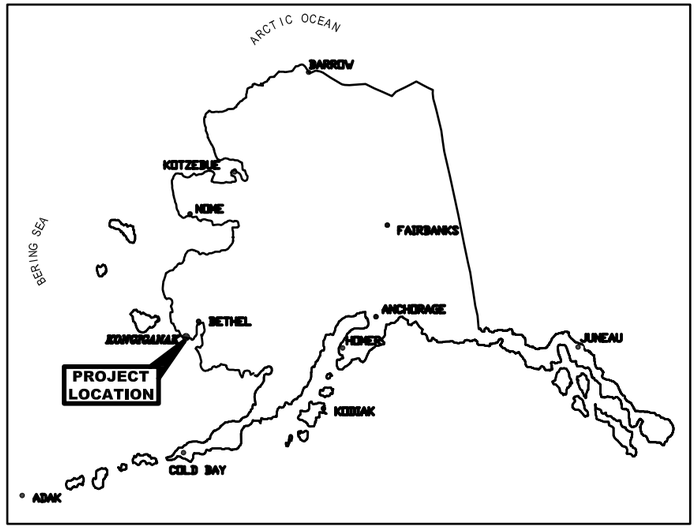
Kongiganak Village Council
Sewer & Water Improvements
Improvements

PHASE 1-2002

CONSTRUCTION PLANS

In Cooperation with the State of Alaska
Department of Environmental Conservation
Village Safe Water Program and
U.S. Department af Agriculture, Rural Development



Location Map

VILLAGE SAFE WATER

SUMMIT
CONSULTING SERVICES INC.

Consultant

PROJECT NUMBER (CONSULTANT)		(VSW)	
VSW PROJECT ENGINEER			
CONSTRUCTION FOREMAN			
FINAL DESIGN	(DATE)		
ADEC APPROVAL	(DATE)		
CONSTRUCTION PERIOD	(FROM)	(TO)	
AS-BUILTS	(DATE)		

SHEET INDEX

ISSUED PER CONSTRUCTION 2/14/03

SITE PLAN

EXISTING		PROPOSED THIS PROJECT
	STRUCTURES	
	ROADS (PAVED)	
	ROADS (UNPAVED)	
	PROPERTY LINE	
-C-	COMMUNICATIONS LINE	C
-P-	POWER LINE	P
	SEWER SERVICE LINE	
	WATER SERVICE LINE	
CO	CLEAN OUT	CO
	SEWER LINE	
	WATER LINE	
FM	FORCE MAIN	FM
FH	FIRE HYDRANT, IN-LINE	FH
FH	FIRE HYDRANT, OFFSET	FH
MH	MANHOLE	MH
	VALVE	
POL	POL LINE (FUEL OIL)	POL
	LIFT STATION WITH BUILDING R.O.W. LINE	
	WELL	
	FENCE	
U	UTILIDOR	U
R	RACEWAY	R
	RAILROAD	
	BENCH MARK	
	TEST HOLE	
EL.	ELEVATION	EL.
ST	SEPTIC TANK	ST
LF	LEACHFIELD	LF
W	CORPORATION STOP	W
BC	BRASS CAP	
W	WATERING POINT	W
PP	POWER POLE	PP
CS	CURB STOP	CS
DT REPS	RESIDENTIAL EFFLUENT PUMPING STATION (DOSING TANK)	DT REPS
	PEDESTAL	
	TRANSFORMER	
W.T.P. or W.T.B.	WATER TREATMENT PLANT OR WATER TREATMENT BUILDING	W.T.P. or W.T.B.
W.S.T.	WATER STORAGE TANK	W.S.T.
W.W.T.F.	WASTE WATER TREATMENT FACILITY	W.W.T.F.
N.F.S.	NON FROST SUSCEPTIBLE	N.F.S.

MECHANICAL

	PRIMARY SYSTEM
HW	HOT WATER LINES
HWR	HOT WATER RETURN LINES
D	DRAIN AND OVERFLOW LINE
CWM	COLD WATER MAKE-UP LINE
BP	BY-PASS LINE
BW	BACK WASH LINE
CW	COLD WATER LINES
LWC	LOW WATER CUT-OFF
CP	CHEMICAL PUMP
C	CIRCULATING PUMP
M	WATER METER
	GATE VALVE
	CHECK VALVE
DE	UNION DIELECTRIC UNION
	AUTOMATIC AIR RELIEF
	PRESSURE RELIEF VALVE
	ADAPTOR
	FLEX PIPE
	FLEX COUPLING
A	AQUASTAT
FS	FLOW SWITCH
PS	PRESSURE SWITCH
	THERMOMETER
	PRESSURE REDUCING VALVE
	PRESSURE GAUGE
	FLOW INDICATOR
	THERMOFLO INDICATOR
	CIRCUIT SETTER
	DIRECTION OF FLOW
V	VACUUM BREAKER
	TANK LEVEL INDICATOR

PIPE FITTING AND VALVE SYMBOLS

	ANGLE VALVE		90° LONG RADIUS ELBOW
	CAP		VICTAULIC COUPLING
	CROSS	V	VACUUM BREAKER
	ELBOW (ELL), 45°		FLOOR DRAIN
	ELBOW, 90°		BALL VALVE
	LATERAL		CHECK BALL VALVE
	TEE	S	SOLENOID VALVE
	STRAINER	M	MOTORIZED VALVE
DE	DIELECTRIC FLANGE PKG.	M	MOTORIZED 3-WAY VALVE
	FLANGE JOINT		GLOBE VALVE
	SCREWED JOINT		BALANCING VALVE
	WELDED JOINT	2-WAY	AUTO. TEMP. CONTROL VALVE
	SOLDERED JOINT	3-WAY	AUTO. TEMP. CONTROL VALVE
	SLEEVE		QUICK OPENING VALVE
	DRESSER COUPLING		FUSIBLE VALVE
	EXPANSION JOINT		BUTTERFLY VALVE
	REDUCER, CONCENTRIC	FC 3gpm	FLOW CONTROL VALVE
	REDUCER, ECCENTRIC		
HB	HOSE BIB	3gpm	PLUG VALVE
	MINITROL	ELL = ELBOW	MJ=MECHANICAL JOINT

ELECTRICAL

	CONDUIT, SURFACE MOUNTED
	CONDUIT, BURIED OR IN-SLAB
	HOME RUN TO CIRCUIT BREAKER PANEL
	CONDUIT W/No. OF WIRES INDICATED ONE NEUTRAL, TWO HOT, A.W.G. 12, COPPER.
	INCANDESCENT FIXTURE
	INCANDESCENT FIXTURE, WALL MOUNTED
	FLUORESCENT FIXTURE
V	VAPOR TIGHT LIGHT FIXTURE
	HIGH PRESSURE SODIUM LIGHT FIXTURE
	INCANDESCENT FIXTURE, RECESSED
	FLUORESCENT FIXTURE, RECESSED
	DUPLEX RECEPTACLES
	QUADRAPLEX RECEPTACLES
	SPECIAL PURPOSE RECEPTACLES
S	SINGLE POLE SWITCH
S_3	3-WAY SWITCH
J	JUNCTION BOX
T	THERMOSTAT
T	TRANSFORMER
A	AQUASTAT
PC	PHOTO CELL
R	RELAY
M	MOTOR OPERATED VALVE (ZONE VALVE)
S	SOLENOID VALVE
	CONTROLLER
	MOTOR STARTER, MANUAL
	MOTOR STARTER, MAGNETIC
	SWITCHING PANEL
	CIRCUIT BREAKER PANEL
	ALARM PANEL
H	HEAT DETECTOR
S	SMOKE DETECTOR
B	BELL
	ALARM HORN
M	METER BASE
2	MOTOR W/HORSEPOWER INDICATED
FLS	FLOAT SWITCH
PS	PRESSURE SWITCH
FS	FLOW SWITCH
UH	UNIT HEATER
	EMERGENCY LIGHT
	EXIT LIGHT
	SYSTEM GROUND
	SWITCHED RECEPTACLE
S_{PB}	PUSH-BUTTON SWITCH
F	FAN
P.C.	FIXTURE W/PULL CHAIN
S_T	SWITCH W/TIMER
CU	TELEPHONE OUTLET COPPER

NOTES

CIVIL

1. MINIMUM VERTICAL SEPARATION BETWEEN WATER LINE AND SEWER LINE AT THEIR CROSSING POINT SHALL BE 18 INCHES.
2. MINIMUM HORIZONTAL SEPARATION BETWEEN WATER LINE AND SEWER LINE SHALL BE 10 FEET.
3. MINIMUM BURY ON WATER LINE SHALL BE 6 FEET.
4. LOCATION OF ALL WELLS, SEPTIC TANKS, MANHOLES, CLEANOUTS, VALVES, ETC. SHALL BE REFERENCED TO THREE PERMANENT ABOVE GROUND STRUCTURES.
5. CLEANOUTS, LEACH FIELDS AND SEPTIC TANKS ARE NUMBERED ACCORDING TO CORRESPONDING MANHOLE, i.e., MH-1, ST-1A, LF-1A AND CO-1A.

MECHANICAL

1. ALL EXPOSED PIPING SHALL BE PAINTED USING THE FOLLOWING COLOR CODE :

OLIVE GREEN	– RAW WATER
AQUA	– CLARIFIED WATER
DARK BLUE	– POTABLE WATER
BLUE W/ BLACK BAND	– NON-POTABLE WATER
BLACK	– HEATING
RED	– FIRE SUPRESSION
YELLOW	– CHLORINE
LT BLUE W/ RED BAND	– FLUORIDE
VIOLET	– POTASSIUM PERMANGANATE
YELLOW	– WASTE HEAT RECOVERY
ORANGE W/ GREEN BAND	– POLYMERS / COAGULAANT AIDS
DARK GREY	– SANITARY SEWER
LIGHT BROWN	– BACKWASH WASTE
DARK GREEN	– COMPRESSED AIR
BLAZE ORANGE	– FUEL
ORANGE	– WASTE HEAT (SECONDARY WATER)
GREEN	– NORMALLY OPEN VALVE HANDLES
RED	– NORMALLY CLOSED VALVE HANDLES

2. TYPE OF PAINT TO BE USED SHALL BE RUST-OLEUM 9100 EPOXY OR APPROVED EQUAL.
3. DIRECTION OF FLOW SHALL BE INDICATED BY ARROWS AND A NAME PLATE SHALL BE ATTACHED DESCRIBING MATERIAL BEING CARRIED.
4. ALL PIPING SHALL BE COPPER UNLESS OTHERWISE INDICATED.
5. ALL SOLDER CONNECTIONS SHALL BE MADE W/LEAD FREE-ANTIMONY SOLDER.
6. ALL HOT WATER LINES SHALL BE INSULATED.
7. ALL PIPE SUPPORTS AND HANGERS SHALL HAVE 5/8 INCH INSULATION BETWEEN COPPER PIPE AND SUPPORTS OR HANGERS.
8. PRESSURE TESTING REQUIREMENTS FOR WATER MAINS AND SERVICES, AND SEWER MAINS AND SERVICES SHALL BE IN ACCORDANCE WITH SFS GUIDELINE C-39.
9. TESTING REQUIREMENTS FOR DRAIN WASTE AND VENT PLUMBING, WATER SUPPLY PIPING AND HYDRONICS PIPING SHALL BE IN ACCORDANCE WITH MOST RECENT UNIFORM PLUMBING CODE.
10. ALL SIZES ARE INDUSTRY STANDARD ASTM A53 PIPE AND ASTM B88 TUBE DESIGNATED BY THEIR NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE LIST BELOW.

NOMINAL SIZE

INCH	mm	INCH	mm
1/2	15	3	80
3/4	20	3-1/2	90
1	25	4	100
1-1/4	32	5	125
1-1/2	40	6	150
2	50	8	200
2-1/2	65	10	250
		12	300

ELECTRICAL

1. CLEAR AREA REQUIRED FOR ELECTRICAL PANELS :
   36" FROM FACE OF PANEL
   75" FROM FLOOR UP TO FIRST OBSTRUCTION
   15" CLEAR EACH SIDE FROM CENTER LINE OF PANEL
2. GROUND SYSTEM, NEUTRAL AND ALL METALLIC SURFACES SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF N. E. C.
3. ALL WIRING SHALL BE IN CONDUIT, UNLESS OTHERWISE SPECIFIED, AND IN CONFORMANCE WITH THE LATEST REVISION OF N. E. C.
4. ALL SIZES ARE INDUSTRY STANDARD ASTM A53 PIPE AND ASTM B88 TUBE DESIGNATED BY THEIR NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE TABLE UNDER MECHANICAL FOR SIZES 1/2" TO 6".

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
LEGEND AND NOTES

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

L-1

Dwg Name:KongLagoonLegend_L-1

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STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
SURVEY DATA

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale: 1"=100' FULL SIZE	

D–1

Dwg Name:KongLagoonSurveyData_D–1

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LEGEND	
⊙	PROBE TO DEPTH OF 5 FEET
⊗	DEEP HOLE
•	PROBE HOLE TO DEPTH OF 2 FEET

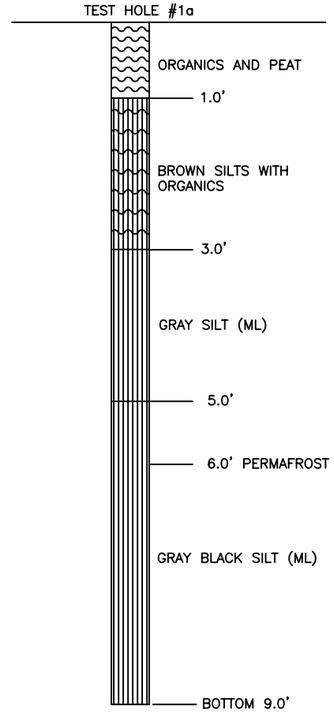
NOTE:
ALL LOCATIONS ARE APPROXIMATE

⊙30

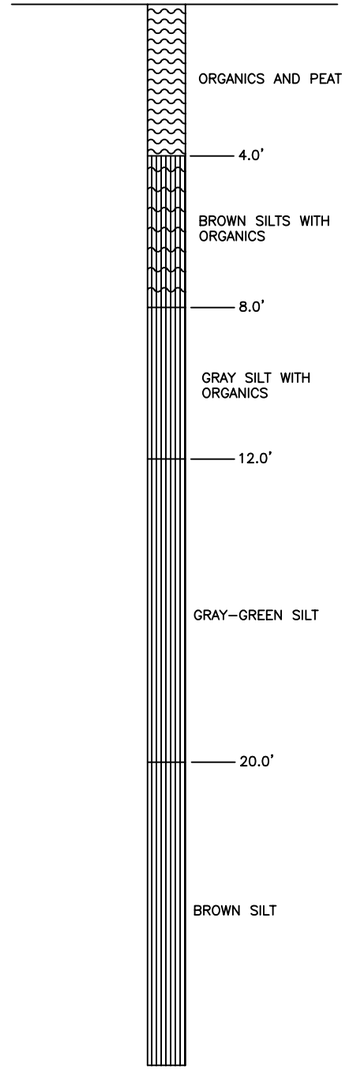
⊙31

VERIFY THE NORTH ARROW ORIENTATION

1 / D-2 TEST HOLE SITE PLAN
SCALE: NOT TO SCALE



2 / D-2 TEST HOLE 1a DETAIL
SCALE: NOT TO SCALE



3 / D-2 GENERALIZED SOIL PROFILE
SCALE: NOT TO SCALE

GEOTECHNICAL INFORMATION:

PREVIOUS INVESTIGATIONS:

THE SANITATION FACILITIES MASTER PLAN, PREPARED BY HDR ALASKA IN 1993 INDICATED THE KONGIGANAK TOWNSITE AND IMMEDIATE AREAS ARE UNDERLAIN BY PERENNIALLY FROZEN SILTS AND FINE SANDS TO A MINIMUM DEPTH OF APPROXIMATELY 200 FEET, BASED UPON AVAILABLE INFORMATION. SURFACE AND NEAR SURFACE SOILS ARE COMPOSED OF ORGANIC OVERBURDEN AND ORGANIC RICH SILTS WITH ICE INCLUSIONS. ISOLATED PERMAFROST–FREE SOIL POCKETS ARE OFTEN ENCOUNTERED DUE TO LOCALIZED THAW BULBS NEAR LARGE BODIES OF WATER, WITH POTENTIAL SALT INCLUSIONS.

LIMITED GEOTECHNICAL INVESTIGATIONS IN THE PAST, NAMELY BY QUANDRA ENGINEERING AND HDR ALASKA ENGINEERING INDICATE SOME SOILS TESTING HAS OCCURRED NEAR THE WATER STORAGE TANK AND THE WATER TREATMENT PLANT. THESE INVESTIGATIONS INDICATE THE FOLLOWING GENERAL SOIL PROFILE:

DEPTH (FT)	DESCRIPTION
0–4	PEAT, WITH VISIBLE ICE
4–8	ORGANIC SILTS WITH VISIBLE ICE.
8–12	SILT WITH SOME ORGANICS AND VISIBLE ICE.
12–20	GRAY–GREEN SILT WITH SOME CLAY.
BELOW 20	BROWN SILT WITH SOME CLAY AND TRACES OF ORGANICS.

THE PERMAFROST LEVEL WAS NOT INDICATED.

CURRENT INVESTIGATIONS:

LIMITED GEOTECHNICAL INVESTIGATIONS OF THE SOILS NEAR THE EXISTING AND PROPOSED LAGOON WERE PERFORMED. LACK OF SUITABLE EQUIPMENT AND THE TYPE OF SOILS LIMITED MOBILITY FOR LARGER EQUIPMENT AND A DRILL RIG WAS NOT AVAILABLE.

AN INITIAL SOILS INVESTIGATION FOR THE LAGOON DESIGN WAS CONDUCTED BY MR. CHRIS ALLARD, P.E. MONTGOMERY WATSON HARZA, OCTOBER 2001. THE METHOD USED WAS A 5–FOOT PROBE CONSTRUCTED OF 1/8–INCH STEEL PIPE WITH AN OUTSIDE DIAMETER OF 0.4 INCHES. THE RESISTANCE TO THE PROBE TO INSERTION INTO THE SOILS WAS USED AS AN INDICATION OF THE SOILS TYPE.

THE GENERAL SOILS PROFILE OBSERVED CONSISTED OF 18 INCHES OF ORGANICS COMPRISED OF ORGANICS ROOTS AND PEAT. THE UPPER 1 TO 3 INCHES WERE FROZEN. BELOW THE ORGANICS IN MOST LOCATIONS WAS GRAY SILT THAT BECAME SLIGHTLY STIFFER (OFFERING MORE RESISTANCE) WITH DEPTH.

VARIATIONS TO THIS GENERAL PROFILE WERE FOUND IN THE MOUNDS AT THE SOUTH END AND SOUTHWEST SIDE OF THE LAGOON, WHERE PERMAFROST WAS FOUND AT OR NEAR 2–FEET DEPTH. ANOTHER VARIATION WAS VERY LITTLE RESISTANCE TO PROBING TO 5–FEET. DIGGING, USING HAND IMPLEMENTS REVEALED A TRANSITION FROM ORGANICS TO A MIXTURE OF ORGANICS AND SILT, BECOMING MORE SILTY WITH DEPTH. THIS PROFILE WAS FOUND IN SCATTERED LOCATIONS ALONG THE WEST SIDE OF THE LAGOON.

IN JUNE 2002, ANOTHER LIMITED GEOTECHNICAL SOILS INVESTIGATION WAS CONDUCTED BY RON GODDEN, P.E., SUMMIT CONSULTING SERVICES, NEAR THE SOUTH END OF THE EXISTING LAGOON. WHILE MOBILITY OF THE EXCAVATOR AND BULLDOZER WAS LIMITED, A HOLE TO 9–FEET BELOW GRADE WAS ACCOMPLISHED (TEST HOLE 1a). THE SOILS PROFILE, TEST HOLE 1a, OBSERVED CONSISTED OF APPROXIMATELY 1–FOOT OF ORGANICS AND PEAT, UNDERLAIN BY GRAY SILT TO 5–FEET. FROM 5–FEET TO APPROXIMATELY 9–FEET, GRAY BLACK SILT WAS OBSERVED. PERMAFROST WAS ALSO OBSERVED BEGINNING AT APPROXIMATELY 3–FEET TO THE BOTTOM OF THE HOLE.

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
GEOTECHNICAL INFORMATION

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	I.W.
Checked By:	C.A.
Scale:	NOT TO SCALE

D2

Dwg Name:KongLagoon_D–2

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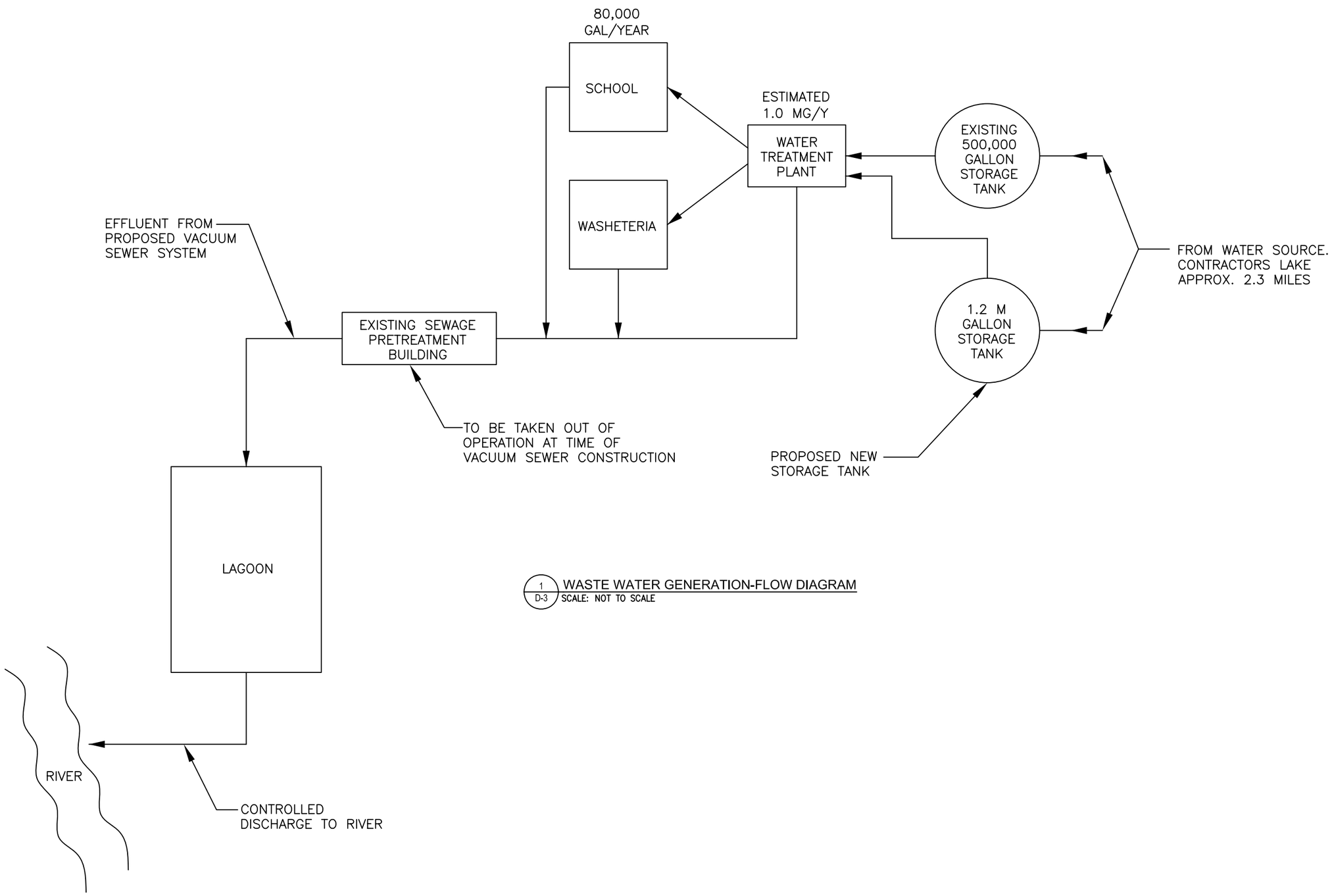

1 / D-3 WASTE WATER GENERATION-FLOW DIAGRAM
SCALE: NOT TO SCALE

STATE OF ALASKA 49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
WASTE WATER GENERATION

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	NOT TO SCALE

D–3

Dwg Name:KongLagoonFlowDiag_D–3

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PROJECT NARRATIVE:

THIS PROJECT CONSISTS OF THE CONSTRUCTION OF A 5.29 ACRE, SINGLE CELL FACULATIVE SEWAGE LAGOON, NON–PERCOLATING, CONTROLLED DISCHARGE, IN ACCORDANCE WITH TITLE 18, ALASKA ADMINISTRATIVE CODE, CHAPTER 72.

THE CONSTRUCTION OF THIS FACILITY WILL BE COMPRISED OF TWO WORK SEASONS DUE TO THE POOR SOIL CONDITIONS AND THE INABILITY TO MOBILIZE HEAVY EQUIPMENT IN THE CONSTRUCTION AREA AT CERTAIN TIMES OF THE YEAR. MOST OF THE WORK WILL OCCUR AFTER FREEZE UP AND BEFORE BREAK UP.

THE WORK IN CY 2003 WILL CONSIST OF THE FOLLOWING:

1. DIKING THE NORTHEAST SECTION OF THE EXISTING TUNDRA POND TO KEEP THE INFLUENT CONFINED TO A SMALL AREA.
2. REMOVING THE ICE AND ORGANIC MATERIALS IN THE EXISTING TUNDRA POND AND PLACING IT IN THE EXISTING HONEY BUCKET DISPOSAL POND TO THE SOUTHWEST OF THE LAGOON.
3. LAYING THE AMCO 2006 GEOTECHNICAL FABRIC UNDER THE FOOTPRINT OF THE DIKE TO BE CONSTRUCTED.
4. EXCAVATING THE BOTTOM OF THE LAGOON TO CREATE MATERIAL TO CONSTRUCT THE DIKE SECTION OF THE LAGOON. THE ELEVATION OF THE BOTTOM OF THE LAGOON WILL BE FIELD ADJUSTED AS NECESSARY TO PROVIDE THE NEEDED MATERIAL.
5. PUSHING THE EXCAVATED MATERIAL OVER THE GEOTECHNICAL FABRIC TO SHAPE THE DIKE. THE ELEVATION OF THE DIKE. THE ELEVATION OF THE DIKE SHALL BE AT LEAST 84.5 FEET ABOVE SEA LEVEL.
6. SHAPING THE OUTSIDE OF THE DIKE, WHICH FORMS THE LAGOON, IN SUCH A MANNER THAT ALL OUTSIDE ELEVATIONS ARE AT LEAST AS HIGH AS THE ELEVATIONS INDICATED ON THE PLANS.
7. SHAPING THE INSIDE OF THE DIKE, WHICH FORMS THE LAGOON, IN SUCH A MANNER THAT ALL INSIDE ELEVATIONS ARE AT LEAST AS HIGH AS THE ELEVATIONS INDICATED ON THE PLANS.
8. RELEASING THE CONTENTS OF THE DIKED AREA IN THE NORTHEAST CORNER OF THE LAGOON AND MOVING THE INFLUENT LINE TO DISCHARGE IN THE LOWER AREA.
9. REMOVING THE MATERIAL FROM THE PREVIOUSLY DIKED AREA AND FORMING THE NORTHEAST PORTION OF THE LAGOON.
10. CONSTRUCT THE NEW HONEY BUCKET DISPOSAL BUTTRESS AND ACCESS RAMP.

THE WORK IN CY 2004 WILL CONSIST OF THE FOLLOWING:

1. RESHAPING THE DIKE TO FINAL GRADES.
2. INSTALLING THE PIPING FOR THE FUTURE DISCHARGE OF THE LAGOON.
3. INSTALLING ALL TOPPING AND EROSION CONTROL MATERIALS.
4. INSTALLING THE FINAL INFLUENT PIPING.
5. INSTALLING ALL FENCING.

KONGIGANAK LAGOON DESIGN CALCULATIONS:

ASSUMPTIONS:

50 GAL/DAY/PERSON, BASED UPON VILLAGE USAGE, NORMALLY 75 GAL/DAY/PERSON.

80 GM BOD_5 /PERSON/DAY (COLD REGIONS UTILITIES MONOGRAPH, 3 ED., TABLE 10–4).

2002 POPULATION=350 PEOPLE, PRESENT.

2010 POPULATION=450 PEOPLE, BASED UPON 2.5% INCREASE PER YEAR.

SOME TYPE OF WASTEWATER COLLECTION SYSTEM WILL BE BUILT IN THE VILLAGE.

SURFACE AREA OF LAGOON=5.295 AC.

LIQUID DEPTH OF LAGOON=72.0 FT–58.0 FT=14.0 FT.

LIQUID VOLUME OF LAGOON AT OPERATION LEVEL OF 72.0 FT.=19,974,754 GALLONS.

REQUIRED DETENTION TIME=AT LEAST 6 MONTHS. (COLD REGIONS UTILITIES MONOGRAPH, 3 ED., TABLE 10–4.

MAXIMUM BOD_5 LOADING=35 LB/AC–DAY, (COLD REGIONS UTILITIES MONOGRAPH, 3 ED., TABLE 10–4).

AVERAGE RAINFALL (BETHEL): 17.9 INCHES/YEAR (AK STATE CLIMATOLOGIST)

AVERAGE SNOWFALL (BETHEL): 51.0 INCHES/YR (AK STATE CLIMATOLOGIST)

EVAPORATION TRANSPORT RATE (BETHEL): 14.05 INCHES/YR AK STATE CLIMATOLOGIST).

CALCULATIONS:

(80 GM BOD_5/PERSON/DAY)(350 PEOPLE)
=28,000 GM BOD_5/DAY
=(28,000 GM BOD_5/DAY)(2.2 LB)/1000 GM
=61.6LB BOD_5/DAY

(80 GM BOD_5/PERSON/DAY)(450 PEOPLE)
=36,000 GM BOD_5/DAY
=(36,000 GM BOD_5/DAY)(2.2 LB)/1000 GM
=79.2LB BOD_5/DAY

THEN:

(61.6 LB BOD_5/DAY)(5.295 AC)=11/63 LB BOD_5/AC–DAY FOR 350 PEOPLE. AND,
(79.2 LB BOD_5/DAY)(5.295 AC)=14.96 LB BOD_5/AC–DAY FOR 450 PEOPLE.

(350 PEOPLE)(50 GAL/PERSON)(365 DAYS/YR)=6,387,500 GAL/YR

(450 PEOPLE(50 GAL/PERSON)(365 DAYS/YR)=8,212,500 GAL/YR

AND:

RAINFALL/YR–EVAPORATION TRANSPORTATION RATE/YR=17.0 IN–14.05 IN=2.95 INCHES/YR.
SNOWFALL/DRIFTING SNOW ACCUMULATION IN LAGOON: 51 INCHES+51 INCHES–102 INCHES.

102 INCHES SNOW 1 INCH WATER/10 INCHES SNOW=10.2 INCHES WATER.

2.95 INCHES WATER FROM RAIN AND 10.2 INCHES WATER FROM SNOW=13.15 INCHES=1.1 FEET.

1 AC–FT WATER=(325,900 GAL/AC–FT)(1.1FT)(5.295 AC)=1,891,014 GAL/YEAR.

THEN:

(350 PEOPLE)(50 GAL/PERSON)(365 DAYS/YR)=6,387,500 GAL/YR+1,891,014 GAL/YEAR
=8,278,514 GAL/YR

(450 PEOPLE)(50 GAL/PERSON)(365 DAYS/YR)=8,212,500 GAL/YR+1,891,014 GAL/YEAR
=10,103,514 GAL/YR

THEN:

(19,974,754 GAL)/8,278,514 GAL/YR)=2.41 YR
(19,974,754 GAL)/10,103,514 GAL/YR)=1.98 YR

STATE OF ALASKA 49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
DESIGN DATA AND
PROJECT NARRATIVE

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	NOT TO SCALE

D–4

GENERAL NOTES:

1. MODEL NUMBERS AND MANUFACTURERS REFERENCED IN PLANS ARE USED TO ESTABLISH THE MINIMUM GRADE OF PRODUCT REQUIRED. OTHER MANUFACTURERS WILL BE ACCEPTABLE PROVIDED THEY MEET THE SAME GRADE, PERFORMANCE, AND DESIGN REQUIREMENTS AS THOSE SPECIFIED.
2. ALL WORK SHALL BE DONE IN A WORKMANLIKE MANNER AND IN CONFORMANCE WITH ALL APPLICABLE CODES.
3. RECORD DRAWINGS–THE SITE SUPERINTENDENT SHALL BE RESPONSIBLE FOR MAINTAINING A CLEAN SET OF DRAWINGS FOR RECORD INFORMATION AT THE PROJECT OFFICE. ALL REQUIRED INFORMATION SHALL BE RECORDED IN RED PENCIL ON A DAILY BASIS IN NEAT, LEGIBLE FASHION.
4. GENERAL RESTORATION–THE AREAS IMPACTED BY CONSTRUCTION SHALL BE RETURNED TO PRE–CONSTRUCTION CONDITION OR BETTER. CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE AREA AND DISPOSED AS DIRECTED.
5. BARRICADES AND WARNING SIGNS SHALL BE PROVIDED TO ADVISE RESIDENTS OF HAZARDOUS CONDITIONS.

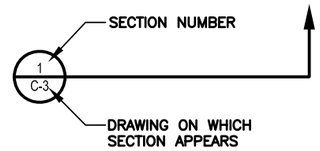
STRUCTURAL:

1. ALL WORK TO BE IN ACCORDANCE WITH UBC 1997.
2. PROVIDE TEMPORARY SUPPORT AND BRACING FOR ALL BUILDING ELEMENTS AGAINST CONSTRUCTION LOADS AS WORK PROGRESSES.

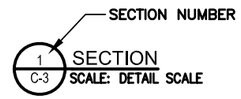
DETAIL AND SECTION REFERENCES:

SECTION IDENTIFICATION

(1) SECTION CUT ON DRAWING C–3:

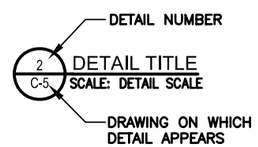


(2) ON DRAWING C–3 THIS SECTION IS IDENTIFIED AS:

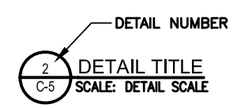


DETAIL IDENTIFICATION

(1) DETAIL SHOWN ON DRAWING C–5:



(2) ON DRAWING C–5 THIS DETAIL IS IDENTIFIED AS:



STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
GENERAL NOTES

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	NOT TO SCALE

D–5

STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

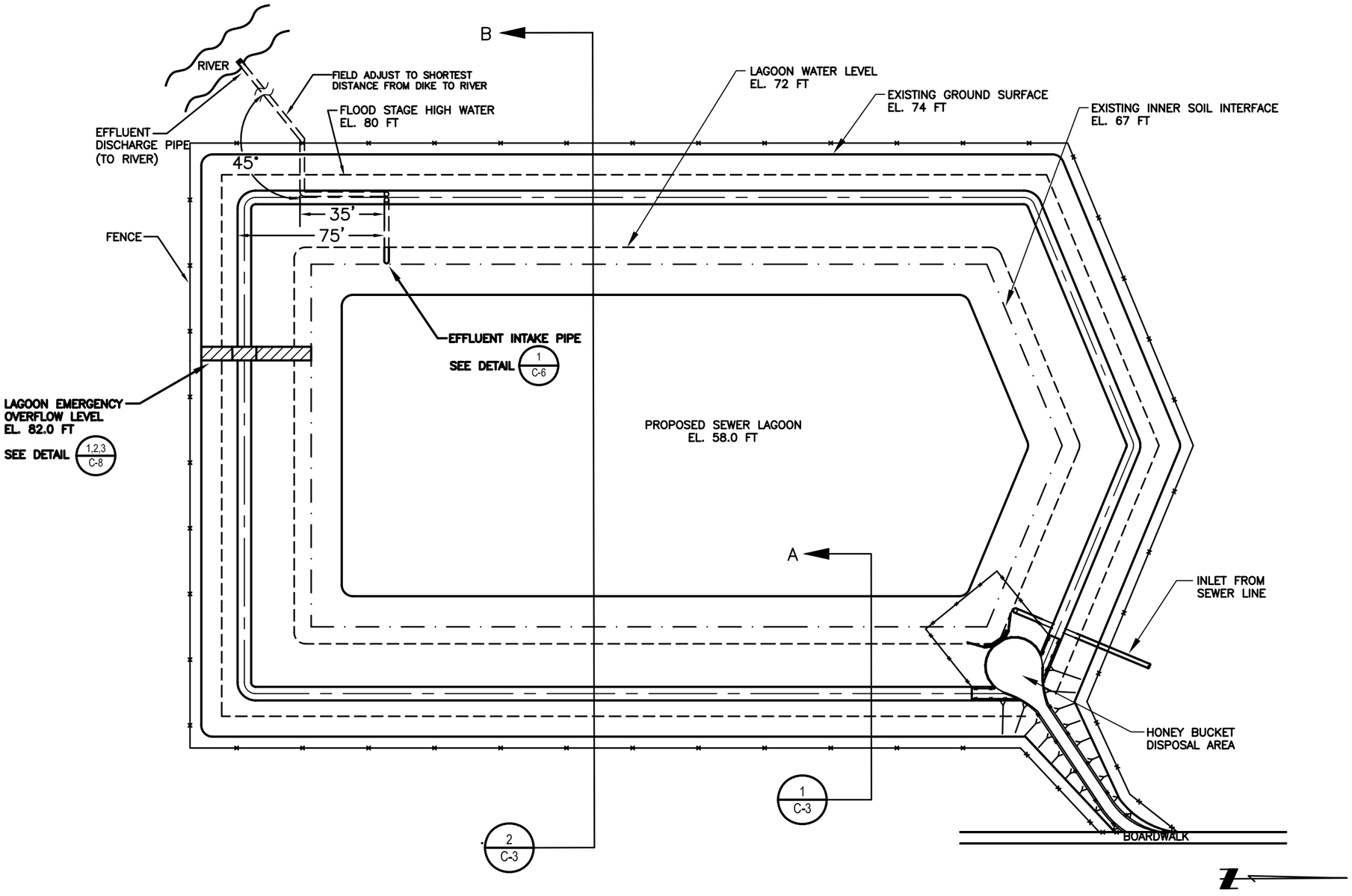
KONGIGANAK LAGOON DESIGN

DISCHARGE PLAN

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale: 1"=150' FULL SIZE	

D-6

S:\CAD\Projects\Kongiganak\Lagoon\Previous Work\IFC\D-6.dwg, Layout1, 7/19/2010 3:56:02 PM



STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
PLAN VIEW

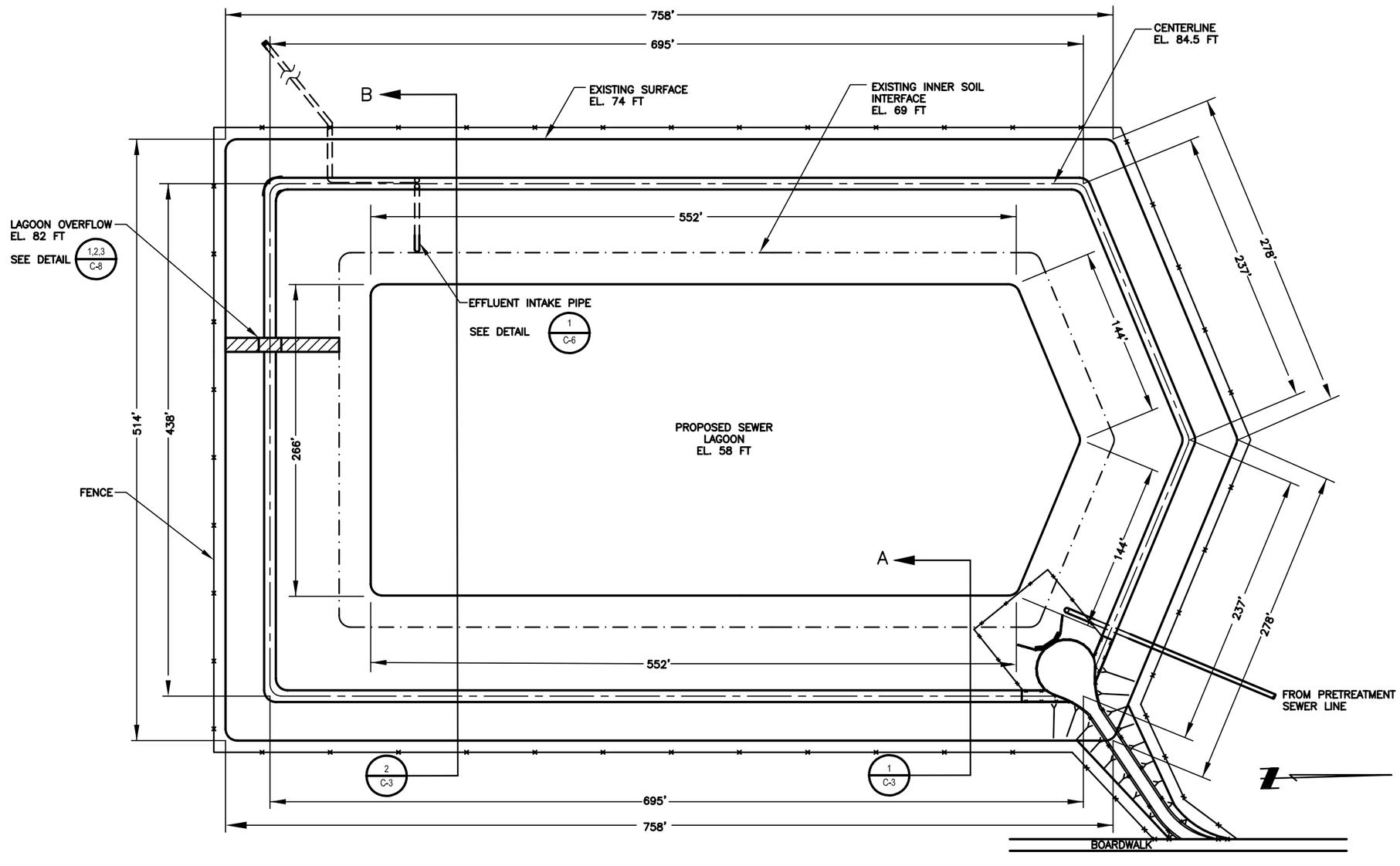
Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	1"=50' FULL SIZE

C-1

S:\CAD\Projects\Kongiganak\Lagoon\Previous Work\IFC\C-1.dwg, Sheet 1, 7/19/2010 3:24:07 PM

Dwg Name:KongLagoonDes_Plan_C-1

NOTE:
1. TO PROVIDE SUFFICIENT MATERIAL TO CONSTRUCT DIKE, ADJUST ELEVATION OF BOTTOM OF LAGOON.



GRAPHIC SCALE
0 50' 100' 150'
SCALE: 1" = 50'

STATE OF ALASKA 49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMIT CONSULTING SERVICES INC.

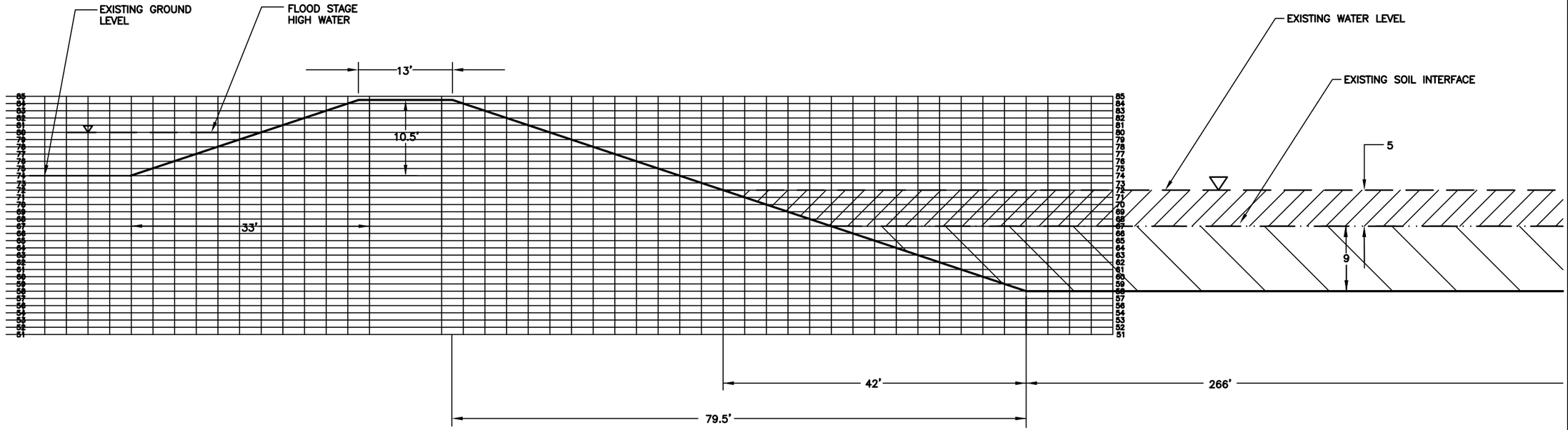
KONGIGANAK LAGOON DESIGN
PLAN VIEW DESIGN DATA

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	1"=50' FULL SIZE

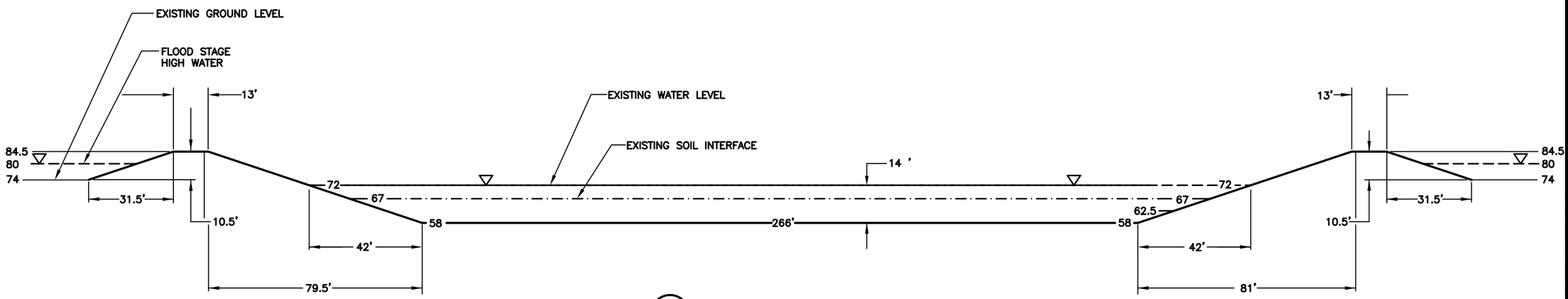
C-2

S:\CAD\Projects\Kongiganak\Lagoon\Previous Work\IFC\C-2.dwg, Sheet 1, 7/19/2010 3:26:36 PM

Dwg Name:KongLagoonDes_Plan_C-2



1 C-3 LAGOON CROSS SECTION A
SCALE: NOT TO SCALE



2 C-3 LAGOON CROSS SECTION B
SCALE: NOT TO SCALE

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMIT CONSULTING SERVICES INC.

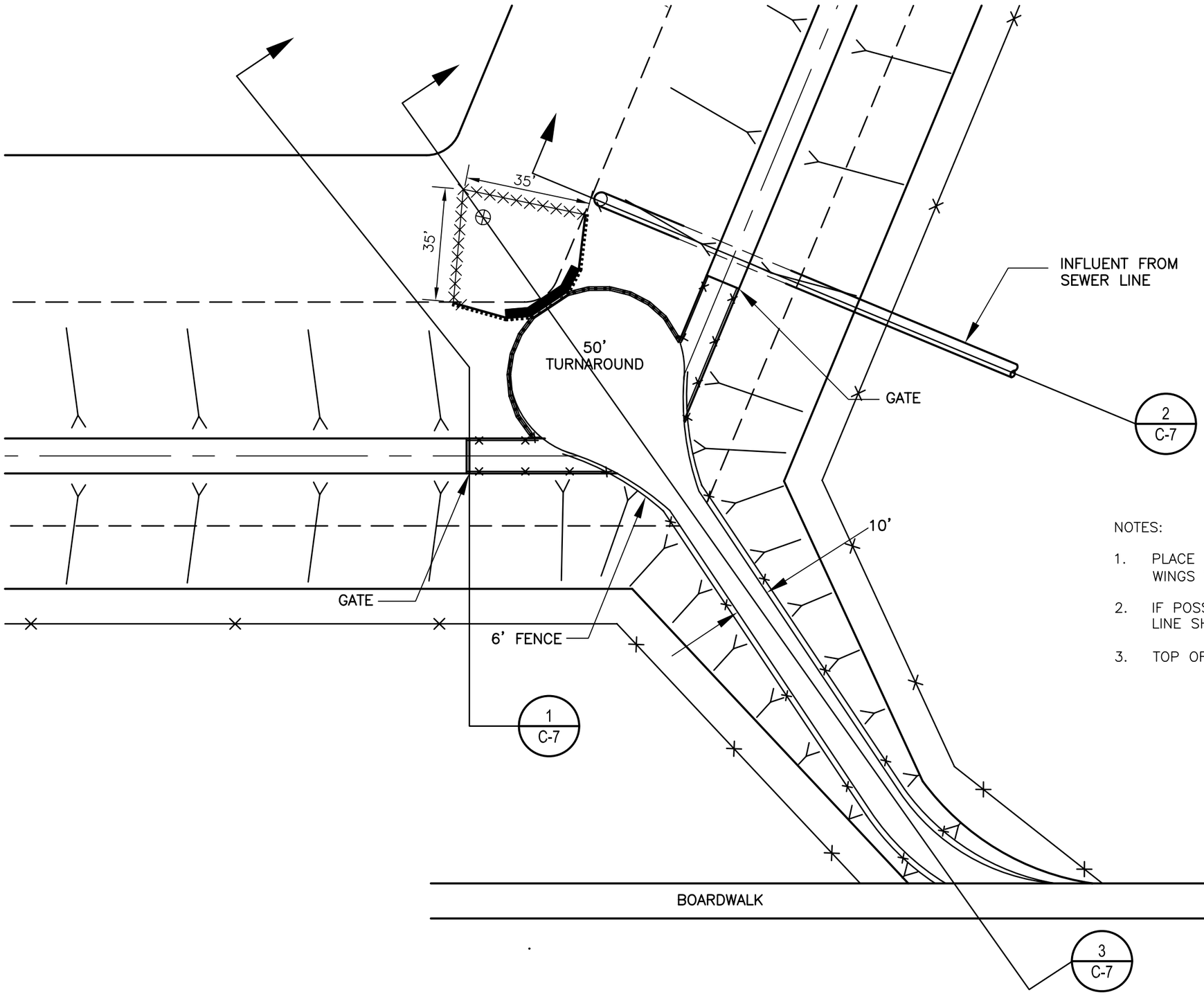
KONGIGANAK LAGOON DESIGN
LAGOON CROSS SECTIONS

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	NOT TO SCALE

C-3

Dwg Name:KongLagoonDes_Sections_C-3

S:\CAD\Projects\Kongiganak\Lagoon\Previous Work\IFC\C-3.dwg, Sheet 1 of 2, 7/19/2010 3:27:55 PM



NOTES:

1. PLACE FENCE ON TOP OF BUTTRESS WINGS TO ELEVATION 72.0'
2. IF POSSIBLE DISCHARGE FROM SEWER LINE SHOULD ENTER AT ⊗
3. TOP OF FENCE ELEVATION 72.0'

2 / C-4 HONEY BUCKET DISPOSAL DETAIL
SCALE: 1:30

CHANGES MADE BY RON GODDEN 9/2/05

GRAPHIC SCALE
0 30' 60'
SCALE: 1" = 30'

STATE OF ALASKA 49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
HONEY BUCKET DISPOSAL AND EROSION DETAILS

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	SMG/RKB
Checked By:	C.A.
Scale:	NOT TO SCALE

C-4

Dwg Name:KongLagoonErosionDetail_C-4

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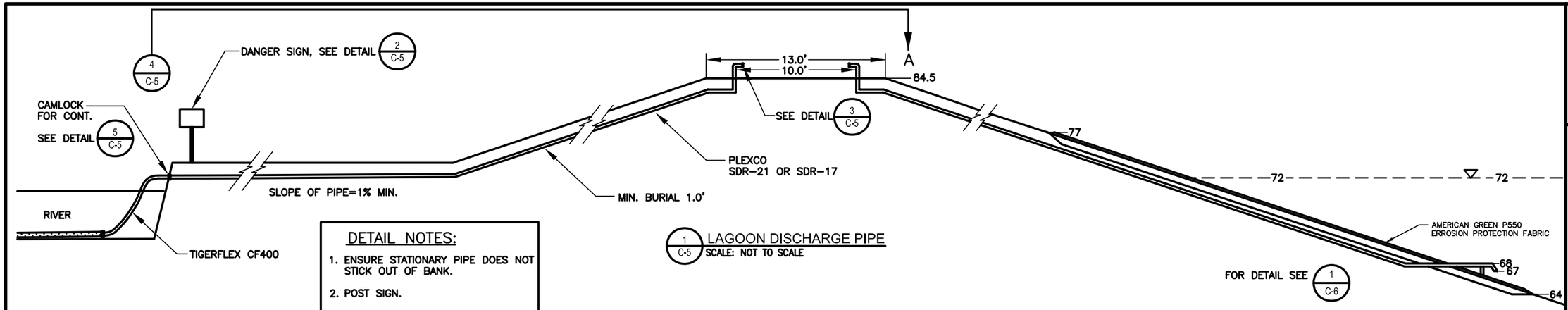
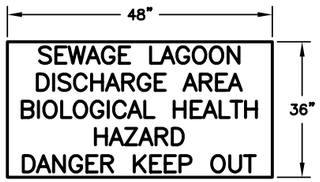


DETAIL NOTES:

1. ENSURE STATIONARY PIPE DOES NOT STICK OUT OF BANK.
2. POST SIGN.

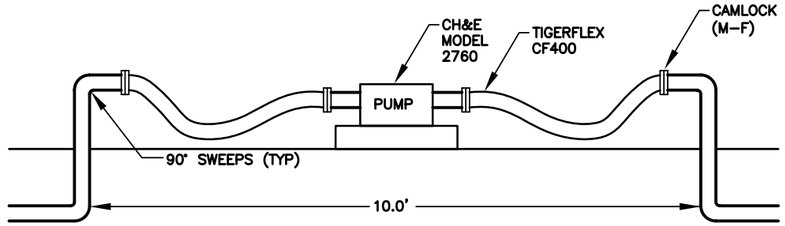
1 C-5 LAGOON DISCHARGE PIPE
SCALE: NOT TO SCALE



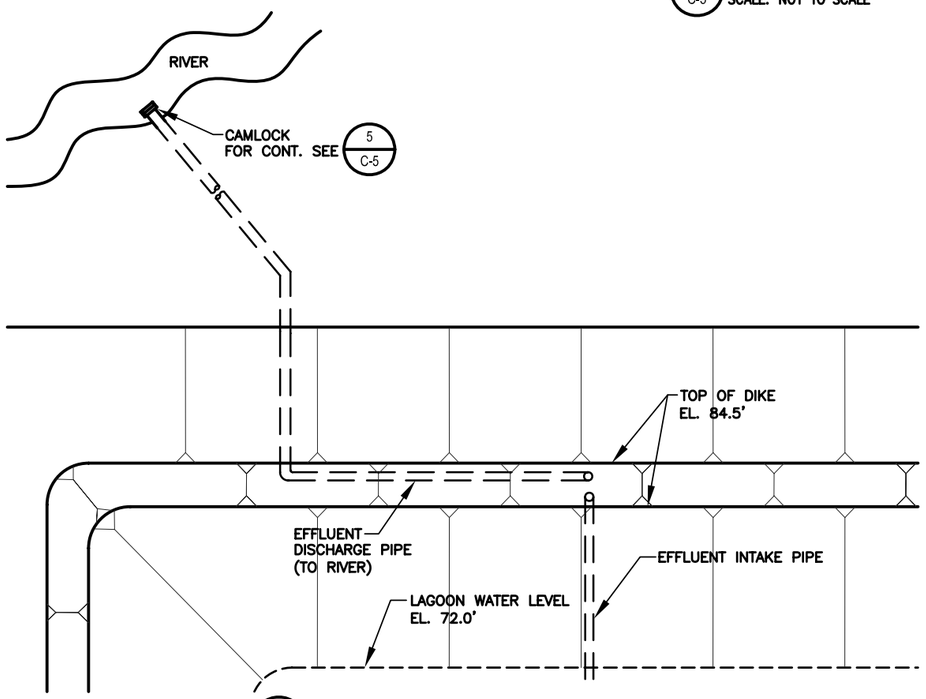
DETAIL NOTES:

1. SIGN SHALL BE 10 GUAGE STEEL, PAINTED WITH GARLOCK EPOXY PAINT.
2. LETTERS SHALL BE 6" HIGH, RED ON WHITE BACKGROUND.
3. LAGOON DISCHARGE SIGN TO BE POSTED AT LAND DISCHARGE POINT.

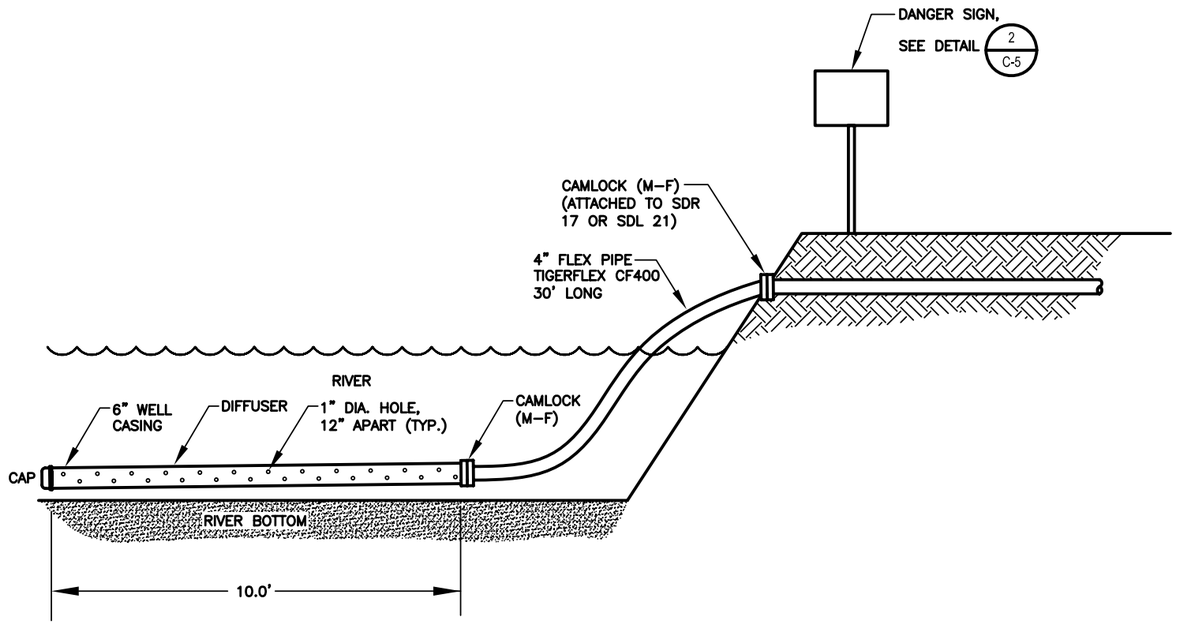
2 C-5 DANGER SIGN (TYP.)
SCALE: NOT TO SCALE



3 C-5 PUMP DETAIL
SCALE: NOT TO SCALE



4 C-5 LAGOON EFFLUENT & DISCHARGE PIPE-SECTION A
SCALE: NOT TO SCALE



5 C-5 DISCHARGE PIPE DETAIL
SCALE: NOT TO SCALE

STATE OF ALASKA 49th
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REGISTERED PROFESSIONAL ENGINEER

SUMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
LAGOON DISCHARGE PIPING DETAILS

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C-5

Dwg Name:KongLagoonDes_Details_C-5

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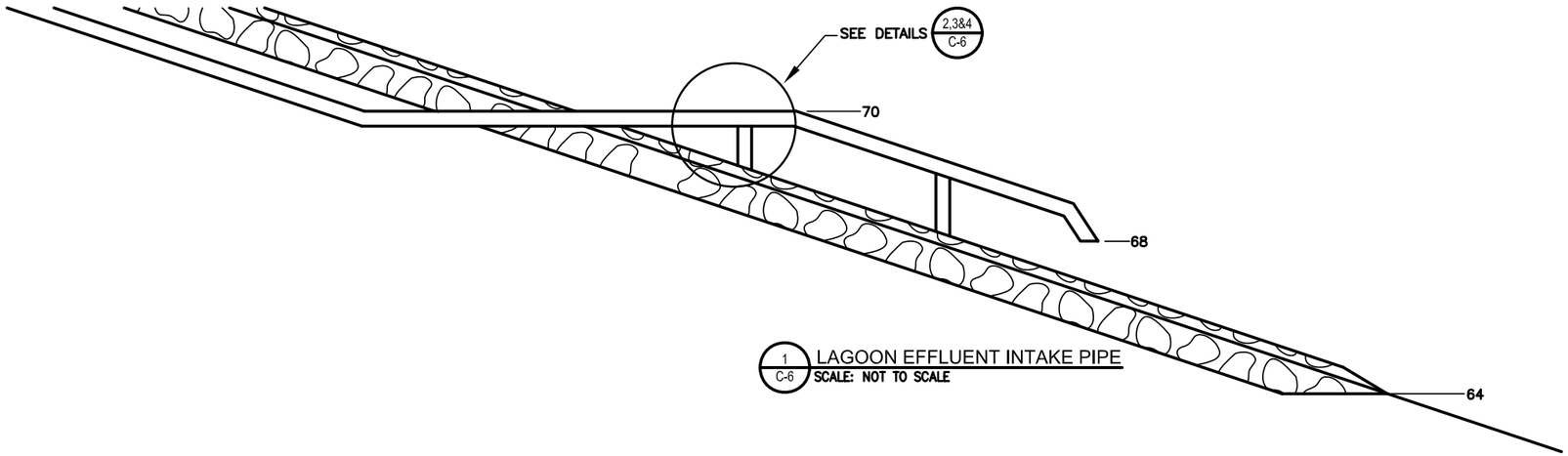
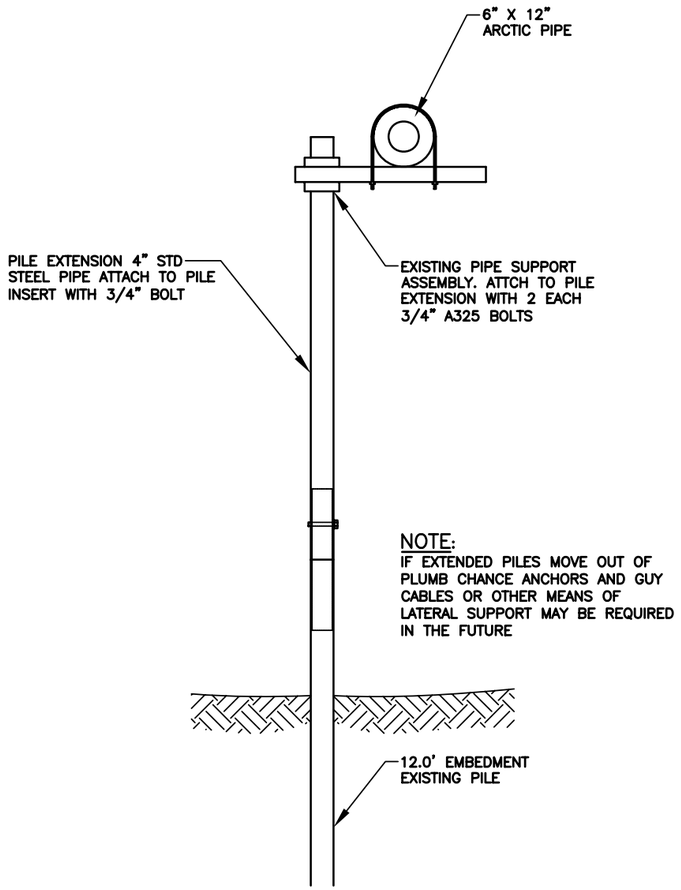
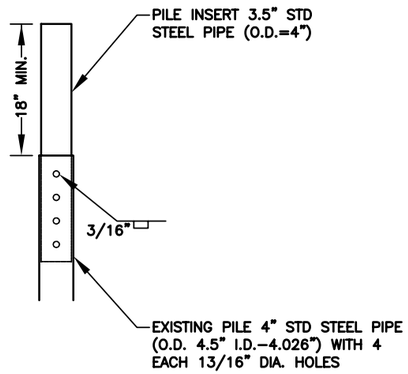


1 / C-6 LAGOON EFFLUENT INTAKE PIPE
SCALE: NOT TO SCALE

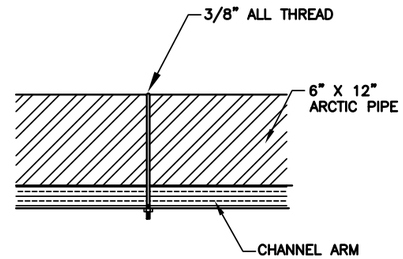


2 / C-6 PILE EXTENSION DETAIL
SCALE: NOT TO SCALE



NOTES:
1. INSERT 3.5" PIPE INTO EXISTING PILE SUCH THAT PIPE EXTENDS BEYOND EXISTING 4 HOLES IN PILE.
2. PIPE INSERT SHALL EXTEND UP MINIMUM 18".
3. PLUG WELD 4 OF THE 13/16" HOLES, 2 EACH SIDE.
4. ALTERNATIVE METHOD TO FASTEN INSERT TO EXISTING PILE: DRILL THROUGH INSERT AND FASTEN WITH 2 EACH 3/4" A325 BOLTS.

3 / C-6 PILE EXTENSION CONNECTION DETAIL
SCALE: NOT TO SCALE



4 / C-6 ARM AND PIPE CONNECTION DETAIL
SCALE: NOT TO SCALE

SUMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
LAGOON INTAKE PIPE DETAILS

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C-6

Dwg Name:KongLagoon_Details_C-6

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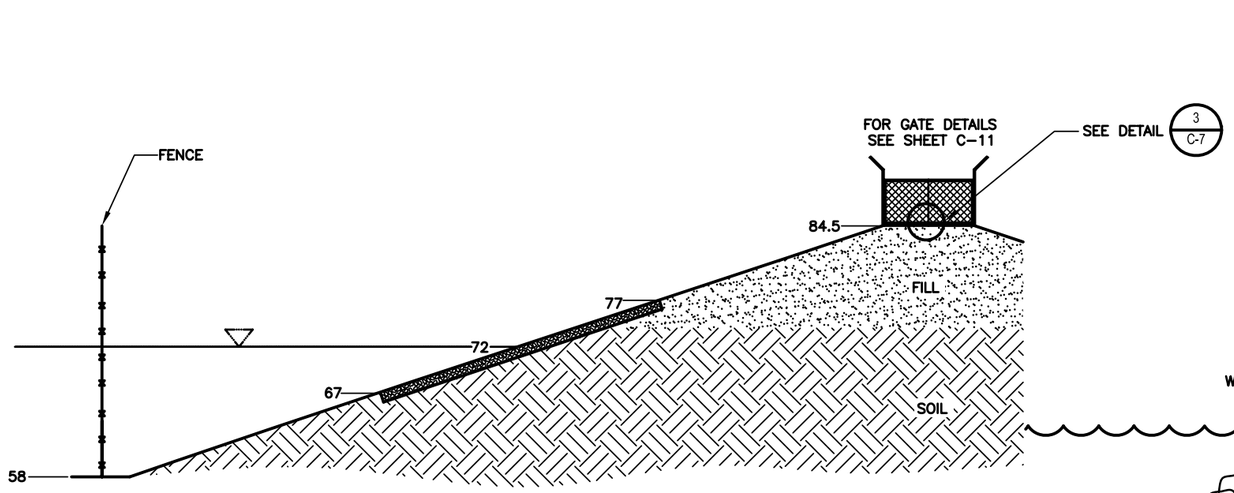
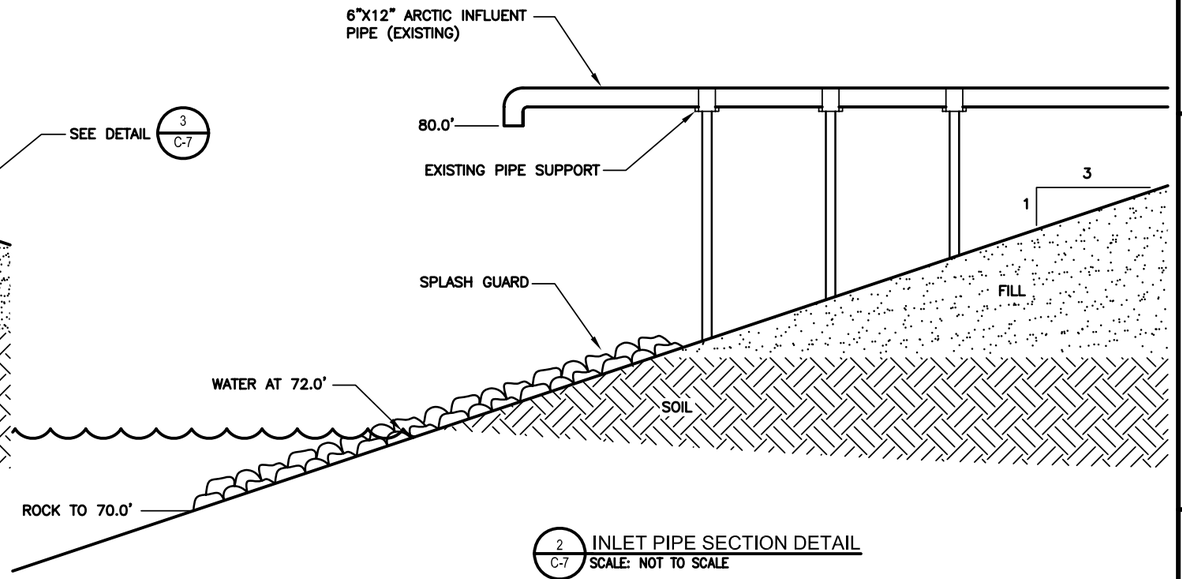
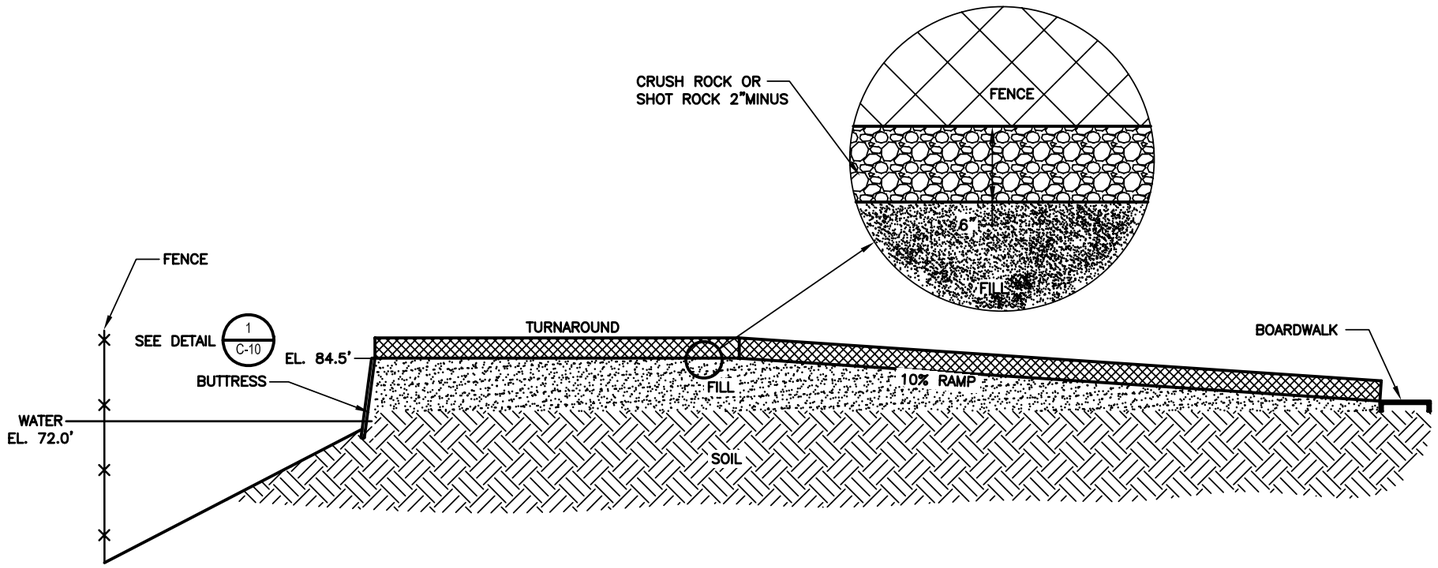


1 C-7 HONEY BUCKET DIKE AREA CROSS SECTION
SCALE: NOT TO SCALE



2 C-7 INLET PIPE SECTION DETAIL
SCALE: NOT TO SCALE



3 C-7 HONEY BUCKET RAMP AREA CROSS SECTION
SCALE: NOT TO SCALE

STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
HONEY BUCKET AND INLET
CROSS SECTIONS

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C-7

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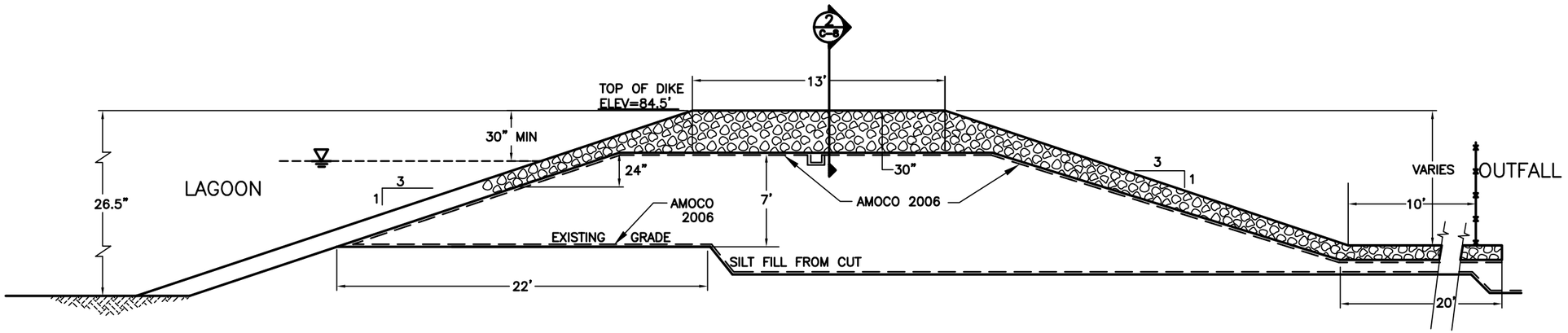
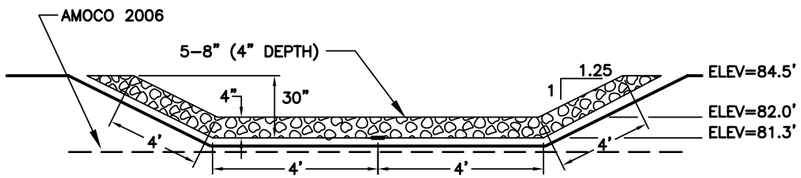
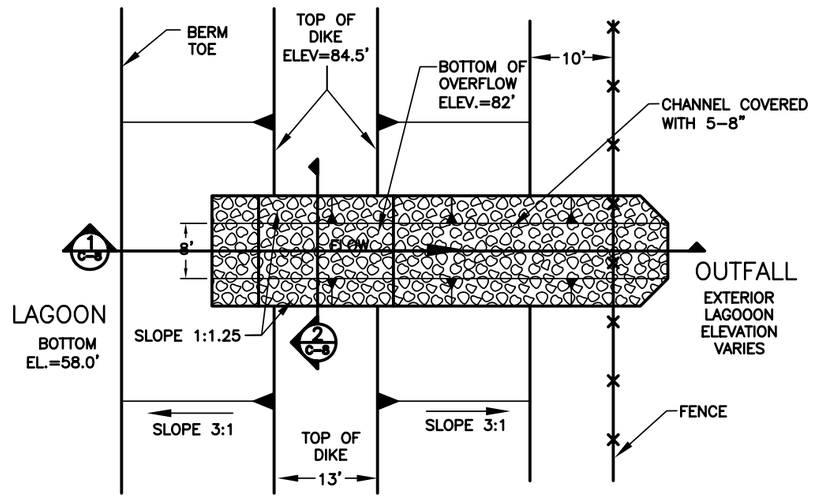
Dwg Name:KongLagoonDes_Details_C-7



1 / C-8 LAGOON DIKE EMERGENCY OVERFLOW SECTION
SCALE: NOT TO SCALE



2 / C-8 LAGOON DIKE EMERGENCY OVERFLOW SECTION
SCALE: NOT TO SCALE



3 / C-8 LAGOON TO OUTFALL
EMERGENCY OVERFLOW CHANNEL PLAN VIEW
SCALE: NOT TO SCALE

STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN DETAILS
DIKE OVERFLOW DETAILS

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C-8

Dwg Name:KongLagoonOverflowDetails_C-8

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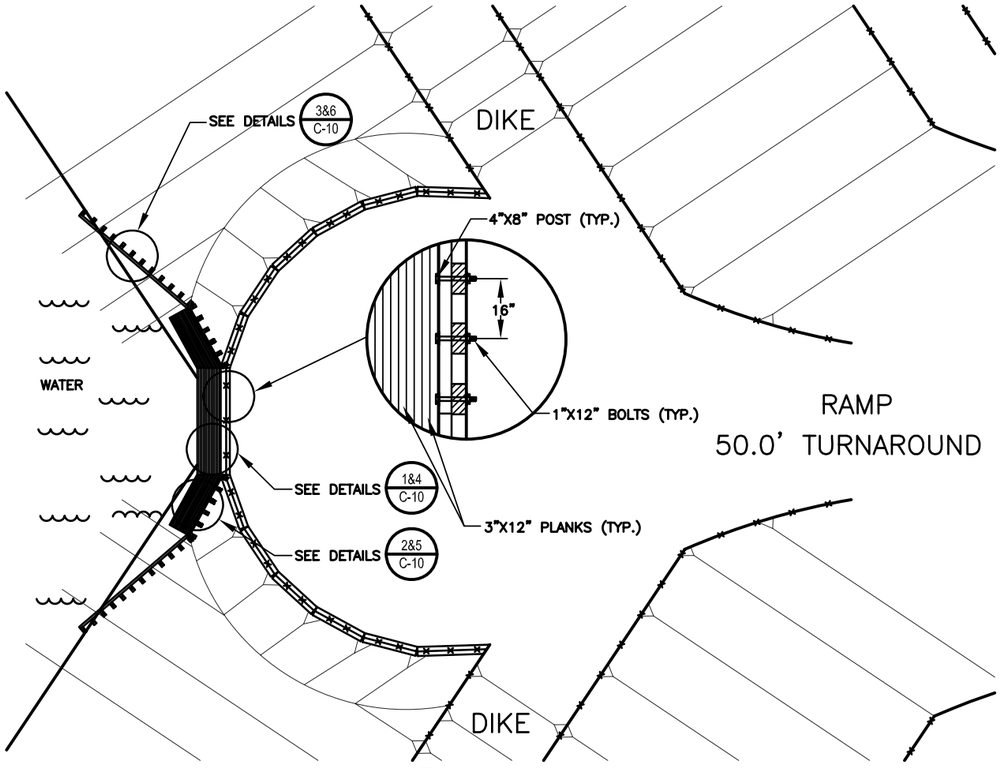
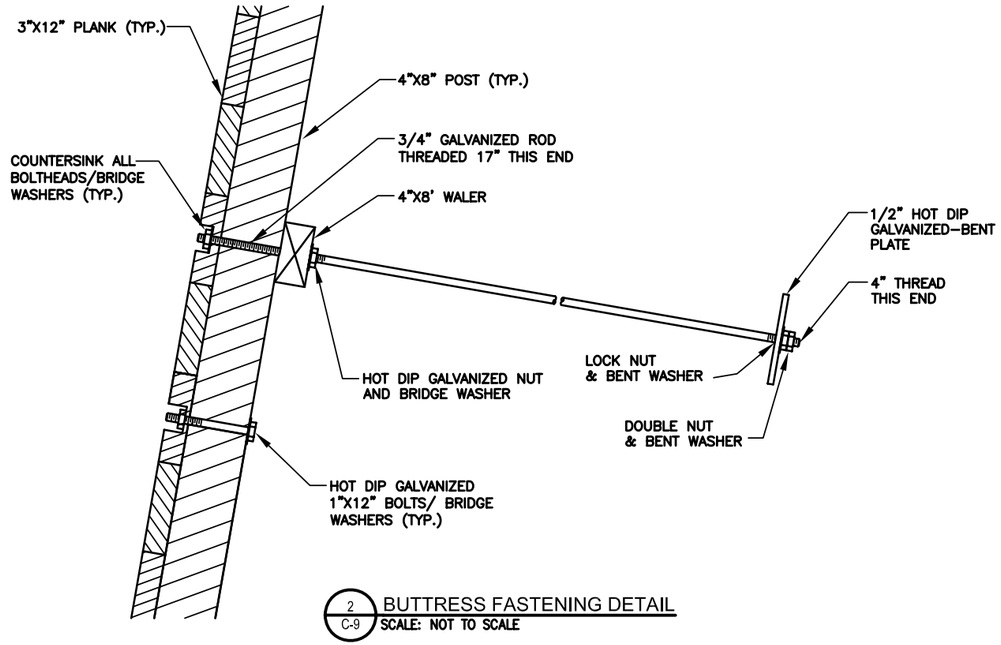
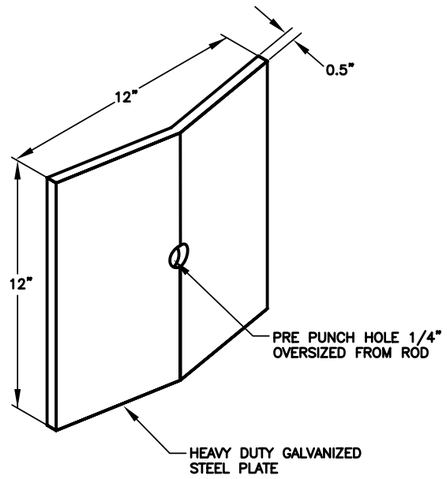


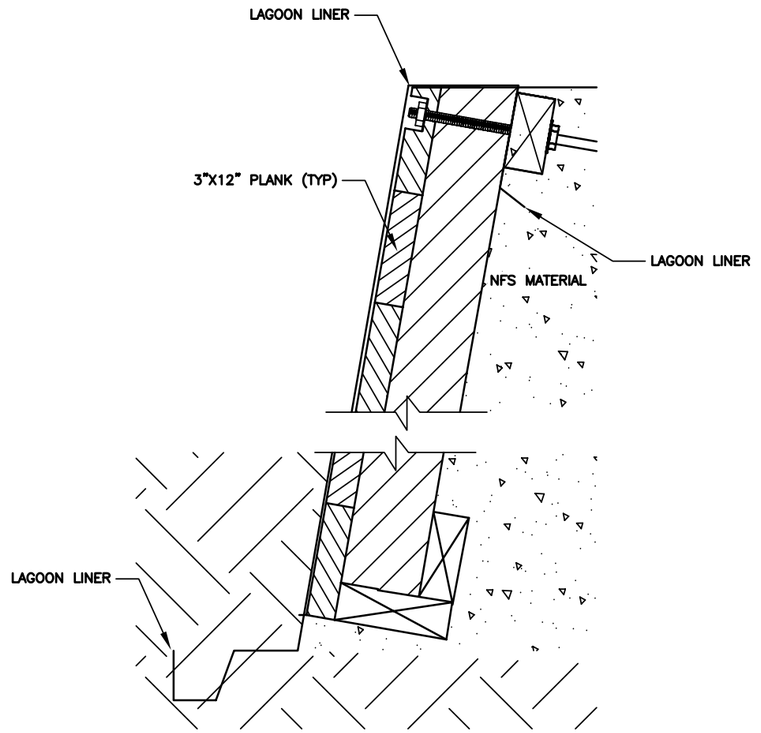
1 C-9 BUTTRESS DETAIL-PLAN VIEW
SCALE: NOT TO SCALE



2 C-9 BUTTRESS FASTENING DETAIL
SCALE: NOT TO SCALE



3 C-9 FASTENING PLATE DETAIL
SCALE: NOT TO SCALE



4 C-9 LAGOON LINER DETAIL
SCALE: NOT TO SCALE

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
BUTTRESS DETAILS

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C-9

Dwg Name:KongLagoonDes_Details_C-9

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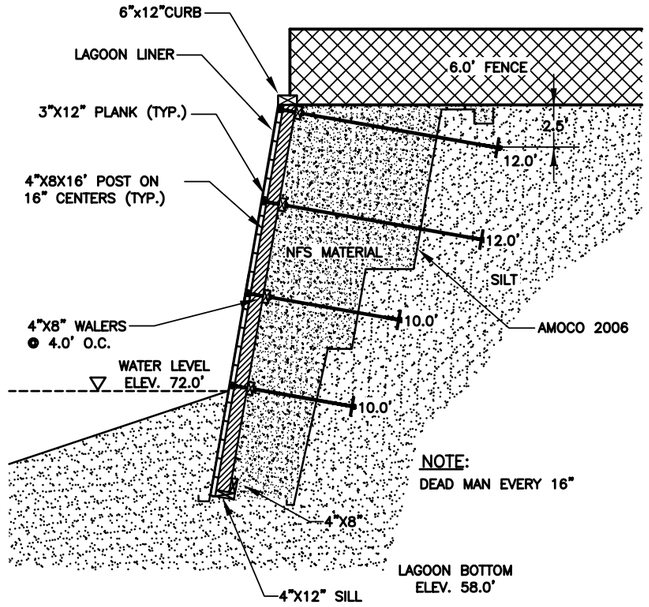
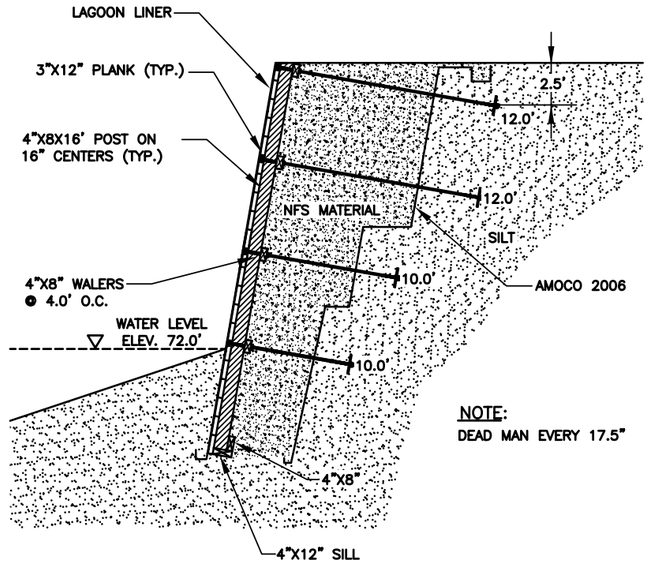
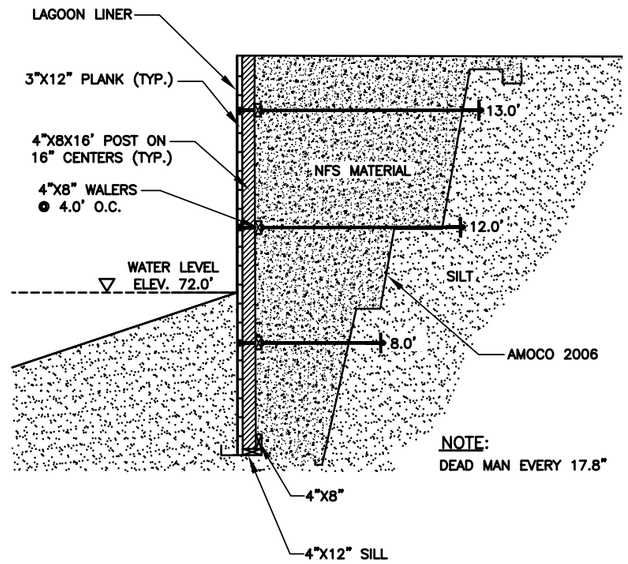


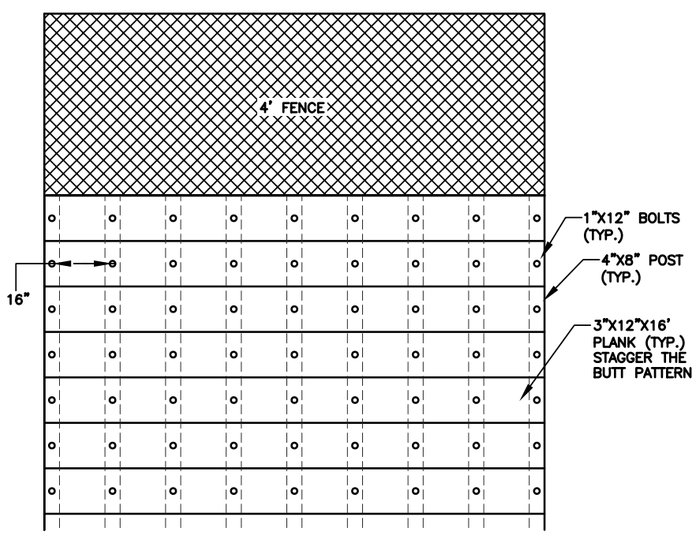
1 C-10 BUTTRESS DETAIL-SECTION A
SCALE: NOT TO SCALE



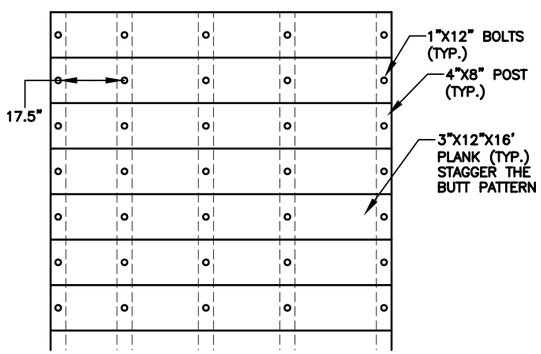
2 C-10 BUTTRESS DETAIL-SECTION B
SCALE: NOT TO SCALE



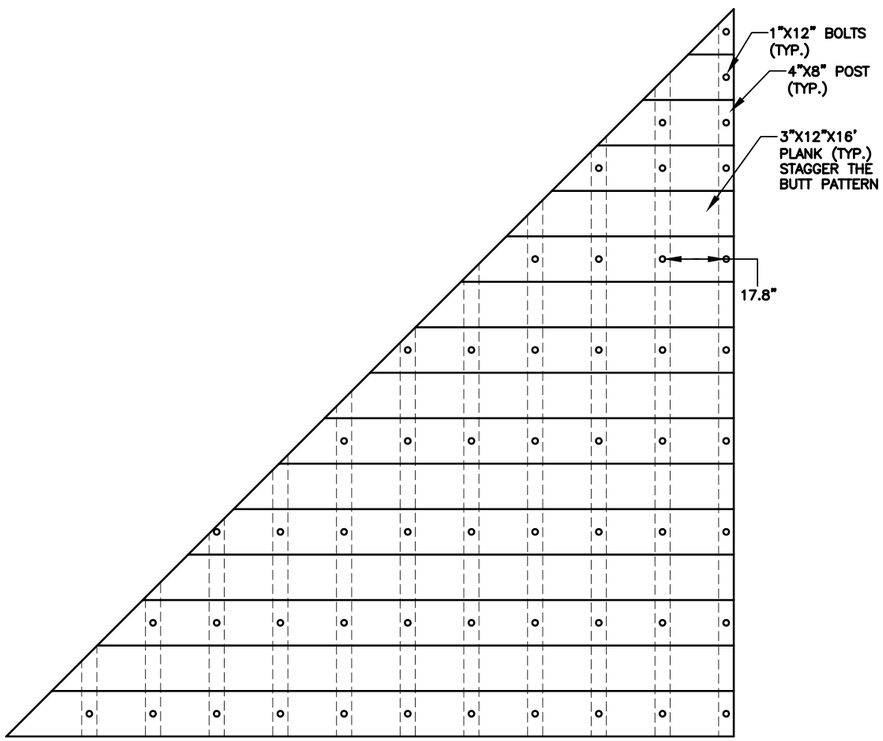
3 C-10 BUTTRESS DETAIL-SECTION C
SCALE: NOT TO SCALE



4 C-10 BUTTRESS DETAIL-SECTION D
SCALE: NOT TO SCALE



5 C-10 BUTTRESS DETAIL-SECTION E
SCALE: NOT TO SCALE



6 C-10 BUTTRESS DETAIL-SECTION F
SCALE: NOT TO SCALE

STATE OF ALASKA
49th
RONALD E. GODDEN
CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT
CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
BUTTRESS SECTIONS

Job No.:	–
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	R.E.G.
Scale:	AS NOTED

C–10

Dwg Name:KongLagoonDes_Details_C–10

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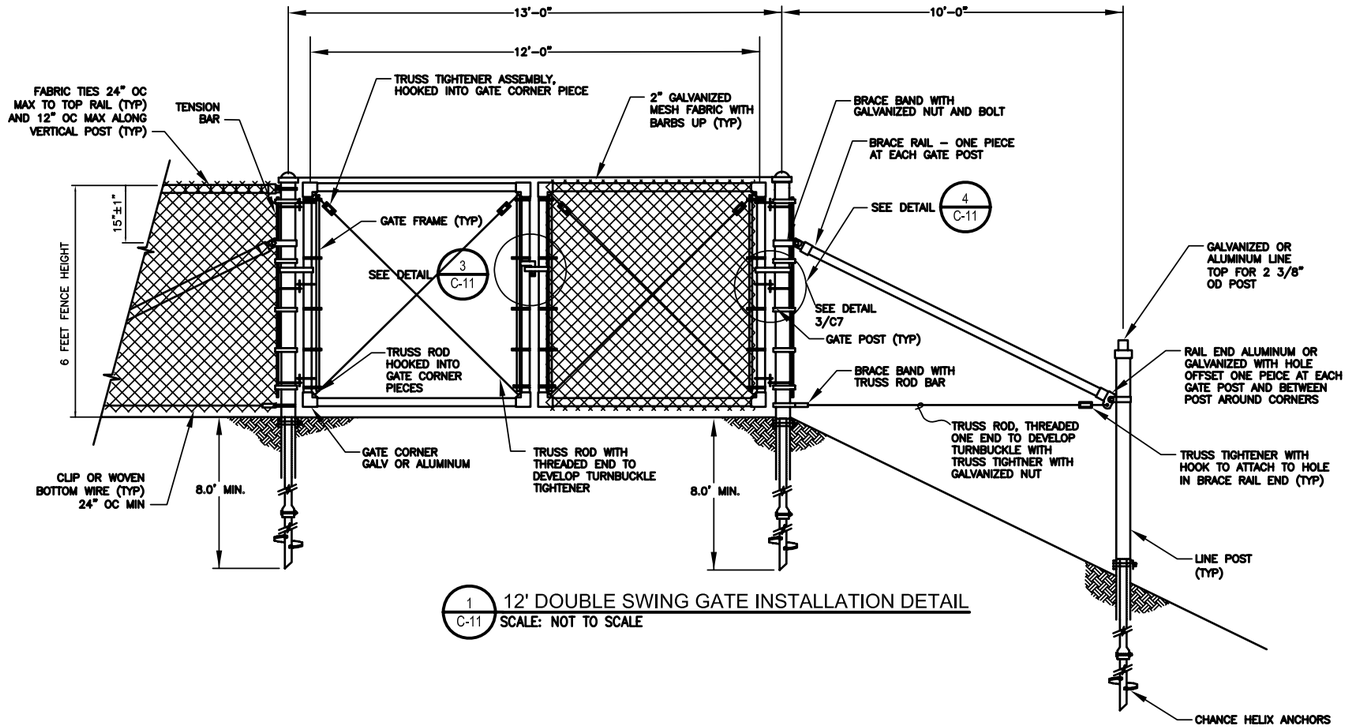
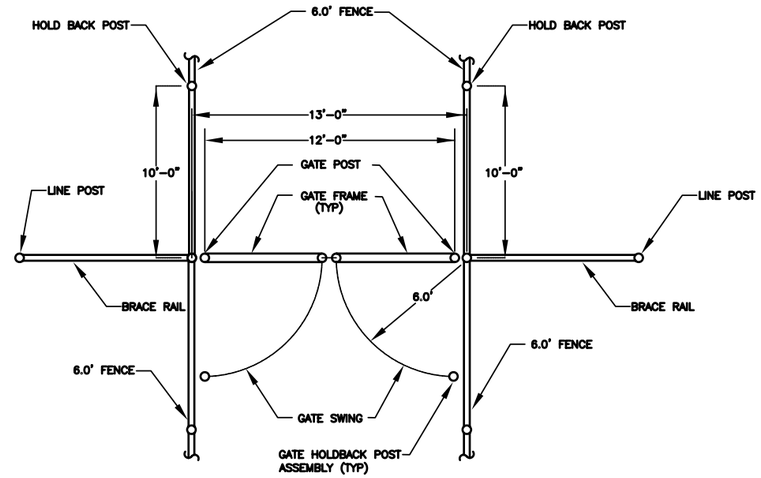
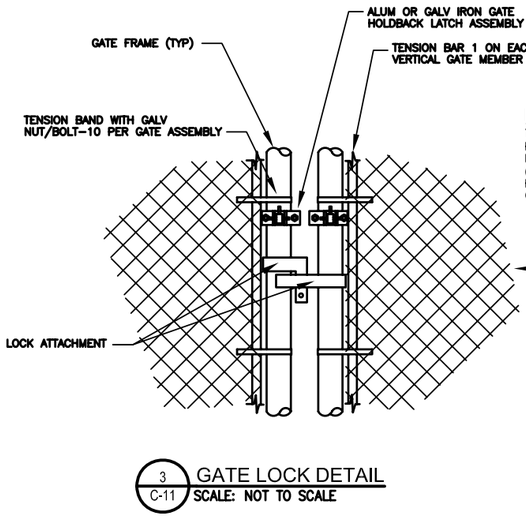


1 / C-11 12' DOUBLE SWING GATE INSTALLATION DETAIL
SCALE: NOT TO SCALE



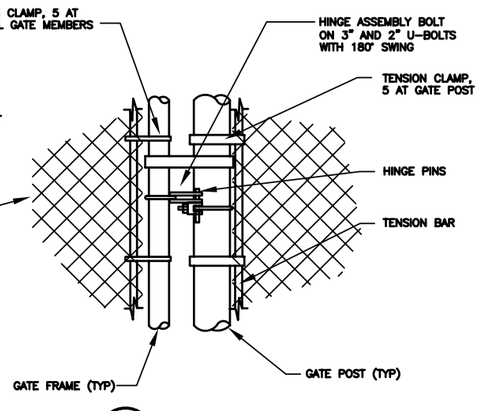
2 / C-11 POST LOCATIONS AT GATE
SCALE: NOT TO SCALE



3 / C-11 GATE LOCK DETAIL
SCALE: NOT TO SCALE

NOTE:
THERE SHALL BE THREE (3) HINGES INSTALLED PER GATE. THE TOP TWO (2) SHALL BE INSTALLED WITH HINGE PINS SUPPORTING GATE (GATE PORTION OF HINGE ON TOP). THE IOWEST HINGE SHALL BE INSTALLED WITH GATE PORTION ON BOTTOM TO PREVENT MOVEMENT OF GATES.

2" MESH CHAIN LINK FENCING MOUNTED WITH BARBS UP



4 / C-11 GATE HINGE DETAIL
SCALE: NOT TO SCALE

FENCE CONSTRUCTION NOTES:

1. FENCING TO BE INSTALLED DURING THE AUGUST-SEPTEMBER TIMEFRAME AFTER FINAL RESHAPING AND SUMMER THAW CYCLE
2. TENSION BARS SHALL BE INSTALLED CONTINUOUSLY FROM TOP RAIL TO BOTTOM OF FENCE
3. TOP RAIL SLEEVE TO BE LOCATED WITHIN 15" OF LINE POST
4. CHANCE HS SCREW ANCHOR-CORNER POSTS OR GATE HOLDBACK POSTS
5. CHANCE SS5 SCREW ANCHORS-LINE POSTS
6. WARNING SIGN TO BE BOLTED TO MESH GALVANIZED FENCE FABRIC AT APPROXIMATE MIDPOINT

CHANCE ANCHOR NOTES:

1. HS SCREW ANCHOR (TWIN HELIX 12"/10") GATE HOLDBACK AND CORNER POST
   1. 3-1/2" PIPE SHAFT
   2. LEAD PART # C150-0023(75")
   3. EXTENSION PART # C150-0025(56")
   4. INSTALL 8 FT BELOW DIKE GROUND SURFACE OR 4,500 - 11,000 FT-LBS
2. SS5 CHANCE HELICAL PIER (TWIN HELIX 10"/8")-LINE POST
   1. 1-1/2" SQUARE SHAFT
   2. LEAD PART # C150-0006(82 1/4")
   3. EXTENSION PART # C150-0047(37-3/4")
   4. INSTALL 8 FT BELOW GROUND-SURFACE OR 3,000-5,500 FT-LBS

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

SUMMIT CONSULTING SERVICES INC.

KONGIGANAK LAGOON DESIGN
GATE DETAILS

Job No.:	-
Date:	9/2/05
Designed By:	R.E.G.
Drawn By:	S.M.G.
Checked By:	C.A.
Scale:	NOT TO SCALE

C-11

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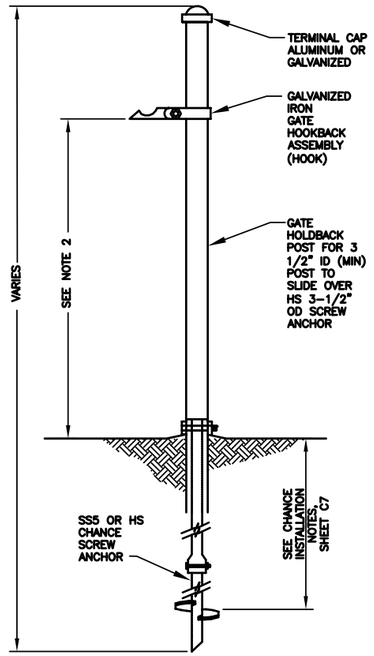
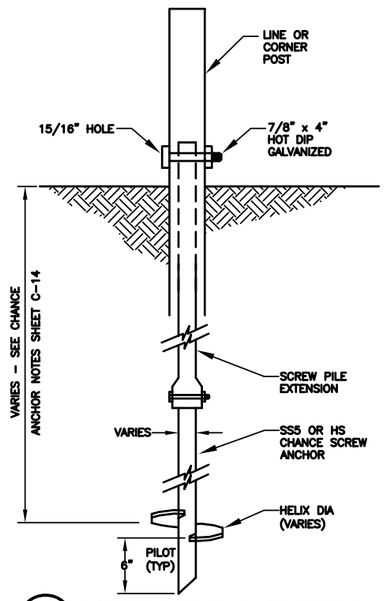


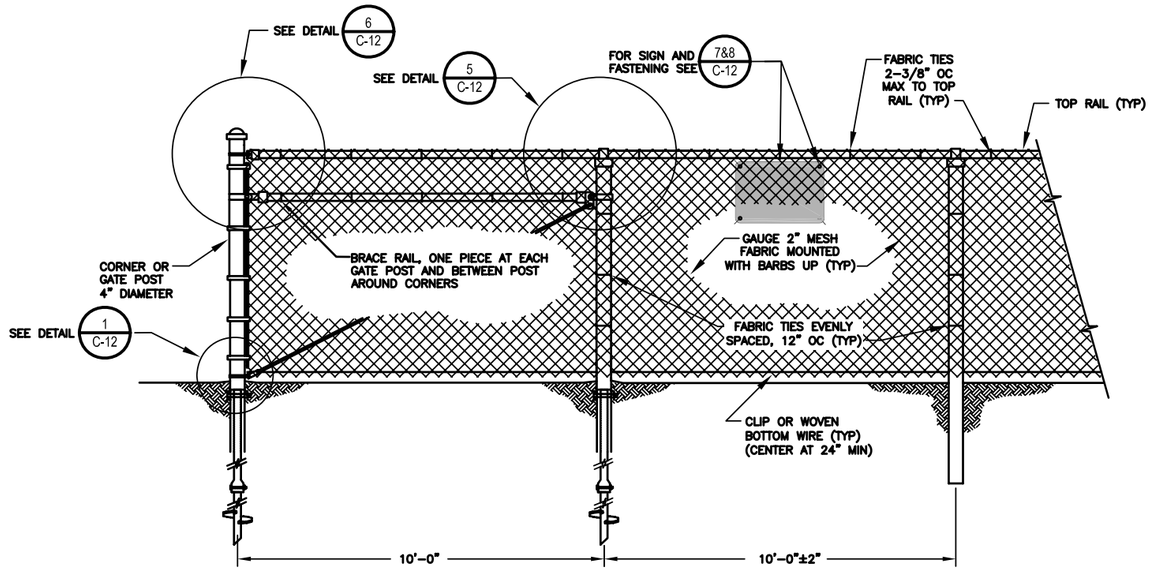
NOTES:

1. SEE DETAIL 1&2, SHEET C-7 FOR LOCATION OF HOLDBACK POST.
2. ACTUAL ELEVATION OF GATE HOOKBACK ASSEMBLY ON POST TO BE DETERMINED IN THE FIELD AS DIRECTED BY ELEVATION OF GATE HOLDBACK LATCH ON GATE.

1 / C-12 GATE HOLDBACK AND CORNERPOST DETAIL
SCALE: NOT TO SCALE

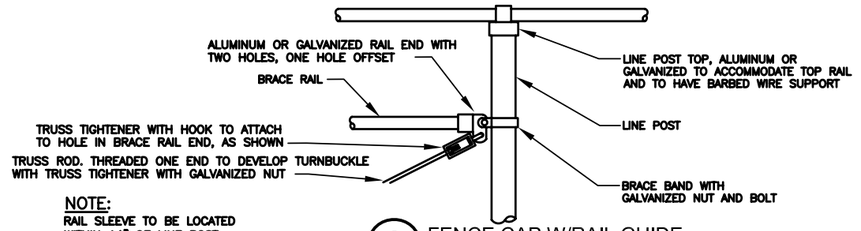


2 / C-12 SCREW PILE ANCHOR DETAIL
SCALE: NOT TO SCALE



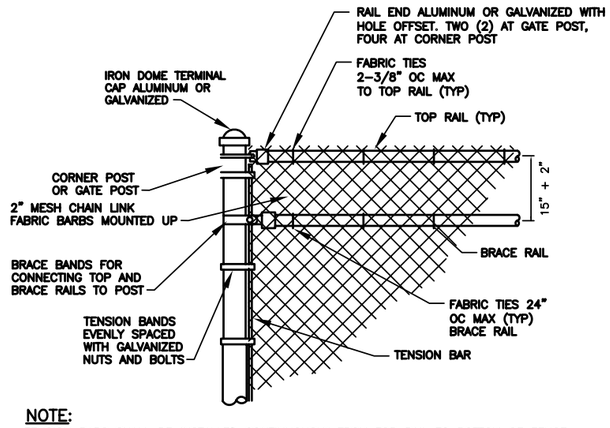
4 / C-12 CORNER AND LINE POST INSTALLATION DETIAL (TYP.)
SCALE: NOT TO SCALE

3 / C-12 TOP RAIL SLEEVE (TYP.)
SCALE: NOT TO SCALE



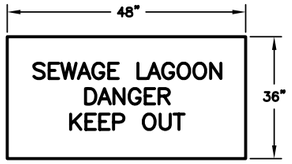
NOTE:
RAIL SLEEVE TO BE LOCATED WITHIN 14" OF LINE POST

5 / C-12 FENCE CAP W/RAIL GUIDE
SCALE: NOT TO SCALE



NOTE:
TENSION BARS SHALL BE INSTALLED CONTINUOUSLY FROM TOP RAIL TO BOTTOM OF FENCE.

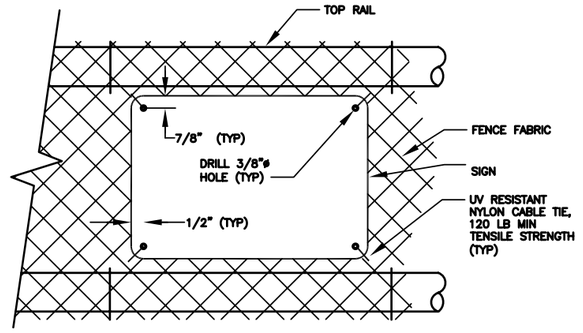
6 / C-12 CORNER POST DETAIL
SCALE: NOT TO SCALE



NOTES:

1. SIGN SHALL BE 10 GUAGE STEEL, PAINTED WITH GARLOCK EPOXY PAINT.
2. LETTERS SHALL BE 6" HIGH, RED ON WHITE BACKGROUND.
3. SIGNS SHALL BE POSTED EVERY 50 FT AROUND PERIMETER OF LAGOON FENCE.

7 / C-12 DANGER SIGN (TYP.)
SCALE: NOT TO SCALE



8 / C-12 SIGN FASTENING DETAIL
SCALE: NOT TO SCALE

STATE OF ALASKA 49th
RONALD E. GODDEN CE 8589
REGISTERED PROFESSIONAL ENGINEER

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KONGIGANAK LAGOON DESIGN
FENCE DETAILS

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Checked By:	C.A.
Scale:	NOT TO SCALE

C-12

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