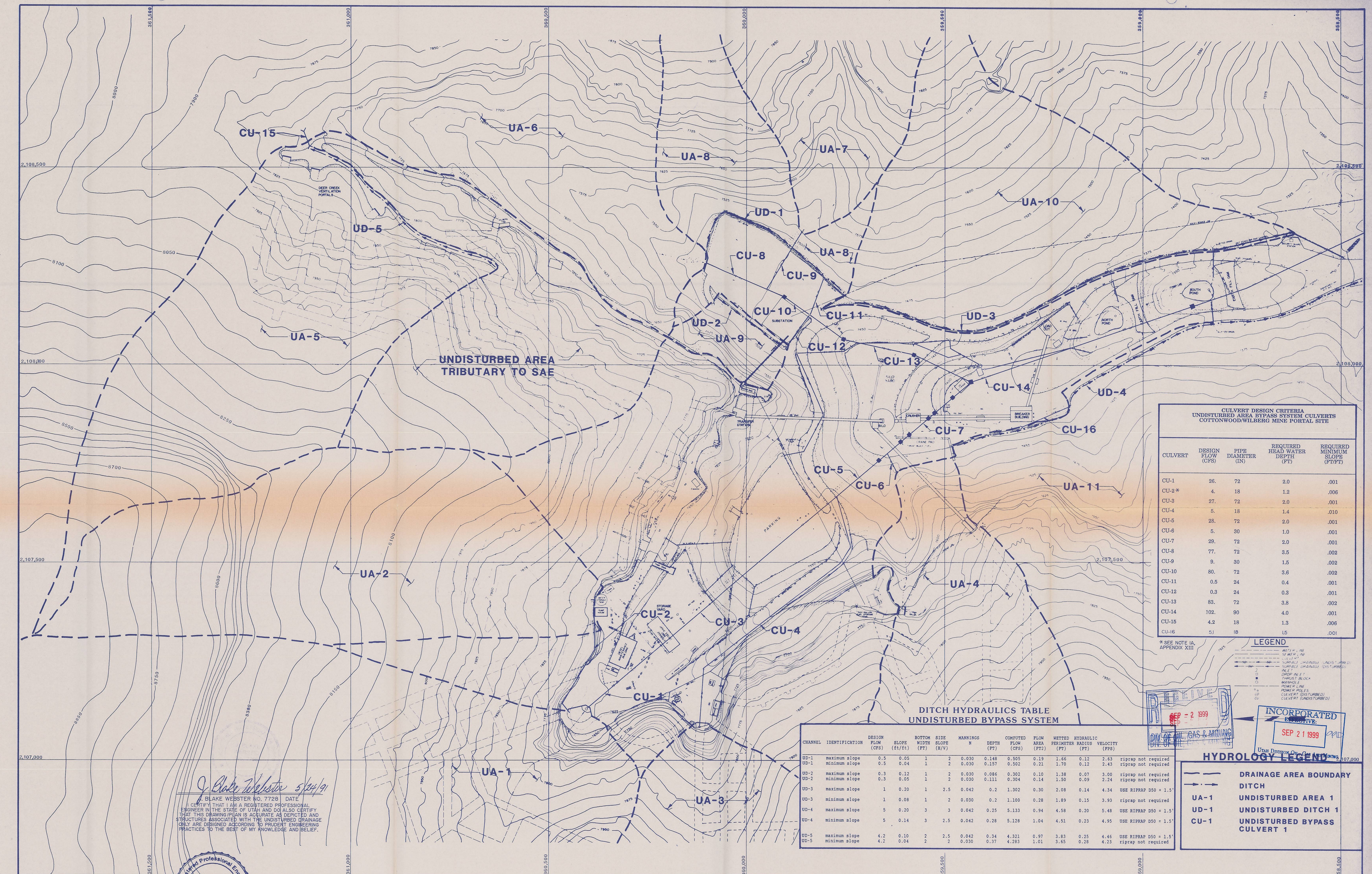

CULVERT DESIGN CRITERIA
UNDISTURBED AREA BYPASS SYSTEM CULVERTS
COTTONWOOD/WILBERG MINE PORTAL SITE

CULVERT	DESIGN FLOW (CFS)	PIPE DIAMETER (IN)	REQUIRED HEAD WATER DEPTH (FT)	REQUIRED MINIMUM SLOPE (FT/FT)
CU-1	26.	72	2.0	.001
CU-2*	4.	18	1.2	.006
CU-3	27.	72	2.0	.001
CU-4	5.	18	1.4	.010
CU-5	28.	72	2.0	.001
CU-6	5.	30	1.0	.001
CU-7	29.	72	2.0	.001
CU-8	77.	72	3.5	.002
CU-9	9.	30	1.5	.002
CU-10	80.	72	3.6	.002
CU-11	0.5	24	0.4	.001
CU-12	0.3	24	0.3	.001
CU-13	83.	72	3.8	.002
CU-14	102.	90	4.0	.001
CU-15	4.2	18	1.3	.006
CU-16	51	18	1.5	.001

* SEE NOTE 1A, APPENDIX XIII

LEGEND

WATER LINE
SEWER LINE
GAS LINE
SURFACE DRAINAGE (INSTALLED)
SURFACE DRAINAGE (DISTURBED)
INLET
DROP INLET
THRUST BLOCK
MANHOLE
POWER LINE
POWER POLES
CULVERT (DISTURBED)
CULVERT (UNDISTURBED)

DITCH HYDRAULICS TABLE
UNDISTURBED BYPASS SYSTEM

CHANNEL	IDENTIFICATION	DESIGN FLOW (CFS)	SLOPE (ft/ft)	BOTTOM WIDTH (FT)	SIDE SLOPE (H/V)	MANNINGS N	DEPTH (FT)	COMPUTED FLOW (CFS)	FLOW AREA (FT2)	WETTED PERIMETER (FT)	HYDRAULIC RADIUS (FT)	VELOCITY (FPS)	
UD-1	maximum slope	0.5	0.05	1	2	0.030	0.148	0.505	0.19	1.66	0.12	2.63	riprap not required
UD-1	minimum slope	0.5	0.04	1	2	0.030	0.157	0.502	0.21	1.70	0.12	2.43	riprap not required
UD-2	maximum slope	0.3	0.12	1	2	0.030	0.086	0.302	0.10	1.38	0.07	3.00	riprap not required
UD-2	minimum slope	0.3	0.05	1	2	0.030	0.111	0.304	0.14	1.50	0.09	2.24	riprap not required
UD-3	maximum slope	1	0.20	1	2.5	0.042	0.2	1.302	0.30	2.08	0.14	4.34	USE RIPRAP D50 = 1.5'
UD-3	minimum slope	1	0.08	1	2	0.030	0.2	1.100	0.28	1.89	0.15	3.93	riprap not required
UD-4	maximum slope	5	0.20	3	3	0.042	0.25	5.133	0.94	4.58	0.20	5.48	USE RIPRAP D50 = 1.5'
UD-4	minimum slope	5	0.14	3	2.5	0.042	0.28	5.128	1.04	4.51	0.23	4.95	USE RIPRAP D50 = 1.5'
UD-5	maximum slope	4.2	0.10	2	2.5	0.042	0.34	4.321	0.97	3.83	0.25	4.46	USE RIPRAP D50 = 1.5'
UD-5	minimum slope	4.2	0.04	2	2	0.030	0.37	4.283	1.01	3.65	0.28	4.23	riprap not required

HYDROLOGY LEGEND

- DRAINAGE AREA BOUNDARY
- DITCH
- UA-1 UNDISTURBED AREA 1
- UD-1 UNDISTURBED DITCH 1
- CU-1 UNDISTURBED BYPASS CULVERT 1

J. Blake Webster 5/24/91
J. BLAKE WEBSTER NO. 7728 DATE
I CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF UTAH AND DO ALSO CERTIFY THAT THIS DRAWING/PLAN IS ACCURATE AS DEPICTED AND STRUCTURES ASSOCIATED WITH THE UNDISTURBED DRAINAGE ONLY ARE DESIGNED ACCORDING TO PRUDENT ENGINEERING PRACTICES TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Registered Professional Engineer No. 6503 GREGORY J. POOLEY State of Utah

RECEIVED SEP - 2 1999 DIV. OF OIL, GAS & MINING

INCORPORATED EFFECTIVE: SEP 21 1999 Utah Division Oil, Gas and Mining

HANSEN ALLEN & LUCE inc
CONSULTANTS ENGINEERS
Salt Lake City Utah

DESIGNED	GJP	3		
DRAFTED	SDM	2		
CHECKED	MEA	1	5-23-91	REVISED TO REFLECT CURRENT UNDISTURBED DRAINAGE
DATE	JUNE, 1989	NO.	DATE	REVISIONS

PROJECT ENGINEER

KJL BY APVD.

SCALE 1" = 100'

VERIFY SCALE 0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

UTAH POWER & LIGHT COMPANY
MINING DIVISION

COTTONWOOD / WILBERG MINE PORTAL
UNDISTURBED AREA RUNOFF CONTROL FACILITIES

SHEET NO. MAP OF 1
5-1-310