Table of Contents

File SPR-1995-230
Date 10/28/99

Present	Scanned	A few items are denoted with an asterisk (*), which means they are to be scanned for permanent record on the ISYS retrieval system. In some instances, not all entries designated to be scanned, are present in the file. There are also documents specific to certain files, not found on the standard list. For this reason, a checklist has been included. Remaining items, (not selected for scanning), will be marked present on the checklist. This index can serve as a quick guide for the contents of each file. Files denoted with (**) are to be located using the ISYS Query System. Planning Clearance will need to be typed in full, as well as other entries such as Ordinances, Resolutions, Board of Appeals, and etc.
X	X	***Summary Sheet – Table of Contents**
X	X	Application form
X		Receipts for fees paid for anything
X	X	***Submittal checklist**
X	X	***General project report**
		Reduced copy of final plans or drawings
		Reduction of assessor's map
		Evidence of title, deeds
		***Mailing list**
		Public notice cards
		Record of certified mail
		Legal description
		Appraisal of raw land
		Reduction of any maps – final copy
		***Final reports for drainage and soils (geotechnical reports)**
		Other bound or nonbound reports
		Traffic studies
X		Individual review comments from agencies
X	X	***Consolidated review comments list**
		***Petitioner's response to comments**
X	X	***Staff Reports**
		***Planning Commission staff report and exhibits**
		***City Council staff report and exhibits**
		***Summary sheet of final conditions**
		***Letters and correspondence dated after the date of final approval (pertaining to change in conditions or expiration date)**

DOCUMENTS SPECIFIC TO THIS DEVELOPMENT FILE:

X	X	Letter from Michael Drollinger to Steve McCallum – 2/26/96			
X		Memo from Michael Drollinger to Dev. Eng., Utility Eng., Fire Dept., Drainage District, CDOT, Police Dept. – 2/7/96			
X	X	Drainage Plan – 1/28/96, 11/22/95			
X	X	Planning Clearance - ** NOT PROCESSED - UNSIGNED			
X	X	Site Plan			
X		Landscape/Light Plan Map			
X		Building Elevation Map			
X		Drainage Plan			

SUBMITTAL CHECKLIST

SITE PLAN REVIEW

Location: *2523 HW 6 & 50* Project Name: *Hanson Equipment Expancion*

recpt 3316

11 agency's

ITEMS: DESCRIPTION	SSID REFERENCE	● City Community Development	● City Dev. Eng.	● City Utility Eng.	● City Property Agent	● ~~City Parks/Recreation~~	● City Fire Department	● City Attorney	○ City Downtown Dev. Auth.	○ County Planning	● County Bldg. Dept.	● Irrigation District *G.V.*	● Drainage District *G.J.*	○ Water District	○ Sewer District	○ U.S. West	○ Public Service	○ GVRP	● CDOT	○ Corps of Engineers	○ Walker Field	● *City Police Dept.*	TOTAL REQ'D.
● Application Fee *$195.00*	VII-1	1																					
● Submittal Checklist*	VII-3	1																					
● Review Agency Cover Sheet*	VII-3	1	1	1	1	X	1	1			1	1	1						1			/	
● Planning Clearance*	VII-3	1																					
● 11"x17" Reduction of Assessor's Map	VII-1	1	1	1	1	X	1	1			1	1	1						1			/	
~~● Evidence of Title~~	VII-2	X			X			X															
○ Appraisal of Raw Land	VII-1	1			1	X																	
○ Deeds	VII-1	1			1			1															
● Easements *- copy of easement*	VII-2	1	1	1	1			1															
○ Avigation Easement	VII-1	1			1			1															
○ ROW	VII-3	1	1	1	1			1															
○ Improvements Agreement/Guarantee	VII-2	1	1	1				1															
○ CDOT Access Permit	VII-3	1	1																				
○ Industrial Pretreatment Sign-off	~~VII-4~~	1		1																			
● General Project Report	X-7	1	1	1	1	X	1	1	1	[illegible]	[illegible]	1	1	1	1	1	1	1	1	1	1	/	
● Elevation Drawing	IX-13	1	1																				
● Site Plan	IX-29	2	2	1	1	X	/	/	/	[illegible]	[illegible]	/	/	/	/	/	/	/	/	/	/	/	
○ 11"x17" Reduction of Site Plan	IX-29					X	1	1	1	[illegible]	[illegible]	1	1	1	1	1	1	1	1	1	1	/	
● Grading and Drainage Plan	IX-16	1	2										1							1			
○ Storm Drainage Plan and Profile	IX-30	1	2										1			1	1	1					
○ Water and Sewer Plan and Profile	IX-34	1	2	1			1							1	1	1	1	1					
○ Roadway Plan and Profile	IX-28	1	2										1										
○ Road Cross-Sections	IX-27	1	2																				
○ Detail Sheet	IX-12	1	2																				
● Landscape Plan	IX-20	2	1	1																			
○ Geotechnical Report	X-8	1	1								1												
● Final Drainage Report	X-5,6	1	2										1										
○ Stormwater Management Plan	X-14	1	2										1							1			
○ Phase I and II Environmental Report	X-10,11	1	1																				
○ Traffic Impact Study	X-15	1	2																1				

NOTES:
1) An asterisk in the item description column indicates that a form is supplied by the City.
2) Required submittal items and distribution are indicated by filled in circles, some of which may be filled in during the pre-application conference. Additional items or copies may be subsequently requested in the review process.
3) Each submitted item must be labeled, named, or otherwise identified as described above in the description column.

DEVELOPMENT APPLICATION

Community Development Department
250 North 5th Street Grand Junction, CO 81501
(303) 244-1430

Receipt _____
Date _____
Rec'd By _____
File No. SPR-95-230

We, the undersigned, being the owners of property situated in Mesa County, State of Colorado, as described herein do hereby petition this:

PETITION	PHASE	SIZE	LOCATION	ZONE	LAND USE
[ ] Subdivision Plat/Plan	[ ] Minor [ ] Major [ ] Resub				
[ ] Rezone				From: To:	
[X] ~~Planned Development~~ Site Plan Review	[ ] ODP [ ] Prelim [X] Final	7,000 s.f. addition	2523 Hwy 6 & 50	C-2	Commercial
[ ] Conditional Use					
[ ] Zone of Annex					
[ ] Text Amendment					
[ ] Special Use					
[ ] Vacation					[ ] Rignt-of-Way [ ] Easement

[X] PROPERTY OWNER	[X] DEVELOPER	[X] REPRESENTATIVE
Bob Hanson	Bob Hanson	TPI / STEVE McCallum
Name	Name	Name
2523 Hwy 6 & 50		552 25 Road
Address	Address	Address
Grand Jct. Co		Grand Jct., CO
City/State/Zip	City/State/Zip	City/State/Zip
243-7771		243-4642
Business Phone No.	Business Phone No.	Business Phone No.

NOTE: Legal property owner is owner of record on date of submittal.

We hereby acknowledge that we have familiarized ourselves with the rules and regulations with respect to the preparation of this submittal, that th foregoing information is true and complete to the best of our knowledge, and that we assume the responsibility to monitor the status of the applicatic and the review comments. We recognize that we or our representative(s) must be present at all hearings. In the event that the petitioner is nc represented, the item will be dropped from the agenda, and an additional fee charged to cover rescheduling expenses before it can again be place on the agenda.

X Stephen McCallum — 12-21-95
Signature of Person Completing Application — Date

X Bob Hanson — 12-21-95

Signature of Property Owner(s) - Attach Additional Sheets if Necessary

GENERAL PROJECT REPORT

Project Location: 2523 Hwy 6 & 50
Grand Junction, CO 81505

Project Name: Hanson Equipment expansion

Hanson Equipment is located at 2523 Hwy 6 & 50. The location presently occupies 7.71 acres. The proposed use of the building expansion will continue to be a sales and service facility.

The general public will benefit from expanded services as well as additional preventative care and maintenance services for the Heavy Trucking Industry by reducing major repairs that have been brought about through a lack of regular service.

The project is located in an area which is presently in compliance and compatible with surrounding uses. Land adjoining to the East is presently utilized for the sale of Mobile Homes. To the West is vacant land, which is agricultural. The property is boarded on the North by Highway 6 & 50.

Site access and traffic patterns will remain the same.

All utilities are presently on site, with the new 8" fire line on the North property line installed by Ute Water and the City of Grand Junction. Fire hydrant locations are indicated on the site plan.

The effects on Public Facilities will remain unchanged and there will be little, if any, impact on site geology.

Hours of operation:

8:00 am	5:30 pm	Sales
8:00 am	7:00 pm	Parts
8:00 am	10:00 pm	Service
8:00 am	4:30 pm	Saturday

No additional signs are planned at the present time. The construction schedule will be 90 days from start date to completion of project.

REVIEW COMMENTS

FILE #SPR-95-230 **TITLE HEADING:** Site Plan Review - Hanson Equipment 7,000 s.f. Expansion

LOCATION: 2523 Highway 6 & 50

PETITIONER: Bob Hanson

PETITIONER'S ADDRESS/TELEPHONE: 2523 Highway 6 & 50
Grand Junction, CO 81505
243-7771

PETITIONER'S REPRESENTATIVE: Steve McCallum

STAFF REPRESENTATIVE: Michael Drollinger

NOTE: WRITTEN RESPONSE (4 COPIES) BY THE PETITIONER TO THE REVIEW COMMENTS IS REQUIRED. A PLANNING CLEARANCE WILL NOT BE ISSUED UNTIL ALL ISSUES HAVE BEEN RESOLVED.

MESA COUNTY BUILDING DEPARTMENT **12/29/95**
Bob Lee **244-1656**

We need 2 sets of sealed plans for plan review. Building may need to be fitted with fire-sprinklers. An area separation wall may be required between new and existing building. Plans submitted for review must show new and existing buildings.

CITY UTILITY ENGINEER **1/5/96**
Trent Prall **244-1591**

Please contact Utility Billing at 244-1580 for information regarding potential changes in Sewer Plant Investment Fees.

COMMUNITY DEVELOPMENT DEPARTMENT **1/10/96**
Michael Drollinger **244-1439**

See attached comments.

CITY FIRE DEPARTMENT **1/10/96**
Hank Masterson **244-1414**

1. A fire flow survey is required. Submit complete building plans to the Fire Department for this purpose and for our required plan review. The proposed preventative care and maintenance shop, if classified as an H-4 Occupancy, is required to have a fire sprinkler system. Requirements for on-site hydrants, if any, will be based on results of the fire flow survey.
2. Fire Department access is adequate as shown.

CITY DEVELOPMENT ENGINEER **1/11/96**
Jody Kliska **244-1591**

1. Drainage fee is $632.79 for direct discharge from site.
2. Transportation Capacity Payment for additional sales/service area - $6,720.00.
3. Please provide a deed for the property to determine if any right-of-way exists for Independent Avenue. Dedication of right-of-way will be required along Independent frontage. Independent Avenue is designated on the Multi-Modal Plan as a bike route. Right-of-way requirements for this street will be the commercial street section which is a full right-of-way width of 52'. The City Code allows for credit for right-of-way dedication toward the Transportation Capacity Payment.

LATE COMMENTS

GRAND JUNCTION DRAINAGE DISTRICT **1/12/96**
John Ballagh **242-4343**

The Ligrani Drain is the drainage channel south of the property owned by Hanson Equipment. The land "around" the Ligrani Drain is privately owned, not by the District. The exact location of property lines is not known by the District. The District has no authority to grant one property owner the right to cross another property owner's land. The proposed drainage facilities may need easement from the owner of the land.

The drainage report does not identify the entire basin so the statement i) on page 3 comparing this sit to the overall drainage basin is not factually supported. Statement iii) page 3 is not factually supported with any analysis.

TO DATE, COMMENTS NOT RECEIVED FROM:
City Property Agent
City Attorney
City Police Department
Grand Valley Irrigation
Colorado Department of Transportation

STAFF REVIEW

FILE: SPR-95-230
DATE: January 10, 1996
STAFF: Michael Drollinger
REQUEST: Site Plan Review - Hanson Equipment
LOCATION: 2523 Hwy. 6&50
ZONING: C-2

STAFF COMMENTS:

Site Plan

1. Parking calculations indicate that three new service bays are proposed. The "West Elevation" on the Building Elevation drawing indicates five garage doors. What will the other two garages be used for?

2. Please provide additional information regarding the use of the parts storage area. Will the area be fenced and screened? How frequently will the area be accessed?

3. A minimum six space bicycle rack must be provided based on the number of required parking. Please indicate the number of spaces provided on the Site Plan.

4. The requested documentation regarding the vacation of the irrigation easement was not provided to this office. Please submit the required information for our review.

Landscape Plan

1. Scale of Landscape Plan insufficient to provide proper detail of planting islands. SSID Manual requires the Landscape Plan be at a scale of 1"=10' or 20'. Please provide a detail of the new parking area including planting islands at a larger scale (1"=10' or 20') with dimensions clearly indicated. As a reminder, since the use requires greater than 50 parking spaces, the proposed new parking area must meet the provisions of Section 5-5-1F (Parking Lot Lighting and Landscaping). A Lighting Plan is also required for the new parking area and may be combined with the Landscape Plan.

PLEASE SUBMIT FOUR (4) COPIES OF REVISED, **STAMPED** PLANS WITH YOUR RESPONSE TO COMMENTS.

PLEASE TAKE NOTE OF THE FOLLOWING:

1. ALL SIGNS TO BE ERECTED ON THE SITE WILL REQUIRE A SIGN PERMIT PRIOR TO INSTALLATION OF THE SIGN.

2. SITE IMPROVEMENTS (INCLUDING LANDSCAPING) MUST BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS. ANY MODIFICATIONS MUST BE APPROVED, IN WRITING AND/OR WITH REVISED PLANS, BY THE COMMUNITY DEVELOPMENT DEPARTMENT. FAILURE TO INSTALL SITE IMPROVEMENTS AS PER THE APPROVED PLANS MAY DELAY THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.

3. SITE IMPROVEMENTS (E.G. LANDSCAPING, SIDEWALK, ETC.) NOT COMPLETED PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY MUST BE GUARANTEED.

You are urged to contact the Community Development Department if you require clarification or further explanation of any items.

h:\cityfil\1995\95-2302.wpd

DRAINAGE PLAN

November 22, 1995

HANSON EQUIPMENT
2523 U.S. Highway 6 & 50
Grand Junction, CO 81505

Prepared For:
TPI
552 25 Road #D
Grand Junction, CO 81505

Prepared By:
Cronk Construction Inc.
1129 -24- Road
Grand Junction, CO 81505
970-245-0577

Table of Contents

I. General Location and Description

The Hanson Equipment property is located on a 7.7 acre parcel of land within the City of Grand Junction city limits at 2523 U.S. Highway 6 & 50 (the SW 1/4 of the SW 1/4 of Section 10, Township 1 North, Range 1 West, Mesa County, Colorado). The property is bordered by a vacant lot to the west, a drainage canal to the south, a vacant lot to the east, and U.S. Highway 6 & 50 to the north. The property is not within the 100 year floodplain of the Colorado River or any other drainages.

Existing development on the property includes an office/sales/shop building and an asphalt display lot. The undeveloped portion of the property consists of graveled parking areas and bare ground. The planned development includes an extension of the shop building, a parts storage shed, and additional paved parking areas. Soil at the site is uncultivated SCS type B soil and is classified by the Soil Conservation Service as Green River very fine sandy loam.

II. Existing Drainage Conditions

The site topography and observations from the site inspection indicate that, at present, precipitation from most of the property drains southward to the drainage canal along the southern boundary of the property either via direct flow or through two drainage pipes. The site topography is relatively flat, with surface gradients that vary from approximately 0.003 to 0.007. For purposes of drainage analysis, the property was divided into 5 subbasins because flow routing for each basin is separate (see drainage plan graphic). The surface runoff from subbasin B flows directly to the canal, while the runoff from subbasins A and C are conveyed to the canal by two separate 12-in. diameter stormwater drains. The gradient on the pipes is greater than or equal to 0.5% and the pipes appear to be open and functioning. The pipes discharge into the drainage ditch which continues west and drains into the Colorado River approximately 200 yards downstream. Stormwater runoff from two small subbasins D and E (0.17 acres and 0.13 acres respectively) in the northeastern portion of the property ponds within the respective basins with no off-site drainage. No existing drainage concerns are apparent.

III. Drainage Design Criteria

Drainage design criteria are taken from the *Stormwater Management Manual* (Public Works Department, City of Grand Junction, CO; June 1994). Reference is also made to the Appendices of the *Stormwater Management Manual* for development of several constitutive design parameters. The Rational Method is used to develop Peak runoff estimate (cfs) for both existing and post-development conditions for the 7.4-acre portion of the property that currently drains off site (subbasins A, B, and C). Peak runoff is developed for both the 2 year and 100 year precipitation events for the Mesa County urbanized area. The two small basins, D and E (0.17 acres and 0.13 acres respectively) have not been considered in these calculations because runoff is retained on site and the areas will be unaffected by the proposed development.

Peak runoff flows for four site scenarios are calculated. The four scenarios investigated include both historic and developed peak runoff flow for precipitation event frequencies of 2 years and 100 years. The time of concentration, T_c, worksheet for each of the 4 scenarios investigated is included for reference as Appendix A. The *Rational Method* worksheet used to calculate peak flow runoff for the four scenarios investigated is included for reference as Appendix B.

IV. Drainage Design (developed conditions)

The proposed shop addition, parts storage shed, and parking lot paving will increase the developed area of the site by approximately 0.75 acres (from an existing 1.5 acres to the proposed 2.25 acres). As shown in Appendix B, development will result in an increase in the peak runoff rate of 11% for the 2 yr. precipitation event (from a historic rate of 3.71 cfs to a developed rate of 4.10 cfs) and 08% for the 100 yr. precipitation event (from a historic rate of 13.1 cfs to a developed rate of 14.1 cfs). Approximately 46% of the runoff will drain from subbasin A with 48% draining from subbasin B. The remaining 6% of runoff will drain from subbasin C. Subbasins D and E will remain unaffected by development and not contribute to runoff.

V. Results and Conclusions

Development will result in an increased peak discharge rate of 0.39 cfs (11%) for the 2 year event and 1.0 cfs (08%) for the 100 year event. As based on the minor effects of development on increased drainage flows it is the conclusion of this report the Hanson Equipment be granted an exemption from peak discharge control and be allowed to discharge developed runoff directly to the drainage canal along the properties southern boundary. This conclusion is further substantiated as follows:

i) In light of the small size of the development in comparison to the overall drainage basin of consideration, development will have a minimal impact on the outflow to the Colorado River.

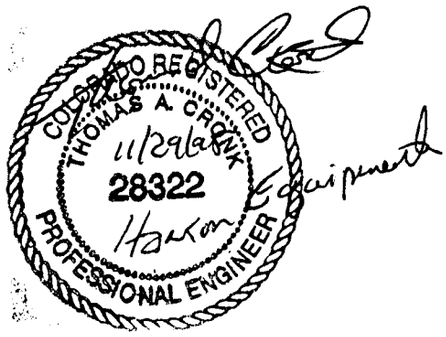
ii) Additionally, the drainage outflow of the property is near the end of the overall drainage basin (approximately 600' to the Colorado River) and peak discharge control may have a detrimental impact on the major drainage course peak discharge and capacity.

iii) Finally, the drainage channel appears to be of more than adequate capacity to carry developed runoff safely to the Colorado River.

VI. Certification

I, Thomas A. Cronk, hereby certify this report was completed by myself or under my direct supervision and has been prepared in accordance with good engineering practices.

Seal



Thomas A. Cronk

Thomas A. Cronk

Date

November 29, 1995.

APPENDIX A

Time of Concentration, T_c, Worksheet

Time of Concentration, T_c, Worksheet

Project: Hanson Equipment
Site Condition: Pre-Development
Prepared by: Tom A. Cronk
Date: November 22, 1995

(The table below is an adaption of a worksheet provided in the SCS TR-55)
This table may be used in subbasin T_c calculations, or for travel time of subbasin runoff through a lower subbasin reach (T_t),
Use only channel flow for T_t calculations

STORM FREQUENCY		2 YEAR	100 YEAR
REACH	AREA IDENTIFIER	None	None
	SEGMENT IDENTIFICATION		
	T_c OR T_t THROUGH BASIN REACH		
OVERLAND FLOW	SURFACE DESCRIPTION (TABLE E-1)	Bare Packed Soil	Bare Packed Soil
	"N" VALUE (TABLE E-1)	0.10	0.10
	FLOW LENGTH, L (TOTAL < 300 FT.) (ft.)	150	150
	LAND SLOPE, S (ft./ft.)	0.005	0.005
	To (min.) (TABLE E-2, OR FIGURE E-1)	23	14
SHALLOW CONCENTRATED FLOW	SURFACE DESCRIPTION (FIGURE E-3)	Nearly Bare and Untilled	Nearly Bare and Untilled
	FLOW LENGTH, L (ft.)	150	150
	FLOW SLOPE, S (ft./ft.)	0.005	0.005
	FLOW VELOCITY, V (FIGURE E-3) (fps)	0.7	0.7
	TRAVEL TIME T_t = L/(60V) (min.)	3.6	3.6
PIPE FLOW	PIPE DIAMETER, d (ft)	1.0	1.0
	CHANNEL SLOPE, S (ft./ft.)	0.005	0.005
	MANNINGS COEFFICIENT, n (APPENDIX F)	0.024	0.024
	$V = 0.59d^{2/3}S^{1/2}/n$ (fps) (Appendix H)	1.74	1.74
	ASSUMED VELOCITY (fps)	1.7	1.7
	FLOW LENGTH, L (ft.)	340	340
	TRAVEL TIME T_a = L/(60V) (min.)	3.3	3.3
T_c	$T_c = T_o + T_t + T_a$ (min.)	30	21

NOTE - Table and all referenced tables, figures, and appendices from Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

Time of concentration calculated for longest flow path in subbasin A, starting in the southwest corner and flowing northeast to the inlet of the 12 inch CMP, thence south to the drainage channel along the south property boundary. The flow lengths used were 150 ft overland flow and 150 ft shallow concentrated flow.

APPENDIX B

RATIONAL METHOD PEAK FLOW RUNOFF FLOW WORKSHEET

Rational Method Peak Flow Runoff Worksheet

Project: HANSON EQUIPMENT
Prepared by: TOM A. CRONK
Date: NOVEMBER 22, 1995

SITE CONDITION: PRE-DEVELOPMENT

BASIN	AREA			RUNOFF COEFFICIENT[1], C	
	SURFACE TYPE	SCS GROUP	ACREAGE, A	C_{02}	C_{100}
All	Traffic area (soil and gravel)	B	3.9	0.64	0.72
	Bare Ground	B	2.0	0.18	0.24
	Pavement/Roof	B	1.5	0.93	0.95

TOTAL ACREAGE, A_T	WEIGHTED RUNOFF COEFFICIENT, C_w		CONCENTRATION TIME[2], T_c (min.)		INTENSITY[3], i (in./hr.)		PEAK RUNOFF $Q=C_wiA_T$ (cfs)	
	C_{02}	C_{100}	T_{C02}	T_{C100}	i_{02}	i_{100}	Q_{02}	Q_{100}
7.4	0.57	0.64	30	21	0.88	2.77	3.71	13.1

[1] - *Rational Method* runoff coefficients taken from Table B-1, Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

[2] - Time of Concentration as derived in attached Appendix A worksheet

[3] - Intensity taken from Table A-1, Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

Subbasins A, B, and C were combined for purposes of these calculations. The ratio of the area of each subbasin to the total area was used to determine the peak runoff from each subbasin discussed in the text.

DRAINAGE PLAN

January 28, 1996

HANSON EQUIPMENT
2523 U.S. Highway 6 & 50
Grand Junction, CO 81505

Prepared For:
Hanson Equipment
2523 U.S. Highway 6 & 50
Grand Junction, CO 81505

Prepared By:
Cronk Construction Inc.
1129 -24- Road
Grand Junction, CO 81505
970-245-0577

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Existing development on the property includes an office/sales/shop building and an asphalt display lot. The undeveloped portion of the property consists of graveled parking areas and bare ground. The planned development includes a new shop building and additional paved parking areas. Soil at the site is uncultivated SCS type B soil and is classified by the Soil Conservation Service as Green River very fine sandy loam.

II. Existing Drainage Conditions

The site topography and observations from the site inspection indicate that, at present, precipitation from most of the property drains southward to the drainage canal along the southern boundary of the property either via direct flow or through two drainage pipes. The site topography is relatively flat, with surface gradients that vary from approximately 0.003 to 0.007. The property was divided into 5 subbasins because flow routing for each basin is separate (Figure 1). The surface runoff from subbasin B flows directly to the canal, while the runoff from subbasins A and C are conveyed to the canal by two separate 12-in. diameter stormwater drains. The gradient on the pipes is greater than or equal to 0.5% and the pipes appear to be open and functioning. The pipes discharge into the drainage ditch which continues west and drains into the Colorado River approximately 200 yards downstream. Stormwater runoff from two small subbasins D and E (0.17 acres and 0.13 acres respectively) in the northeastern portion of the property ponds within the respective basins with no off-site drainage. No existing drainage concerns are apparent.

III. Drainage Design Criteria

Drainage design criteria are taken from the *Stormwater Management Manual* (Public Works Department,

City of Grand Junction, CO; June, 1994). Reference is also made to the Appendices in the *Stormwater Management Manual* for development of several constitutive design parameters. The Rational Method is used to develop Peak runoff estimates (cfs) for both existing and post-development conditions for the 7.4-acre potion of the property that currently drains off site (subbasins A, B, and C). Peak runoff is developed for the 2-year and 100-year precipitation events for the Mesa County urbanized area. The SCS Type II-A hydrograph (HEC-1, Corps of Engineers - U.S. Army) is used to develop the *time of critical storm duration, T_d,* for detention basin storage sizing. The two small basins, D and E (0.17 acres and 0.13 acres) in the northeastern portion of the property on which water ponds and does not drain off site, have not been considered in these calculations because these areas will be unaffected by the proposed development.

Peak runoff flows for four site scenarios are calculated using the *Rational Method.* The four scenarios include peak runoff flow for precipitation event frequencies of 2 years and 100 years for existing conditions and for post-development conditions. The time of concentration, T_c, worksheet for each of the scenarios investigated is included for reference as Appendix A. The *Rational Method* worksheet used to calculate peak flow runoff is included for reference as Appendix B. The SCS Type II-A hydrograph for the area (HEC-1) is used to develop the time of critical storm duration, T_d, as shown in Appendix C. The detention basin sizing worksheet is included for reference as Appendix D.

IV. Drainage Design (developed conditions)

The proposed new shop building and pavement will increase the developed area of the property by approximately 2.17 acres (1.38 acres of new roof/pavement area in subbasin A and 0.79 acres of new gravel traffic area in subbasin B). The required detention volume from the 100 year design storm due to development is approximately 8750 cf. Approximately 64% of the additional flow will drain to subbasin A and 36% will drain to subbasin B. Drainage in subbasin C will be unaffected by the proposed development. Ponding on the two small areas (subbasins D and E) in the northeastern portion of the property will also be unchanged by the proposed development. Surface water drainage from 7.4 acres of the site will still feed to the drainage canal at the southern boundary of the propery, both through direct run-off into the canal and through the existing stormwater drains. As shown on the Grading and Drainage Plan, post-development drainage in subbasin B will be still be discharged directly to the drainage ditch. The post-development drainage in subbasin A will be routed to a detention basin located adjacent to the

existing 12 inch drainage pipe. This basin is sized to contain 100% of the developed runoff or approximately 5300 cf (Appendix D). In accordance with the use of single stage outlet control, the detention basin is sized to detain the excess volumes of stormwater generated from the 100 year storm event under fully developed conditions (Appendix D).

V. Results and Conclusions

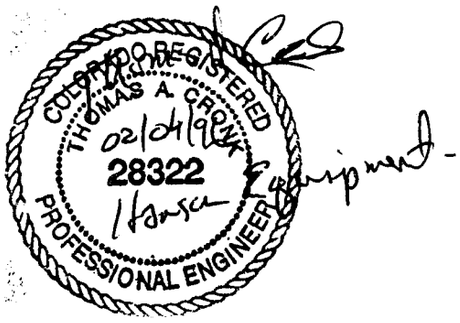
The existing peak-flow runoff from subbasins A, B, and C is estimated at 3.71 cfs (2 year event) and 13.1 cfs (100 year event). The existing drain pipe in subbasin A is undersized for the 100 yr historic event and carries approximately 5.4 cfs. The calculated existing 100 year discharge rate for subbasin A, neglecting the pipe flow, is approximately 7.5 cfs. Thus, ponding near the pipe inlet already provides some detention storage under existing conditions. This detention storage will be enlarged to accomodate the increased runoff from developed conditions. Under developed conditions, the 100 yr precipitation event will result in a maximum storage volume in subbasin A of approximately 5,300 cubic feet (Appendix D). The calculated 100 year discharge rate for subbasin B is approximately 4.7 cfs, compared to the existing 100-year rate of approximately 3.5 cfs. Subbasin C will continue to discharge at existing 100-year rates of near 2 cfs.

This drainage plan will require that Hanson Equipment be granted an exception from peak discharge control for the increased discharge rate from subbasin B into the drainage ditch. This option is justifiable because the outfall of the drainage ditch is within 200 yards of the Colorado River, and the drain appears capable of carrying the flow.

VI. Certification

I, Thomas A. Cronk, hereby certify this report was completed by myself or under my direct supervision and has been prepared in accordance with good engineering practices.

Seal



Thomas A. Cronk

Thomas A. Cronk

Date

February 4, 1996

APPENDIX A

Time of Concentration, T_c, Worksheet

Time of Concentration, T_c, Worksheet

Project: Hanson Equipment
Site Condition: Existing conditions
Prepared by: Tom A. Cronk
Date: January 28, 1996

(The table below is an adaption of a worksheet provided in the SCS TR-55)
This table may be used in subbasin T_c calculations, or for travel time of subbasin runoff through a lower subbasin reach (T_t).
Use only channel flow for T_t calculations

STORM FREQUENCY		2 YEAR	100 YEAR
OVERLAND FLOW	SURFACE DESCRIPTION (TABLE E-1)	Bare packed soil	Bare packed soil
	"N" VALUE (TABLE E-1)	0.10	0.10
	FLOW LENGTH, L (TOTAL < 300 FT.) (ft.)	150	150
	LAND SLOPE, S (ft./ft.)	0.005	0.005
	To (min.) (TABLE E-2, OR FIGURE E-1)	23	14
SHALLOW CONCENTRATED FLOW	SURFACE DESCRIPTION (FIGURE E-3)	Nearly bare and untilled	Nearly bare and untilled
	FLOW LENGTH, L (ft.)	150	150
	FLOW SLOPE, S (ft./ft.)	0.005	0.005
	FLOW VELOCITY, V (FIGURE E-3) (fps)	0.7	0.7
	TRAVEL TIME T_t = L/(60V) (min.)	3.6	3.6
PIPE FLOW	PIPE DIAMETER, d (ft)	1.0	1.0
	CHANNEL SLOPE, S (ft./ft.)	0.005	0.005
	MANNINGS COEFFICIENT, n (APPENDIX F)	0.024	0.024
	$V = 0.59d^{2/3}S^{1/2}/n$ (fps) (APPENDIX H)	1.74	1.74
	ASSUMED VELOCITY (fps)	1.7	1.7
	FLOW LENGTH, L (ft.)	340	340
	TRAVEL TIME T_{ch} = L/(60V) (min.)	3.3	3.3
T_c	$T_c=T_o+T_t+T_{ch}$ (min.)	30	21

NOTE - Table and all referenced tables, figures, and appendices from Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

Time of concentration was calculated for the longest flow path in subbasin A, starting in the southwest corner and flowing northeast to the inlet of the 12 inch CMP, thence through the pipe to the drainage ditch along the south edge of the property. The flow lengths used were 150 ft overland and 150 ft shallow concentrated flow.

Time of Concentration, T_c, Worksheet

Project: Hanson Equipment
Site Condition: Post-development
Prepared by: Tom A. Cronk
Date: January 28, 1996

(The table below is an adaption of a worksheet provided in the SCS TR-55)
This table may be used in subbasin T_c calculations, or for travel time of subbasin runoff through a lower subbasin reach (T_t).
Use only channel flow for T_t calculations

STORM FREQUENCY		2 YEAR		100 YEAR	
OVERLAND FLOW	SURFACE DESCRIPTION (TABLE E-1)	Bare packed soil		Bare packed soil	
	"N" VALUE (TABLE E-1)	0.10		0.10	
	FLOW LENGTH, L (TOTAL < 300 FT.) (ft.)	150		150	
	LAND SLOPE, S (ft./ft.)	0.016		0.016	
	To (min.) (TABLE E-2, OR FIGURE E-1)	15		9	
SHALLOW CONCENTRATED FLOW	SURFACE DESCRIPTION (FIGURE E-3)	Nearly bare and untilled		Nearly bare and untilled	
	FLOW LENGTH, L (ft.)	120		120	
	FLOW SLOPE, S (ft./ft.)	0.005		0.005	
	FLOW VELOCITY, V (FIGURE E-3) (fps)	0.7		0.7	
	TRAVEL TIME $T_t = L/(60V)$ (min.)	2.9		2.9	
CHANNEL FLOW	CHANNEL SEGMENT	CONCRETE V-PAN	GRAVEL V-PAN	CONCRETE V-PAN	GRAVEL V-PAN
	CROSS-SECTIONAL FLOW AREA, a (ft^2)	0.75	0.75	0.75	0.75
	WETTED PERIMETER, Pw (ft)	3.16	3.16	3.16	3.16
	HYDRAULIC RADIUS, r = a/Pw (ft)	0.237	0.237	0.237	0.237
	CHANNEL SLOPE, S (ft./ft.)	0.004	0.004	0.004	0.004
	MANNINGS COEFFICIENT, n (APPENDIX F)	0.015	0.035	0.015	0.035
	$V = 1.49 r^{2/3} S^{1/2}/n$ (fps)	2.40	1.03	2.40	1.03
	ASSUMED VELOCITY (fps)	2.4	1.0	2.4	1.0
	FLOW LENGTH, L (ft.)	30	130	30	130
	TRAVEL TIME $T_{ch} = L/(60V)$ (min.)	0.2	2.2	0.2	2.2
PIPE FLOW	PIPE DIAMETER, d (ft)	1.0		1.0	
	CHANNEL SLOPE, S (ft./ft.)	0.005		0.005	
	MANNINGS COEFFICIENT, n (APPENDIX F)	0.024		0.024	
	$V = 0.59 d^{2/3} S^{1/2}/n$ (fps) (APPENDIX H)	1.74		1.74	
	ASSUMED VELOCITY (fps)	1.7		1.7	
	FLOW LENGTH, L (ft.)	365		365	
	TRAVEL TIME $T_{pi} = L/(60V)$ (min.)	3.6		3.6	
T_c	$T_c = T_t + T_t + T_{ch}$ (min.)	24		18	

NOTE - Table and all referenced tables, figures, and appendices from Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994.

Time of concentration was calculated for the longest flow path in subbasin A, starting in the southwest corner and flowing northeast to the inlet of the 12 inch CMP, thence through the pipe to the drainage ditch along the south edge of the property. The flow lengths used were 150 ft overland, 120 ft shallow concentrated, 30 ft channel flow in a valley pan across the driveway, and 130 ft channel flow in a valley pan across the gravel-lined detention basin to the inlet of the culvert pipe. The valley pans are assumed to be 3 ft across and 0.5 ft deep.

APPENDIX B

RATIONAL METHOD PEAK FLOW RUNOFF WORKSHEET

Rational Method Peak Flow Runoff Worksheet

Project: Hanson Equipment
Prepared by: Tom A. Cronk
Date: January 28, 1996

SITE CONDITION: EXISTING CONDITIONS

BASIN	AREA			RUNOFF COEFFICIENT[1], C	
	SURFACE TYPE	SCS GROUP	ACREAGE, A	C_{52}	C_{100}
All	Traffic area (soil and gravel)	B	3.9	0.64	0.72
	Bare ground	B	2.0	0.18	0.24
	Pavement/Roof	B	1.5	0.93	0.95

TOTAL ACREAGE, A_T	WEIGHTED RUNOFF COEFFICIENT, C_w		CONCENTRATION TIME[2], T_c (min.)		INTENSITY[3], i (in./hr.)		PEAK RUNOFF $Q=C_w i A_T$ (cfs)	
	C_{52}	C_{100}	T_{c52}	T_{c100}	i_{52}	i_{100}	Q_{52}	Q_{100}
7.4	0.57	0.64	30	21	0.88	2.77	3.71	13.1

[1] - *Rational Method* runoff coefficients taken from Table B-1, **Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994**

[2] - Time of Concentration as derived in attached Appendix A worksheet

[3] - Intensity taken from Table A-1, **Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994**

Subbasins A, B, and C were combined for purposes of these calculations, and the ratio of the area of each subbasin to the total area was used to determine the proportion of flow from that basin.

Rational Method Peak Flow Runoff Worksheet

Project: Hansen Equipment
Prepared by: Tom A. Cronk
Date: January 28, 1996

SITE CONDITION: POST-DEVELOPMENT

BASIN	AREA			RUNOFF COEFFICIENT[1], C	
	SURFACE TYPE	SCS GROUP	ACREAGE, A	C_{5}	C_{100}
	Traffic area (soil and gravel)	B	3.31	0.64	0.72
	Bare ground	B	1.21	0.18	0.24
	Pavement/Roof	B	2.88	0.93	0.95

TOTAL ACREAGE, A_T	WEIGHTED RUNOFF COEFFICIENT, C_w		CONCENTRATION TIME[2], T_c (min.)		INTENSITY[3], i (in./hr.)		PEAK RUNOFF $Q=C_w i A_T$ (cfs)	
	C_{5}	C_{100}	T_{c5}	T_{c100}	i_{5}	i_{100}	Q_{5}	Q_{100}
7.4	0.68	0.73	24	18	1.00	2.99	5.03	16.2

[1] - *Rational Method* runoff coefficients taken from Table B-1, Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

[2] - Time of Concentration as derived in attached Appendix A worksheet

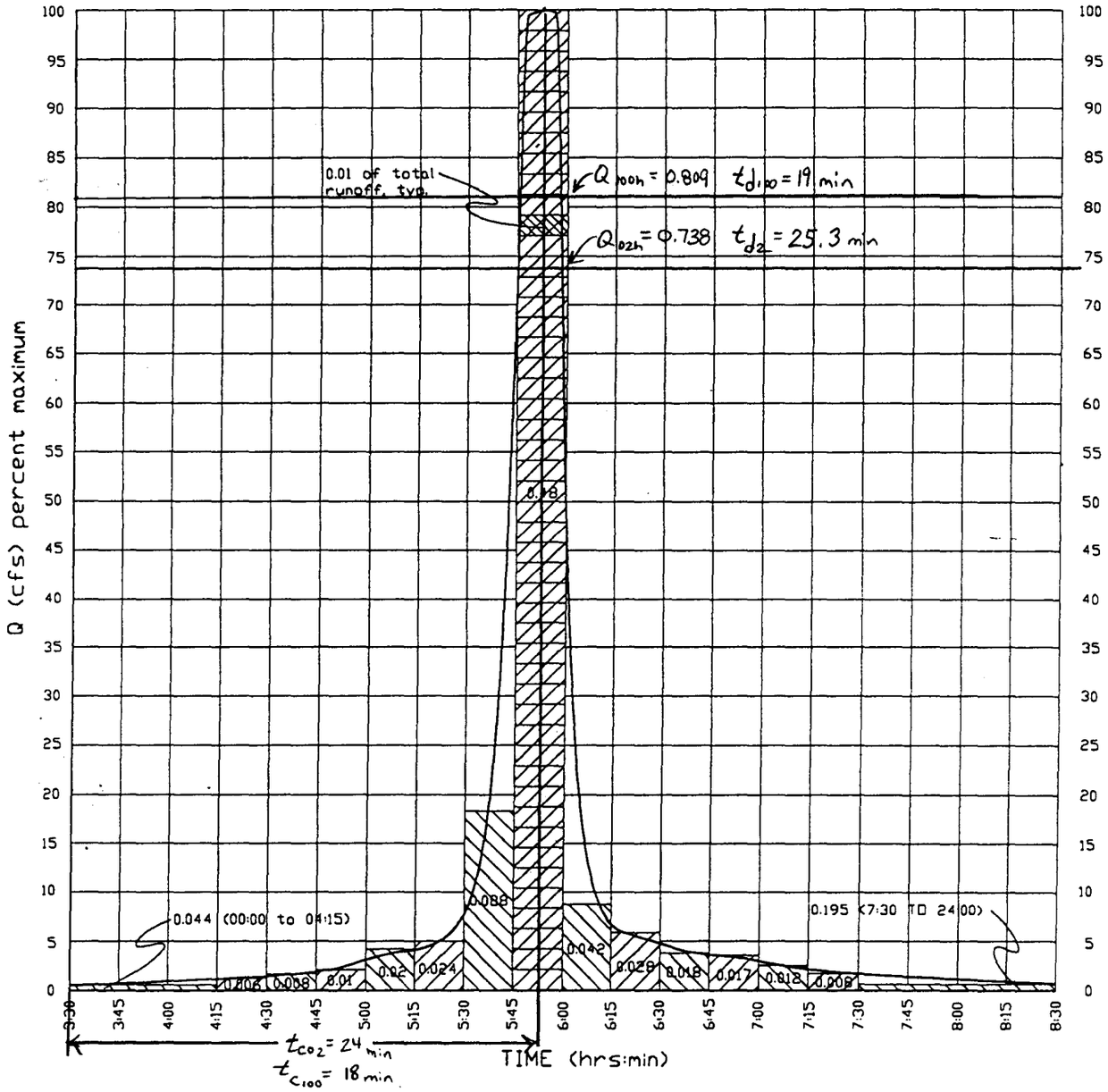
[3] - Intensity taken from Table A-1, Stormwater Management Manual, Public Works Department, City of Grand Junction, June, 1994

Subbasins A, B, and C were combined for purposes of these calculations. Subbasin A is assumed to receive 64% of the increased runoff compared to existing conditions because 64% of the proposed development area lies in subbasin A. Similarly, subbasin B is assumed to receive 36% of the increased runoff compared to existing conditions because 36% of the proposed development area lies in subbasin B.

APPENDIX C
TIME OF CRITICAL DURATION, T_d, WORKSHEET

RUNOFF HISTOGRAPH FOR SCS TYPE IIA 24 HR. EVENT
AND
APPROXIMATE HYDROGRAPH OF RUNOFF DISCHARGE RATE, Q, (cfs)

SCALE: 1/16" = 1% Q
SCALE: 1/16" = 3 min. time



EXAMPLES

Total Runoff Volume (cf) = $\frac{Q_{100d}\ (15\ \text{min.})(60\ \text{sec/min.})}{0.48}$

Required Detention Volumne (ft) = $\left[1.00 - \left(\frac{Q_{design}}{Q_{100d}}\right)\right](0.48)$(total runoff volumne)

Existing Conditions

	Q_2	Total Runoff	Q_{100}	Total Runoff
Pre-devel	3.71	6956	13.1	24563
Post-devel	5.03	9431	16.2	30375
Ratio	0.738		0.809	

APPENDIX D
***MODIFIED RATIONAL METHOD* DETENTION BASIN SIZING WORKSHEET**

MODIFIED RATIONAL METHOD DETENTION BASIN SIZING WORKSHEET

Project: Hanson Equipment
Prepared by: Tom A. Cronk
Date: January 28, 1996

Basin	Site Hydrology								Detention Basin Sizing					
	Site Condition		2 year event			100 year event			2 year event			100 year event		
			C_{24}	T_{c24} (min.)	Q_{24} (cfs)	C_{100d}	T_{c100d} (min.)	Q_{100d} (cfs)	$^1T_{d2}$ (min.)	$^2Q_{r2}$ (cfs)	Storage Volume, $^3V_2$, (ft^3)	T_{d100} ^{1} (min.)	Q_{r100} ^{2} (cfs)	Storage Volume, V_{100} ^{3}, (ft^3)
All	Existing conditions		0.57	30	3.71	0.64	21	13.1						
	Post-development		0.68	24	5.03	0.73	18	16.2	25	3.04	2,666	19	10.7	5,291
	Development Impact	quantity			+1.32			+3.10						
		percent			+36%			+24%						

[1] Time of critical duration, T_d, from Appendix C worksheet

[2] Average rate of discharge, Q_r = 82% of actual discharge, Q_a, taken from Appendix C plus other discharge sources (i.e., lower stage discharge and/or sheetflows)

[3] Storage volume required, V (ft^3), calculated from:

$$V = 60\left[Q_d T_d - Q_r T_d - Q_r T_{cd} + \frac{K Q_r T_{cd}}{2} + \frac{Q_r^2 T_{cd}}{2 Q_d}\right], \text{ where,}$$

K = Ratio of pre- and post-development T_{cd}

FILE

Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(970) 244-1430 FAX (970) 244-1599

February 26, 1996

Steve McCallum
TPI
552 25 Road
Grand Junction CO 81505

Re: Hanson Equipment Expansion (SPR-95-230)

Dear Mr. McCallum,

The review agencies have reviewed the latest plans for the above project dated January 18, 1996 and offer the following comments. For your convenience I have grouped the comments by review agency.

City Development Engineer

1. Total runoff from the development appears to be less than existing conditions. No drainage fee is due; no waiver is required.

2. A deed for Independent Avenue right-of-way is required.

City Utility Engineer

1. Resubmittal OK.

Grand Junction Drainage District (GJDD)

1. The revised plans do not affect or address any GJDD concerns.

Fire Department

1. The new building is classified as an H-4 Occupancy, is greater than 3,000 square feet, and therefore is required to have a complete fire sprinkler system installed. The spray booth will also require an automatic extinguishing system.

2. The fire flow survey, based on a fully sprinklered building, results in a required fire flow of 1,000 gallons per minute. An on-site fire hydrant is required and must be located within 250 feet of required fire department vehicle access. The recommended location of

the hydrant is the 6" curbed island just east of the 34 proposed parking spaces. The minimum fire line size for this hydrant is 8".

3. A complete set of sealed building plans is required to be submitted to the Fire Department for our review and approval. Also, have your fire sprinkler contractor submit complete plans, specifications, and calculations to the Fire Department for our review and approval.

Police Department

1. The lighting plan for the north side of the building appears to work well and so does the proposed fencing, as long as the fence is made of transparent material. My only additional suggestion would be to ensure that the other three sides of the proposed building are also well covered with lights.

Community Development

1. The provisions of Section 5-5-1F2(c)2 regarding paved overhangs in planting islands has not been met. Please revise the landscaping plan to meet this requirement.

All other previous comments have been addressed satisfactorily.

Revised plans are required. Please provide this office with four sets of stamped plans which address the comments in this letter which will be issued with your Planning Clearance.

If you have any questions or require further information please do not hesitate to contact me.

Sincerely yours,

Michael T. Drollinger
Senior Planner

cc: Tom Cronk, Cronk Construction Inc.

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