



US Army Corps
of Engineers
Alaska District

KENAI BLUFF STABILIZATION

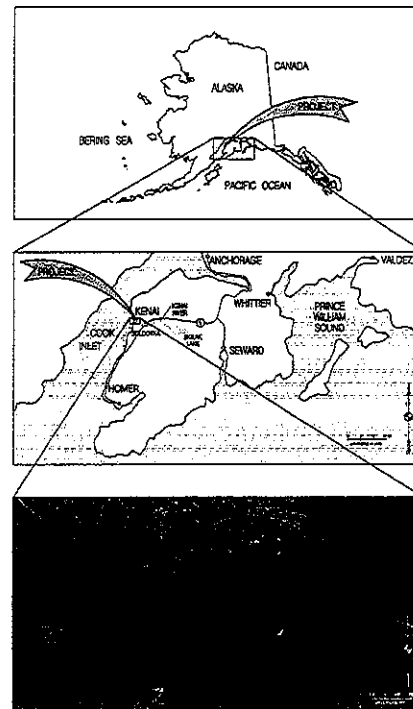
KENAI, ALASKA

PRELIMINARY DESIGN 27MAR09

KENXXX

PN XXXXX

INV. NO. DACW85-03-D-0002





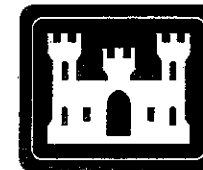
KENAI BLUFF STABILIZATION

KENAI, ALASKA

PRELIMINARY DESIGN - KENXXX/PN xxxxx, 27MAR09

INV. NO. DACW85-03-D-0002

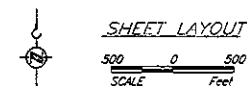
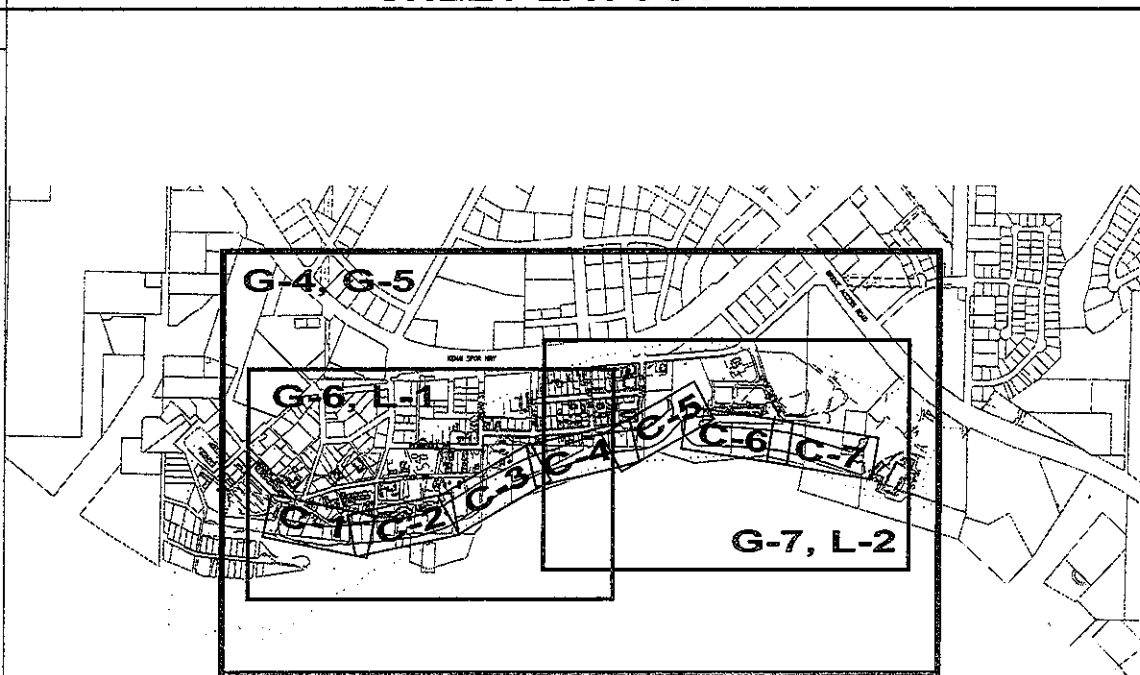
ALASKA DISTRICT U.S. ARMY CORPS OF ENGINEERS



SCHEDULE OF DRAWINGS

SHEET LAYOUT

SHT	REF. NUM.	SHEET TITLE	SHT	REF. NUM.	SHEET TITLE
GENERAL					
1	G-1	COVER, VICINITY, AND LOCATION			
2	G-2	SHEET INDEX			
3	G-3	LEGEND, NOTES, AND ABBREVIATIONS			
4	G-4	SURVEY CONTROL			
5	G-5	REAL ESTATE, ACCESS AND STAGING			
6	G-6	EROSION CONTROL AND WETLANDS I			
7	G-7	EROSION CONTROL AND WETLANDS II			
CIVIL					
8	C-1	PROJECT PLAN AND SITE MAP			
9	C-2	PROJECT PLAN AND SITE MAP			
10	C-3	PROJECT PLAN AND SITE MAP			
11	C-4	PROJECT PLAN AND SITE MAP			
12	C-5	PROJECT PLAN AND SITE MAP			
13	C-6	PROJECT PLAN AND SITE MAP			
14	C-7	PROJECT PLAN AND SITE MAP			
15	C-8	GRADING CROSS SECTIONS I			
16	C-9	GRADING CROSS SECTIONS II			
17	C-10	GRADING CROSS SECTIONS III			
18	C-11	TYPICAL SECTIONS			
19	C-12	ROCK REVETMENT DETAILS			
20	C-13	DRAINAGE DETAILS			
21	C-14	MISCELLANEOUS DETAILS			
LANDSCAPING PLANS					
22	L-1	PLANTING PLAN I			
23	L-2	PLANTING PLAN II			
24	L-3	PLANTING TABLE AND DETAILS			



LEGEND

EXISTING

HV-312
APL-25

ANCHOR

ANTENNA

AUGER POINT

CATCH BASIN

CATCH BASIN MANHOLE

CLEANOUT

COMMUNICATION PED

ELECTRIC METER

ELECTRIC PEDESTAL

FIRE HYDRANT

GUARD POST / BOLLARD

LIGHT POLE

MANHOLE

MONITORING WELL

NATURAL GAS METER

POWER POLE

ROCK / BOULDER

SIGN

SPOT ELEVATION

TREE / BUSH

VENT PIPE

WATER VALVE

BUILDING

CONCRETE

CULVERT

CURB AND GUTTER

EDGE OF GRAVEL / DIRT

EDGE OF PAVEMENT

EDGE OF VEGETATION

FENCE LINE

GUARD RAIL

MAJOR CONTOUR

MINOR CONTOUR

PROPOSED

DESIGN ELEVATION

GRADING LIMITS

MAJOR CONTOUR

MINOR CONTOUR

CENTERLINE

FLOW PATH

GEOTEXTILE

CHAIN LINK FENCE

CUT AREA

DEMOLITION AREA

COMPACTED FILL / PIT-RUN GRAVEL

ARMOR "A" ROCK

SECONDARY "B" ROCK

CORE "C" ROCK

RIPRAP

SECONDARY RIPRAP

CRUSHED ROAD SFC

DISCLAIMER

THESE DOCUMENTS HAVE BEEN PREPARED FOR A SPECIFIC PROJECT AND SHALL NEITHER BE ALTERED NOR REUSED FOR ANY OTHER PURPOSE. ALSO, THESE DOCUMENTS DO NOT REPRESENT AS-BUILT CONDITIONS. IF THESE DOCUMENTS ARE ALTERED INTENTIONALLY OR UNINTENTIONALLY, OR REUSED WITHOUT THE DESIGN ENGINEER'S WRITTEN APPROVAL, IT WILL BE AT THE SOLE RISK AND RESPONSIBILITY OF THE USER. THE ACT OF ALTERING OR REUSING IS CONSTRUED AS INDENIFYING AND HOLDING THE DESIGN ENGINEERING FIRM AND ITS EMPLOYEES HARMLESS FROM ALL CLAIMS, DAMAGES, AND EXPENSES, INCLUDING ATTORNEY FEES, ARISING OUT OF SUCH ACT.

GENERAL NOTES

PROJECT LIMITS

ALL CONSTRUCTION ACTIVITY SHALL BE CONFINED TO THE PROJECT LIMITS (FOOTPRINT) INCLUDING THE STAGING/STOCKPILE AREA. DESIGNATED HAUL ROUTES AND PROJECT FEATURES AS SHOWN ON THE DRAWINGS, DO NOT DISTURB, EXCAVATE OR WORK BEYOND PROJECT LIMITS WITHOUT PERMISSION FROM CONTRACTING OFFICER OR REPRESENTATIVE.

SITE MAPPING

REPRESENTATIONS OF TRUE NORTH SHALL NOT BE USED TO IDENTIFY OR ESTABLISH THE BEARING OF TRUE NORTH AT THE JOB SITE. VERIFICATION OF MAPPING IS THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING AND MAINTAINING REQUIRED DATUM, BENCHMARKS, CONTROL LINES AND LEVELS.

SURVEY STAKING

SURVEY STAKING IS THE RESPONSIBILITY OF THE CONTRACTOR. SURVEY CONTROL POINTS EXISTS ON SITE, BUT SURVEY CONTROL LINES NEED FIELD LAYOUT.

PERMITS

THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS SET FORTH IN ALL PERMITS OBTAINED FOR THIS PROJECT. THE CONTRACTOR IS REQUIRED TO COMPLY WITH ALL CONSTRUCTION RELATED REQUIREMENTS IN EACH PERMIT.

UTILITIES

UTILITY LOCATIONS HAVE NOT BEEN SURVEYED. IT IS THE RESPONSIBILITY OF CONTRACTOR TO PERFORM ALL UTILITY LOCATIONS 48 HOURS PRIOR TO EXCAVATION, CALL (907) 278-3121. IT IS THE RESPONSIBILITY OF CONTRACTOR TO PROTECT ALL EXISTING SEWER, WATER, GAS AND ELECTRIC UTILITIES ENCOUNTERED IN THE WORK. ANY RELOCATION OR IMPROVEMENTS OF UTILITIES SHALL BE ACCURATELY NOTED ON AS-BUILT DRAWINGS AND ISSUED TO THE CONTRACTING OFFICER AT THE COMPLETION OF THE CONSTRUCTION.

TEMPORARY CONSTRUCTION FACILITIES

ALL TEMPORARY UTILITIES AND FACILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. A CONSTRUCTION TRAILER IS NOT REQUIRED. POTABLE WATER AND ELECTRICITY ARE NOT AVAILABLE ON SITE AND SHALL BE PROVIDED BY CONTRACTOR. A CHEMICAL TOILET OF SUITABLE TYPE SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. THE CONTRACTOR IS RESPONSIBLE FOR JOB SITE CONDITIONS AND THE SAFETY OF HUMAN LIFE. DURING THE COURSE OF CONSTRUCTION, THIS REQUIREMENT SHALL APPLY CONTINUOUSLY DURING THE PERIOD OF CONSTRUCTION AND NOT LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL PROVIDE SIGNAGE AND BARRIERS NECESSARY TO PROVIDE SECURITY AND SAFETY TO WORKERS AND THE PUBLIC DURING THE ENTIRETY OF THE CONSTRUCTION PERIOD.

THE CONTRACTOR SHALL KEEP JOB SITE AREA CLEAR, HAZARD FREE AND DISPOSE OF ALL DEBRIS, RUBBISH AND CONSTRUCTION WASTE, AND REMOVE ALL MATERIALS FROM THE SITE. ALL DISTURBED STAGING AND ACCESS AREAS ARE TO BE REHABILITATED TO PRE-CONSTRUCTION CONDITION. THE CONTRACTOR IS RESPONSIBLE FOR RECLAIM (REGRADE AND SEED) CONSTRUCTION FEATURES NOT SPECIFIED AS REMAINING ON THE SITE AND CLEAN UP ALL AREAS AT THE COMPLETION OF THE CONSTRUCTION.

ENVIRONMENTAL PROTECTION

ENVIRONMENTAL PROTECTION IS THE PREVENTION/CONTROL OF POLLUTION AND HABITAT DISRUPTION THAT MAY OCCUR TO THE ENVIRONMENT DURING CONSTRUCTION. THE CONTROL OF ENVIRONMENTAL POLLUTION AND DAMAGE REQUIRES CONSIDERATION OF LAND, WATER, AND AIR; BIOLOGICAL AND CULTURAL RESOURCES; AND INCLUDES MANAGEMENT OF VISUAL AESTHETICS; NOISE; SOLID, CHEMICAL, LIQUID, AND GASEOUS WASTE; RADIANT ENERGY AND RADIOACTIVE MATERIAL AS WELL AS OTHER POLLUTANTS. THE CONTRACTOR SHALL MINIMIZE ENVIRONMENTAL POLLUTION AND DAMAGE THAT MAY OCCUR AS THE RESULT OF CONSTRUCTION OPERATIONS. THE ENVIRONMENTAL RESOURCES WITHIN THE PROJECT BOUNDARIES AND THOSE AFFECTED OUTSIDE THE LIMITS OF PERMANENT WORK SHALL BE PROTECTED DURING THE ENTIRE DURATION OF THIS CONTRACT. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE ENVIRONMENTAL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND UTILIZING BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT STORMWATER RUNOFF AND WATER POLLUTION DURING CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL PROVIDE COR WITH STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR APPROVAL PRIOR TO CONSTRUCTION. THE CONTRACTOR SHOULD USE CAUTION WHEN WORKING IN AND AROUND LOCAL DUMPING AREAS. IF POTENTIAL HAZARDOUS MATERIALS ARE ENCOUNTERED, THE CONTRACTING OFFICE SHOULD BE CONTACTED IMMEDIATELY.

CONSTRUCTION SPOILS AND WASTE HANDLING ALL CONSTRUCTION SPOILS AND WASTE SHALL BE DISPOSED OF AT AN APPROVED DISPOSAL SITE AND/OR LANDFILL FACILITY.

CLEARING AND GRUBBING

EXISTING ON-SITE MATERIALS SHALL BE CAREFULLY REMOVED AND STORED, OR DISPOSED OF, COMPLETELY REMOVE STUMPS, ROOTS, WILLOWS, SHRUBS, WEEDS, AND OTHER DEBRIS PROTRUDING FROM THE GROUND IN AREAS TO BE EXCAVATED. ALL CLEARED AND GRUBBED STUMPS, ROOTS, WILLOWS, SHRUBS, WEEDS, AND LIMBS SHALL BE DISPOSED PER CONSTRUCTION WASTE HANDLING SPECIFICATIONS. TREES DESIGNATED TO BE CLEARED, SHALL BE DISPOSED OF BY THE CONTRACTOR.

SITE EARTHWORK AND GRADING

THE CONTRACTOR IS RESPONSIBLE FOR ALL SITE EARTHWORK AND GRADING ACTIVITIES TO MEET DESIGNS IDENTIFIED IN PLANS AND DETAILS, WHICH ARE INTENDED TO SHOW FINAL RESULT OF DESIGN. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB SITE CONDITIONS AND SHALL BE INCLUDED IN AS-BUILT DRAWINGS PROVIDED TO CONTRACTING OFFICER AT COMPLETION OF CONSTRUCTION. AT THE END OF EACH DAY OF WORK THE CONTRACTOR SHALL MAINTAIN ALL EXPOSED AREAS AS ACCEPTABLE TO COR AND PERMIT REQUIREMENTS.

BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS. ADDITIONAL IMPORTED FILL MATERIAL MAY BE REQUIRED FOR CONSTRUCTION ALONG THE LANDWARD SIDE OF THE ARMORED EMBANKMENT IF THE OPTION IS EXERCISED. ALL MATERIAL SHALL BE FREE FROM ORGANIC MATTER, SILTS, CLAYBALLS AND OTHER DELETERIOUS MATERIALS EXCEPT WHERE EXPLICITLY STATED.

ABBREVIATIONS

AC	ACRE
APPROX	APPROXIMATE
BOB	BASIS OF BEARING
BM	BENCH MARK
BMP	BEST MANAGEMENT PRACTICES
CLR	CLEARANCE
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
CONT	CONTINUE
COR	CONTRACTING OFFICER'S REPRESENTATIVE
DIA	DIAMETER
DET	DETAIL
D/S	DOWNSTREAM
EA	EAST, EASTING
E	EACH
ELEV	ELEVATION
EG	EXISTING GRADE
EXIST	EXISTING
FG	FINISH GRADE
G1	ENTRANCE GRADE
G2	EXIT GRADE
GRND	GROUND
H	HORIZONTAL
HGL	HYDRAULIC GRADE LINE
IE	INVERT ELEVATION
INV	INVERT
LF	LINEAR FOOT
MAX	MAXIMUM
MIN	MINIMUM
N	NORTH, NORTHING
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PERM	PERMANENT
PCL	PRIMARY CONTROL LINE
PC	POINT OF CURVATURE
POC	POINT ON CURVE
POB	POINT OF BEGINNING
POE	POINT OF END
PI	POINT OF INTERSECTION
PRV	PRIVATE
PVI	POINT OF VERTICAL INTERCEPT
PVT	POINT OF TANGENCY
PT	POINT ON TANGENT
POT	POINT ON TANGENT
PUB	PUBLIC
Q	FLOW
R	RADIUS
R/W	RIGHT OF WAY
REINF	REINFORCED
REG	REGULATORY
S	SOUTH
SCL	SECONDARY CONTROL LINE
SF	SQUARE FEET
SS	SANITARY SEWER
SPEC	SPECIFICATION
STA	STATION
SW	SIDEWALK
SY	SQUARE YARD
TBD	TO BE DETERMINED
TOB	TOP OF BANK
TOE	TOE OF BANK
TYP	TYPICAL
ULT	UNDER GROUND
VERT	VERTICAL
W	WEST
WSEL	WATER SURFACE ELEVATION



CONTRACT NO.	DATE
CONTRACTOR	PROJECT
OFFICE	LOCATION
DESIGNER	SCALE

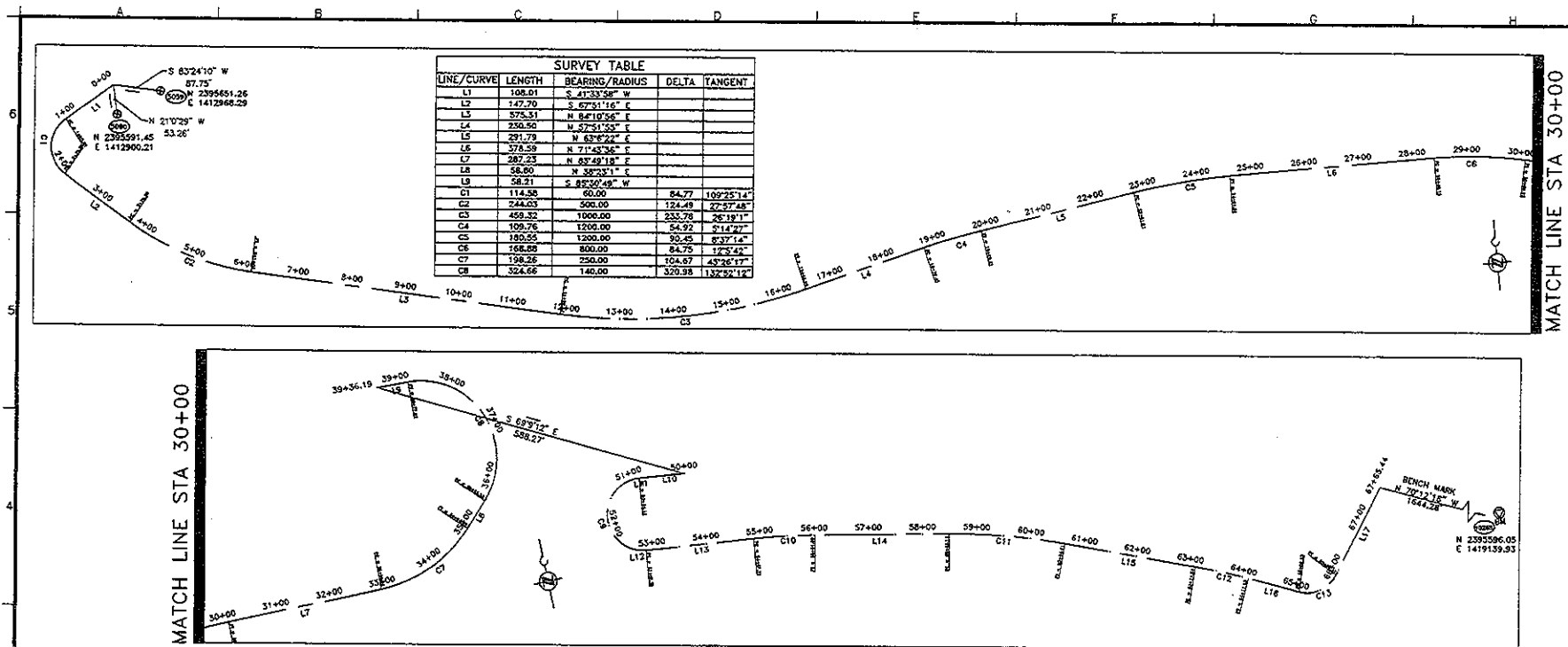
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DESIGNER	DATE
PROJECT	LOCATION
SCALE	PROJECT
DESIGNER	PROJECT

DESIGNER	DATE
PROJECT	LOCATION
SCALE	PROJECT
DESIGNER	PROJECT

Reference number:
G-3
Sheet 3 of 24

PRELIMINARY DESIGN



AEROMETRIC AERIAL MAPPING NOTES

- This map was compiled to meet horizontal accuracy in accordance with ASPRS Class II Accuracy Standards.
- This map was compiled to meet vertical accuracy in accordance with ASPRS Class II Accuracy Standards.
- Areas denoting vegetation cover on the ground should be considered less accurate and not used for engineering purposes until field checked in accordance with ASPRS Accuracy Standards.
- The map projection is Alaska State Plane, Zone 4, NAD83 as expressed in U.S. Survey Feet.
- Vertical data is referenced to MLLW based on NOAA Tidal Station "Nikiski".
- This map is based on photography acquired 09-27-2007 at a nominal scale of 1"=300'.
- This map produced for output at a scale of 1"=100' with a contour interval of 1 foot.

PHOTO CONTROL SURVEY NOTES

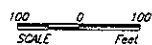
- The information provided here is based on Aerial Mapping produced by Aerometric and controlled by field surveys performed by R&M Consultants. The aerial photography was acquired September 9th, 2007. R&M Control Surveys took place in 2007 and 2008.
- Primary horizontal control and aerial photo control was established using Static GPS techniques with Trimble dual frequency receivers. GPS vectors were adjusted using simultaneous least-squares methods.
- Project coordinates are referenced to the Alaska Coordinate System of 1983 (ACSR83), Zone 4 values, reported in U.S. Survey Feet and are based on Survey Control Station "McLane CP 1" as shown on the DOWM Engineers drawing "Kenai River Bluff Erosion Survey Topography" dated July 16, 2003. McLane CP 1 zone 4 coordinates = N 2,385,666.774, E 1,419,401.413.
- Project bearings are NAD83 Zone 4 state plane grid bearings based on GPS adjusted measurements constrained at McLane CP 1.
- Primary vertical control was established with a combination of Trimble dual frequency GPS measurements and differential leveling. GPS measurements incorporated Geoid99. Differential levels were performed with a Leica DNA10 digital level and barcode rod.

- Project vertical datum is referenced to Mean Lower Low Water (MLLW) based on NOAA Tidal Station Nikiski, Station ID No. 945 5760, publication date 10/00/2003. Station Nikiski is referenced by BM No. 0, et al., which was held for all project elevations (BM No. 8 elevation was verified by measurements to BM No. 7 & 9). The official station designation for BM No. 8 is "945 5760 TIDAL B" (see PID No. A87150). NOAA MLLW elevation for BM No. 8 = 109.659 U.S. Survey Feet (33.424 meters). Elevations were transferred from BM No. 8 roughly 10 miles south to the project site using the following sequence:
BM No. 8 to nearby set point CP 51
CP 51 to McLane CP 1
CP 1 to nearby Kenai BM No. 3
Note that CP 1 is vertically unstable and that Kenai BM No. 3 has been used to control and adjust the elevation of CP 1 at each visit for GPS observations. The most recent visit found CP 1 with aluminum cap lying nearby. The cap was reset and the elevation reestablished from Kenai BM No. 3. The elevation for Kenai BM No. 3, established from Nikiski, is 31.18 feet.

Elevations of tidal datums referred to station Nikiski MLLW in feet:
Highest Observed Water Level (12/26/1976) = 29.02
Mean Higher High Water (MHHW) = 20.42
Mean High Water (MHW) = 19.58
Mean Sea Level (MSL) = 11.18
North American Vertical Datum-1986 (NAVD86) = 6.76
Mean Low Water (MLW) = 2.05
Mean Lower Low Water (MLLW) = 0.00
Lowest Observed Water Level (12/25/1999) = -6.37

- Aerial Mapping contours were ground-truthed using RTK GPS broadcasted from station McLane CP 1. Elevations fit well in areas without foliage and less well where trees and brush existed. No extreme discrepancies were discovered.
- Geotechnical borehole positions were located using RTK GPS together with differential levels.
- The contour interval shown is one foot.
- Property lines, street rights-of-way, street names, etc. were taken from the Kenai Peninsula Borough (KPB) Geographical Information Systems (GIS) website. The KPB GIS was inserted and fit to physical features within the aerial mapping (street intersections, etc).

SURVEY CONTROL



LINE	LENGTH	BEARING	DELTA	TANGENT
L10	84.16	S 89°46'11" W		
L11	0.00	N 89°45'11" E		
L12	0.00	S 89°45'11" W		
L13	199.38	N 89°45'11" E		
L14	248.09	S 84°50'18" E		
L15	248.75	S 74°33'10" E		
L16	96.90	S 69°43'50" E		
L17	173.83	N 32°48'54" E		
C9	204.20	63.00	180°0'2"	INFINITE
C10	113.34	1200.00	5°24'41"	56.71
C11	216.42	1200.00	10°17'8"	108.00
C12	100.30	1200.00	4°47'20"	50.16
C13	61.08	60.00	77°25'16"	48.09

MONUMENT LEGEND

- ⊕ RECOVERED BLM MONUMENT
- ⊕ RECOVERED PRIMARY MONUMENT (BRASS CAP)
- ⊕ RECOVERED PRIMARY MONUMENT (ALCAP)
- ⊕ RECOVERED SECONDARY MONUMENT
- ⊕ SET PRIMARY SURVEY CONTROL POINT
- ⊕ BENCH MARK
- ⊕ TEMPORARY BENCH MARK
- ⊕ SURVEY POINT NUMBER

PRELIMINARY DESIGN



CONTRACT NO.	
CONTRACT DATE	
CONTRACT DESCRIPTION	
CONTRACT LOCATION	
CONTRACT STATUS	

DATE	
TIME	
LOCATION	
STATUS	

REVISION	
DATE	
BY	
FOR	

PROJECT NAME	
PROJECT LOCATION	
PROJECT STATUS	

PROJECT NAME	
PROJECT LOCATION	
PROJECT STATUS	

Reference number:	G-4
Sheet	4 of 24



CONTRACT NO.	
CONTRACTOR	
CITY	
DATE	

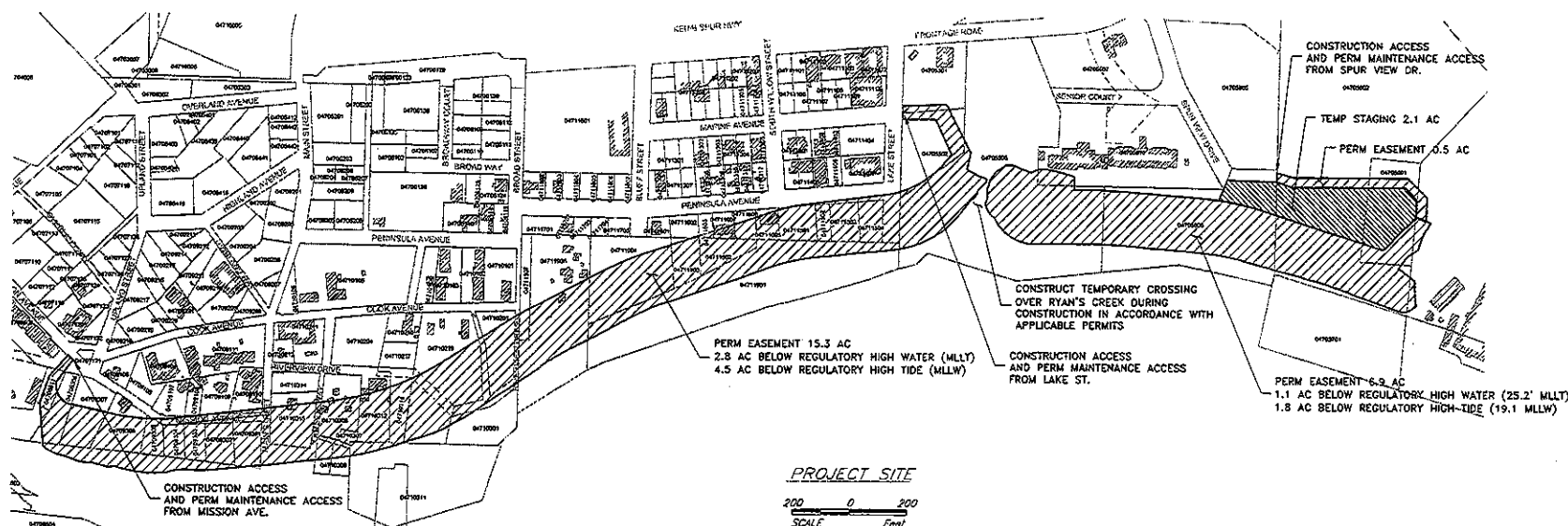
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NO. 3	
NO. 4	
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NO. 6	
NO. 7	
NO. 8	
NO. 9	
NO. 10	

APPROVED FOR	DATE
FOR AS NOTED	
FOR PERMIT	
FOR RECORD	

U.S. ARMY CORPS OF ENGINEERS	ANCHORAGE, ALASKA
ALASKA DISTRICT	

KENAI BLUFF STABILIZATION
KENAI, ALASKA
REAL ESTATE, ACCESS AND STAGING

Reference number:
G-5
Sheet 5 of 24



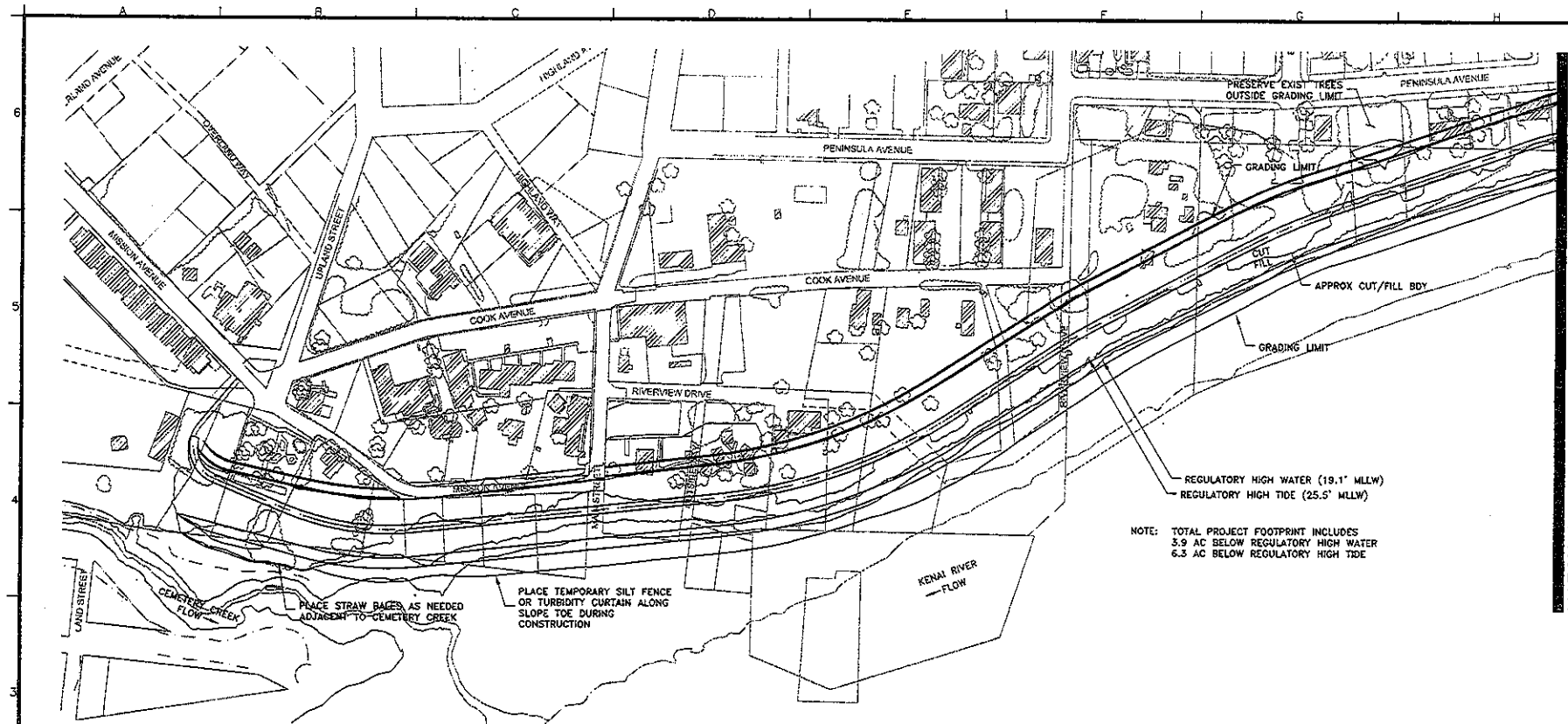
PROJECT SITE
200 0 200
SCALE Feet

KEY
PERMANENT EASEMENT
TEMPORARY EASEMENT

PROJECT EASEMENT AREAS BY PARCEL

Parcel ID	Ownership Type	Usage	Required Easement (Acres)	Total Lot Size (Acres)	Required Easement (% of Lot)	Affected Structures (Square feet)	Owner	Parcel ID	Ownership Type	Usage	Required Easement (Acres)	Total Lot Size (Acres)	Required Easement (% of Lot)	Affected Structures (Square feet)	Owner
4709308	PRV	VA	0.41	0.41	100%	0	O'CONNELL ROBERT D ET AL, SWARNER LINDA	4711904	PRV	VA	1.08	1.60	67%	0	VANN RICKY L & CORINNE L TRUSTEES
4709307	PUB	VA	0.64	0.64	100%	0	CITY OF KENAI	4711901	PRV	VA	2.98	4.31	69%	0	JOHNSON JAMES E, JOHNSON LANCET ANN ET AL
4709306	PRV	RS	0.44	0.58	76%	0	SHOWALTER JENNIFER F	4711903	PRV	VA	0.35	0.35	100%	0	COOPER DOROTHY M
4709305	PUB	VA	0.19	0.19	100%	0	KENAI CITY OF	4711902	PRV	VA	0.36	0.36	100%	0	SANDS PATRICIA R TRUSTEE & B SANDS
4709304	PRV	VA	0.19	0.19	100%	0	WEBBER CHARLES R	4711603	PRV	AB	0.02	0.10	20%	0	FREITAG HERBERT & JUDITH
4709303	PRV	VA	0.21	0.21	100%	0	KNIGHT KEITH K	4711602	PUB	VA	0.18	0.18	100%	0	KENAI CITY OF
4709302	PUB	VA	0.32	0.32	100%	0	KENAI CITY OF	4711607	PRV	RS	0.67	0.16	42%	2269	YANHORN ALAN K & MARIAN F
4709301	PRV	VA	0.33	0.33	100%	0	KENAI BIBLE CHURCH	4711606	PRV	VA	0.11	0.17	65%	0	HANNAM TONEY A & LINDA M
4709109	PRV	RS	0.004	0.37	1%	0	ANDERSON HARRY K & NELLIE MAE	4711605	PRV	CM	0.17	0.19	86%	2040	HUTCHINGS STEPHEN PAUL SR CUST
4709110	PRV	CH	0.02	0.35	7%	0	KENAI BIBLE CHURCH	4711501	PRV	VA	0.35	0.35	100%	0	ALASKA LABORERS BUILDING CORP
4710315	PRV	RS	0.63	0.63	100%	1314	LOFSTEDT DIANA	4711502	PRV	VA	0.14	0.14	100%	0	YOUNG WILLIAM C TRUSTEE
4710308	PRV	VA	0.17	0.30	56%	0	STERLING GLENDA A ET AL, MCCANN BILLY ESTATE	4711503	PRV	VA	0.30	0.30	100%	0	CENTRAL PENINSULA MENTAL HEALTH
4710306	PRV	CM	0.63	0.63	100%	1538	LOFSTEDT DIANA	4711504	PRV	VA	0.27	0.27	100%	0	LEDoux CLARENCE E SR ESTATE OF
4710307	PRV	VA	0.06	0.06	100%	0	ERREA JULIAN & HILDEBRAND DAN L	4705906	PUB	VA	3.14	8.22	38%	0	CITY OF KENAI
4710311	PRV	VA	0.10	2.77	4%	0	CLARK RUSSELL S	4205502	PUB	VA	0.22	1.11	20%	0	CITY OF KENAI
4710312	PRV	RS	0.43	0.57	76%	3137	FOSTER GARY L & KATHLEEN	4705501	PRV	CH	0.02	1.14	2%	0	SHELDON DENTON SHILLING
4710316	PRV	VA	0.30	0.33	91%	0	SEELINGER DONALD P	4705510	PUB	VA	0.14	3.43	4%	0	CITY OF KENAI
4710319	PRV	RS	0.66	1.40	47%	0	SEELINGER DONALD P	4705906	PUB	VA	3.13	3.37	93%	0	CITY OF KENAI
4710321	PUB	VA	0.03	0.69	4%	0	KENAI CITY OF	4705802	PUB	VA	3.24	14.95	22%	0	PACIFIC STAR SEAFOODS INC
4710301	PRV	VA	0.47	0.62	75%	0	PETERSON ROBERT T & BONNIE	4705901	PRV	CH	1.24	1.43	87%	0	DIOCESE OF SITKA & ALASKA ORTHODOX
4711907	PUB	VA	0.08	0.29	27%	0	CITY OF KENAI	4705703	PRV	ID	0.32	14.50	2%	0	PACIFIC STAR SEAFOODS INC
4711906	PRV	RS	1.13	2.67	42%	637	KARAFIA PAUL P & CONSEL ROGER D								

PRELIMINARY DESIGN



EROSION CONTROL AND WETLAND PLAN

100 0 100
SCALE Feet

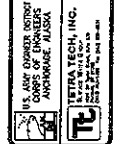
MATCH LINE SEE SHEET G-7



PROJECT NO.	DATE
CONTRACT NO.	OFFICE
CITY	PROJECT NAME
STATE	DESIGNER

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10

DESIGNATION	DATE
BY	FOR
PROJECT	NO.
SCALE	DATE

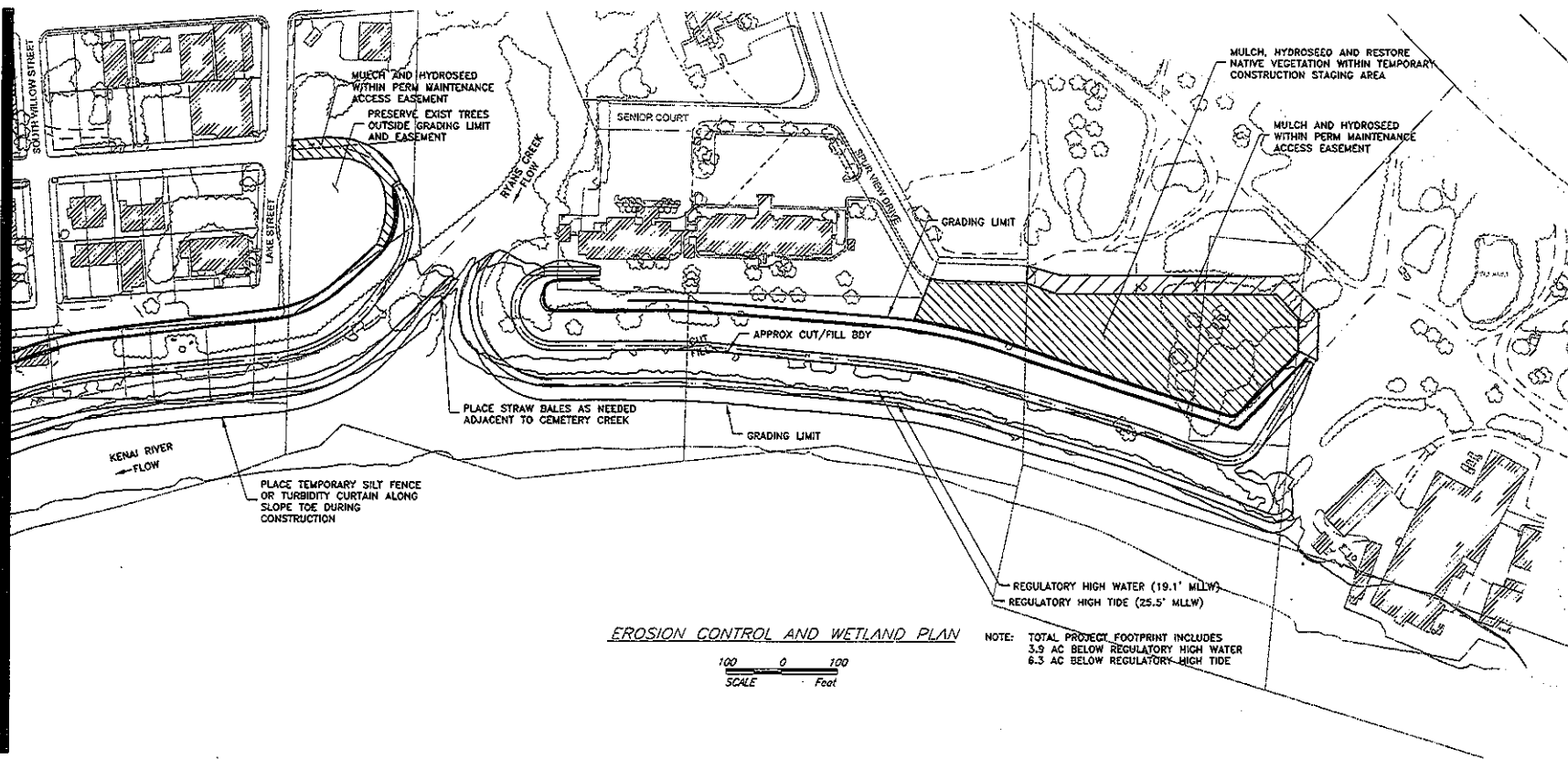


KENAI BLUFF STABILIZATION
KENAI, ALASKA
GENERAL
EROSION CONTROL AND
WETLANDS I

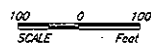
Reference number:
G-6
Sheet 6 of 24

PRELIMINARY DESIGN

MATCH LINE SEE SHEET G-6



EROSION CONTROL AND WETLAND PLAN



NOTE: TOTAL PROJECT FOOTPRINT INCLUDES
3.9 AC BELOW REGULATORY HIGH WATER
6.3 AC BELOW REGULATORY HIGH TIDE

PRELIMINARY DESIGN



CONTRACT NO.	DATE
COMMISSION	APPROVED
BY	DATE

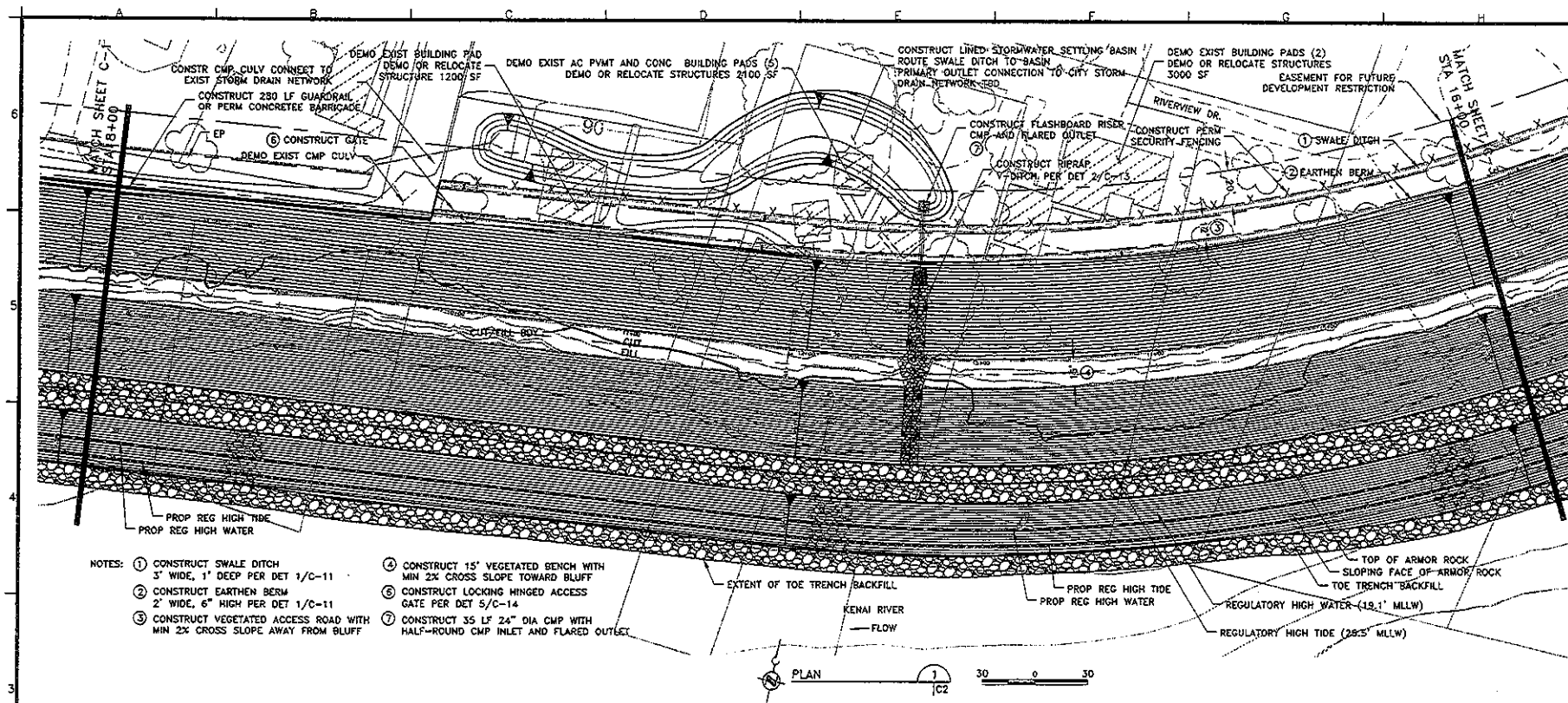
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DESIGNED BY	DATE
CHECKED BY	DATE
IN CHARGE	DATE

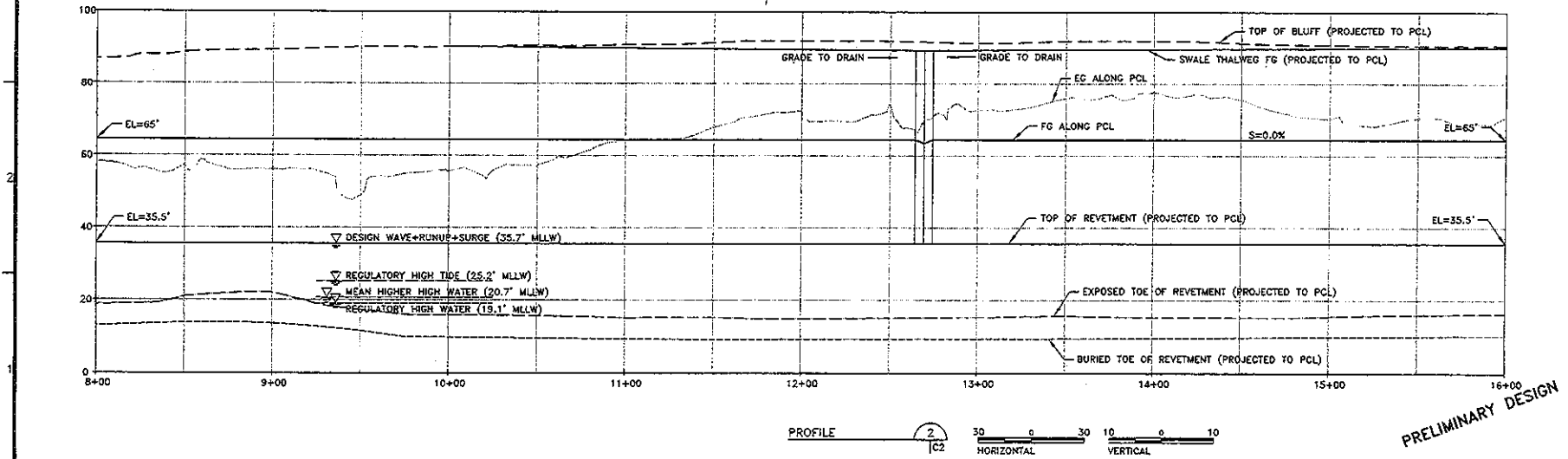


KENAI BLUFF STABILIZATION
KENAI, ALASKA
GENERAL
EROSION CONTROL AND
WETLANDS II

Reference number:
G-7
Sheet 7 of 24



- NOTES:
1. CONSTRUCT SWALE DITCH 3' WIDE, 1' DEEP PER DET 1/C-11
 2. CONSTRUCT EARTHEN BERM 2' WIDE, 6" HIGH PER DET 1/C-11
 3. CONSTRUCT VEGETATED ACCESS ROAD WITH MIN 2% CROSS SLOPE AWAY FROM BLUFF
 4. CONSTRUCT 15' VEGETATED BENCH WITH MIN 2% CROSS SLOPE TOWARD BLUFF
 5. CONSTRUCT LOCKING HINGED ACCESS GATE PER DET 5/C-14
 6. CONSTRUCT 35 LF 24" DIA CMP WITH HALF-ROUND CMP INLET AND FLARED OUTLET



PROFILE 2/C2

HORIZONTAL 30 0 30

VERTICAL 10 0 10

PRELIMINARY DESIGN

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

PROJECT NO.	DATE
CONTRACT NO.	DESIGNER
CITY	PROJECT
STATE	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS

DESIGNED BY: J. E. P. J.

CHECKED BY: J. E. P. J.

APPROVED BY: J. E. P. J.

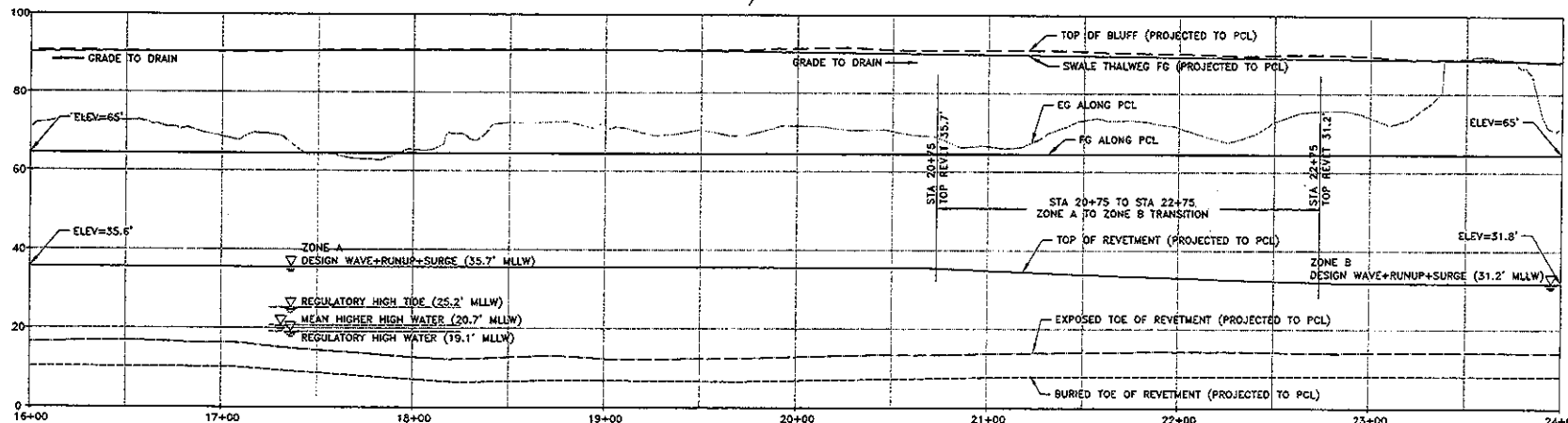
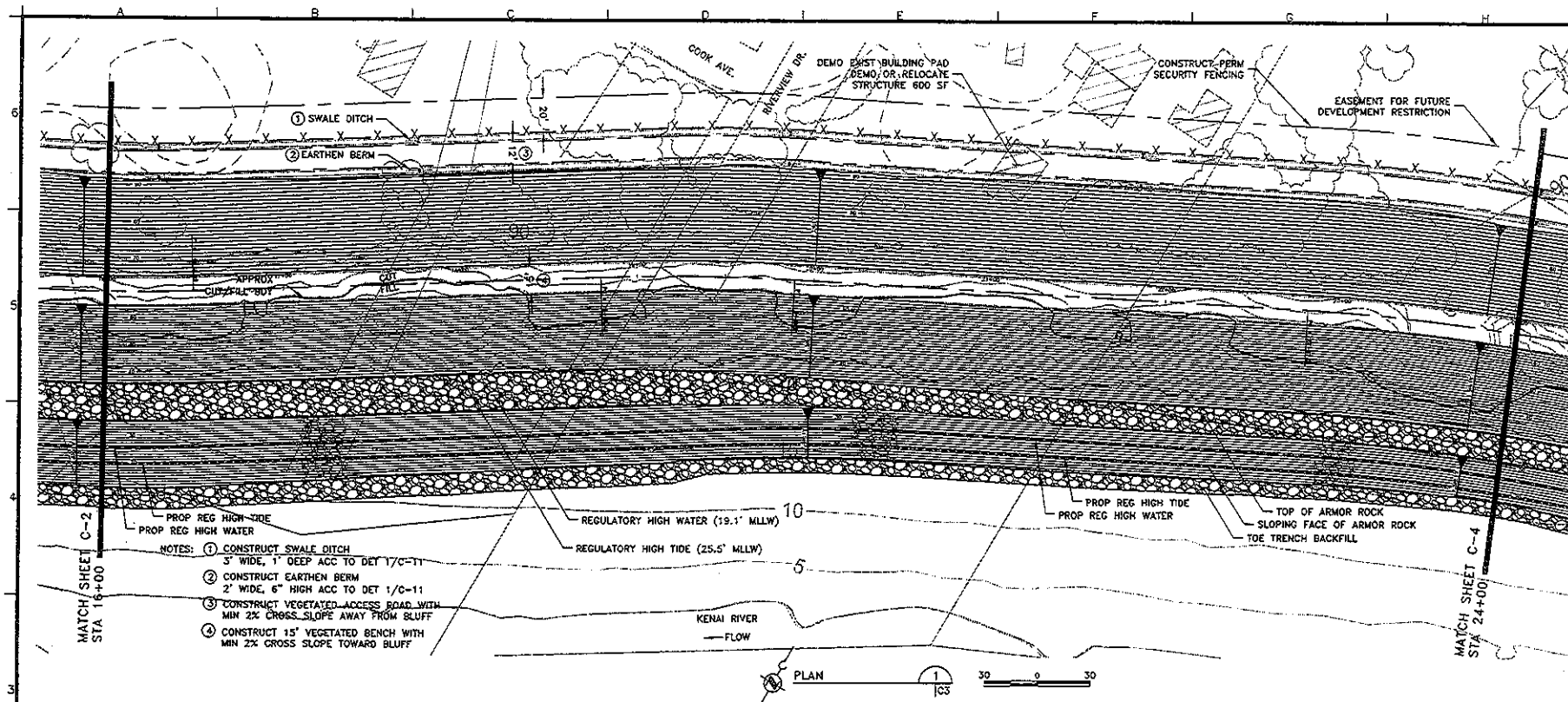
DATE: 10/1/00

PROJECT: Kenai Bluff Stabilization

PROJECT PLAN AND SITE MAP

Reference number: C-2

Sheet 9 of 24



HORIZONTAL 30 0 30
VERTICAL 10 0 10

PRELIMINARY DESIGN



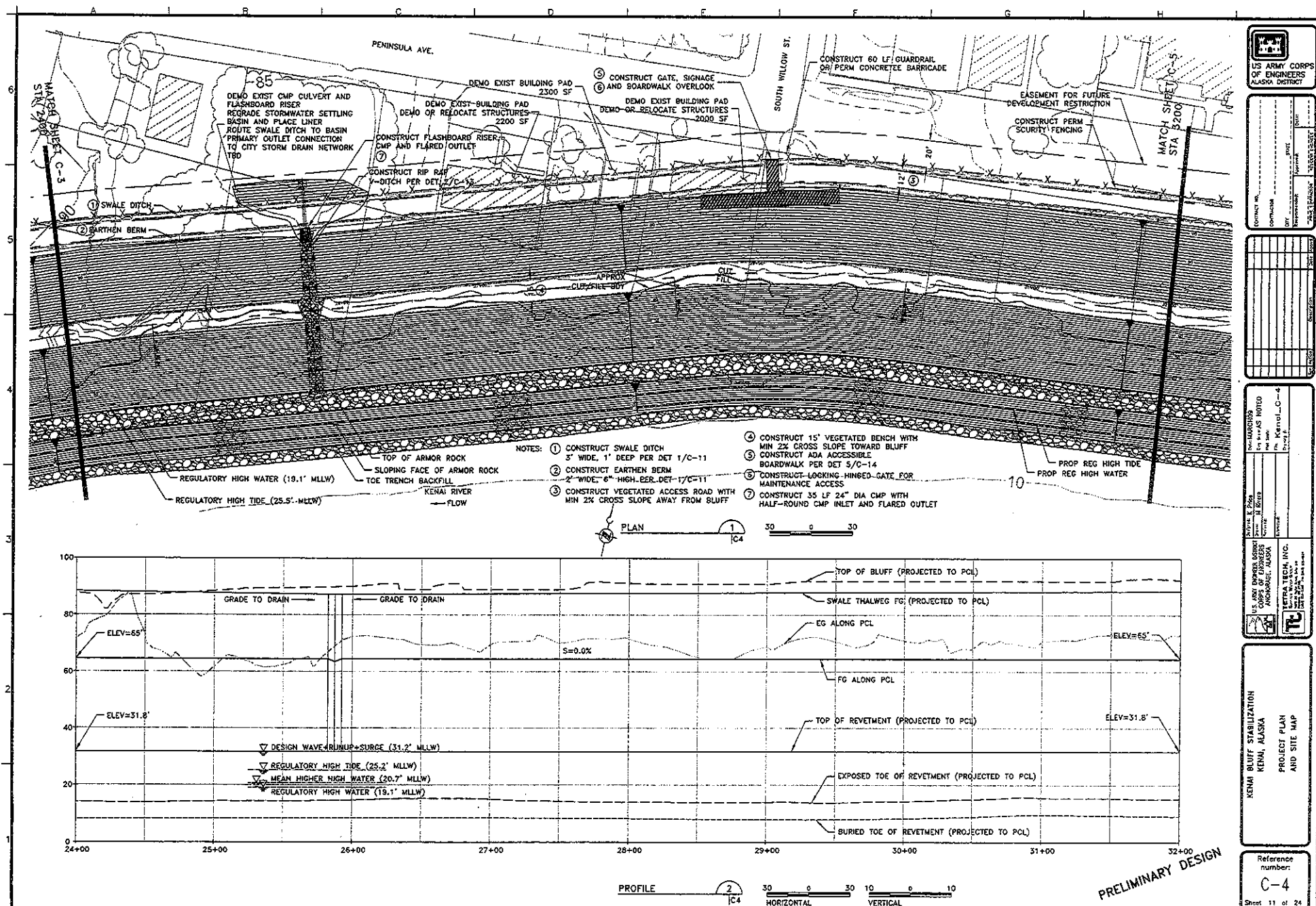
CONTRACT NO.	DATE
PROJECT NO.	DATE
DESIGNER	DATE
CHECKED	DATE
APPROVED	DATE

NO.	REVISION

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT ANCHORAGE, ALASKA	DESIGNED BY CHECKED BY APPROVED BY
U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT ANCHORAGE, ALASKA	DESIGNED BY CHECKED BY APPROVED BY

KENAI BLUFF STABILIZATION KENAI, ALASKA PROJECT PLAN AND SITE MAP
--

Reference number: C-3 Sheet 10 of 24
--



PROJECT NO.	DATE
CONTRACT NO.	REVISION
OFFICIAL NAME	BY
DATE	DATE

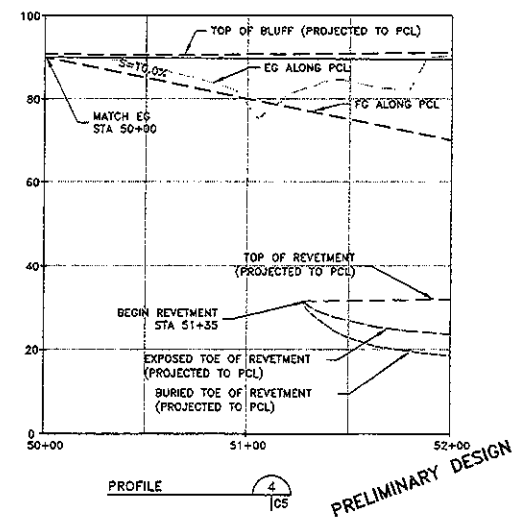
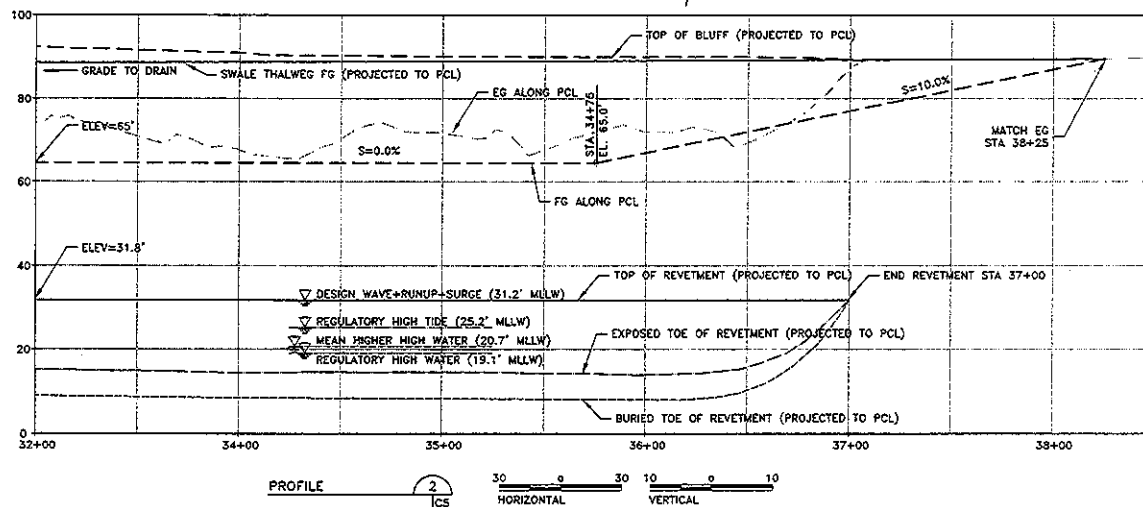
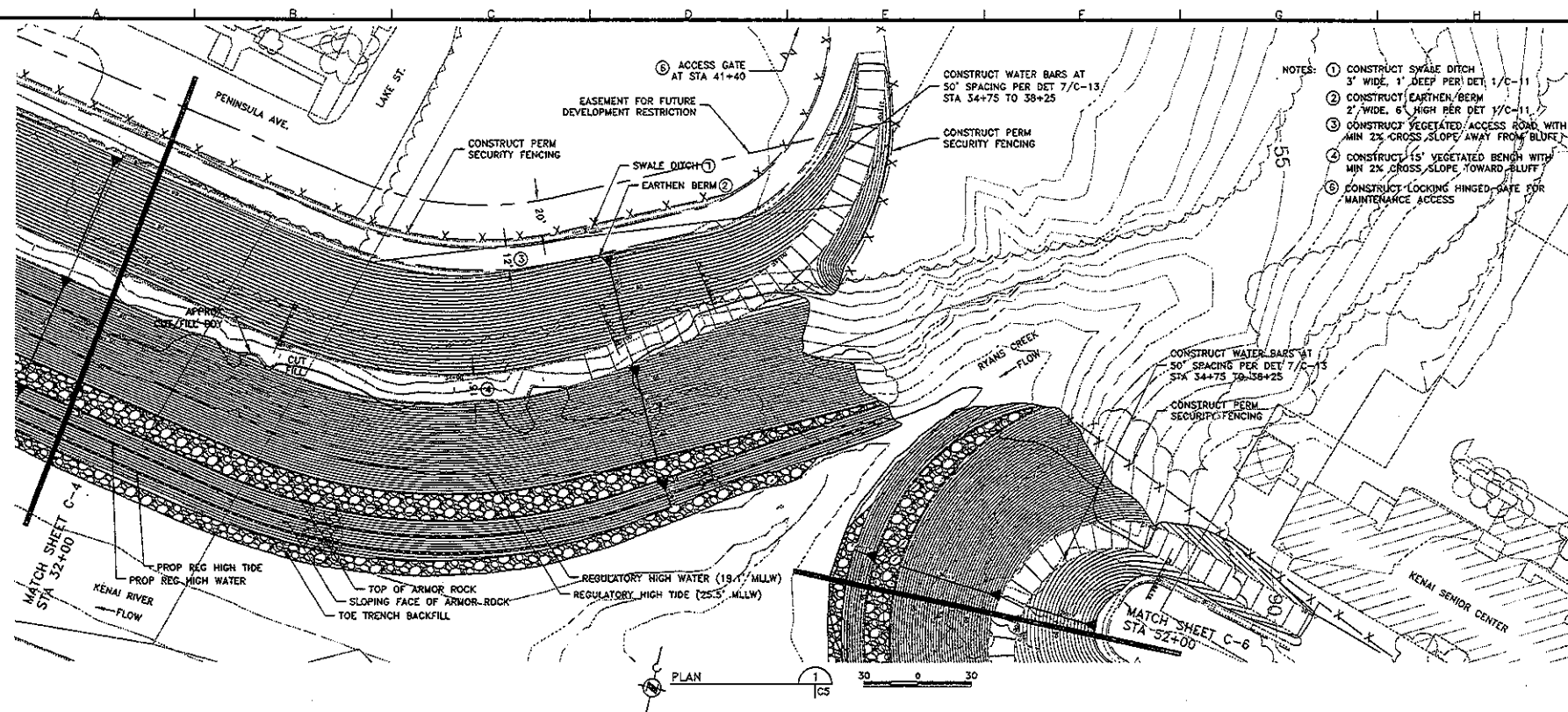
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2	REVISION	10/1/00
3	REVISION	10/1/00
4	REVISION	10/1/00
5	REVISION	10/1/00
6	REVISION	10/1/00
7	REVISION	10/1/00
8	REVISION	10/1/00
9	REVISION	10/1/00
10	REVISION	10/1/00

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
PROJECT NO.	DATE
CONTRACT NO.	DATE
OFFICIAL NAME	DATE
DATE	DATE



KENAI BLUFF STABILIZATION
KENAI, ALASKA
PROJECT PLAN
AND SITE MAP

Reference number:
C-4
Sheet 11 of 24



PRELIMINARY DESIGN



Contract No.	Design No.	Drawn By	Checked By
City	State	Project No.	Sheet No.

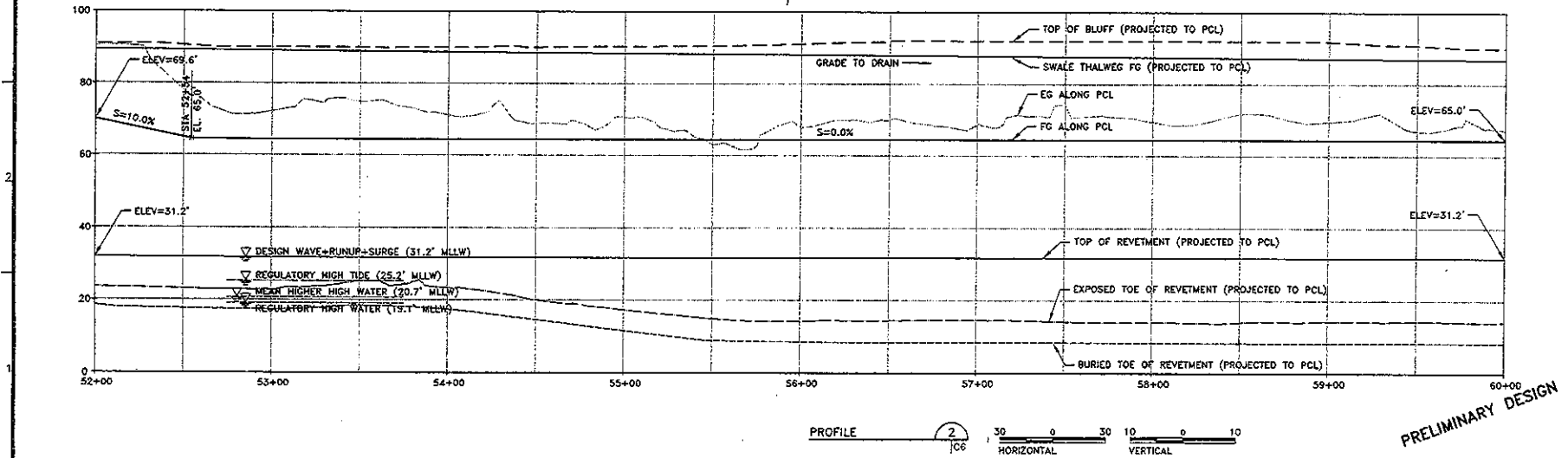
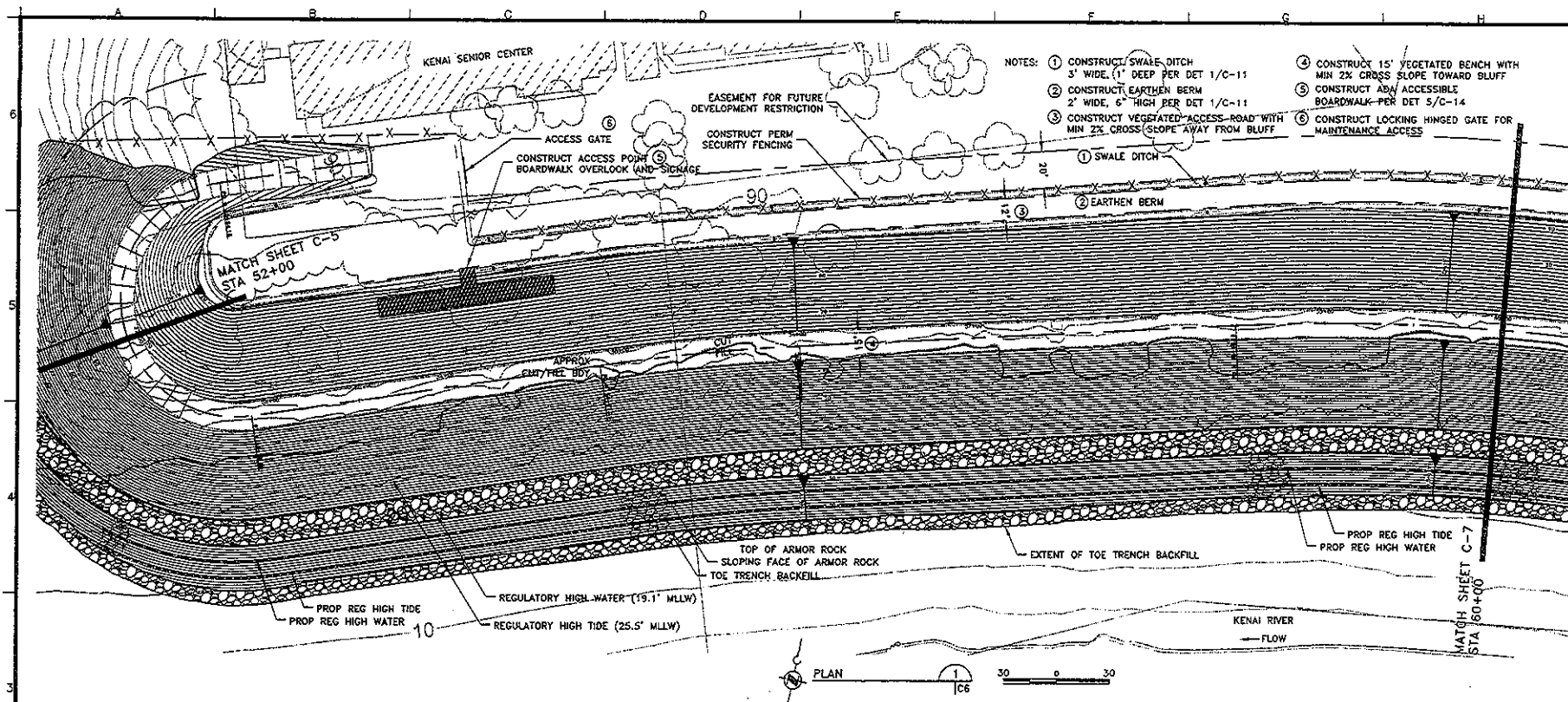
Project Name	Project Location
Project Description	Project Status

Project Manager	Project Engineer
Project Designer	Project Checker

Project Name	Project Location
Project Description	Project Status

Project Name	Project Location
Project Description	Project Status

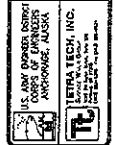
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Sheet	9 of 24



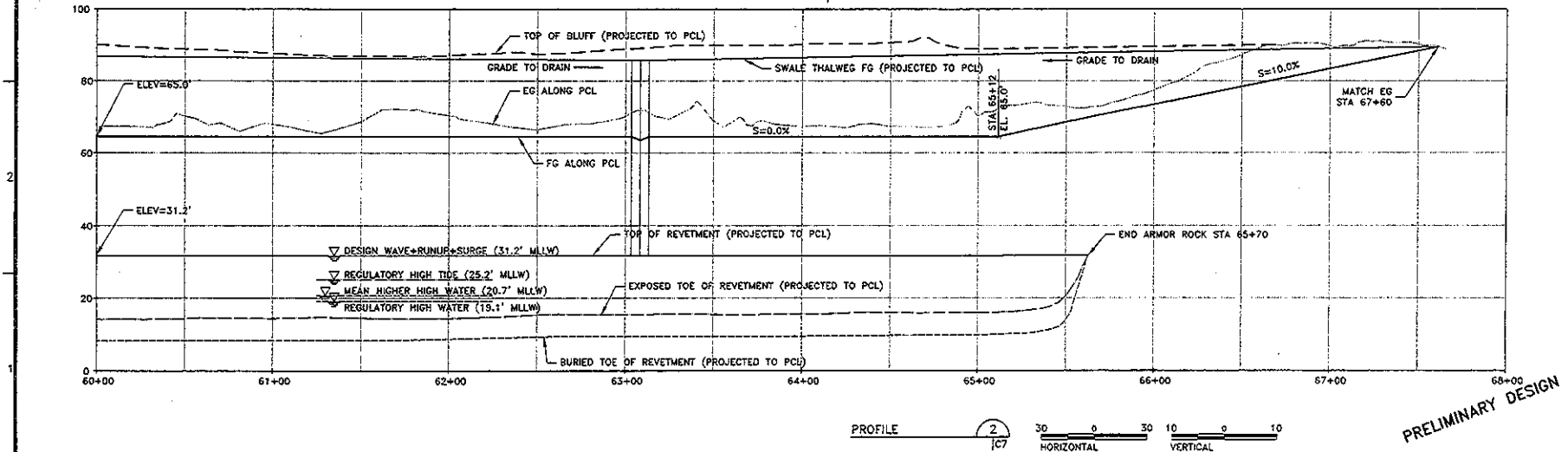
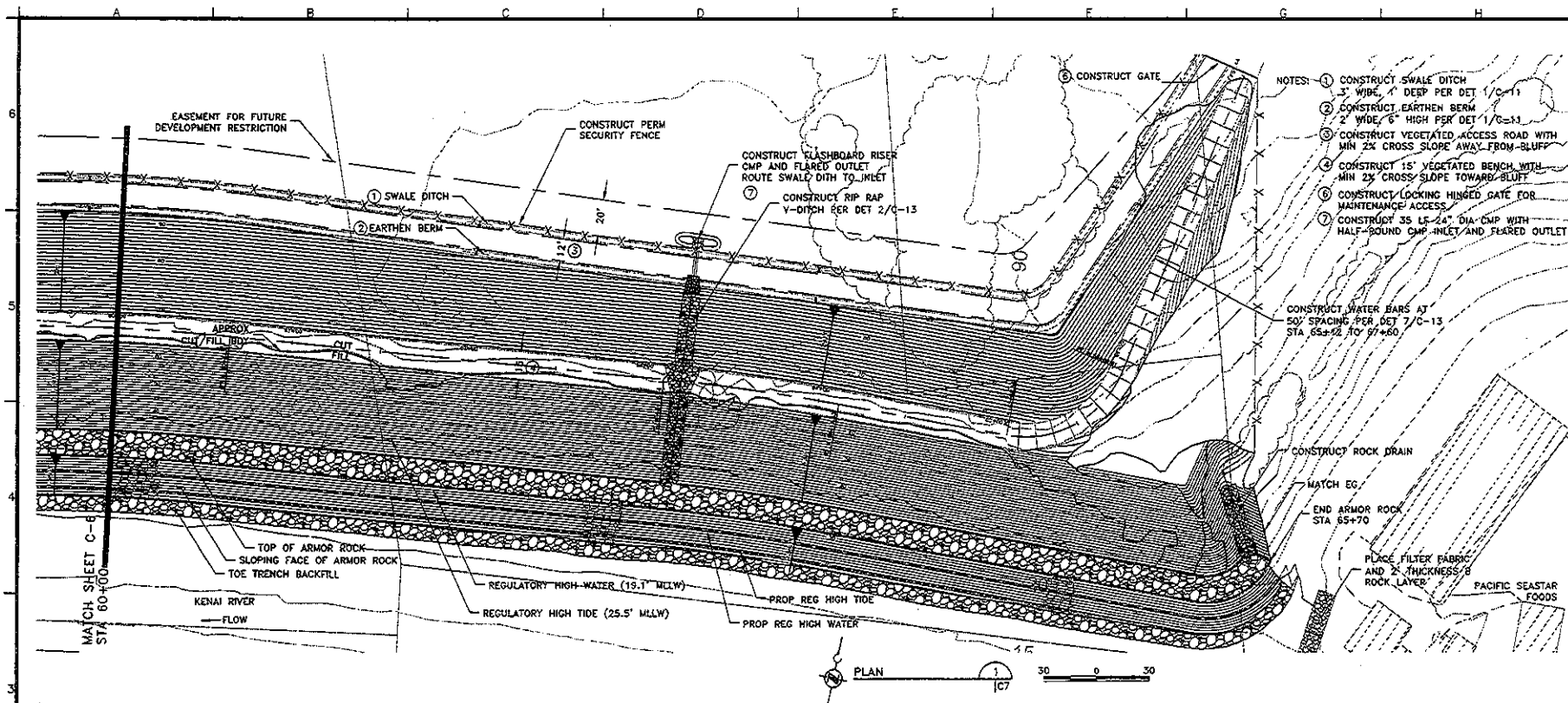
CONTRACT NO.	DATE
COMMISSION	APPROVED
BY	FOR USE
DATE	PROJECT NO.

NO.	DESCRIPTION	DATE

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
PROJECT NO.	



KENAI BLUFF STABILIZATION
KENAI, ALASKA
PROJECT PLAN
AND SITE MAP



PRELIMINARY DESIGN

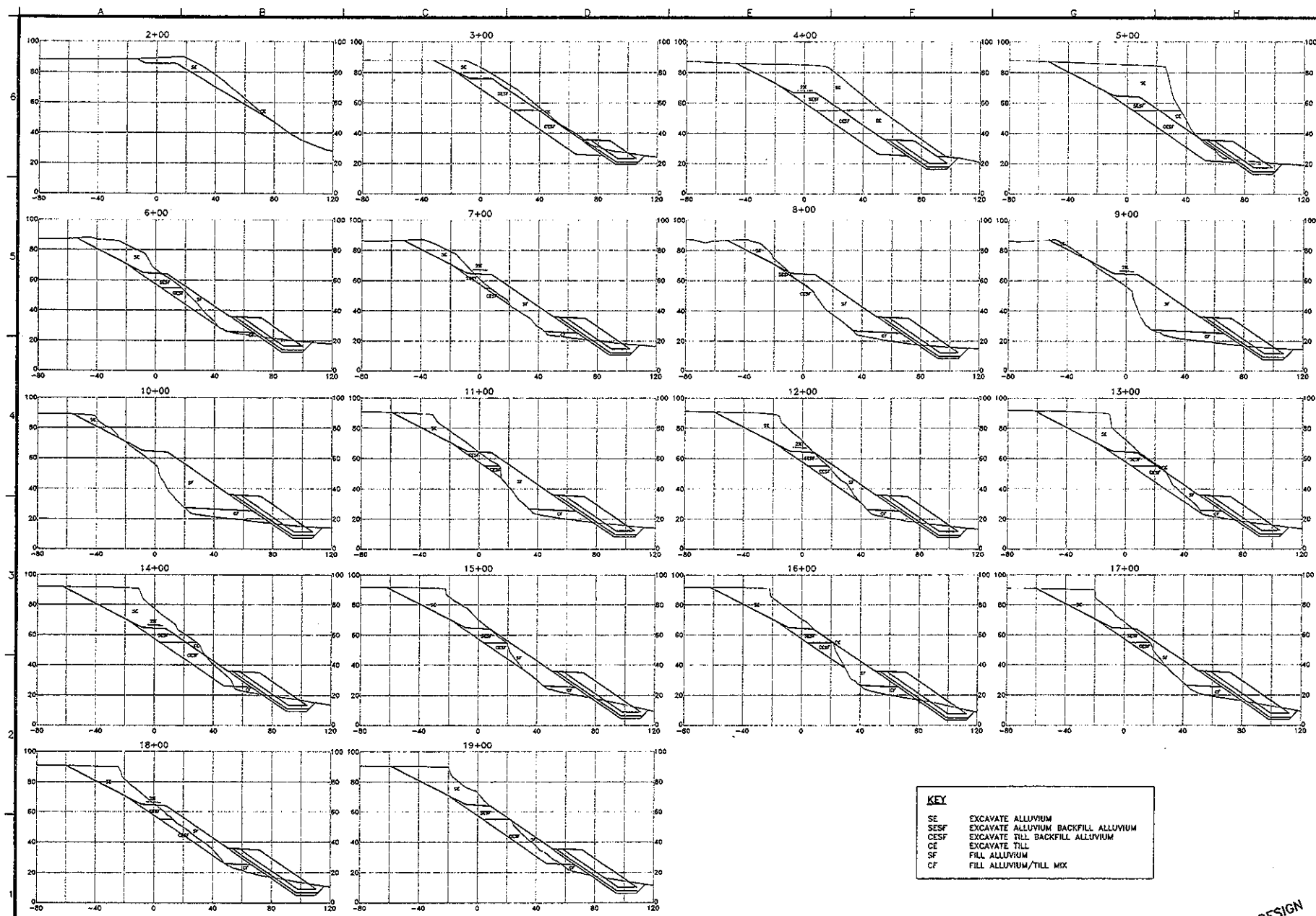


PROJECT NO.	DATE	DESIGNED BY	CHECKED BY
PROJECT NAME	DATE	DESIGNED BY	CHECKED BY
PROJECT NO.	DATE	DESIGNED BY	CHECKED BY
PROJECT NAME	DATE	DESIGNED BY	CHECKED BY

PROJECT NO.	DATE	DESIGNED BY	CHECKED BY
PROJECT NAME	DATE	DESIGNED BY	CHECKED BY
PROJECT NO.	DATE	DESIGNED BY	CHECKED BY
PROJECT NAME	DATE	DESIGNED BY	CHECKED BY

KENAI BLUFF STABILIZATION
KENAI, ALASKA
PROJECT PLAN
AND SITE MAP

Reference number:
C-7
 Sheet 14 of 24



KEY

SE EXCAVATE ALLUVIUM
 SESF EXCAVATE ALLUVIUM BACKFILL ALLUVIUM
 CESF EXCAVATE TILL BACKFILL ALLUVIUM
 CE EXCAVATE TILL
 SF FILL ALLUVIUM
 CF FILL ALLUVIUM/TILL MIX

CROSS SECTIONS 1
 SCALE: 1"=30'

PRELIMINARY DESIGN

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. _____ DATE _____

DESIGN NO. _____ DATE _____

PROJECT NAME _____

PROJECT LOCATION _____

PROJECT NUMBER _____

DESIGNER: _____

CHECKED: _____

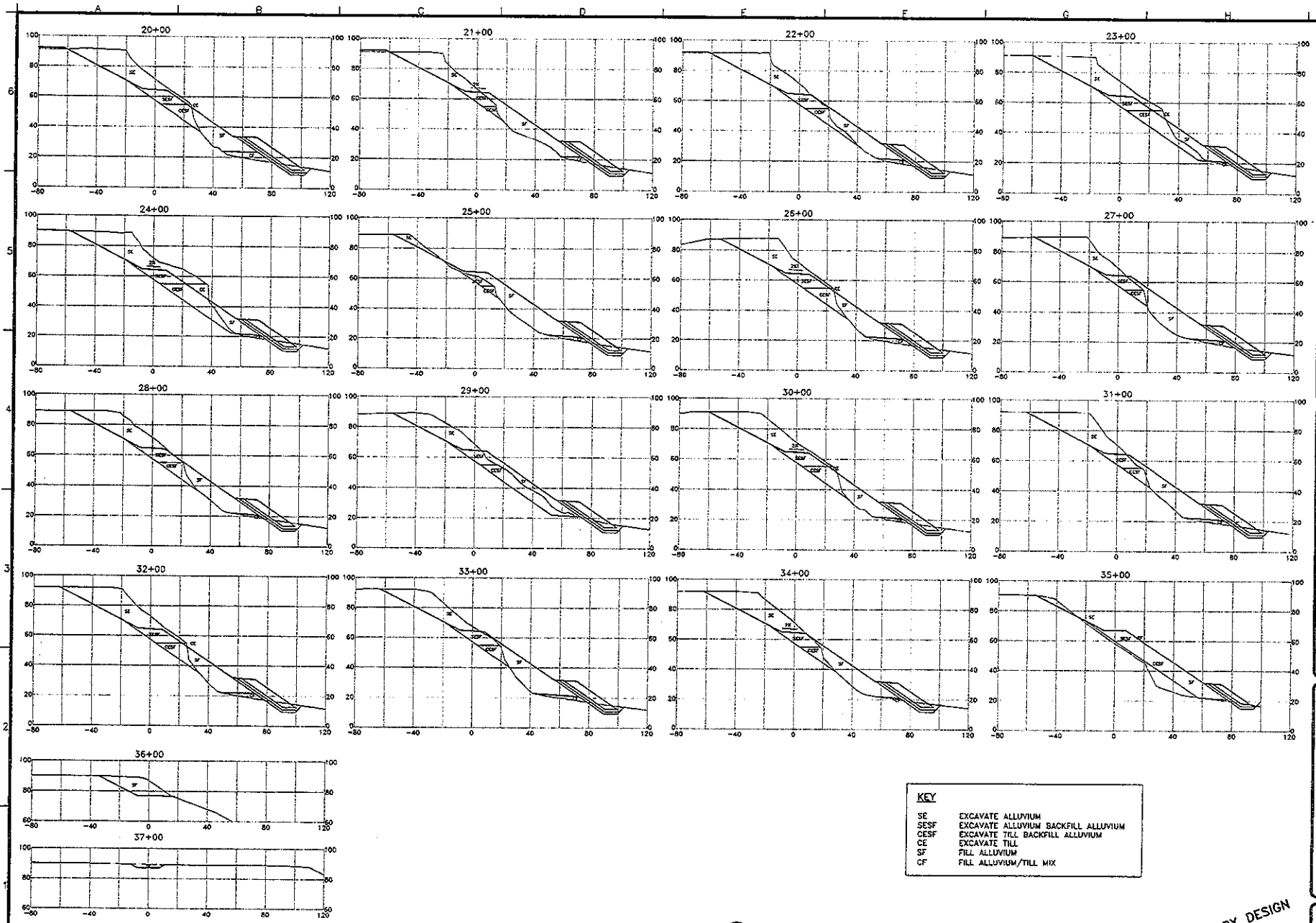
APPROVED: _____

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
KNOX, ALASKA

TECHNICAL INCHARGE: _____

Reference number:
C-8

Sheet 15 of 24



KEY

- SE EXCAVATE ALLUVIUM
- SEBF EXCAVATE ALLUVIUM BACKFILL ALLUVIUM
- CESF EXCAVATE TILL BACKFILL ALLUVIUM
- CE EXCAVATE TILL
- SF FILL ALLUVIUM
- CF FILL ALLUVIUM/TILL MIX

CROSS SECTIONS **1**
SCALE: 1"=30'

PRELIMINARY DESIGN



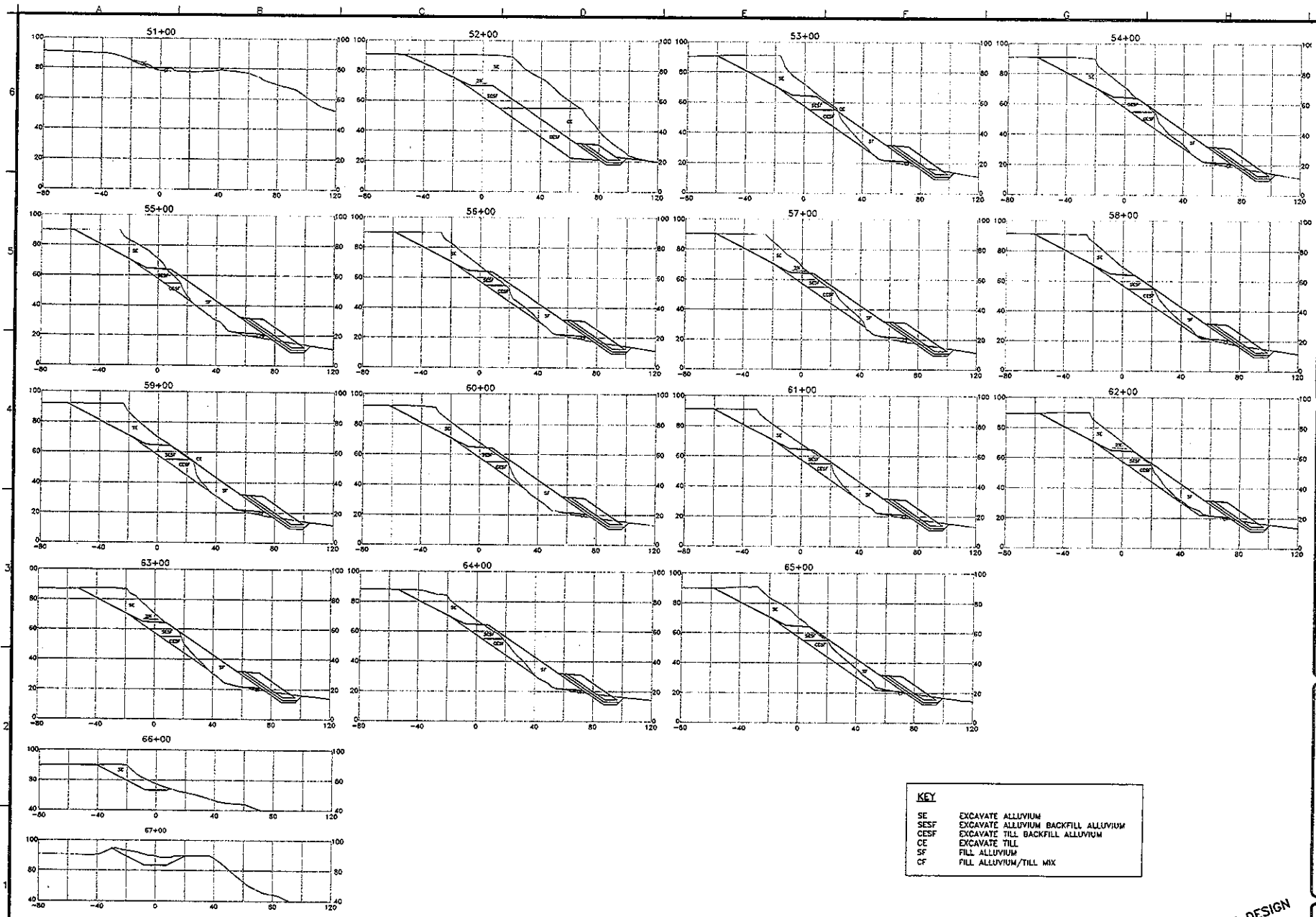
US ARMY CORPS
OF ENGINEERS
ALASKA DISTRICT

DESIGN NO.	DATE
PROJECT NO.	SCALE
CITY	PROJECT NAME
STATE	PROJECT NO.

DESIGNED BY: J. J. JONES
CHECKED BY: M. J. JONES
APPROVED BY: K. J. JONES

PROJECT NO. 100-100-100
PROJECT NAME: KENAI BLUFF STABILIZATION
PROJECT LOCATION: KENAI, ALASKA
PROJECT STATUS: PRELIMINARY DESIGN

Reference number:
C-9



KEY

- SE EXCAVATE ALLUVIUM
- SESF EXCAVATE ALLUVIUM BACKFILL ALLUVIUM
- CESEF EXCAVATE TILL BACKFILL ALLUVIUM
- CE EXCAVATE TILL
- SF FILL ALLUVIUM
- CF FILL ALLUVIUM/TILL MIX

CROSS SECTIONS 7
SCALE: 1"=30'

PRELIMINARY DESIGN

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

CONTRACT NO. _____

PROJECT NO. _____

DATE _____

DESIGNED BY _____

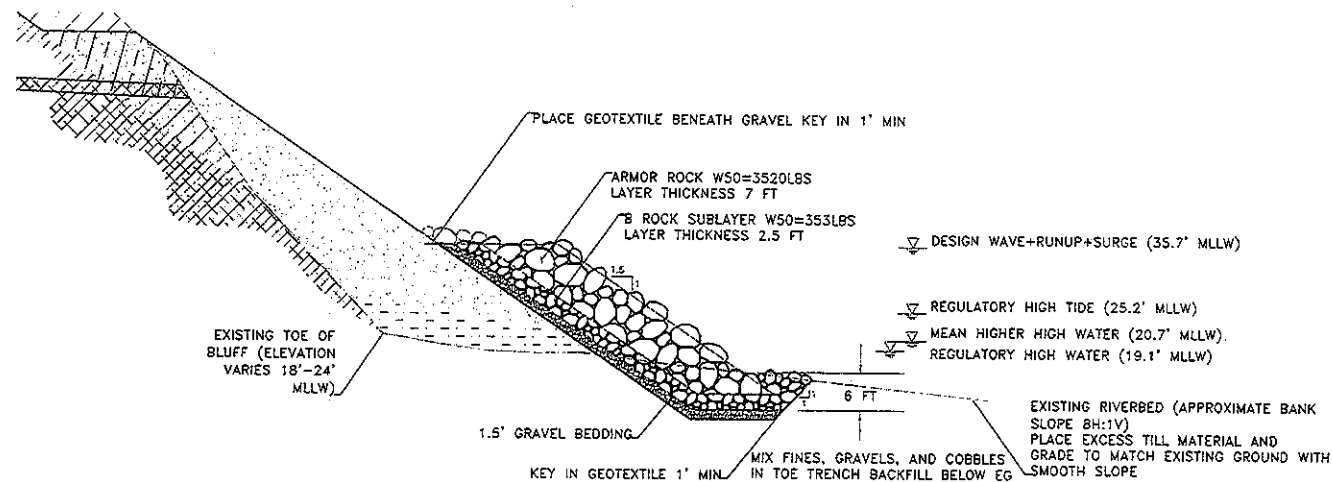
CHECKED BY _____

APPROVED BY _____

Kenai Bluff Stabilization
Kenai, Alaska
Grading Cross Sections III

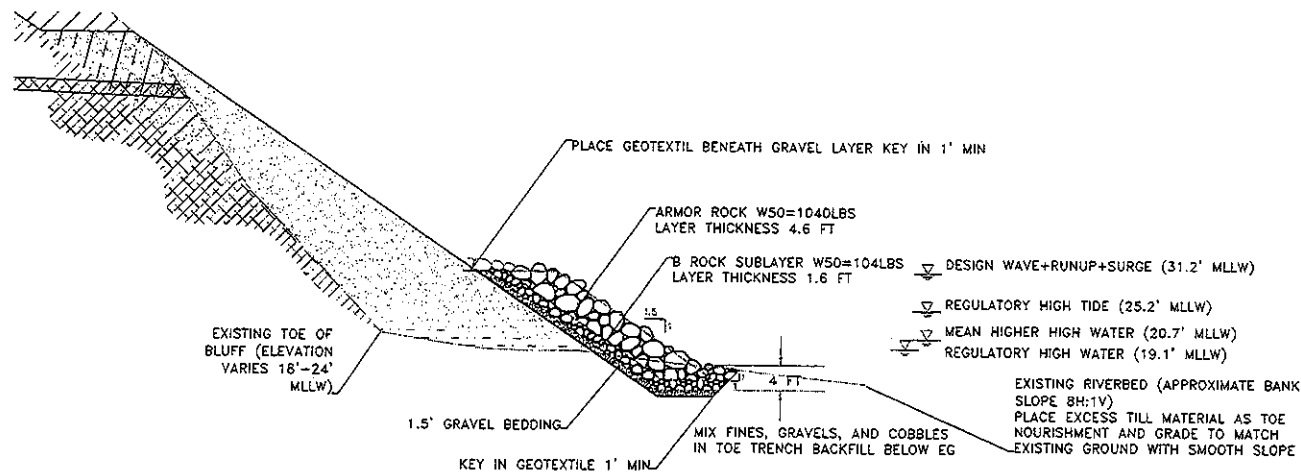
Reference number:
C-10

Sheet 17 of 24



STA 2+00 TO STA 19+50

TYPICAL SECTION 1
SCALE: NTS



STA 21+50 TO 36+00 AND STA 51+50 TO 65+20

TYPICAL SECTION 2
SCALE: NTS

PRELIMINARY DESIGN



DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

NO. OF SHEETS	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS
NO. OF SHEETS	NO. OF SHEETS

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

DESIGNED BY	DATE
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APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

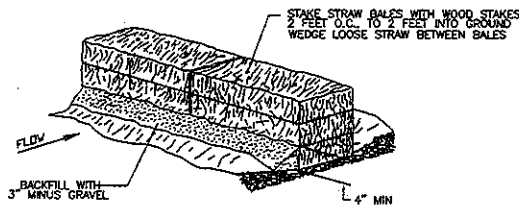
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CHECKED BY	DATE
APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
CONSTRUCTION	DATE
OPERATION	DATE
MAINTENANCE	DATE

STRAW BALES NOTE

STRAW BALES SHALL BE CERTIFIED "WEED FREE" AND NOT HAY BALES. BALES SHALL BE SECURED WITH WOOD OR METAL STAKES DRIVEN 2 FEET INTO GROUND. 3" MINUS GRAVEL SHALL BE PLACED AT A DEPTH OF 4" ON THE UP-GRADE TOE OF THE BALES. BALES CAN BE REMOVED WHEN VEGETATION IS ESTABLISHED.

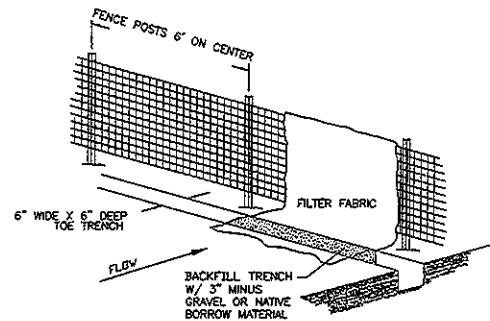


STRAW BALE

TYPICAL DETAIL 1
SCALE: NOT TO SCALE TYP

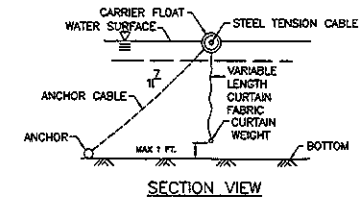
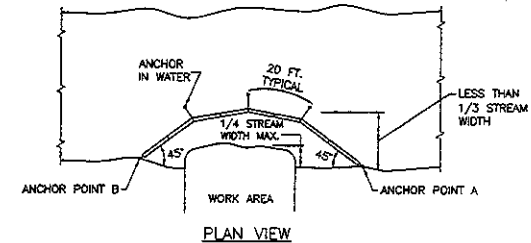
SILT FENCE NOTE

SILT FENCE SHALL BE INSTALLED PER WITH A 6 INCH BY 6 INCH ANCHOR TRENCH UP-GRADE OF THE FENCE LINE, AND FENCE POSTS ON 6 FEET CENTERS. THE ANCHOR TRENCH SHALL BE BACKFILLED TO EXISTING GRADE WITH NATIVE MATERIAL AND MECHANICALLY COMPACTED. THE SILT FENCES ARE TO BE INSTALLED DOWN TO WATER'S EDGE.



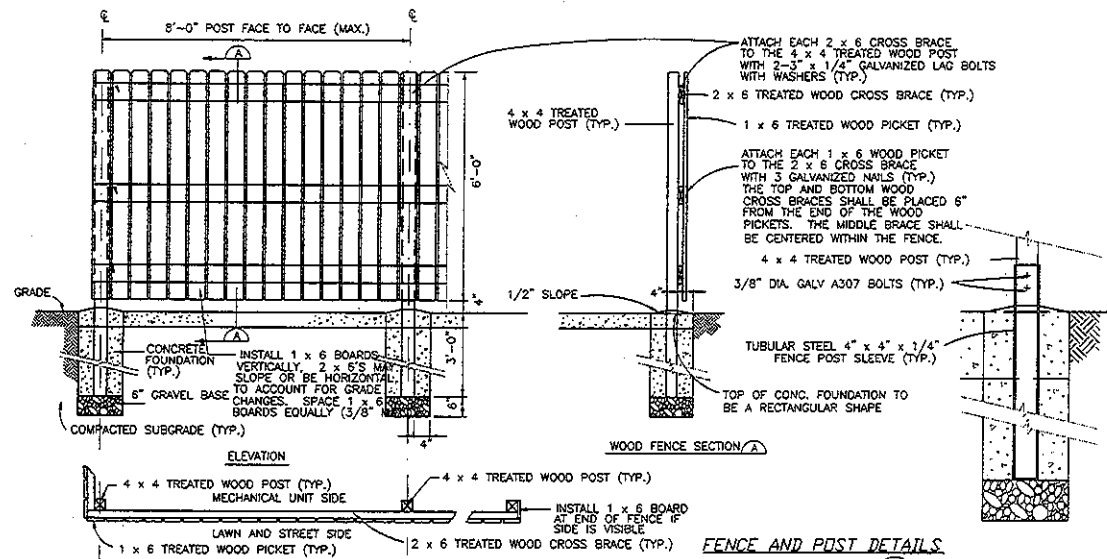
SILT FENCE

TYPICAL DETAIL 2
SCALE: NOT TO SCALE TYP



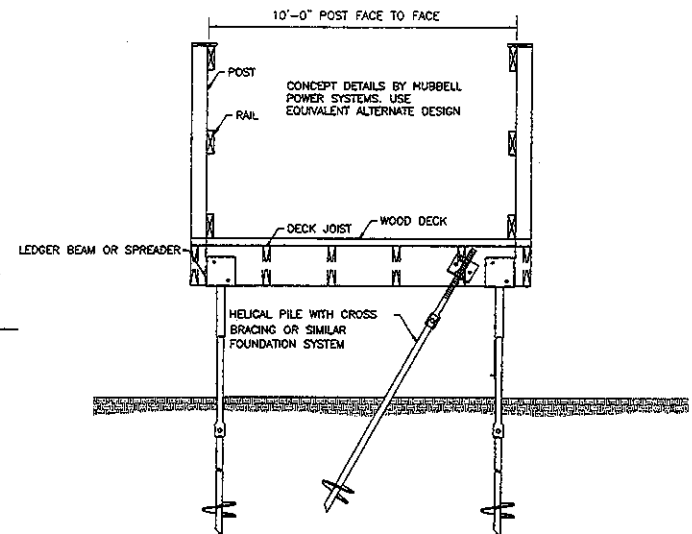
TURBIDITY CURTAIN

TYPICAL DETAIL 3
SCALE: NOT TO SCALE TYP



FENCE AND POST DETAILS

TYPICAL DETAIL 4
SCALE: NOT TO SCALE TYP



BOARDWALK DETAILS

TYPICAL DETAIL 5
SCALE: NOT TO SCALE TYP

PRELIMINARY DESIGN



US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO.	DATE
COMMITTEE	APPROVED
DESIGNER	REVIEWER
IN CHARGE	PROJECT LEADER

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10
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NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19	NO. 20
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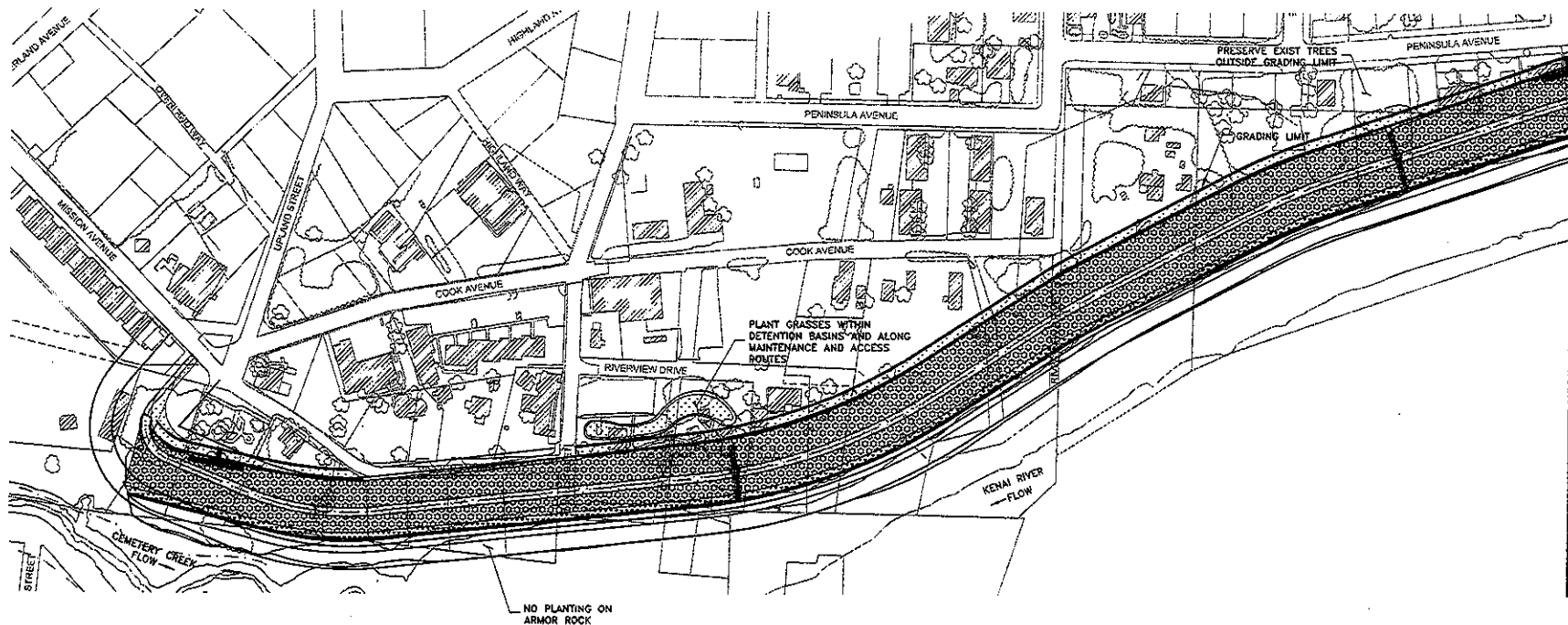
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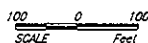
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NO. 71	NO. 72	NO. 73	NO. 74	NO. 75	NO. 76	NO. 77	NO. 78	NO. 79	NO. 80
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PLANTING PLAN



LEGEND	
	WILLOW
	ALDERS
	CONIFER
	GRASS

MATCH LINE SEE SHEET L-2

PRELIMINARY DESIGN



CONTRACT NO.	DATE
PROJECT NO.	PROJECT NAME
CITY	STATE
DESIGNED BY	DESIGNED DATE
CHECKED BY	CHECKED DATE

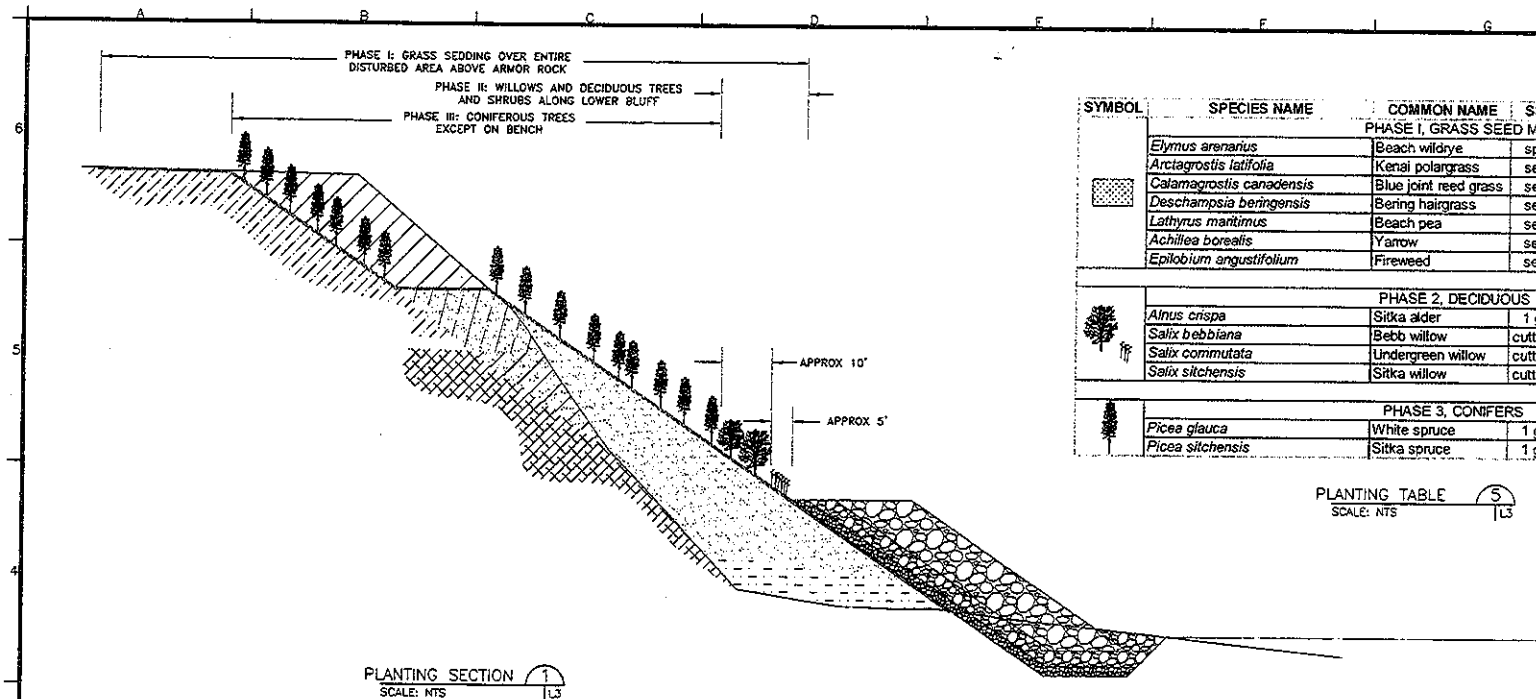
NO.	DESCRIPTION	DATE

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
PROJECT NO.	PROJECT NAME
CITY	STATE



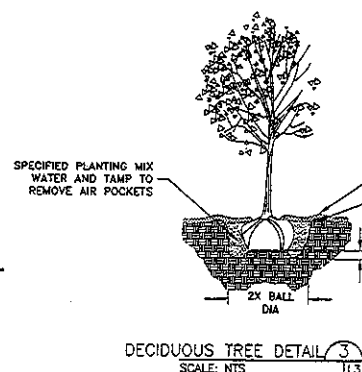
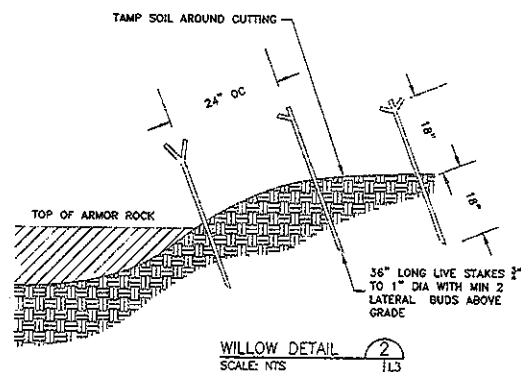
KENAI BLUFF STABILIZATION KENAI, ALASKA GENERAL PLANTING PLAN I
--

Reference number: L-1 Sheet 22 of 24
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SYMBOL	SPECIES NAME	COMMON NAME	SIZE	DENSITY	QUANTITY/acre
PHASE I, GRASS SEED MIX					
	<i>Elymus arenarius</i>	Beach wildrye	sprig	2' o.c.	10,000
	<i>Arctagrostis latifolia</i>	Kenai polargrass	seed		5 lbs/ac
	<i>Calamagrostis canadensis</i>	Blue joint reed grass	seed		10 lbs/ac
	<i>Deschampsia beringensis</i>	Bering hairgrass	seed		3 lbs/ac
	<i>Lathyrus maritimus</i>	Beach pea	seed		1 lb/ac
	<i>Achillea borealis</i>	Yarrow	seed		2 lbs/ac
	<i>Epilobium angustifolium</i>	Fireweed	seed		1 lb/ac
PHASE 2, DECIDUOUS					
	<i>Alnus crispa</i>	Sitka alder	1 gal	10' o.c.	435
	<i>Salix bebbiana</i>	Bebb willow	cuttings	5' o.c.	580
	<i>Salix commutata</i>	Undergreen willow	cuttings	5' o.c.	580
	<i>Salix sitchensis</i>	Sitka willow	cuttings	5' o.c.	580
PHASE 3, CONIFERS					
	<i>Picea glauca</i>	White spruce	1 gal	15' o.c.	190
	<i>Picea sitchensis</i>	Sitka spruce	1 gal	25' o.c.	70

PLANTING TABLE 5
SCALE: NTS

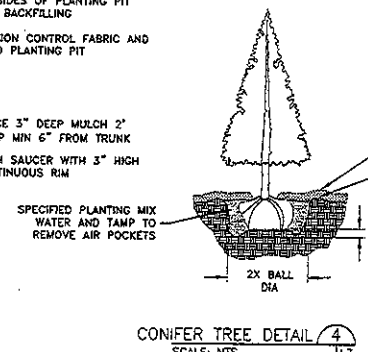


NOTES:

PLANT DECIDUOUS AND CONIFEROUS TREES SO THAT TOP OF ROOT BALL IS EVEN WITH THE FINISHED GRADE ON THE DOWNHILL SIDE

SCARIFY SIDES OF PLANTING PIT PRIOR TO BACKFILLING

CUT EROSION CONTROL FABRIC AND KEY IN TO PLANTING PIT



PRELIMINARY DESIGN



DESIGN NO. _____

CONTRACT NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT

NO. _____

DATE _____

BY _____

FOR _____

APPROVED _____

US ARMY CORPS OF ENGINEERS ALASKA DISTRICT