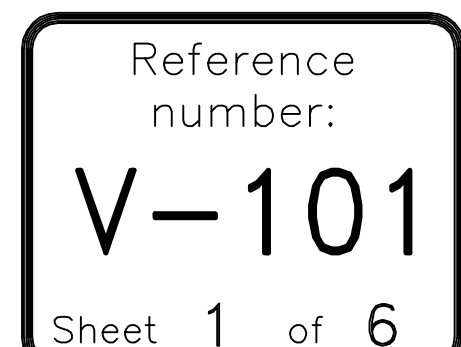


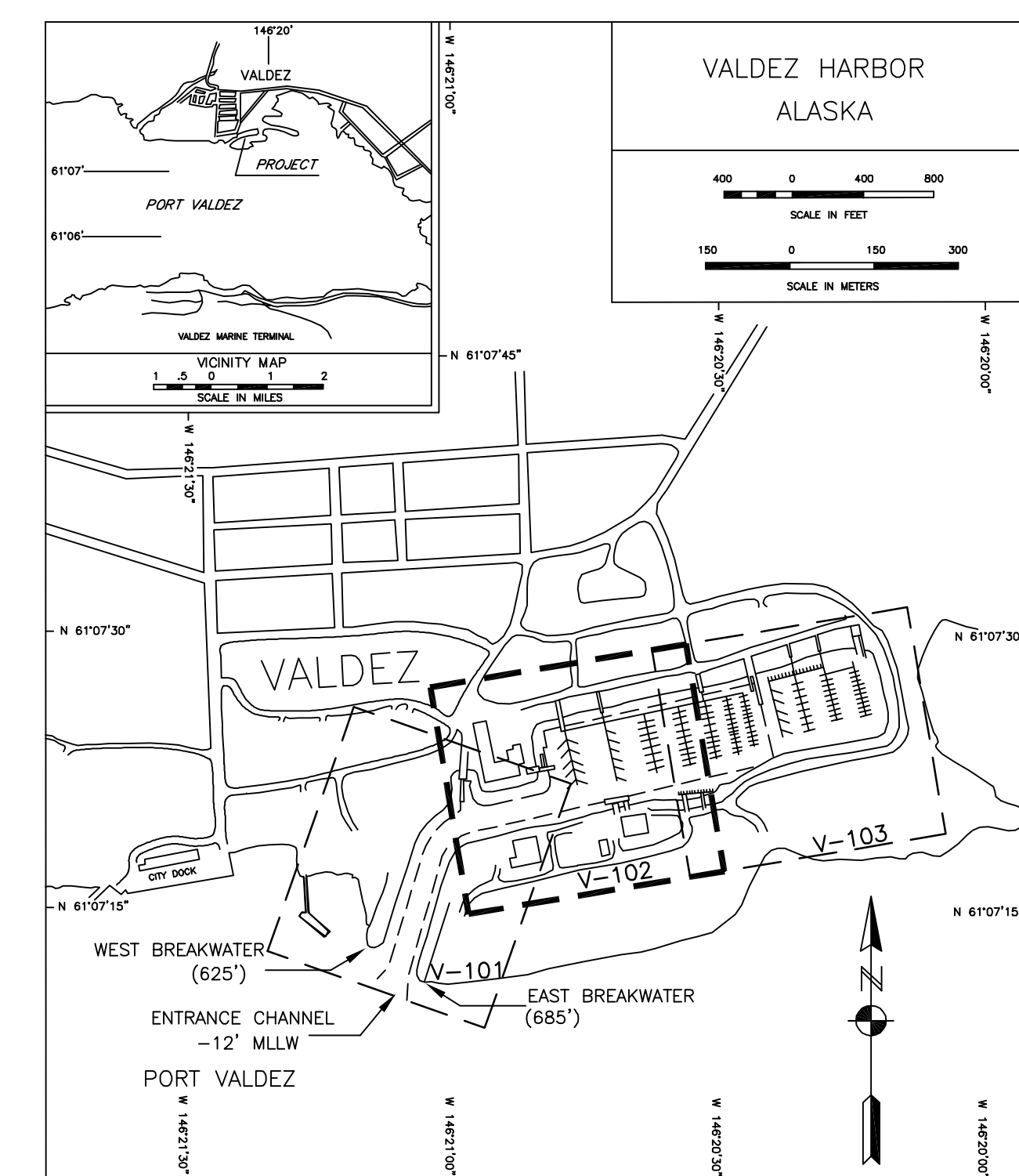
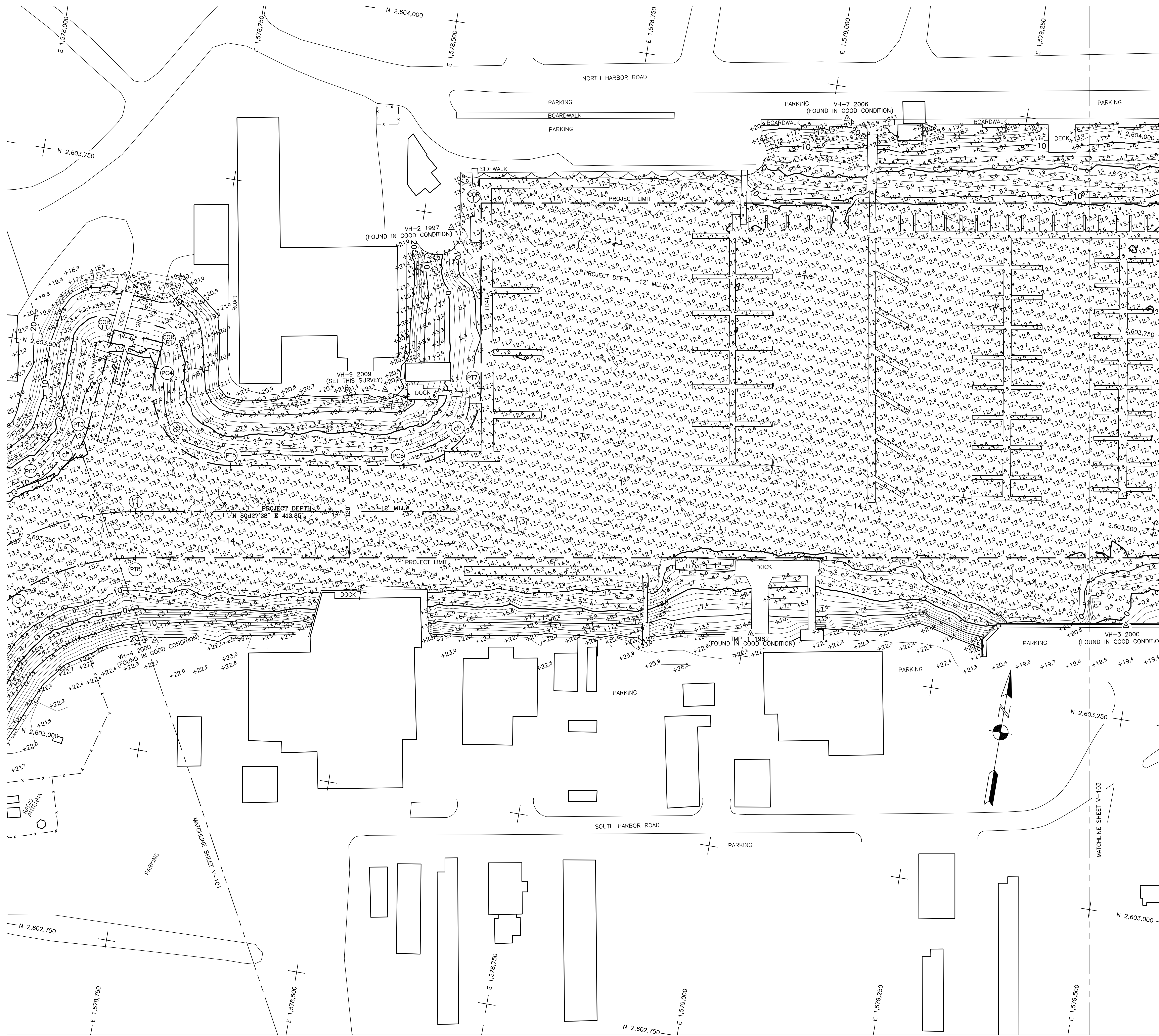


50 0 50 100 150

SCALE: 1" = 50'







## NOTES

- HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 3, NAD83 IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83(CORS) 2003.00 EPOCH VALUES OF NOS CORS STATIONS: "GLENNLEN CORRS ARP" (GNAA - NOS PID #42492) AS 620844.57648" N, 1495812.01548" W, "PORT VALDEZ CORRS ARP" (POTS - NOS PID #43043) AS 610322.53315" N, 1464148.51737" W AND "ANCHORAGE AK DOT CORRS ARP" (TBN - NOS PID #40555) AS 611046.98000" N, 1494706.41489" W. RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD 3-1/4" DOMED BRASS CAP, "VH-9 2009" AS N 2,603,513.62', E 1,578,487.96' AND 3-1/4" DOMED BRASS CAP, "VH-6 2003" AS N 2,603,739.93', E 1,580,595.12'.
- VERTICAL CONTROL IS MEAN-LOWER-LOW-WATER (MLLW = 0.0'). BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST FOR STATION, "0454249, VALDEZ, PRINCE WILLIAM SOUND, ALASKA, PUBLISHED 05/04/2005". THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING USCS STANDARD BENCH MARK BRASS CAP, NO 21 1966" AS 20.57' AND USCS STANDARD BENCH MARK BRASS CAP, WAREHOUSE 1966" AS 25.54'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVDB) EQUIVALENTS, BASED ON HOLDING NOS FIRST ORDER CLASS II PUBLISHED VERTICAL VALUES FOR USCS STANDARD BENCH MARK BRASS CAP, "B 98 1964" (NOS PID T11710), AS 17.87'.
- VERTICAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING CONVENTIONAL (OPTICAL) EQUIPMENT AND DIFFERENTIAL LEVELING TECHNIQUES. HORIZONTAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING A COMBINATION OF STATIC GPS AND CONVENTIONAL TRAVERSE PROCEDURES. LONG-PERIOD STATIC GPS DATA WAS COLLECTED USING A PAIR OF LEICA RX1200 SERIES RECEIVERS. THE CONVENTIONAL TRAVERSE WAS CONDUCTED USING A TOPCON GTS-4 TOTAL STATION, ADJUSTED TO ATMOSPHERIC CONDITIONS. TOPOGRAPHIC DATA WAS COLLECTED ON 26-29 SEPTEMBER, 2009 USING A PAIR OF LEICA RX1200 GPS RECEIVERS AND REAL-TIME-KINEMATIC PROCEDURES WITH THE RTK BASE STATION LOCATED AT USACE SBC, "VH-9 2009". GPS DATA WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).
- HYDROGRAPHIC SOUNDING DATA WAS COLLECTED 26-29 SEPTEMBER, 2009 USING A RESON 8101 MULTI-BEAM ECHOSOUNDER (240kHz, 150 DEGREE SWATH-WIDTH WITH 101, 1.5 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE MEASURED USING A CODA OCTOPUS F180 INERTIAL NAVIGATION SYSTEM OPERATING ON RTK CORRECTORS BROADCAST FROM A LEICA RX1200 BASE STATION LOCATED AT USACE SBC, "VH-9 2009". SOUND VELOCITY WAS MEASURED AT NUMEROUS LOCATIONS AND TIDE PHASES USING AN ODOM DIGI-BAR PRO SOUND VELOCITY PROFILER. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPERACK HYPERWEEPER (2009a) SOFTWARE. MULTI-BEAM SURVEY DATA WAS POST-PROCESSED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDING VALUES SHOWN ARE IN FEET AND MINUS UNLESS NOTED OTHERWISE.
- THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.

| CONTROL DATA   |              |              |                   |             |                            |
|----------------|--------------|--------------|-------------------|-------------|----------------------------|
| STATION        | NORTHING     | EASTING      | ELEV. (MLW/NAVDB) | ELEV. (MSS) | DESCRIPTION                |
| BREAK 1965     | 2,602,778.67 | 1,578,004.17 | 17.79             | 18.70       | 3 1/4" USACE DBC           |
| TMP-1 1982     | 2,603,279.85 | 1,579,007.85 | 23.20             | 24.11       | 3 1/4" USACE DBC           |
| VH-1 1997      | 2,603,041.94 | 1,577,733.46 | 17.78             | 18.69       | 3 1/4" TERRA SURVEYS DBC   |
| VH-2 1997      | 2,603,735.41 | 1,578,538.01 | 20.51             | 21.42       | 3 1/4" TERRA SURVEYS DBC   |
| VH-3 2000      | 2,603,371.17 | 1,579,485.89 | 22.18             | 22.19       | 3 1/4" TERRA SURVEYS DBC   |
| NI-3 2000      | 2,602,429.89 | 1,577,946.73 | 20.00             | 20.91       | 3 1/4" USACE DBC           |
| VH-4 2000      | 2,603,143.94 | 1,578,248.04 | 27.94             | 22.85       | 3 1/4" TERRA SURVEYS DBC   |
| VH-5 2003      | 2,604,218.42 | 1,580,381.26 | 16.80             | 17.71       | 3 1/4" TERRA SURVEYS DBC   |
| VH-6 2003      | 2,603,739.93 | 1,580,595.12 | 17.62             | 18.53       | 3 1/4" TERRA SURVEYS DBC   |
| VH-7 2006      | 2,603,960.18 | 1,579,020.58 | 21.24             | 22.15       | 3 1/4" HUGHES & ASSOC. DBC |
| VH-8 2006      | 2,604,074.83 | 1,578,772.68 | 17.46             | 18.37       | 3 1/4" HUGHES & ASSOC. DBC |
| VH-9 2009      | 2,603,513.62 | 1,578,487.96 | 22.15             | 22.15       | 3 1/4" TERRA SURVEYS DBC   |
| NO 21 1966     | -            | -            | 20.57             | 21.48       | NOAA/NOS TIDAL BENCH MARK  |
| WAREHOUSE 1966 | -            | -            | 25.54             | 26.45       | NOAA/NOS TIDAL BENCH MARK  |
| B 98 1964      | 2,608,238    | 1,584,077    | 16.96             | 17.87       | NOS NAVD 88 BENCH MARK     |

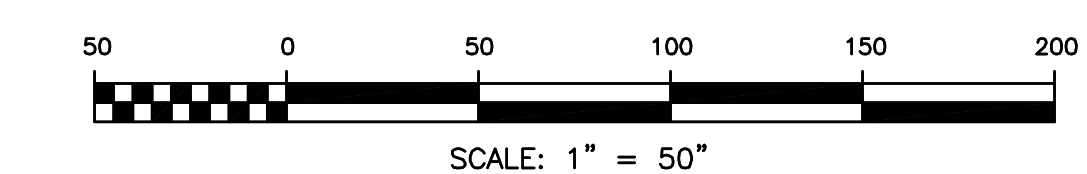
NOTE: MONUMENTS WITH AN ASTERISK (\*) WERE SET THIS SURVEY.

| NAVIGATION AIDS |                                  |             |             |
|-----------------|----------------------------------|-------------|-------------|
| USCG No.        | DESCRIPTION                      | NORTHING    | EASTING     |
| 25815           | VALDEZ BOAT HARBOR LIGHT 2 RED   | 2,602,427.1 | 1,577,865.8 |
| 25820           | VALDEZ BOAT HARBOR LIGHT 3 GREEN | 2,602,637.0 | 1,577,603.1 |

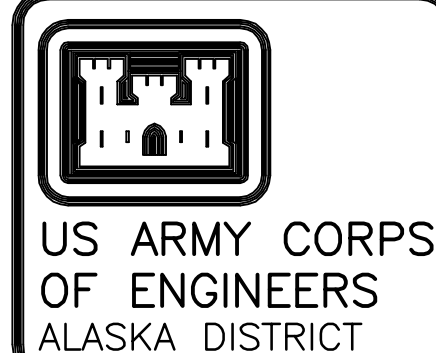
| VOLUME COMPUTATIONS                                       |  |             |
|---|--|-------------|
| Project Depth -12' MLLW                                   |  | CUBIC YARDS |
| MINIMUM PAY LINE (-12' MLLW)                              |  | 3,198       |
| Between MINIMUM PAY LINE AND MAXIMUM PAY LINE (-13' MLLW) |  | 8,057       |
| VOLUME AVAILABLE ALONG SIDESLOPES (3:1, HV)               |  | 4,842       |
| TOTAL   |  | 16,097      |

| PROJECT LIMITS |              |              |        |              |              |
|----------------|--------------|--------------|--------|--------------|--------------|
| CORNER         | NORTHING     | EASTING      | CORNER | NORTHING     | EASTING      |
| PC 1           | 2,603,103.58 | 1,577,876.01 | PT 8   | 2,603,245.12 | 1,578,205.20 |
| PC 2           | 2,603,322.01 | 1,578,063.74 | PC 9   | 2,603,063.59 | 1,577,988.15 |
| PT 3           | 2,603,400.29 | 1,578,116.13 | PC 10  | 2,603,083.58 | 1,577,932.58 |
| COR LT         | 2,603,532.03 | 1,578,128.72 | PT 11  | 2,603,304.29 | 1,578,195.26 |
| COR RT         | 2,603,525.81 | 1,578,193.85 | COR 1  | 2,603,773.16 | 1,578,570.59 |
| PC 4           | 2,603,482.40 | 1,578,190.64 | COR 2  | 2,603,083.57 | 1,579,922.90 |
| PT 5           | 2,603,383.86 | 1,578,306.71 | COR 3  | 2,603,529.72 | 1,579,899.19 |
| PC 6           | 2,603,421.09 | 1,578,528.33 |        |              |              |
| PT 7           | 2,603,536.27 | 1,578,610.38 |        |              |              |

| CURVE DATA |         |            |             |              |
|------------|---------|------------|-------------|--------------|
| CURVE      | RADIUS  | ARC LENGTH | DELTA ANGLE | CHORD LENGTH |
| C1         | 278.00' | 295.97'    | 60°59'59"   | 282.19'      |
| C2         | 338.00' | 359.85'    | 60°59'59"   | 343.09'      |
| C3         | 398.00' | 294.71'    | 42°25'36"   | 288.03'      |
| C4         | 100.00' | 98.07'     | 56°11'31"   | 94.19'       |
| C5         | 100.00' | 183.67'    | 105°14'06"  | 158.92'      |
| C6         | 100.00' | 157.08'    | 89°59'53"   | 141.42'      |



SURVEY



CONTRACT NO. W911KH-08-D-0002-0011  
 CONTRACTOR TERRASON LIMITED  
 CITY PALMER STATE ALASKA  
 Recommended: Approved: Date:  
 Project Engineer: Person in Charge:

| Revision | Date | By | Appr. |
|----------|------|----|-------|
|          |      |    |       |
|          |      |    |       |
|          |      |    |       |
|          |      |    |       |

Drawn: JEA  
 Checked: CAE  
 Reviewed: LEP  
 Submitted: KOW  
 Date: 12-07-09  
 Scale: 1" = 50'  
 Project: VALDEZ HARBOR  
 Drawing #: 2715-09

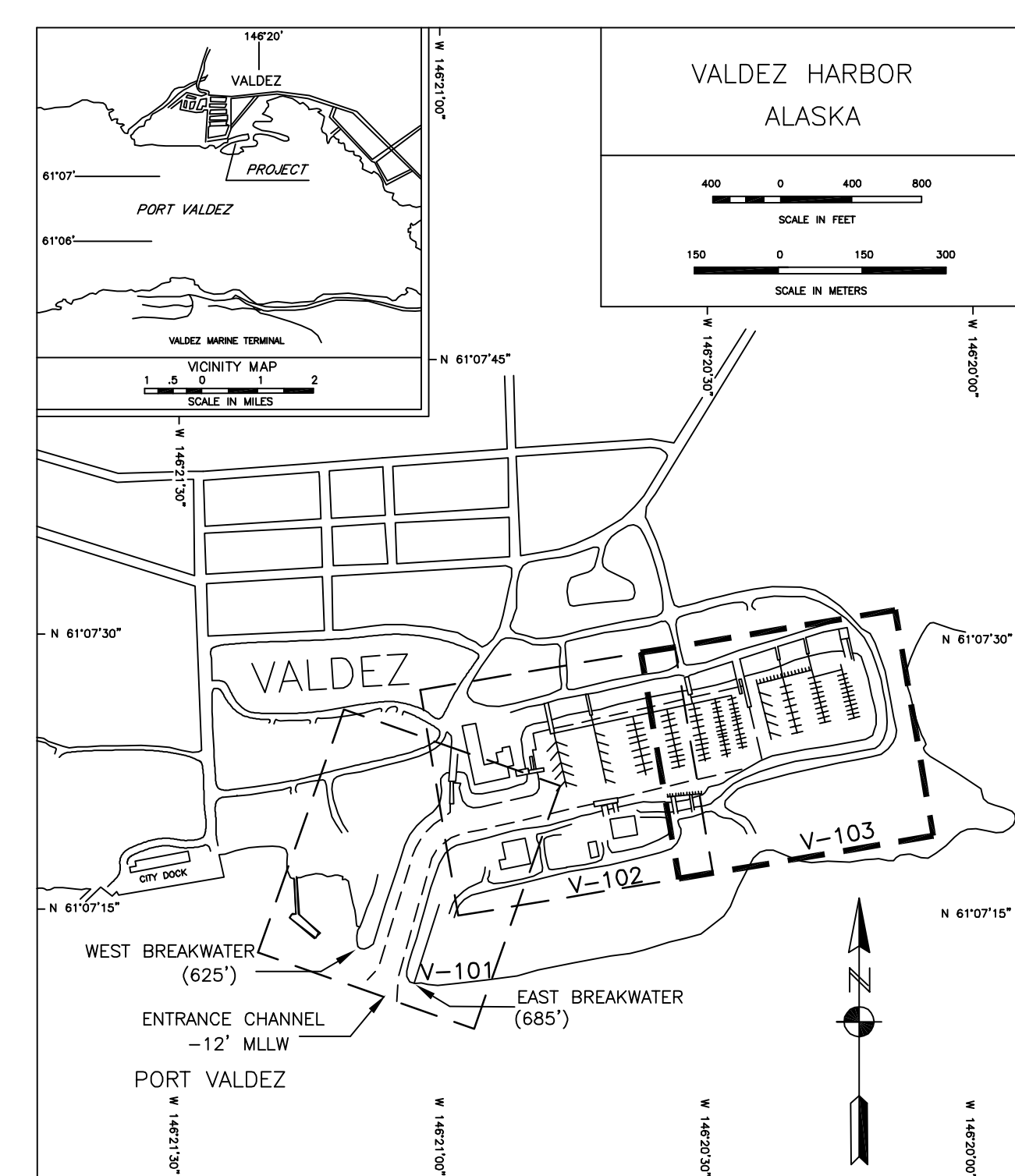
U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ANCHORAGE, ALASKA

VALDEZ, ALASKA  
 VALDEZ HARBOR  
 PROJECT CONDITION SURVEY  
 SEPTEMBER 24-29, 2009

Reference number:

V-102  
 Sheet 2 of 6





1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 3, NAD83 IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83(CORS) 2003.00 TRANSFORMED TO STATE PLANE COORDINATES BY THE NATIONAL CENTER FOR GEODETIC INFORMATION (NCGI) AT 620645.457648"N, 14°59'18.70158"W ("POTATO PIT" CORS CORRESPONDENCE "POTS" = NSIDG ID# D310323-255315"N, 144°04'48.5173"E) AND "ANCHORAGE AC DOT CORS AREA" (FEDERAL PID #D42005) AT 621046.880000"N, 149°47'06.41488"W. RESULTANT TRANSFORMATIONAL PARAMETERS AT PRIMARY HARDWARE STATION HOLD 3-1/4" DOMED BRASS CAP, "VH-9" 2009" AS FOLLOWS: X=153.62, Y= 1,626.03, Z=-497.96" AND 3-1/4" DOMED BRASS CAP, "VH-6 2009" AS FOLLOWS: X=260.39, Y=39.93", Z= -808.595-1.2".

2. VERTICAL CONTROL IS MEAN-LOW-WATER (MLW = 0.0'), BASED ON THE NOAA/NADS TIDE BENCH MARK LIST FOR STATION, "9454240 VALDEZ, PRINCE WILLIAM SOUND, ALASKA," PUBLISHED 05/04/2005. THIS TIDAL DATUM IS BASED ON THE 1983-2011 TIDAL EPOCH AND ANCHORED TO THE TIDE GAUGE BY DEPT OF COMMERCE (NOAA) STATION NUMBER "9454240" 20.57' AND USCGS STANDARD BENCH BRASS CAP, "WAREHOUSE 1966", AT 25.54'. ALSO PERMITTED BY THE U.S. NAVY, NAUTICAL CHART NO. 18660, 1984 EDITION. ALL DATA ARE BASED ON HOLDING NOS FIRST ORDER, CLASS II PUBLISHED VERTICAL VALUES FOR USCGS STANDARD BENCH BRASS CAP, "B\_98 1964" (NSG PID TT1710), AT 15.87'.

3. VERTICAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING CONVENTIONAL (OPTICAL) LEVELING AND DIFFERENTIAL LEVELING TECHNIQUES. CONTROL WAS SURVEYED 24-25 SEPTEMBER, 2009 USING A COMBINATION OF STATIC GPS AND CONVENTIONAL TRAVERSE PROCEDURES. LONG-PERIOD STATIC GPS DATA WAS COLLECTED USING A PAIR OF LIECA RX1200 GPS RECEIVERS OPERATED BY TWO OBSERVERS. GPS DATA WAS COLLECTED IN REAL-TIME, TOTAL STATION, ADJUSTED TO ATMOSPHERIC CONDITIONS. TOPOGRAPHIC DATA WAS COLLECTED USING A TRIMBLE SCIENTIFIC SYSTEMS (TRIMBLE) SATELLITE RECEIVER OPERATING IN REAL-TIME-KINETIMATIC PROCEDURES WITH THE RTK BENCH STATION LOCATED AT USACE SBC, "VH-9 2009". GPS DATA WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).

4. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED 26-29 SEPTEMBER, 2009 USING A SONAR 8101 TWIN BEAM ECHO SOUNDING SYSTEM (SONAR 8101) WITH 200 METERS RANGE (200 METERS BEAMS). POSITIONING AND VESSEL ATTITUDE WERE MEASURED USING A CODA OCTOPUS I180 INERTIAL NAVIGATION SYSTEM OPERATING ON RTK CORRECTORS BROADCAST FROM A LIECA RX1200 BENCH STATION LOCATED AT USACE SBC, "VH-9 2009". WATER DEPTH WAS MEASURED USING A Kongsberg EK60 SONAR. NUMEROUS LOCATIONS AND TIDE PHASES USING AN ODOM DIGIT-BAR PRO SOUND VELOCITY AND TEMPERATURE LOGGING SYSTEM (ODOM MODEL 1000) WITH "HYPERMETER" SOFTWARE (2009a) SOFTWARE. MULTI-BEAM SURVEY DATA WAS TAKEN WITH POST-PROCESSING USING CARIS HP/SURFER (Ver.1).

5. SOUNDING VALUES SHOWN ARE IN FEET AND MINUS UNLESS NOTED OTHERWISE.

6. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.

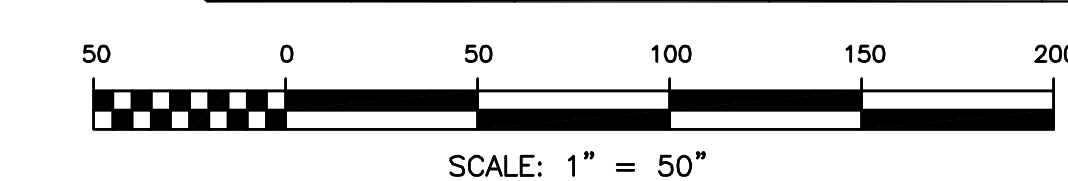
| STATION        | NORTHING     | EASTING      | CONTROL DATA |            | DESCRIPTION                |
|----------------|--------------|--------------|--------------|------------|----------------------------|
|                |              |              | ELEV (M)     | ELV (FOOT) |                            |
| BREAK 1965     | 2,602,778.67 | 1,578,004.17 | 17.79        | 18.70      | 3 1/4" USACE DBC           |
| TMP-1 1982     | 2,603,279.85 | 1,579,007.85 | 23.20        | 24.11      | 3 1/4" USACE DBC           |
| VH-1 1987      | 2,603,041.94 | 1,577,735.46 | 17.78        | 18.69      | 1 1/4" TERRA SURVEYS DBC   |
| VH-2 1987      | 2,603,735.41 | 1,578,530.31 | 20.51        | 22.42      | 1 1/4" TERRA SURVEYS DBC   |
| VH-3 2000      | 2,603,371.17 | 1,579,485.89 | 21.28        | 21.99      | 3 1/4" TERRA SURVEYS DBC   |
| N-3 2002       | 2,602,429.69 | 1,577,545.41 | 20.20        | 20.91      | 1 1/4" USACE ASSOC. DBC    |
| VH-4 2000      | 2,603,143.94 | 1,578,248.04 | 27.94        | 22.85      | 3 1/4" TERRA SURVEYS DBC   |
| VH-5 2003      | 2,604,218.42 | 1,580,381.26 | 16.80        | 17.71      | 1 1/4" TERRA SURVEYS DBC   |
| VH-6 2003      | 2,603,739.93 | 1,580,595.52 | 17.62        | 18.53      | 3 1/4" TERRA SURVEYS DBC   |
| VH-7 2006      | 2,603,960.18 | 1,579,020.58 | 21.24        | 22.15      | 3 1/4" HUGHES & ASSOC. DBC |
| VH-8 2009      | 2,602,429.69 | 1,579,545.41 | 20.20        | 20.91      | 1 1/4" USACE ASSOC. DBC    |
| VH-9 2009*     | 2,603,513.62 | 1,578,487.98 | 21.24        | 22.15      | 3 1/4" TERRA SURVEYS DBC   |
| N 201 1966     |              |              | 20.57        | 21.48      | NOAA/NOS TIDAL BENCH MARK  |
| WAREHOUSE 1966 |              |              | 25.54        | 26.45      | NOAA/NOS TIDAL BENCH MARK  |
| B 98 1964      | 2,608,238    | 1,584,077    | 16.96        | 17.87      | NOS NAVD 88 BENCH MARK     |

| ★ NAVIGATION AIDS ★ |                          |   |       |             |
|---------------------|--------------------------|---|-------|-------------|
| USCG No.            | DESCRIPTION              |   |       | EASTING     |
| 25815               | VALDEZ BOAT HARBOR LIGHT | 2 | RED   | 1,577,865.8 |
| 25820               | VALDEZ BOAT HARBOR LIGHT | 3 | GREEN | 1,577,603.1 |

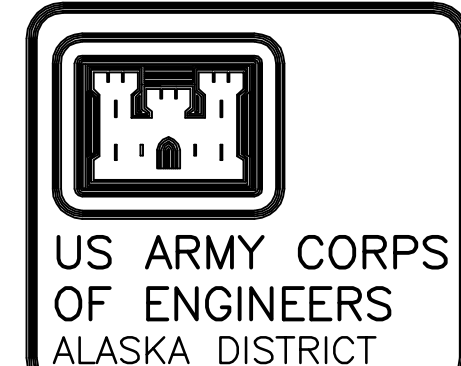
| VOLUME COMPUTATIONS                                       |             |
|---|-------------|
| Project Depth -12' MLLW                                   | CUBIC YARDS |
| MINIMUM PAY LINE (-12' MLLW)                              | 3,198       |
| Between MINIMUM PAY LINE and MAXIMUM PAY LINE (-13' MLLW) | 8,057       |
| VOLUME AVAILABLE ALONG SIDESLOPES (3:1, H:V)              | 4,842       |
| TOTAL   | 16,097      |

| PROJECT LIMITS |              |              |        |              |              |  |
|----------------|--------------|--------------|--------|--------------|--------------|--|
| CORNER         | NORTHING     | EASTING      | CORNER | NORTHING     | EASTING      |  |
| PC 1           | 2,603,103.58 | 1,577,876.01 | PT 8   | 2,603,245.12 | 1,578,205.20 |  |
| PC 2           | 2,603,322.01 | 1,578,063.74 | PC 9   | 2,603,063.59 | 1,577,989.15 |  |
| PT 3           | 2,603,299.29 | 1,578,116.13 | PT 10  | 2,603,063.59 | 1,577,989.15 |  |
| PC 3           | 2,603,523.03 | 1,578,128.72 | PT 11  | 2,603,304.29 | 1,578,050.26 |  |
| COR RT         | 2,603,525.81 | 1,578,193.85 | PC 1   | 2,603,773.76 | 1,578,175.59 |  |
| PT 4           | 2,603,492.40 | 1,578,193.85 | PC 2   | 2,603,083.32 | 1,578,872.82 |  |
| PT 5           | 2,603,383.86 | 1,578,306.71 | COR 3  | 2,603,529.72 | 1,578,899.19 |  |
| PC 4           | 2,603,421.09 | 1,578,528.33 |        |              |              |  |

| CURVE DATA |         |            |             |              |         |
|------------|---------|------------|-------------|--------------|---------|
| CURVE      | RADIUS  | ARC LENGTH | DELTA ANGLE | CHORD LENGTH | TANGENT |
| C1         | 278.00' | 295.97'    | 60°59'59"   | 282.19'      | 163.75' |
| C2         | 338.00' | 359.85'    | 60°59'59"   | 343.09'      | 199.10' |
| C3         | 398.00' | 294.71'    | 42°25'36"   | 288.03'      | 154.48' |
| C4         | 100.00' | 98.07'     | 56°11'31"   | 94.19'       | 53.39'  |
| C5         | 100.00' | 183.67'    | 105°14'06"  | 158.82'      | 130.88' |
| C6         | 100.00' | 11.08'     | 89°57'59"   | 14.42'       |         |



## SURVEY



CONTRACT NO. W911KB-08-D-0002-0011


FOR TERRASOND LIMITED  
MER STATE ALASKA

|                 |                                      |             |
|-----------------|--------------------------------------|-------------|
| Approved: _____ | Approved: _____<br>RESIDENT ENGINEER | Date: _____ |
|-----------------|--------------------------------------|-------------|

[illegible]

|                     |  |
|---------------------|--|
| Date: 12-07-09      |  |
| Dwg Scale: 1" = 50' |  |
| Plot Scale:         |  |
| File:               |  |
| Drawing #:          |  |
| Section             |  |
| Branch              |  |

2715-09

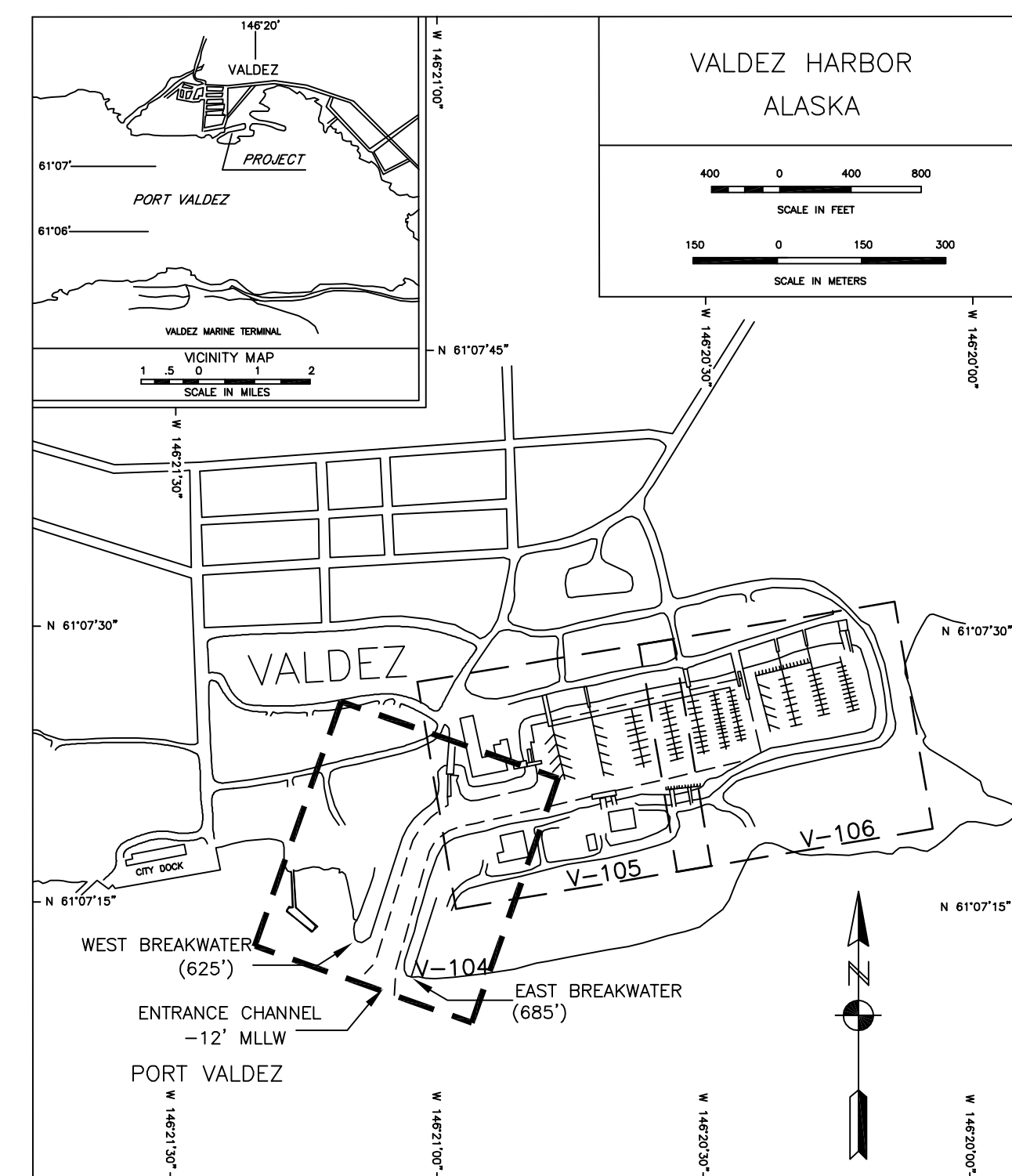
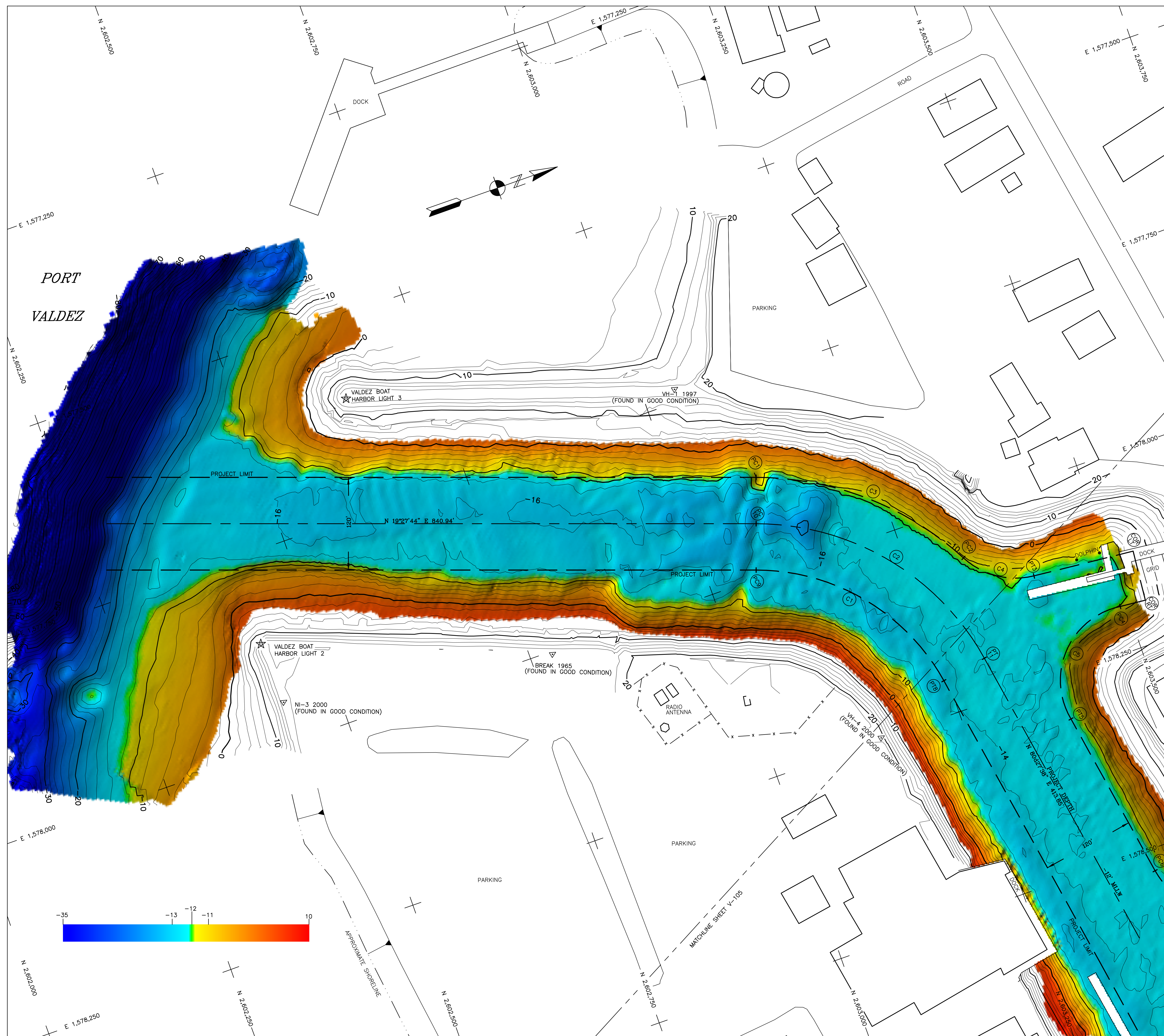
|   |  |                |               |
|---|--|----------------|---------------|
|  | U.S. ARMY ENGINEER DISTRICT<br>CORPS OF ENGINEERS<br>ANCHORAGE, ALASKA |                | Designed: JEA |
|   |  |                | Drawn: CAE    |
|   |  |                | Reviewed: LP  |
|   |  |                | Chief: _____  |
|   |  | Submitted: KDW | Chief: _____  |

VALDEZ, ALASKA  
VALDEZ HARBOR  
PROJECT CONDITION SURVEY  
SEPTEMBER 24-29, 2009

Reference  
number:

V-103





## NOTES

- HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 3, NAD83 IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83(CORS) 2003.00 EPOCH VALUES OF NOS CORS STATIONS: "GLENVILLE CORS ARP" (GNAA - NOS PID A04292) AS 6708144.570488" N, 1450812.701588" W; "PORT POINT S CORS ARP" (POTS - NOS PID D13043) AS 6103722.533151" N, 1464148.517373" W AND "ANCHORAGE AK DOT CORS ARP" (BDON - NOS PID D04055) AS 6110146.880000" N, 1484706.414891" W. RESIDENTIAL COORDINATES AT PRIMARY HARBOR CONTROL HOLD 3-1/4" DOMED BRASS CAP, "VH-9 2009" AS N 2,603,513.62", E 1,578,487.96" AND 3-1/4" DOMED BRASS CAP, "VH-6 2003" AS N 2,603,739.93", E 1,580,595.12".
- VERTICAL CONTROL IS MEAN-LOWER-LOW-WATER (MLLW = 0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST FOR STATION: "3454240, VALDEZ, PRICE WILLIAM SOUND, ALASKA, PUBLISHED 05/04/2009". THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING USCGS STANDARD BENCH MARK BRASS CAP, "NO 21 1986" AS 20.57' AND USCGS STANDARD BENCH MARK BRASS CAP, "WAREHOUSE 1966", AS 25.54'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING NOS FIRST ORDER CLASS II PUBLISHED VERTICAL VALUES FOR USCGS STANDARD BENCH MARK BRASS CAP, "B 98 1964" (NOS PID T11710), AS 17.87'.
- VERTICAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING CONVENTIONAL (OPTICAL) EQUIPMENT AND DIFFERENTIAL LEVELING TECHNIQUES. HORIZONTAL CONTROL WAS SURVEYED 24-25 SEPTEMBER, 2009 USING A COMBINATION OF STATIC GPS AND CONVENTIONAL TRAVERSE PROCEDURES. LONG-PERIOD STATIC GPS DATA WAS COLLECTED USING A PAIR OF LEICA RX1200 SERIES RECEIVERS. THE CONVENTIONAL TRAVERSE WAS CONDUCTED USING A TOPCON GTS-4 TOTAL STATION, ADJUSTED TO ATMOSPHERIC CONDITIONS. TOPOGRAPHIC DATA WAS COLLECTED ON 26-29 SEPTEMBER, 2009 USING A PAIR OF LEICA RX1200 GPS RECEIVERS AND REAL-TIME-KINEMATIC PROCEDURES WITH THE RTK BASE STATION LOCATED AT USACE SBC, "VH-9 2009". GPS DATA WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).
- HYDROGRAPHIC SOUNDING DATA WAS COLLECTED 26-29 SEPTEMBER, 2009 USING A RESON 8101 MULTI-BEAM ECHOSOUNDER (240KHz, 150 DEGREE SWATH-WIDTH WITH 101, 1.5 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE MEASURED USING A CODA OCTOPUS F180 INERTIAL NAVIGATION SYSTEM OPERATING ON RTK CORRECTORS BROADCAST FROM A LEICA RX1200 BASE STATION LOCATED AT USACE SBC, "VH-9 2009". SOUND VELOCITY WAS MEASURED AT NUMEROUS LOCATIONS AND TIDE PHASES USING AN ODOM DIGI-BAR PRO SOUND VELOCITY PROFILER. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPACK HYSWEEP (2009a) SOFTWARE. MULTI-BEAM SURVEY DATA WAS POST-PROCESSED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDING VALUES SHOWN ARE IN FEET AND MINUS UNLESS NOTED OTHERWISE.
- THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.

| CONTROL DATA   |              |              |             |               |                            |
|----------------|--------------|--------------|-------------|---------------|----------------------------|
| STATION        | NORTHING     | EASTING      | ELEV (MLLW) | ELEV (NAVD88) | DESCRIPTION                |
| BREAK 1965     | 2,602,778.67 | 1,578,004.17 | 17.79       | 18.70         | 3 1/4" USACE DBC           |
| TMP-1 1982     | 2,603,279.85 | 1,579,007.85 | 23.20       | 24.11         | 3 1/4" USACE DBC           |
| VH-1 1987      | 2,603,041.94 | 1,577,733.48 | 17.78       | 18.69         | 3 1/4" TERRA SURVEYS DBC   |
| VH-2 1987      | 2,603,735.41 | 1,578,538.01 | 20.51       | 21.42         | 3 1/4" TERRA SURVEYS DBC   |
| VH-3 2000      | 2,603,371.17 | 1,579,485.89 | 21.28       | 22.19         | 3 1/4" TERRA SURVEYS DBC   |
| NI-3 2000      | 2,602,429.69 | 1,577,846.73 | 20.00       | 20.91         | 3 1/4" USACE DBC           |
| VH-4 2000      | 2,603,143.94 | 1,578,248.04 | 22.94       | 22.85         | 3 1/4" TERRA SURVEYS DBC   |
| VH-5 2003      | 2,604,218.42 | 1,580,381.25 | 18.61       | 17.71         | 3 1/4" TERRA SURVEYS DBC   |
| VH-6 2003      | 2,603,739.93 | 1,580,595.12 | 17.62       | 18.53         | 3 1/4" TERRA SURVEYS DBC   |
| VH-7 2006      | 2,603,960.18 | 1,579,020.58 | 21.24       | 22.15         | 3 1/4" HUGHES & ASSOC. DBC |
| VH-8 2006      | 2,604,074.83 | 1,579,772.68 | 17.48       | 18.37         | 3 1/4" HUGHES & ASSOC. DBC |
| VH-9 2009*     | 2,603,513.62 | 1,578,487.96 | 21.24       | 22.15         | 3 1/4" TERRA SURVEYS DBC   |
| NO 21 1966     | -            | -            | 20.57       | 21.48         | NOAA/NOS TIDAL BENCH MARK  |
| WAREHOUSE 1966 | -            | -            | 25.54       | 26.45         | NOAA/NOS TIDAL BENCH MARK  |
| B 98 1964      | 2,608,238    | 1,584,077    | 18.96       | 17.87         | NOS NAVD 88 BENCH MARK     |

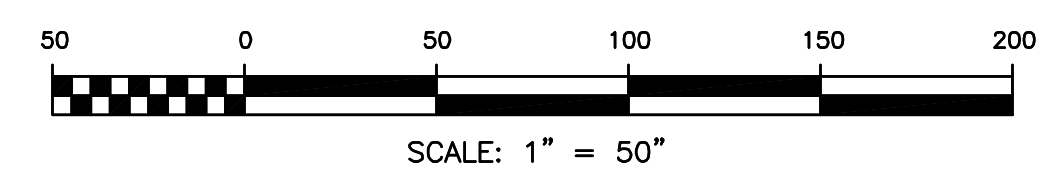
NOTE: MONUMENTS WITH AN ASTERISK (\*) WERE SET THIS SURVEY.

| NAVIGATION AIDS |                                  |             |             |
|-----------------|----------------------------------|-------------|-------------|
| USCG No.        | DESCRIPTION                      | NORTHING    | EASTING     |
| 25815           | VALDEZ BOAT HARBOR LIGHT 2 RED   | 2,602,427.1 | 1,577,865.8 |
| 25820           | VALDEZ BOAT HARBOR LIGHT 3 GREEN | 2,602,637.0 | 1,577,603.1 |

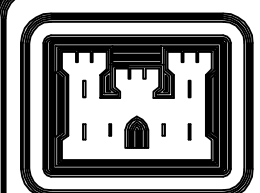
| VOLUME COMPUTATIONS                                       |  | CUBIC YARDS |
|---|--|-------------|
| Project Depth -12' MLLW                                   |  | 3,198       |
| MINIMUM PAY LINE (-12' MLLW)                              |  | 8,057       |
| Between MINIMUM PAY LINE and MAXIMUM PAY LINE (-13' MLLW) |  | 4,842       |
| VOLUME AVAILABLE ALONG SIDESLOPES (3:1, HY)               |  | 16,097      |
| TOTAL   |  |             |

| PROJECT LIMITS |              |              |        |              |              |
|----------------|--------------|--------------|--------|--------------|--------------|
| CORNER         | NORTHING     | EASTING      | CORNER | NORTHING     | EASTING      |
| PC 1           | 2,603,103.58 | 1,577,876.01 | PT 8   | 2,603,245.12 | 1,578,205.20 |
| PC 2           | 2,603,322.01 | 1,578,063.74 | PC 9   | 2,603,083.58 | 1,577,889.15 |
| PT 3           | 2,603,400.29 | 1,578,116.13 | PC 10  | 2,603,083.58 | 1,577,932.58 |
| COR LT         | 2,603,532.03 | 1,578,128.72 | PT 11  | 2,603,304.29 | 1,578,195.26 |
| COR RT         | 2,603,523.81 | 1,578,193.86 | COR 16 | 2,603,773.16 | 1,578,370.59 |
| PC 4           | 2,603,492.40 | 1,578,190.64 | COR 2  | 2,603,983.57 | 1,579,822.90 |
| PT 5           | 2,603,383.86 | 1,578,306.71 | COR 3  | 2,603,529.72 | 1,579,899.19 |
| PC 6           | 2,603,421.09 | 1,578,528.33 |        |              |              |
| PT 7           | 2,603,536.27 | 1,578,610.38 |        |              |              |

| CURVE DATA |         |            |             |              |
|------------|---------|------------|-------------|--------------|
| CURVE      | RADIUS  | ARC LENGTH | DELTA ANGLE | CHORD LENGTH |
| C1         | 278.00' | 295.97'    | 60°59'59"   | 282.19'      |
| C2         | 338.00' | 359.85'    | 60°59'59"   | 343.09'      |
| C3         | 398.00' | 294.71'    | 42°25'36"   | 288.03'      |
| C4         | 100.00' | 58.07'     | 96°11'31"   | 94.19'       |
| C5         | 100.00' | 183.67'    | 105°14'06"  | 158.92'      |
| C6         | 100.00' | 157.08'    | 89°59'53"   | 141.42'      |



SURVEY

US ARMY CORPS  
OF ENGINEERS  
ALASKA DISTRICT

CONTRACT NO. W911KB-08-D-0002-0011

CONTRACTOR TERRASOIL LIMITED

CITY PALMER

STATE ALASKA

APPROVED: [Signature]

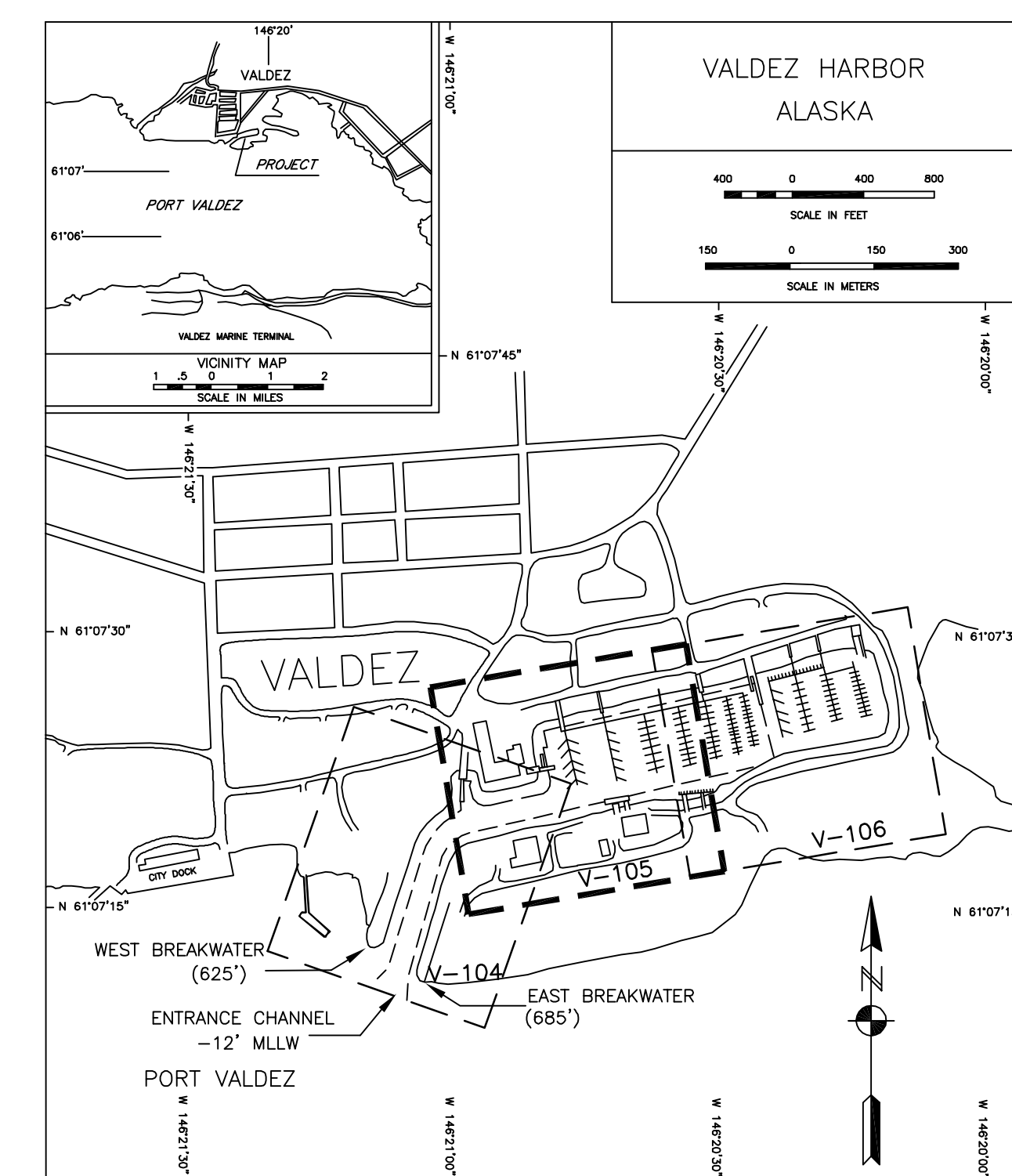
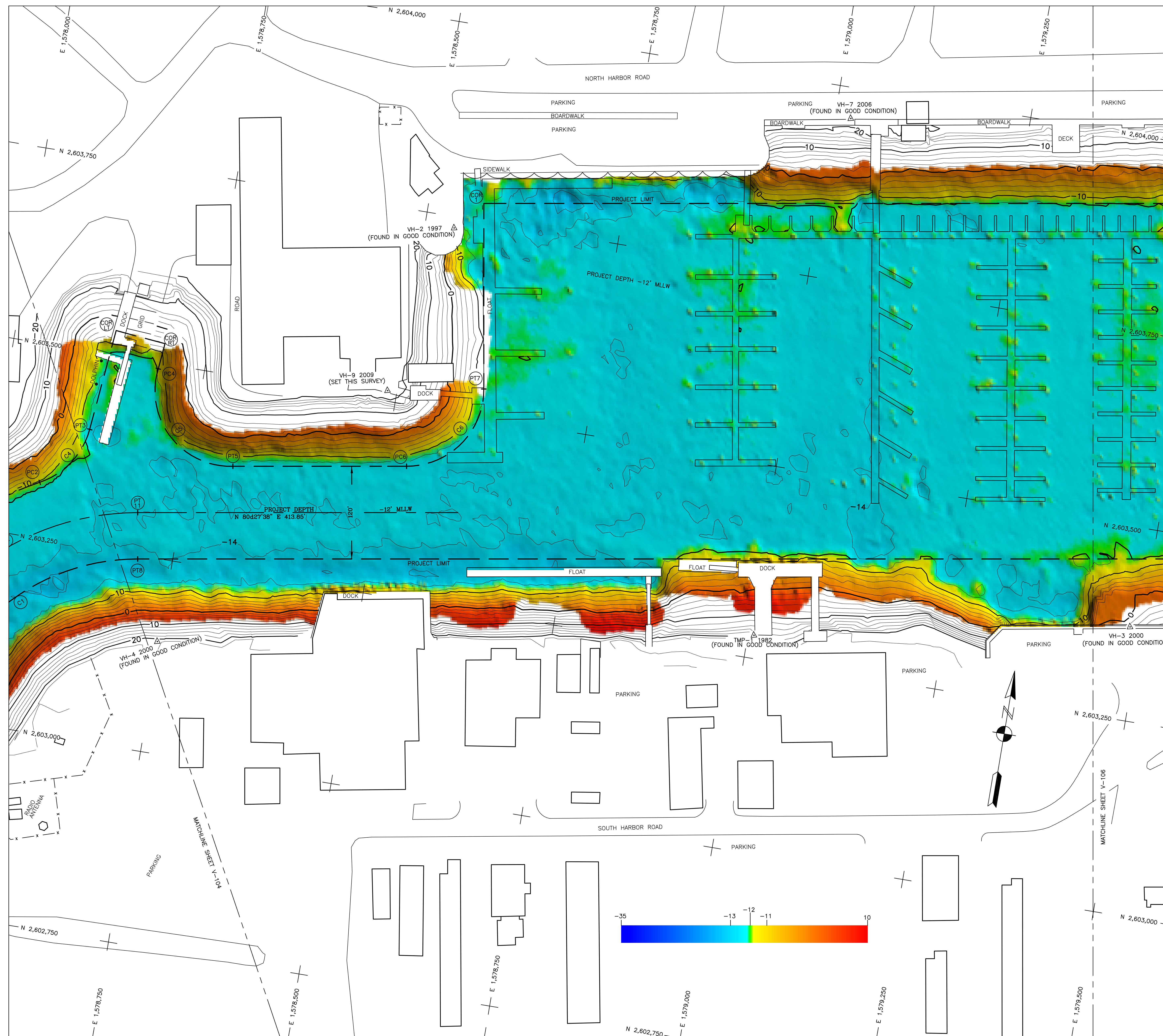
DATE: [Date]

| NO. | DESCRIPTION    | DATE |
|-----|----------------|------|
| 1   | DESIGN         | 2008 |
| 2   | CONSTRUCTION   | 2009 |
| 3   | OPERATION      | 2009 |
| 4   | MAINTENANCE    | 2009 |
| 5   | REPAIR         | 2009 |
| 6   | RECONSTRUCTION | 2009 |
| 7   | DEMOLITION     | 2009 |
| 8   | ABANDONMENT    | 2009 |
| 9   | REUSE          | 2009 |
| 10  | RECYCLING      | 2009 |
| 11  | REPAIR         | 2009 |
| 12  | RECONSTRUCTION | 2009 |
| 13  | DEMOLITION     | 2009 |
| 14  | ABANDONMENT    | 2009 |
| 15  | REUSE          | 2009 |
| 16  | RECYCLING      | 2009 |
| 17  | REPAIR         | 2009 |
| 18  | RECONSTRUCTION | 2009 |
| 19  | DEMOLITION     | 2009 |
| 20  | ABANDONMENT    | 2009 |
| 21  | REUSE          | 2009 |
| 22  | RECYCLING      | 2009 |
| 23  | REPAIR         | 2009 |
| 24  | RECONSTRUCTION | 2009 |
| 25  | DEMOLITION     | 2009 |
| 26  | ABANDONMENT    | 2009 |
| 27  | REUSE          | 2009 |
| 28  | RECYCLING      | 2009 |
| 29  | REPAIR         | 2009 |
| 30  | RECONSTRUCTION | 2009 |
| 31  | DEMOLITION     | 2009 |
| 32  | ABANDONMENT    | 2009 |
| 33  | REUSE          | 2009 |
| 34  | RECYCLING      | 2009 |
| 35  | REPAIR         | 2009 |
| 36  | RECONSTRUCTION | 2009 |
| 37  | DEMOLITION     | 2009 |
| 38  | ABANDONMENT    | 2009 |
| 39  | REUSE          | 2009 |
| 40  | RECYCLING      | 2009 |
| 41  | REPAIR         | 2009 |
| 42  | RECONSTRUCTION | 2009 |
| 43  | DEMOLITION     | 2009 |
| 44  | ABANDONMENT    | 2009 |
| 45  | REUSE          | 2009 |
| 46  | RECYCLING      | 2009 |
| 47  | REPAIR         | 2009 |
| 48  | RECONSTRUCTION | 2009 |
| 49  | DEMOLITION     | 2009 |
| 50  | ABANDONMENT    | 2009 |
| 51  | REUSE          | 2009 |
| 52  | RECYCLING      | 2009 |
| 53  | REPAIR         | 2009 |
| 54  | RECONSTRUCTION | 2009 |
| 55  | DEMOLITION     | 2009 |
| 56  | ABANDONMENT    | 2009 |
| 57  | REUSE          | 2009 |
| 58  | RECYCLING      | 2009 |
| 59  | REPAIR         | 2009 |
| 60  | RECONSTRUCTION | 2009 |
| 61  | DEMOLITION     | 2009 |
| 62  | ABANDONMENT    | 2009 |
| 63  | REUSE          | 2009 |
| 64  | RECYCLING      | 2009 |
| 65  | REPAIR         | 2009 |
| 66  | RECONSTRUCTION | 2009 |
| 67  | DEMOLITION     | 2009 |
| 68  | ABANDONMENT    | 2009 |
| 69  | REUSE          | 2009 |
| 70  | RECYCLING      | 2009 |
| 71  | REPAIR         | 2009 |
| 72  | RECONSTRUCTION | 2009 |
| 73  | DEMOLITION     | 2009 |
| 74  | ABANDONMENT    | 2009 |
| 75  | REUSE          | 2009 |
| 76  | RECYCLING      | 2009 |
| 77  | REPAIR         | 2009 |
| 78  | RECONSTRUCTION | 2009 |
| 79  | DEMOLITION     | 2009 |
| 80  | ABANDONMENT    | 2009 |
| 81  | REUSE          | 2009 |
| 82  | RECYCLING      | 2009 |
| 83  | REPAIR         | 2009 |
| 84  | RECONSTRUCTION | 2009 |
| 85  | DEMOLITION     | 2009 |
| 86  | ABANDONMENT    | 2009 |
| 87  | REUSE          | 2009 |
| 88  | RECYCLING      | 2009 |
| 89  | REPAIR         | 2009 |
| 90  | RECONSTRUCTION | 2009 |
| 91  | DEMOLITION     | 2009 |
| 92  | ABANDONMENT    | 2009 |
| 93  | REUSE          | 2009 |
| 94  | RECYCLING      | 2009 |
| 95  | REPAIR         | 2009 |
| 96  | RECONSTRUCTION | 2009 |
| 97  | DEMOLITION     | 2009 |
| 98  | ABANDONMENT    | 2009 |
| 99  | REUSE          | 2009 |
| 100 | RECYCLING      | 2009 |

|                             |                |                     |
|-----------------------------|----------------|---------------------|
| Date: 12-07-09              | Drawn: CAE     | Scale: 1" = 50'     |
| Designed: LEA               | Reviewed: LP   | Plot Scale: [Blank] |
| U.S. ARMY ENGINEER DISTRICT | Sumner/KOW     | Sheet: [Blank]      |
| CORPS OF ENGINEERS          | Chief: [Blank] | Branch: [Blank]     |
| ANCHORAGE, ALASKA           | Drawn: [Blank] | Drawing #: 2715-09  |

VALDEZ, ALASKA  
VALDEZ HARBOR  
PROJECT CONDITION SURVEY  
SEPTEMBER 24-29, 2009Reference  
number:  
V-104  
Sheet 4 of 6





## NOTES

- HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 3, NAD83 IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83(CORS) 2003.00 EPOCH VALUES OF NOS CORS STATIONS: "GLENDALE CORS ARP" (GNAA - NOS PID AH2492) AS 670044.571648" N, 1495812.70188" W, "POTATO POINT CORS ARP" (POTS - NOS PID DJ3043) AS 610322.53315" N, 1464148.51737" W AND "ANCHORAGE AK DOT CORS ARP" (TSON - NOS PID DK4055) AS 611046.98000" N, 1494706.41489" W. RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD 3-1/4" DOMED BRASS CAP, "VH-9 2009" AS N 2,603,513.62", E 1,578,487.96" AND 3-1/4" DOMED BRASS CAP, "VH-6 2003" AS N 2,603,739.93", E 1,580,595.12".
- VERTICAL CONTROL IS MEAN-LOWER-LOW-WATER (MLLW = 0.0'). BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST FOR STATION, "0454249, VALDEZ, PRINCE WILLIAM SOUND, ALASKA, PUBLISHED 05/04/2005". THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING USCGS STANDARD BENCH MARK BRASS CAP AND NO 21 1966" AS 20.57' AND USCGS STANDARD BENCH MARK BRASS CAP, "WAREHOUSE 1966", AS 25.54'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING NOS FIRST ORDER CLASS II PUBLISHED VERTICAL VALUES FOR USCGS STANDARD BENCH MARK BRASS CAP, "B 98 1964" (NOS PID T11710), AS 17.87'.
- VERTICAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING CONVENTIONAL (OPTICAL) EQUIPMENT AND DIFFERENTIAL LEVELING TECHNIQUES. HORIZONTAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING A COMBINATION OF STATIC GPS AND CONVENTIONAL TRAVERSE PROCEDURES. LONG-PERIOD STATIC GPS DATA WAS COLLECTED USING A PAIR OF LEICA RX1200 SERIES RECEIVERS. THE CONVENTIONAL TRAVERSE WAS CONDUCTED USING A TOPCON GTS-4 TOTAL STATION, ADJUSTED TO ATMOSPHERIC CONDITIONS. TOPOGRAPHIC DATA WAS COLLECTED ON 26-29 SEPTEMBER, 2009 USING A PAIR OF LEICA RX1200 GPS RECEIVERS AND REAL-TIME-KINEMATIC PROCEDURES WITH THE RTK BASE STATION LOCATED AT USACE SBC, "VH-9 2009". GPS DATA WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).
- HYDROGRAPHIC SOUNDING DATA WAS COLLECTED 26-29 SEPTEMBER, 2009 USING A RESON 8101 MULTI-BEAM ECHOSOUNDER (240kHz, 150 DEGREE SWATH-WIDTH WITH 101, 1.5 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE MEASURED USING A COXA OCTOPUS F180 INERTIAL NAVIGATION SYSTEM OPERATING ON RTK CORRECTORS BROADCAST FROM A LEICA RX1200 BASE STATION LOCATED AT USACE SBC, "VH-9 2009". SOUND VELOCITY WAS MEASURED AT NUMEROUS LOCATIONS AND TIDE PHASES USING AN ODOM DIGI-BAR PRO SOUND VELOCITY PROFILES. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPERACK HSWEEP (2009a) SOFTWARE. MULTI-BEAM SURVEY DATA WAS POST-PROCESSED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDING VALUES SHOWN ARE IN FEET AND MINUS UNLESS NOTED OTHERWISE.
- THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.

## CONTROL DATA

| STATION        | NORTHING     | EASTING      | ELEV (MLW)(NAVD88) | ELEV (MLW)(NAD83) | DESCRIPTION                |
|----------------|--------------|--------------|--------------------|-------------------|----------------------------|
| BREAK 1965     | 2,602,778.67 | 1,578,004.17 | 17.79              | 18.70             | 3 1/4" USACE DBC           |
| TMP-1 1982     | 2,603,279.85 | 1,579,007.85 | 23.20              | 24.11             | 3 1/4" USACE DBC           |
| VH-1 1997      | 2,603,041.94 | 1,577,733.46 | 17.78              | 18.69             | 3 1/4" TERRA SURVEYS DBC   |
| VH-2 1997      | 2,603,735.41 | 1,578,538.01 | 20.51              | 21.42             | 3 1/4" TERRA SURVEYS DBC   |
| VH-3 2000      | 2,603,371.17 | 1,579,485.89 | 21.28              | 22.19             | 3 1/4" TERRA SURVEYS DBC   |
| NI-3 2000      | 2,602,429.69 | 1,577,946.73 | 20.00              | 20.91             | 3 1/4" USACE DBC           |
| VH-4 2000      | 2,603,143.94 | 1,578,248.04 | 27.94              | 22.85             | 3 1/4" TERRA SURVEYS DBC   |
| VH-5 2003      | 2,604,218.42 | 1,580,381.26 | 16.80              | 17.71             | 3 1/4" TERRA SURVEYS DBC   |
| VH-6 2003      | 2,603,739.93 | 1,580,595.12 | 17.62              | 18.53             | 3 1/4" TERRA SURVEYS DBC   |
| VH-7 2006      | 2,603,960.18 | 1,579,020.58 | 21.24              | 22.15             | 3 1/4" HUGHES & ASSOC. DBC |
| VH-8 2006      | 2,604,074.83 | 1,578,772.68 | 17.46              | 18.37             | 3 1/4" HUGHES & ASSOC. DBC |
| VH-9 2009*     | 2,603,513.62 | 1,578,487.96 | 21.24              | 22.15             | 3 1/4" TERRA SURVEYS DBC   |
| NO 21 1966     | -            | -            | 20.57              | 21.48             | NOAA/NOS TIDAL BENCH MARK  |
| WAREHOUSE 1966 | -            | -            | 25.54              | 26.45             | NOAA/NOS TIDAL BENCH MARK  |
| B 98 1964      | 2,608,238    | 1,584,077    | 16.96              | 17.87             | NOS NAVD 88 BENCH MARK     |

NOTE: MONUMENTS WITH AN ASTERISK (\*) WERE SET THIS SURVEY.

## NAVIGATION AIDS

| USCG No. | DESCRIPTION                      | NORTHING    | EASTING     |
|----------|----------------------------------|-------------|-------------|
| 25815    | VALDEZ BOAT HARBOR LIGHT 2 RED   | 2,602,427.1 | 1,577,865.8 |
| 25820    | VALDEZ BOAT HARBOR LIGHT 3 GREEN | 2,602,637.0 | 1,577,603.1 |

## VOLUME COMPUTATIONS

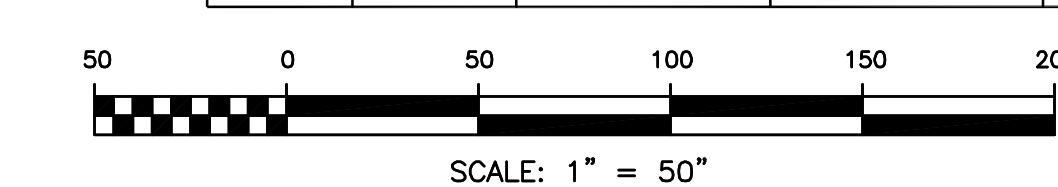
| Project Depth -12' MLLW                                   | CUBIC YARDS |
|---|-------------|
| MINIMUM PAY LINE (-12' MLLW)                              | 3,198       |
| BETWEEN MINIMUM PAY LINE AND MAXIMUM PAY LINE (-13' MLLW) | 8,057       |
| VOLUME AVAILABLE ALONG SIDESLOPES (3:1, HV)               | 4,842       |
| TOTAL   | 16,097      |

## PROJECT LIMITS

| CORNER | NORTHING     | EASTING      | CORNER | NORTHING     | EASTING      |
|--------|--------------|--------------|--------|--------------|--------------|
| PC 1   | 2,603,103.58 | 1,577,876.01 | PT 8   | 2,603,245.12 | 1,578,205.20 |
| PC 2   | 2,603,322.01 | 1,578,063.74 | PC 9   | 2,603,063.59 | 1,577,988.15 |
| PT 3   | 2,603,400.29 | 1,578,116.13 | PC 10  | 2,603,083.58 | 1,577,932.58 |
| COR LT | 2,603,532.03 | 1,578,128.72 | PT 11  | 2,603,304.29 | 1,578,195.26 |
| COR RT | 2,603,525.81 | 1,578,193.85 | COR 1  | 2,603,773.16 | 1,578,570.59 |
| PC 4   | 2,603,492.40 | 1,578,190.64 | COR 2  | 2,603,983.57 | 1,579,822.90 |
| PT 5   | 2,603,383.86 | 1,578,306.71 | COR 3  | 2,603,529.72 | 1,579,899.19 |
| PC 6   | 2,603,421.09 | 1,578,528.33 |        |              |              |
| PT 7   | 2,603,536.27 | 1,578,610.38 |        |              |              |

## CURVE DATA

| CURVE | RADIUS  | ARC LENGTH | DELTA ANGLE | CHORD LENGTH | TANGENT |
|-------|---------|------------|-------------|--------------|---------|
| C1    | 278.00' | 295.97'    | 60°59'59"   | 282.19'      | 163.75' |
| C2    | 338.00' | 359.85'    | 60°59'59"   | 343.09'      | 199.10' |
| C3    | 398.00' | 294.71'    | 42°25'36"   | 288.03'      | 154.48' |
| C4    | 100.00' | 98.07'     | 56°11'31"   | 94.18'       | 53.39'  |
| C5    | 100.00' | 183.67'    | 105°14'06"  | 158.92'      | 130.88' |
| C6    | 100.00' | 157.08'    | 89°59'53"   | 141.42'      | 100.00' |



SURVEY



CONTRACT NO. W911KB-08-D-0002-0011  
CONTRACTOR TERRASON LIMITED  
CITY PALMER  
STATE ALASKA  
Approved: \_\_\_\_\_  
Recommended: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_

| Rev | Section | Description | Date | Appr |
|-----|---------|-------------|------|------|
|     |         |             |      |      |
|     |         |             |      |      |
|     |         |             |      |      |
|     |         |             |      |      |

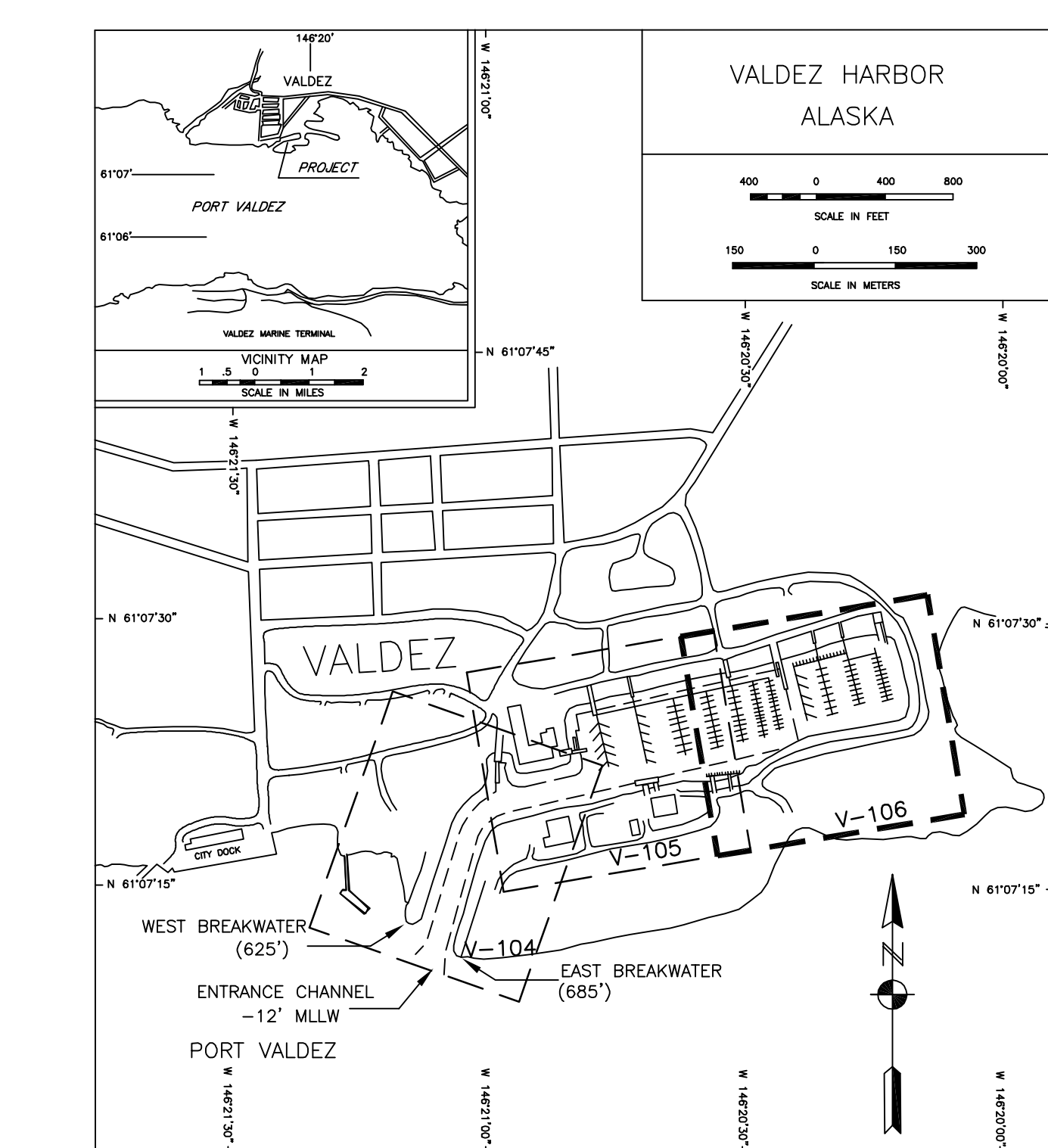
Drawn: JEA  
Checked: CAE  
Reviewed: LP  
Submitted: KOW  
Chief: \_\_\_\_\_  
Scale: 1" = 50'  
Date: 12-07-09  
Project: VALDEZ HARBOR  
Sheet: 5 of 6  
Drawing #: 2715-09

VALDEZ, ALASKA  
VALDEZ HARBOR  
PROJECT CONDITION SURVEY  
SEPTEMBER 24-29, 2009

Reference number:

V-105  
Sheet 5 of 6





1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 3, NAD83 IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83(CORS) 2003.00 DATUM. THE DATUM POINTS ARE LOCATED AT THE FOLLOWING COORDINATES (NAD83(CORS) 2003.00): 62°06'48.57648" N, 143°03'22.55315" W, "POTATO POINT 5 CORS ARP" (POT5 = NGS PID D3043) IS 81°19'22.55315" N, 170°14'48.51737" W AND "ANCHORAGE GUT DOT CORS ARP" (ANCHGUT = NGS PID D3045) IS 61°11'46.88000" N, 149°47'08.41488" W. RESULTS DERIVED AT PRIMARY HARDWARE CONTROL HOLD 3-1/4" DOWMED BRASS CAP, "VM-9 2009" (2009) 61°16'22.55315" N, 157°48.48488" W AND 3-1/4" DOWMED BRASS CAP, "VM-6 2003" AS 62°06'23.793.93" N, 1.580.959.12".

2. VERTICAL CONTROL IS MEAN-LOWER-LOW-WATER (MLW = 0.0'). BASED ON THE NOAA/NATIONAL TIDAL BENCH MARK LIST FOR STATION, "9454240, VALDEZ, PRINCE WILLIAM SOUND, ALASKA, 02/04/1984". THE DATUM POINTS ARE LOCATED AT THE FOLLOWING COORDINATES (NAD83(CORS) 2003.00) AND IS REFERENCED BY HOLDING USCGS STANDARD BENCH MARK BRASS CAP, "NO 21 1966" AS 20.57" AND USCGS STANDARD BENCH MARK BRASS CAP, "WAREHOUSE 1966", AS 25.54". ALSO REFERENCED BY HOLDING USCGS STANDARD BENCH MARK BRASS CAP, "NO 22 1966" AS 25.54" ON HOLDING NGS FIRST ORDER, CLASS II PUBLISHED VERTICAL VALUES FOR USCGS STANDARD BENCH MARK BRASS CAP, "B 98 1964" (NGS PID TT1710), AS 17.87".

3. VERTICAL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING CONVENTIONAL (OPTICAL) LEVELING. VERTICAL CONTROL WAS SURVEYED USING CONVENTIONAL TRAVEL CONTROL WAS SURVEYED 24-29 SEPTEMBER, 2009 USING A COMBINATION OF STATIC GPS AND CONVENTIONAL TRAVERSE SURVEYING. LONG-PERIOD STATIC GPS DATA WAS COLLECTED USING A PAIR OF LIECA R12020 GPS RECEIVERS. TRAVERSE SURVEYING WAS CONDUCTED USING A TRIMBLE 5600 GPS RECEIVER. TOTAL STATION, ADJUSTED TO ATMOSPHERIC CONDITIONS. TOPOGRAPHIC DATA WAS COLLECTED USING A TRIMBLE 5600 GPS RECEIVER. USCGS STANDARD BENCH MARK BRASS CAP, "NO 21 1966" REAL-TIME-KINEMATIC PROCEDURES WITH THE RITE BENCH STATION LOCATED AT USASC SSC, "VM-9 2009". GPS DATA WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).

4. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED 26-29 SEPTEMBER, 2009 USING A RESON 81010 HYDROGRAPHIC SOUNDING SYSTEM. BEAM ANGLES WERE 1.5 DEGREES. BEAMS' POSITIONS AND VESSEL ATTITUDE WERE MEASURED USING A CODA OCTOPUS F180 INERTIAL NAVIGATION SYSTEM OPERATING ON RITE CORRECTORS BROADCAST FROM A LIECA R12020 GPS RECEIVER. DATA WAS COLLECTED USING A TRIMBLE 5600 GPS RECEIVER.

5. NUMEROUS LOCATIONS AND TIDE PHASES USING AN ODOM DIGIT-BAR PRO SOUND VELOCITY CORRECTOR AND COLLECTION AND TIDE PHASES USING AN ODOM DIGIT-BAR PRO SOUND VELOCITY CORRECTOR. SOFTWARE. 1.580.959.12". DATA WAS POST-PROCESSED USING TRIMBLE GEOMATICS OFFICE (V1.6.3).

6. SOUNDING VALUES SHOWN ARE IN FEET AND MINUS UNLESS NOTED OTHERWISE.

7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.

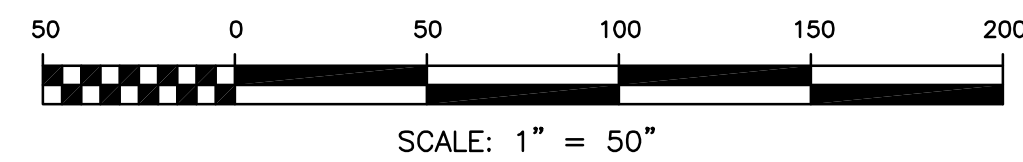
| STATION    | NORTHING      | CONTROL DATA  |                | DESCRIPTION                      |
|------------|---------------|---------------|----------------|----------------------------------|
|            |               | EASTING       | ELEV. (NAVD83) |                                  |
| BMPK 1965  | 2,602,778.671 | 1,578,004.117 | 17.79          | 18.70 3 1/4" TERRA SURVEYS DBC   |
| NIR-2 1982 | 2,603,379.681 | 1,579,007.885 | 20.21          | 22.32 3 1/4" TERRA SURVEYS DBC   |
| VH1-1997   | 2,603,041.944 | 1,577,733.46  | 17.78          | 18.69 3 1/4" TERRA SURVEYS DBC   |
| VH2-1997   | 2,603,735.41  | 1,576,538.31  | 20.51          | 21.42 3 1/4" TERRA SURVEYS DBC   |
| VH3-2000   | 2,603,371.177 | 1,579,485.69  | 21.28          | 22.19 3 1/4" TERRA SURVEYS DBC   |
| VH4-2000   | 2,602,628.681 | 1,577,946.94  | 20.91          | 22.14 3 1/4" TERRA SURVEYS DBC   |
| VH4-2000   | 2,603,143.94  | 1,578,248.04  | 21.94          | 22.85 3 1/4" TERRA SURVEYS DBC   |
| VH5-2003   | 2,604,286.142 | 1,580,381.26  | 16.80          | 17.71 3 1/4" TERRA SURVEYS DBC   |
| VH5-2003   | 2,603,931.931 | 1,580,000.00  | 20.91          | 21.42 3 1/4" TERRA SURVEYS DBC   |
| VH7-2006   | 2,603,810.18  | 1,579,020.58  | 22.24          | 22.15 3 1/4" HUGHES & ASSOC. DBC |
| NH-8 2006  | 2,604,074.831 | 1,579,772.98  | 17.46          | 18.37 3 1/4" HUGHES & ASSOC. DBC |
| NH-8 2006  | 2,603,913.62  | 1,578,487.98  | 21.24          | 22.15 3 1/4" HUGHES & ASSOC. DBC |
| W-1965     | 2,603,913.62  | 1,578,487.98  | 21.24          | 22.15 3 1/4" HUGHES & ASSOC. DBC |
| WAREHOUSE  | NOTED         | NOTED         | 25.94          | 26.94 NGS/NAOS 120 BENCH MARK    |
| B 98 1984  | 2,608,238.1   | 1,584,077.1   | 15.96          | 17.87 NGS NAOS 88 BENCH MARK     |

| NAVIGATION AIDS |             |      |                      |             |
|-----------------|-------------|------|----------------------|-------------|
| USCG No.        | DESCRIPTION |      |                      | EASTING     |
| 25815           | VALDEZ      | BOAT | HARBOR LIGHT 2 RED   | 1,577,865.8 |
| 25820           | VALDEZ      | BOAT | HARBOR LIGHT 3 GREEN | 1,577,603.1 |

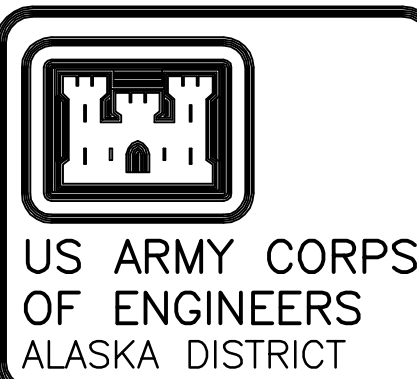
| VOLUME COMPUTATIONS                                       |             |
|---|-------------|
| Project Depth -12' MLLW                                   | CUBIC YARDS |
| MINIMUM PAY LINE (-12' MLLW)                              | 3,198       |
| Between MINIMUM PAY LINE and MAXIMUM PAY LINE (-13' MLLW) | 8,057       |
| VOLUME AVAILABLE ALONG SIDESLOPES (3:1, H:V)              | 4,842       |
| TOTAL   | 16,097      |

| PROJECT LIMITS |              |              |        |              |              |  |
|----------------|--------------|--------------|--------|--------------|--------------|--|
| CORNER         | NORTHING     | EASTING      | CORNER | NORTHING     | EASTING      |  |
| PC 1           | 2,603,103.58 | 1,577,876.01 | PT 8   | 2,603,245.12 | 1,578,205.20 |  |
| PC 2           | 2,603,031.33 | 1,577,874.74 | PT 9   | 2,603,363.59 | 1,577,989.15 |  |
| PT 3           | 2,603,400.29 | 1,578,116.13 | PC 10  | 2,603,083.58 | 1,577,932.58 |  |
| COR LT         | 2,603,532.03 | 1,578,128.72 | PT 11  | 2,603,304.29 | 1,578,195.26 |  |
| COR RT         | 2,603,525.81 | 1,578,193.85 | COR 1  | 2,603,773.16 | 1,578,570.59 |  |
| CD 4           | 2,603,492.40 | 1,578,190.64 | COR 2  | 2,603,983.57 | 1,579,822.90 |  |
| PT 5           | 2,603,386.86 | 1,578,306.33 | COR 3  | 2,603,529.72 | 1,579,899.91 |  |
| PC 6           | 2,603,472.98 | 1,578,307.71 |        |              |              |  |
| PT 7           | 2,603,526.27 | 1,578,610.38 |        |              |              |  |

| CURVE DATA |         |            |             |              |         |
|------------|---------|------------|-------------|--------------|---------|
| CURVE      | RADIUS  | ARC LENGTH | DELTA ANGLE | CHORD LENGTH | TANGENT |
| C1         | 278.00' | 295.97'    | 60°59'59"   | 282.19'      | 163.75' |
| C2         | 338.00' | 359.85'    | 60°59'59"   | 343.09'      | 199.10' |
| C3         | 398.00' | 294.71'    | 42°25'36"   | 288.03'      | 154.48' |
| C4         | 100.00' | 98.07'     | 56°11'31"   | 94.19'       | 53.39'  |
| C5         | 100.00' | 183.67'    | 106°06'58"  | 158.92'      | 130.88' |
| C6         | 100.00' | 157.08'    | 89°59'53"   | 141.42'      | 100.00' |




## SURVEY



|                                    |            |                   |                   |        |       |        |
|------------------------------------|------------|-------------------|-------------------|--------|-------|--------|
| CONTRACT NO. W911KB-08-D-0002-0011 | CONTRACTOR | TERRASOND LIMITED | CITY              | PALMER | STATE | ALASKA |
| Recommended:                       |            |                   | Approved:         | Date:  |       |        |
| PRIME CONTRACTOR                   |            |                   | RESIDENT ENGINEER |        |       |        |

[illegible]

|  |               |              |                |
|--|---------------|--------------|----------------|
|  | Designed: JEA |              | Date: 12-07-09 |
|  | Drawn: CAE    | Proj. Score: | 1" = 50'       |
|  | Reviewed:     | Plot Scale:  |                |
|  | Chief:        | Section:     | Title:         |
|  | Submitted:    | Branch:      | Drawing #:     |

VALDEZ, ALASKA  
VALDEZ HARBOR  
PROJECT CONDITION SURVEY  
SEPTEMBER 24-29, 2009

Reference  
number:  
**V-106**  
Sheet 6 of 6