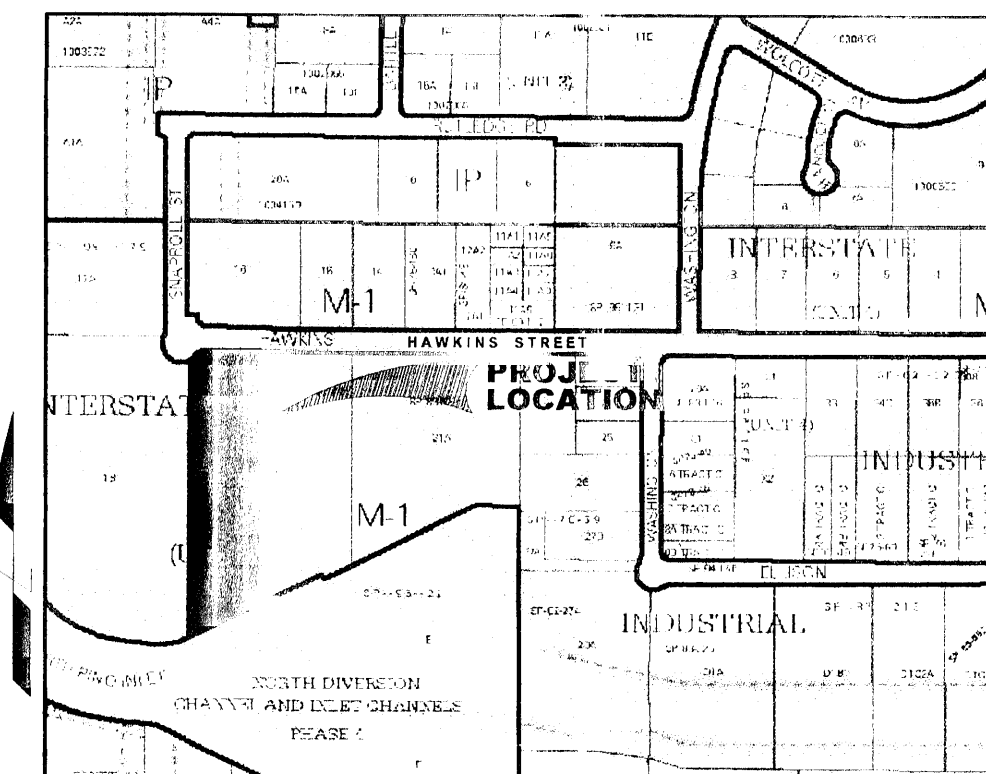
Flow: 30.6381 cfs
Area of Flow: 8.0405 ft²
Wetted Perimeter: 13.7871 ft
Hydraulic Radius: 0.5832 ft
Average Velocity: 3.8105 ft/s
Top Width: 13.5016 ft
Froude Number: 0.8702
Critical Depth: 0.6132 ft
Critical Velocity: 4.2083 ft/s
Critical Slope: 0.0053 ft/ft
Critical Top Width: 13.2469 ft
Calculated Max Shear Stress: 0.1631 lb/ft²
Calculated Avg Shear Stress: 0.1419 lb/ft²

FLOOD INSURANCE RATE MAP



35001C0136G

VICINITY MAP



D-17

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CALCULATIONS

SHEET NUMBER
C102

