City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 20, 1999

James L. Hewitt, P.E.
Hewitt Engineering & Environmental Consultants
2433 Palomas Drive, NE
Albuquerque, NM 87110

RE: CANDLEWOOD SUBDIVISION (H10-D22). GRADING AND DRAINAGE PLAN CERTIFICATION FOR RELEASE OF FINANCIAL GUARANTEES. ENGINEER'S STAMP DATED JUNE 24,1999.

Dear Mr. Hewitt:

Based on the information provided on your July 1, 1999 submittal, the above referenced plan is adequate to satisfy the requirement for Subdivision Certification for release of Financial Guarantees per the Infrastructure List dated January 20, 1998, and last revised on December 8, 1998.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 16, 1999

James L. Hewitt, P.E.
Hewitt Engineering & Environmental Consultants
2433 Palomas Drive, NE
Albuquerque, NM 87110

RE: CANDLEWOOD SUBDIVISION (H10-D22). ENGINEER'S CERTIFICATION FOR CERTIFICATE OF OCCUPANCY APPROVAL. ENGINEER'S STAMP DATED JUNE 24,1999.

Dear Mr. Hewitt:

Based on the information provided on your July 1, 1999 submittal, the above referenced project is approved for Certificate of Occupancy.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: File

Copy

DRB Case No. DRB-97-46
DRC Project No.
Prelim. Plat Approved 1.20.98
Prelim. Plat Expires ~~1.27.99~~ 12-8-99
Site Plan Approved
Date Submitted ~~01/02/98~~ 01/20/98
1 12-08-98

EXHIBIT 'A'
to Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Candlewood Subdivision - Preliminary Plat
(Tract 271, Town of Atrisco Grant, Airport Unit)

Following is a summary of PUBLIC/PRIVATE infrastructure require to be constructed or financially guaranteed for the above development. This summary is not necessarily a complete listing. During CPC, BCC, the design process and/or in the preparation of the construction drawings, if the City, County, and/or AMAFCA determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items are normally the Subdivider's responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project, and which are normally the Subdivider's responsibility, will be included in the financial guarantee provided to the City, County, and/or AMAFCA.

Size	Type Improvement	Location	From	To
1 26'/F-F	Residential Paving per City Standards Curb & Gutter Sidewalks 4' (Both sides) *	Kenwood Ct.	Iliff Rd.	End of Cul-de-sac with sidewalk waiver around the cul de sac.
6"	Water PVC Line	Kenwood Ct.	Iliff Rd.	End of Cul-de-sac
8"	SAS Gravity Line	Kenwood Ct.	Iliff Rd.	End of Cul-de-sac
1 ~~18"~~	~~RCP Storm Sewer~~	~~Kenwood Ct.~~	~~Kenwood Ct.~~	~~End of Cul-de-sac~~
4'	Sidewalk (South Side of ROW)	Iliff Rd. (Incl. Drainage ROW Entrance)	West Property Line	68th St. (East Side of ROW)

Size	Type Improvement	Location	From	To
4'	Sidewalk (East Side of ROW)	68th St. (Incl. Drainage ROW Entrance)	Sta 10+50 68th St.	Iliff Rd. (South Side of ROW)
3'	Alley Gutter	68th St. ROW	Iliff Rd.	Ret. Pond
1'	Rundown Curb	68th St. ROW	Iliff Rd.	Ret. Pond
N/A	Single Type 'A' Inlet	68th Rd.	Iliff Rd	@ 68th St.

Catch Basins and RCP included with storm sewer

Water infrastructure to include valves, fittings, valve boxes, and fire hydrants as required

Sanitary Sewer to include manholes and service connections as required

Residential Street lights per DPM

Certified Grading & Drainage with private retaining walls & private drainage (Non-Work Order Item) Required for SIA/Financial Release

Modified Procedure 'C'

* Internal sidewalks deferred

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Page: 9 of 9
04/08/1999 10:36A
Bk-9905 Pg-6826
Judy D. Woodward Bern. Co. AGRE R 23.00

Prepared by: James L. Hewitt

Print Name: James L. Hewitt, Jr., PE

Firm: Hewitt Engineering & Environmental Consultants

Development Review Board Member Approvals

12-08-98		RLL 12/8/98		12-8-98	
Traffic	1-20-98 Date	Utility Dev.	1-20-98 Date	Parks & G.S.	1/20/98 Date
	1/20/98			RW Duccio	12/8/98
City Engineer	Date	Chair	1/20/98 Date		

AMAFCA
F J Agnew 12/8/98

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 3,1998

James Hewitt Jr.
Hewitt Engineering
3730 Coors Blvd. NW Suite C
Albuquerque, New Mexico 87120

RE: REVISED DRAINAGE PLAN FOR CANDLEWOOD SUBDIVISION (H10-D22)
REVISION DATED 12/1/98

Dear Mr. Hewitt:

Based on the information provided on your December 3,1998 resubmittal, the above referenced site is approved for Preliminary and Final Plat.

Please be advised that Engineer Certification per the DPM checklist will be required prior to Financial Guarantee release.

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
Associate Engineer

DRAINAGE REPORT
FOR
CANDLEWOOD SUBDIVISION

Tract 271
Town of Atrisco Grant,
Airport Unit
Bernalillo County, New Mexico

SUPPLEMENTAL HYDROLOGIC & HYDRAULIC INFORMATION

December 3, 1998

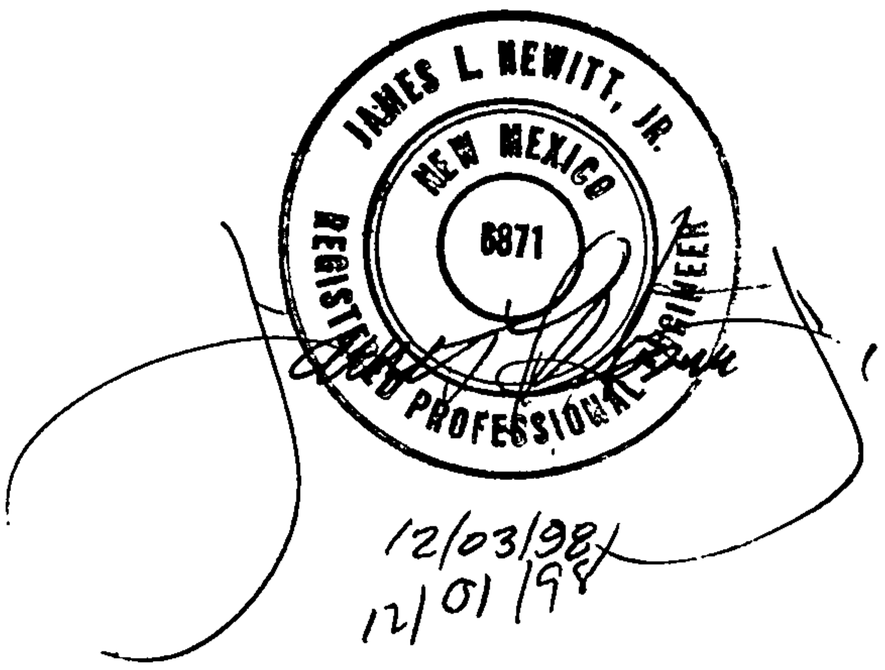
Prepared for:

Mr. Adil Rizvi, PE
7049 Luella Anne Drive, N.E.
Albuquerque, New Mexico 87112

Prepared by:

Hewitt Engineering & Environmental Consultants
2433 Palomas Drive, NE
Albuquerque, New Mexico 87110

TEL. (505) 889-4040
FAX. (505) 889-4040



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List of Appendices

Appendix

1.0 General Information

1.1 Legal Description:

Tract 271, Town of Atrisco Grant, Airport Unit. Filed in Vol. D, Folio 117 on December 5, 1944.

1.2 Engineer:

James L. Hewitt, Jr
NMPE No. 6871
Hewitt Engineering & Environmental Consultants
2433 Palomas Drive, NE
Albuquerque, New Mexico 87110
(505) 889-4040

1.3 Surveyor:

Franklin E. Wilson
NMLS No. 6446
Southwest Surveying Co., Inc.
333 Lomas Boulevard, N.E.
Albuquerque, New Mexico 87102
(505) 247-4444

1.4 Benchmark:

ACS "6-J10," 3-1/4" aluminum cap in the center median of I-40. 0.81 miles west of Coors Blvd. Elevation 5117.13, SLD 1929.

1.5 Temporary Benchmark:

Northwest bonnet bolt on fire hydrant along the north curb of Iliff Road, N.W. Elevation 5122.65.

1.6 Zoning:

RD (15 Dwelling Units/Acre maximum)

1.7 Proposed Development:

16 Single Family Residential Lots.

1.8 Land Area:

Total land area of the development parcel is 1.9825 acres. The proposed vacation of a portion (i.e., 20 feet) of the 68th Street right-of-way will increase the total land area of the development parcel to 2.1388 acres.

1.9 Flood Hazard:

Tract 271 is located in Flood Hazard Zone X (i.e., areas determined to be outside 500-year floodplain) designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel Map No. 35001C0327 D (September 20, 1996). The southeastern corner of Tract 271 was removed from the Special Flood Hazard Area (SFHA) designated on FEMA's Community-Panel No. 350002 0021 C (October 14, 1983) by a Letter of Map Revision (LOMR). The LOMR was issued by FEMA on August 31, 1994.

1.10 Location and Description:

The proposed site is currently undeveloped and undisturbed. Existing ground cover at the site is comprised of sage and native grasses. The proposed site is bounded on the north by Iliff Road, NW; on the south by a drainage easement (i.e., width ≈ 99 feet); on the west by an existing residential development (i.e., Chamisa Pointe, Unit 2); and on the east by the 68th Street right-of-way (and vacant land reserved for future development of the East Atrisco Park). The West Bluff Outfall, Phase II Storm Interceptor (West Bluff Interceptor) will be constructed in the drainage easement along the Interstate 40 (I-40) right-of-way (to the south of the Candlewood Subdivision).

2.0 Hydrologic Analysis

2.1 Existing Conditions:

Off-site runoff to the west (within the Chamisa Pointe Subdivision) is intercepted and conveyed to retention ponds along the I-40 right-of-way. Off-site runoff to the north (from the Susie Rayos Marmon Elementary School and the Toratolla Acres and Aldea Solana residential subdivisions) is intercepted by 68th Street and Iliff Road. These flows are conveyed to the intersection of 68th Street and Iliff Road. An asphalt-lined channel and a 48-inch storm drain intercept and convey these flows southward (within the 68th Street right-of-way) to a retention pond adjacent to the I-40 right-of-way.

Tract 271 slopes from west to east at a gradient of about 1 percent. On-site runoff from Tract 271 occurs as overland flow. On-site runoff is intercepted by the asphalt-lined channel (within the 68th Street right-of-way) and conveyed to the retention pond adjacent to I-40 right-of-way.

2.2 Site Hydrology (Existing Conditions):

The site hydrology calculations presented herein are based on the methods and criteria presented within the City of Albuquerque, Development Process Manual (DPM) - Volume 2, Section 22.2 - Hydrology, January, 1993. The proposed subdivision is located in Precipitation Zone 1 (west of the Rio Grande). The total runoff volume and peak discharge from undeveloped Tract 271 are computed as follows:

LAND [1] TREATMENT CLASSIFICATION	AREA, acres	EXCESS [2] PRECIPITATION, inches	PEAK [3] DISCHARGE, $ft^3/sec\text{-}acre$
A	2.14	0.44	1.29

Footnotes: (1) **DPM**, Table A-4. Land Treatments.
(2) **DPM**, Table A-8. Excess Precipitation, E.
(3) **DPM**, Table A-9. Peak Discharge.

Total Volume of Runoff

V_{360} = 0.44 in x 2.14 acres x 1 ft/12 in

= 0.08 acre-ft x 43,560 ft^2/acre

= 3,418.01 ft^3

Peak Discharge

Total Q_P = 1.29 ft^3/sec-acre x 2.14 acres

= 2.76 ft^3/sec

2.3 Proposed Improvements:

On-site "Fully Developed" runoff from the roofs, side yards, front yards, and backyards of Lots 8 through 14 will be discharged to Kenwood Court, N.W. On-site "Fully Developed" runoff from the roofs, side yards, and front yards of Lots 3 through 7 will also be discharged to Kenwood Court. These flows will be intercepted by a storm inlet located in Kenwood Court. A storm drain will convey these flows to an interim storm water retention pond to be constructed in the drainage easement along the I-40 right-of-way. The retention pond will be eliminated and the Kenwood Court storm drain will be extended on completion of the West Bluff Interceptor.

On-site "Fully Developed" runoff from the backyards of Lots 1 through 7 will be directly discharged to the asphalt-lined channel (within the 68th Street right-of-way) and conveyed to the existing retention pond adjacent to I-40 right-of-way.

On-site "Fully Developed" runoff from Lots 15 and 16 will be discharged to Kenwood Court and conveyed to Iliff Road. On-site "Fully Developed" runoff from the roofs, side yards, and front yards of Lots 1 and 2 will also be discharged to Kenwood Court and conveyed to Iliff Road. A water block in Kenwood Court will prevent entry of off-site runoff from Iliff Road.

2.4 Site Hydrology (Proposed Improvements):

2.4.1 Runoff from Lots 3 - 7 and Lots 8 - 14:

The total runoff volume and peak discharge to Kenwood Court, from Lots 3 through 7 and Lots 8 through 14, are computed as follows:

LAND TREATMENT CLASSIFICATION	AREA, acres	EXCESS PRECIPITATION, inches	PEAK DISCHARGE, ft^3/sec-acre
A	0.00	0.44	1.29
B	0.40	0.67	2.03
C	0.19	0.99	2.87
D	0.95	1.97	4.37

Total Volume of Runoff

Weighted E = ((0.40 x 0.67) + (0.19 x 0.99) + (0.95 x 1.97))/1.54

= 1.51 in

V_{360} = 1.51 in x 1.54 acres x 1 ft/12 in

= 0.19 acre-ft x 43,560 ft^2/acre

= 8,441.2 ft^3

Peak Discharge

Total Q_P = (2.03 x 0.40) + (2.87 x 0.19) + (4.37 x 0.95)

= 5.51 ft^3/sec

Existing grades within the drainage easement and along the I-40 right-of-way preclude discharge of storm flow in excess of the runoff volume from the 100-year 6-hour event via an at grade, emergency spillway; hence, the interim retention pond has been designed to accept the total runoff volume from the 10-day event (about 13,510 ft^3).

Interim retention pond design calculations are presented in Appendix A.

2.4.2 Backyard Runoff from Lots 1 through 7:

The total runoff volume and peak discharge to the asphalt-lined channel, from the backyards of Lots 1 through 7, are computed as follows:

LAND TREATMENT CLASSIFICATION	AREA, acres	EXCESS PRECIPITATION, inches	PEAK DISCHARGE, ft^3/sec-acre
B	0.12	0.67	2.03

Total Volume of Runoff

V_{360} = 0.67 in x 0.12 acres x 1 ft/12 in

= 0.01 acre-ft x 43,560 ft^2/acre

= 291.85 ft^3

Peak Discharge

Total Q_P = 2.03 ft^3/sec-acre x 0.12 acres

= 0.24 ft^3/sec

2.4.3 Runoff from Lots 1, 2, 14, and 15 and Kenwood Court:

The total runoff volume and peak discharge to Iliff Road, from Lots 1, 2, 15, and 16 and Kenwood Court, are computed as follows:

LAND TREATMENT CLASSIFICATION	AREA, acres	EXCESS PRECIPITATION, inches	PEAK DISCHARGE, $ft^3/sec\text{-}acre$
A	0.00	0.44	1.29
B	0.12	0.67	2.03
C	0.06	0.99	2.87
D	0.30	1.97	4.37

Total Volume of Runoff

Weighted E = ((0.12 x 0.67) + (0.06 x 0.99) + (0.30 x 1.97))/0.48

= 1.52 in

V_{360} = 1.52 in x 0.48 acre x 1 ft/12 in

= 0.06 acre-ft x 43,560 ft^2/acre

= 2,648.5 ft^3

Peak Discharge

Total Q_p = (2.03 x 0.12) + (2.87 x 0.06) + (4.37 x 0.30)

= 1.73 ft^3/sec

2.5 Site Hydrology (Storm Inlet Analyses):

2.5.1 Kenwood Court Street Flow Capacity:

The proposed width of Kenwood Court is 26 feet wide from face of curb to face of curb. City of Albuquerque DPM Plates 22.3, D-1 through D-4 are applicable for streets ranging from 32 to 70 feet wide. Therefore, the flow carrying capacity of Kenwood Court was derived with the U.S. Army Corps of Engineers HEC-RAS Water Surface Profiles computer model. Output from the HEC-RAS analysis is included in Appendix B.

The results derived from the HEC-RAS analysis are:

$Q = 5.51$ ft^3/sec
$S = 0.50$ %, $D = 0.31$ ft
$V = 1.98$ ft/sec
Subcritical Flow

2.5.2 Storm Inlet Capacities:

The grating and inlet capacities for the Kenwood Court storm inlet were derived with the HY12 hydraulics microcomputer program. This program automates the design methods described in the U.S. Department of Transportation, Federal Highway Administration, Hydraulic Engineering Circular No. 12 (HEC-12) "Drainage of Highway Pavements." Output from the HY12 analysis is included in Appendix C.

One double Type 'A' storm inlet is proposed for Kenwood Court. The double Type 'A' storm inlet will be located in the Kenwood Court cul de sac. This inlet will operate as a “sag’ inlet.

The results derived from the HY12 analysis are:

Kenwood Court cul de sac ($S = 0.00$ %, $D = 0.59$ ft)

Q_i = 15.11 ft^3/sec x 1 double Type 'A' storm inlet

= 15.11 ft^3/sec > 5.51 ft^3/sec

where: Q_i = Flow Intercepted, ft^3/sec

The storm drain outfall to the interim storm water retention pond will be an 18" diameter RCP.

If the storm inlet becomes blocked, the peak discharge from the 100-year storm will be safely conveyed to the retention pond via the overflow easement at the end of the cul de sac. Training walls constructed along the sides of the overflow easement will prevent the spread of such storm flows onto adjacent properties.

The retention pond will be eliminated and the Kenwood Court storm drain will be extended on completion of the West Bluff Interceptor.

3.0 References

City of Albuquerque, Development Process Manual - Volume 2, Section 22.2 - Hydrology, January, 1993.

City of Albuquerque, Standard Specifications for Public Works Construction, June 1, 1995.

Richards, Dennis L., Simons, Li & Associates, July 1988, Hydraulics Microcomputer Program HY12 - Drainage of Highway Pavements.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, April 1996, HEC-RAS River Analysis System, Version 1.2.

U.S. Department of Transportation, Federal Highway Administration, 1984, Hydraulic Engineering Circular (HEC) No. 12 - Drainage of Highway Pavements.

Appendix A

Interim Storm Water Retention Pond

Design Calculations

Interim Storm Water Retention Pond
Design Calculations

Design Assumptions and Criteria:

The total runoff volume (i.e., V_{360}) to Kenwood Court is about 8,441 ft^3. Existing grades within the drainage easement and along the I-40 right-of-way (i.e., 5,109 to 5111 MSL) preclude discharge of storm flow in excess of the runoff volume from the 100-year 6-hour event via an at grade, emergency spillway. Hence, the interim retention pond must accept the runoff volume from the 10-day event. The total runoff volume from the 10-day event is computed as follows:

$V_{10\ days} = V_{360} + [A_D \times (P_{10\ days} - P_{360}) \times 1\ ft/12\ in \times 43{,}560\ ft^2/acre]$

$= 8{,}441\ ft^3 + [0.95\ acre \times (3.67 - 2.20)\ in \times 1\ ft/12\ in \times 43{,}560\ ft^2/acre]$

$= 13{,}510\ ft^3$

The proposed invert dimensions for the pond are 16 ft x 16 ft. The pond will be 8.0 feet deep (at capacity) and will have 3:1 side slopes. The proposed top of grate elevation for the last storm inlet in Kenwood Court is 5,106.13 ft MSL; hence, the pond invert will be at 5,098.13 ft MSL. The volume of the proposed pond is computed as follows:

Pond Volume (Frustum of Inverted Pyramid):

$$V = 1/3H\ (B_1 + B_2 + ((B_1 \times B_2)^{0.5}))$$

where: V = volume, ft^3

H = height above pond invert, 8.0 ft

B_1 = upper surface area, 4,096.0 ft^2

B_2 = lower surface area, 256.0 ft^2

Solving for V:

$$V = 1/3H\ (B_1 + B_2 + ((B_1 \times B_2)^{0.5}))$$

$= 14{,}336\ ft^3 > 13{,}510\ ft^3$

The pond will have total depth of about 12 ft due to the existing grades within the drainage easement. The pond will be surrounded by a chain link fence (height = 6 feet) to preclude unauthorized entry.

HEC-RAS Plan: Plan 01 Reach: Kenwood Dr.

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
340	5.51	5107.88	5108.23		5108.26	0.004137	1.56	3.54	25.98	0.74
280.*	5.51	5107.58	5107.91		5107.96	0.006395	1.84	3.00	23.76	0.91
220.*	5.51	5107.28	5107.63		5107.67	0.003709	1.50	3.66	26.11	0.71
160	5.51	5106.98	5107.30	5107.30	5107.36	0.007760	1.98	2.79	22.90	1.00

HEC-RAS Plan: Plan 01 Reach: Kenwood Dr. Riv Sta: 340 Profile: 1

W.S. Elev (ft)	5108.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.016	
E.G. Elev (ft)	5108.26	Reach Len. (ft)	60.00	60.00	60.00
E.G. Slope (ft/ft)	0.004137	Flow Area (sq ft)		3.54	
Q Total (cfs)	5.51	Flow (cfs)		5.51	
Top Width (ft)	25.98	Top Width (ft)		25.98	
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)		1.56	
Max Chl Dpth (ft)	0.34	Hydr. Depth (ft)		0.14	
Crit W.S. (ft)		Wetted Per. (ft)		26.57	
Conv. Total (cfs)	85.7	Conv. (cfs)		85.7	

HEC-RAS Plan: Plan 01 Reach: Kenwood Dr. Riv Sta: 280.* Profile: 1

W.S. Elev (ft)	5107.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.016	
E.G. Elev (ft)	5107.96	Reach Len. (ft)	60.00	60.00	60.00
E.G. Slope (ft/ft)	0.006395	Flow Area (sq ft)		3.00	
Q Total (cfs)	5.51	Flow (cfs)		5.51	
Top Width (ft)	23.76	Top Width (ft)		23.76	
Vel Total (ft/s)	1.84	Avg. Vel. (ft/s)		1.84	
Max Chl Dpth (ft)	0.33	Hydr. Depth (ft)		0.13	
Crit W.S. (ft)		Wetted Per. (ft)		24.33	
Conv. Total (cfs)	68.9	Conv. (cfs)		68.9	

HEC-RAS Plan: Plan 01 Reach: Kenwood Dr. Riv Sta: 220.* Profile: 1

W.S. Elev (ft)	5107.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.016	
E.G. Elev (ft)	5107.67	Reach Len. (ft)	60.00	60.00	60.00
E.G. Slope (ft/ft)	0.003709	Flow Area (sq ft)		3.66	
Q Total (cfs)	5.51	Flow (cfs)		5.51	
Top Width (ft)	26.11	Top Width (ft)		26.11	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	0.35	Hydr. Depth (ft)		0.14	
Crit W.S. (ft)		Wetted Per. (ft)		26.73	
Conv. Total (cfs)	90.5	Conv. (cfs)		90.5	

HEC-RAS Plan: Plan 01 Reach: Kenwood Dr. Riv Sta: 160 Profile: 1

W.S. Elev (ft)	5107.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	5107.36	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.007760	Flow Area (sq ft)		2.79	
Q Total (cfs)	5.51	Flow (cfs)		5.51	
Top Width (ft)	22.90	Top Width (ft)		22.90	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	0.31	Hydr. Depth (ft)		0.12	
Crit W.S. (ft)	5107.30	Wetted Per. (ft)		23.43	
Conv. Total (cfs)	62.6	Conv. (cfs)		62.6	