

**Red Dog Operations**

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**Teck**

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# ONE YEAR MINE PLAN – 2011

## ADDENDUM

HL

December 2010

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**Teck**

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### Distribution List – September 2010

#### Red Dog Mine, Teck Alaska Inc.

Vice President - Mike Agg	Short Range Planning (2)
General Manager – Mike Bonneau	Long Range Planning (1)
Operations Manager– John Egan	Projects (1)
Mine Superintendent - Mark Smith	Geology (1)
Mine General Forman – Larry Hanna	Spares (4)
Chief Engineer – Tom Farr	

## 1. SUMMARY

### 1.1. Introduction

The 2011 mine plan was completed in June 2010. The following initial assumptions of the 2011 mine plan have changed dramatically during this several month period of mine development:

- 1) End of 2010 mine status projection has changed mainly due to geotechnical and production scheduling issues.
- 2) Final date of Main-pit completion reset to December 2011 from 2012.
- 3) Equipment availability, such as 12 haul trucks will be available until September of 2011.

This 2011 Mine Plan Addendum is a collection of revised monthly 2011 mine production plans, equipment forecast, Aqqaluk dewatering plan and other major changes.

### 1.2. Mine Production

The production target forecast has been reset to 13,341 kt of total mine production from the Main Pit and the Aqqaluk Pit (Table 1-1). The 3,487 kt of ore at XX.X% Zn and X.X% Pb is from the Main Pit and Aqqaluk Pit throughout 2011. Within the total 9,854 kt of waste scheduled, 8,368 kt is from the Aqqaluk Pit.

**Table 1-1 2011 Mine Plan Summary**

	Main Pit	Aqqaluk Pit	Total
Total (t)	3,000,354	10,340,625	13,340,979
Ore (t)	1,514,234	1,972,592	3,486,826
Zn (%)			
Pb (%)			
Waste (t)	1,486,120	8,368,033	9,854,153
SR	0.98	4.2	2.83

### 1.3. Equipment Fleets

For the first three quarters of 2011, the equipment required to achieve the 2011 plan will remain unchanged from current fleet size (Table 1-2). Red Dog purchased three 777F Haul Trucks, one 993K Loader, and one DML Drill in 2010 as replacement equipment but due to the increased demands from Aqqaluk stripping, the equipment intended to be replaced was rescheduled as a

result of the permit delay. A D10 dozer was also leased to support the Aqqaluk development. Once Aqqaluk stripping is completed in 3<sup>rd</sup> quarter of 2011, three trucks, one drill, one loader, and one dozer will be decommissioned.

**Table 1-2 2011 Equipment Schedule**

Equipment	Description	2011 required	End of 2011 Fleet
Drills	DML	3	2
Trucks	777	12	9
Loaders	992	5	4
Dozers	D10	4	3



**Table 2-2 2011 Quarterly Mine Plan Summary**

<u>Main</u>	Q1	Q2	Q3	Q4	2011 Total
Ore (t)	704,712	299,168	261,816	248,538	1,514,234
NSR (\$/t)					
Zn (%)					
Pb (%)					
sPb (%)	0.8	1.0	1.0	1.1	0.9
Ag (g/t)					
Fe (%)	6.2	7.2	6.5	7.8	6.7
Ba (%)	4.1	3.4	2.1	2.9	3.4
TOC (%)	0.6	0.3	0.3	0.4	0.5
SiO2 (%)	43.2	32.0	40.5	41.5	40.3
Marginal (t)	0	0	0	0	0
Waste (t)	627,998	403,605	268,954	185,563	1,486,120
Total(t)	1,332,710	702,773	530,770	434,101	3,000,354
SR	0.89	1.35	1.03	0.75	0.98

<u>Aqgaluk</u>	Q1	Q2	Q3	Q4	2011 Total
Ore (t)	154,207	564,156	622,427	631,802	1,972,592
NSR (\$/t)					
Zn (%)					
Pb (%)					
sPb (%)	0.9	0.9	0.8	1.1	1.0
Ag (g/t)					
Fe (%)	3.4	4.2	4.4	4.2	4.2
Ba (%)	6.4	3.9	5.9	8.5	6.2
TOC (%)	0.2	0.2	0.2	0.2	0.2
Marginal (t)	0	0	0	0	0
Waste (t)	1,935,330	2,293,143	2,396,908	1,742,652	8,368,033
Total(t)	2,089,537	2,857,299	3,019,335	2,374,454	10,340,625
SR	12.55	4.06	3.85	2.76	4.2

<u>Total</u>	Q1	Q2	Q3	Q4	2011 Total
Ore (t)	858,919	863,324	884,243	880,340	3,486,826
NSR (\$/t)					
Zn (%)					
Pb (%)					
sPb (%)	0.9	1.0	0.9	1.1	1.0
Ag (g/t)					
Fe (%)	5.7	5.3	5.0	5.2	5.3
Ba (%)	4.5	3.7	4.7	6.9	5.0
TOC (%)	0.5	0.3	0.2	0.3	0.3
Marginal (t)	0	0	0	0	0
Waste (t)	2,563,328	2,696,748	2,665,862	1,928,215	9,854,153
Total(t)	3,422,247	3,560,072	3,550,105	2,808,555	13,340,979
SR	3.0	3.1	3.0	2.2	2.83
Ag in Zn conc (g/dmt)					
Ag in Pb conc (g/dmt)					
Zn/Fe					
Zn/Pb tot					
sPb/Pb					
Zn/TOC					
Zn conc (t)					
Pb conc (t)					
Total Conc (t)					

### 3. EQUIPMENT FLEETS

**Table 3-1 Monthly Non-production Projects Hours**

Projects	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>Tailings dam</b>													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	61	61	61	61	61	0	0	0	305
Haultruck hours	0	0	0	0	145	145	145	145	145	0	0	0	726
Dozer hours	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Back dam</b>													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	37	37	37	37	37	0	0	0	184
Haultruck hours	0	0	0	0	88	88	88	88	88	0	0	0	438
Dozer hours	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>MWD 3:1 reslope</b>													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Haultruck hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Dozer hours	0	0	0	66	48	26	206	206	200	0	0	0	753
<b>Aqqaluk topsoil stripping</b>													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	0	57	0	0	0	0	0	0	57
Haultruck hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Dozer hours	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>quarries</b>													
Drill hours	0	0	0	0	65	65	65	65	0	0	0	0	259
Loader hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Haultruck hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Dozer hours	0	0	0	0	20	40	0	0	0	0	0	0	60
<b>Infill drilling pad preparation</b>													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Haultruck hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Dozer hours	69	62	69	67	69	67	69	69	67	69	67	69	813
<b>Total</b>													
Drill hours	0	0	0	0	65	65	65	65	0	0	0	0	259
Loader hours	0	0	0	0	98	155	98	98	98	0	0	0	546
Haultruck hours	0	0	0	0	233	233	233	233	233	0	0	0	1164
Dozer hours	69	62	69	133	137	133	275	275	267	69	67	69	1625





## **4. APPENDICES**

**Appendix-I 2011 Aqqaluk Dewatering Plan**

**Appendix-II 2011 Mine Plan Maps (by month)**

**Appendix-III 2011 Mine Plan 3D View and End of Period Surface (by month)**

## 2011 Aqqaluk Dewatering Summary

Beginning December 2010 a new haul road (green in Figure 4-1) will be constructed on the west end of the Aqqaluk deposit. The road will be finished in January 2011. The construction of the haul road will intersect the existing dewatering ditch in Aqqaluk (teal in Figure 4-1). The existing ditch and new haul road will intersect at the 1045 elevation at a settling pond (red in Figure 4-1). A new dewatering ditch (pink in Figure 4-1) will be excavated on the original ground side of the haul road and flow to another settling pond at the 1010 elevation. From the settling pond at 1010 a 36" culvert (orange in Figure 4-1) will be needed to move the flow of water to the mine side of the haul road. After the road crossing, water will continue to flow to the 950 elevation into a third settling pond. The settling pond on 950 will also hold water from a temporary dewatering ditch dug into the 950 bench (purple in Figure 4-1). The 950 ditch will be extended as mining allows and can be moved where needed to collect water flowing through the highwall. The 950 collection ditch may require blasting, so future mine sequencing will have to be considered before it is extended each month.

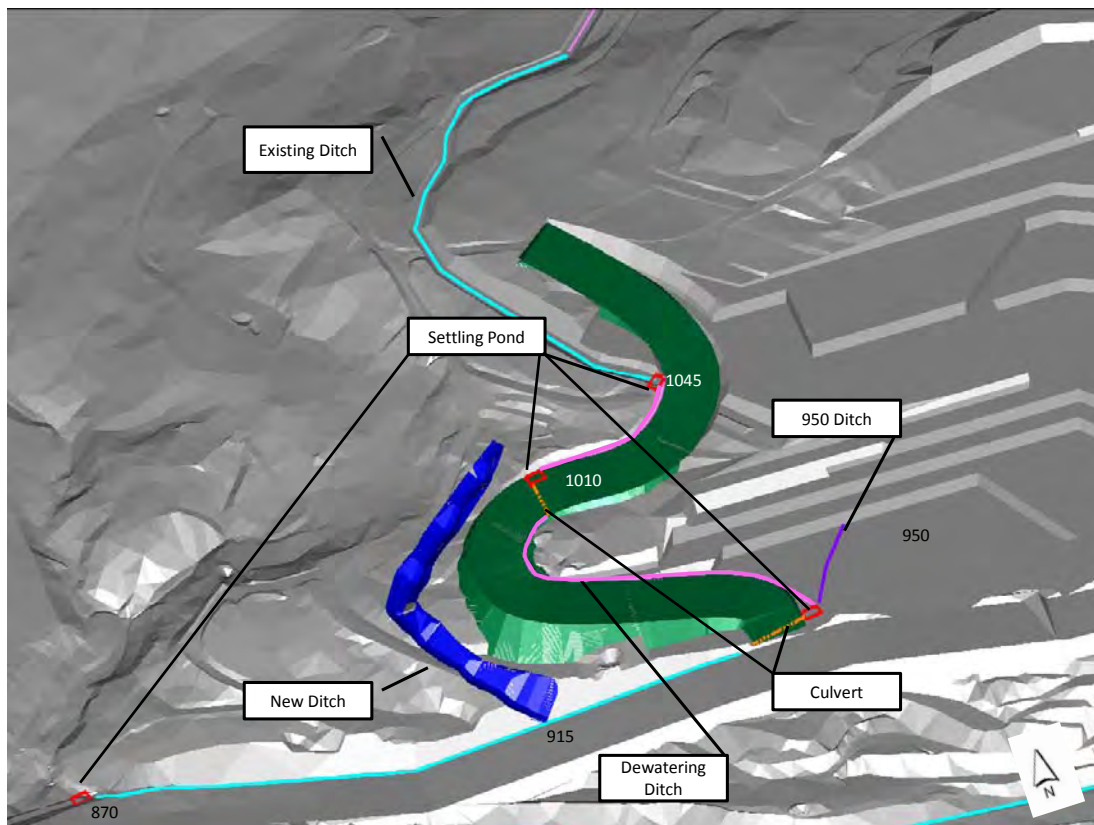


Figure 4-1 West Aqqaluk Haul Road

A second culvert from the 950 settling pond will be needed to intersect the existing dewatering ditch on the Aqqaluk haul road.

Below the new haul road a ditch will have to be dug (blue in Figure 4-1) to collect any water running off the original ground side of the haul road. The ditch will require blasting and excavator work to intersect the Aqqaluk haul road at the 915 elevation.

Further down the Aqqaluk haul road, at approximately the 870 elevation, a settling pond will need to be dug out. The pond will be lined with a connex container. Water will flow from the 870 settling pond to the Red Dog Creek pump back station.

The ditch to the north of Aqqaluk (pink in Figure 4-2) needs to be completed to design, 40 feet from the mine side of the silt fence, before spring break up.

The end of year dewatering layout for the west and north end of Aqqaluk for 2011 is shown in Figure 4-2.

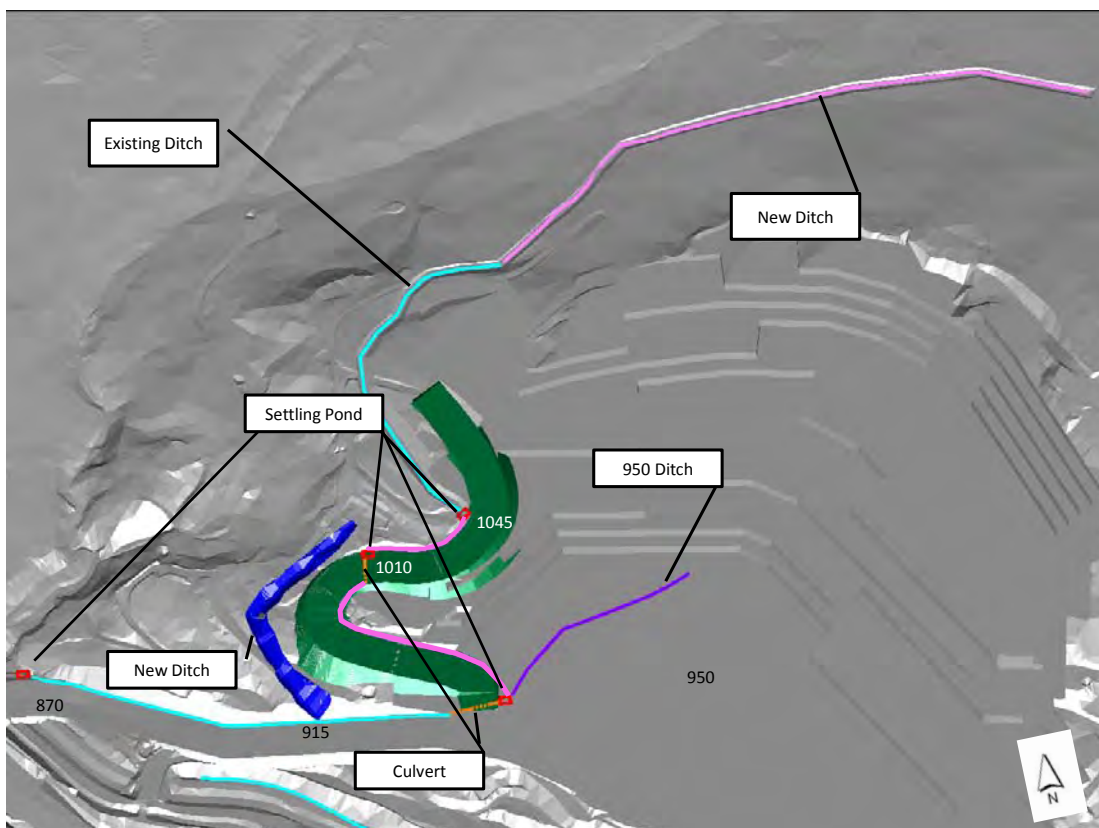


Figure 4-2 EOY Aqqaluk Dewatering

Dewatering needs on the south end of Aqqaluk will remain mostly unchanged. There is a sump and electric pump in place (yellow in Figure 4-3). There is also a sump (green in Figure 4-3) to collect runoff from the Aqqaluk haul road at the 880 elevation. A portable pump can be moved here if required.

Natural water channels (brown in Figure 4-3) will have to be expanded to accommodate the increased water flow as Aqqaluk haul road is removed. A road crossing culvert will also be needed to allow access to Shelly Creek drainage area.

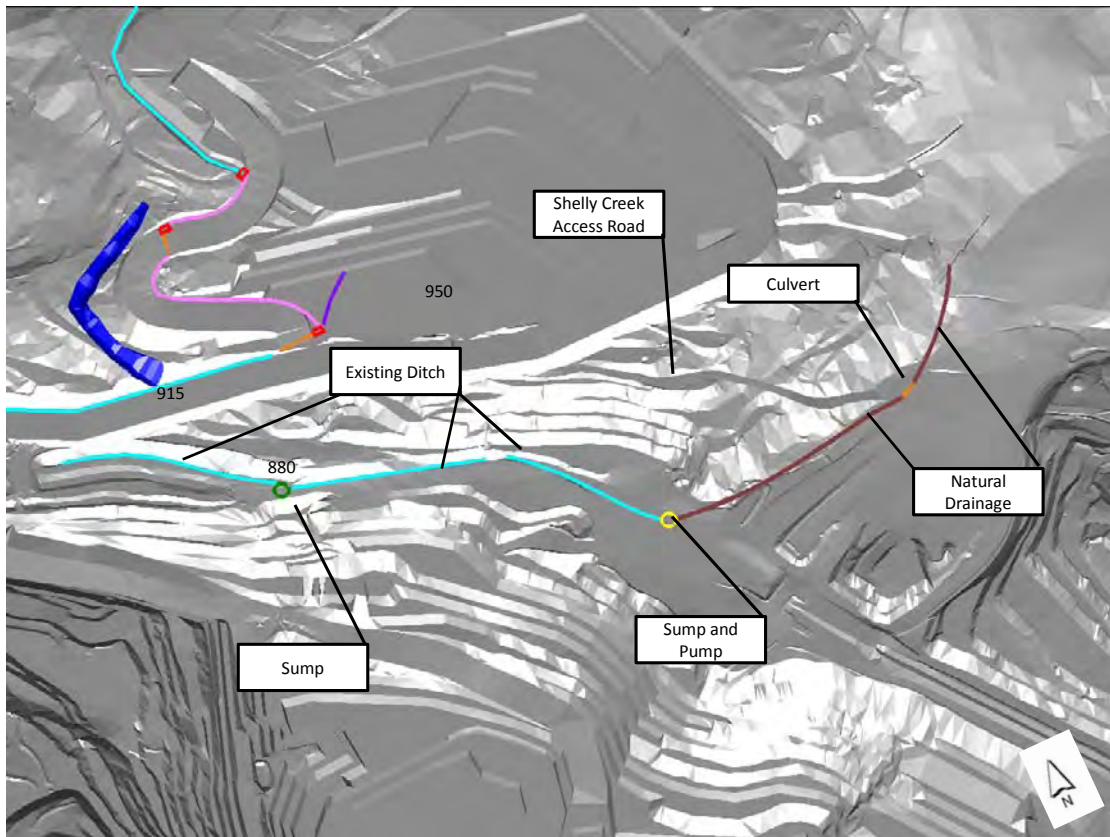


Figure 4-3 South Aqqaluk Dewatering

Figure 4-4 displays the Aqqaluk dewatering plan for 2011 as well as a cross section of the west end haul road and new collection ditch.

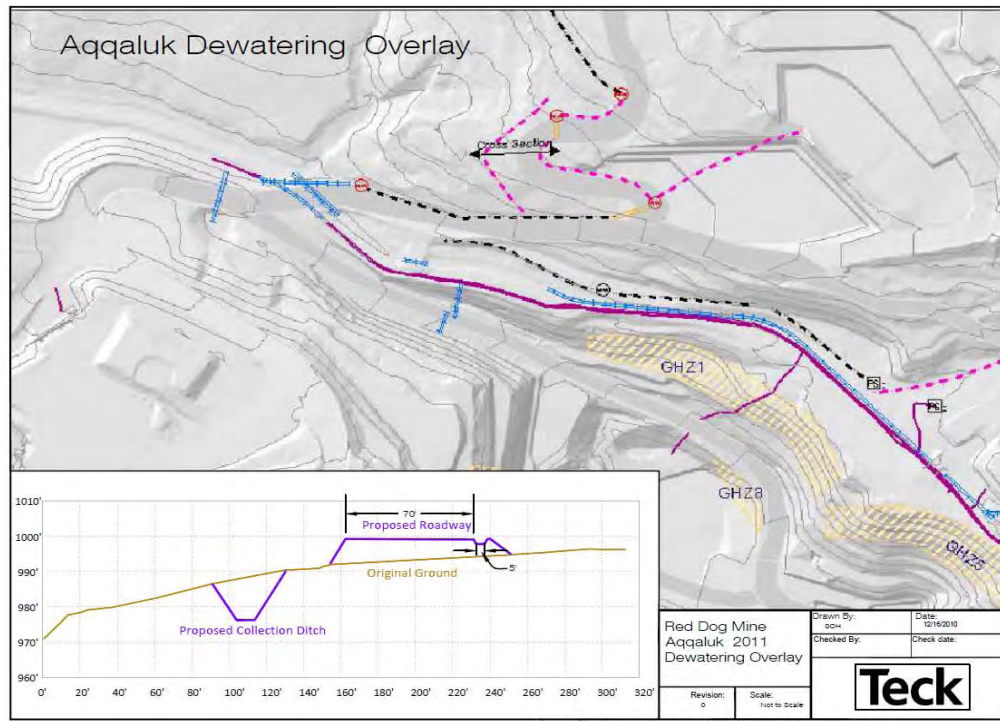
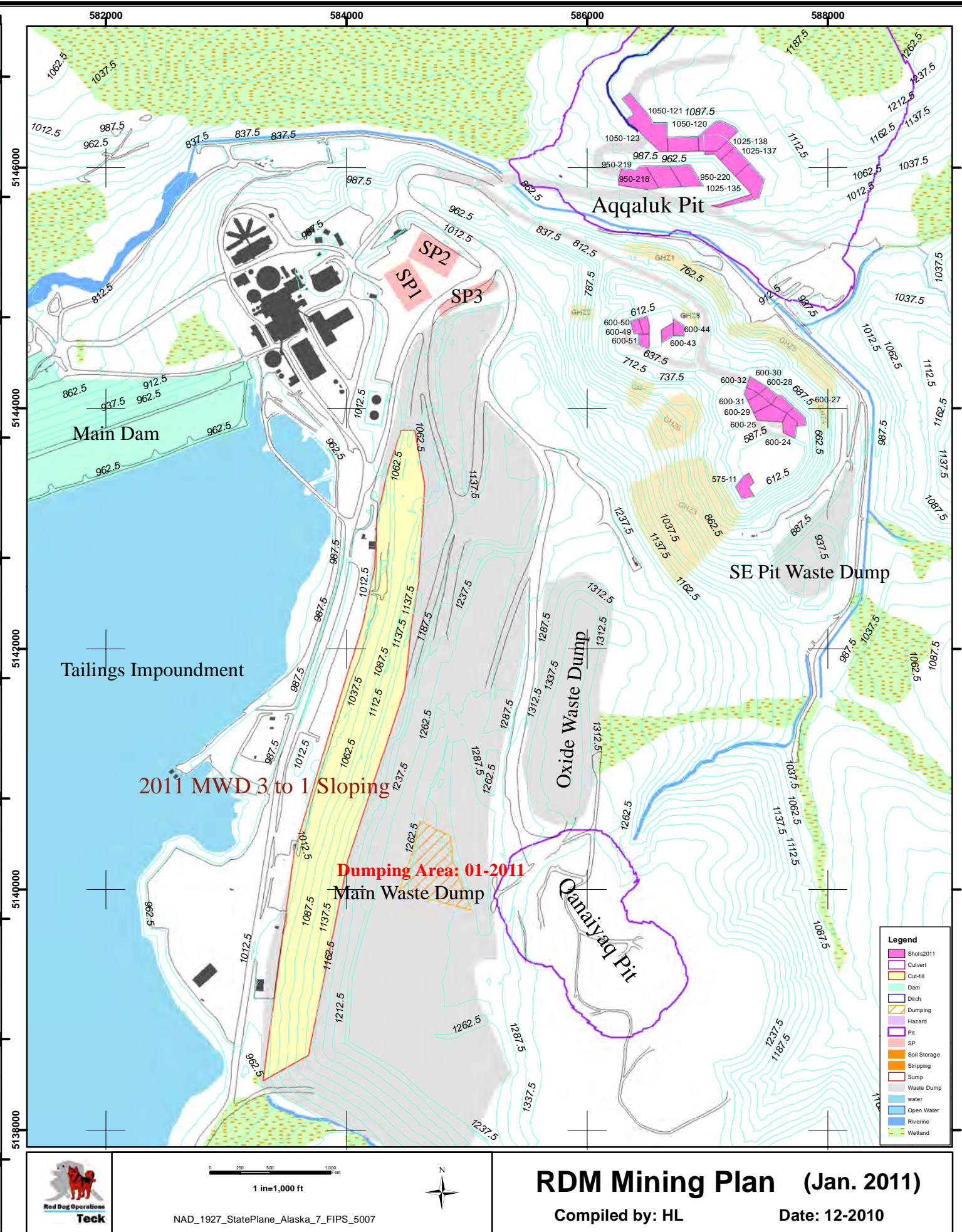
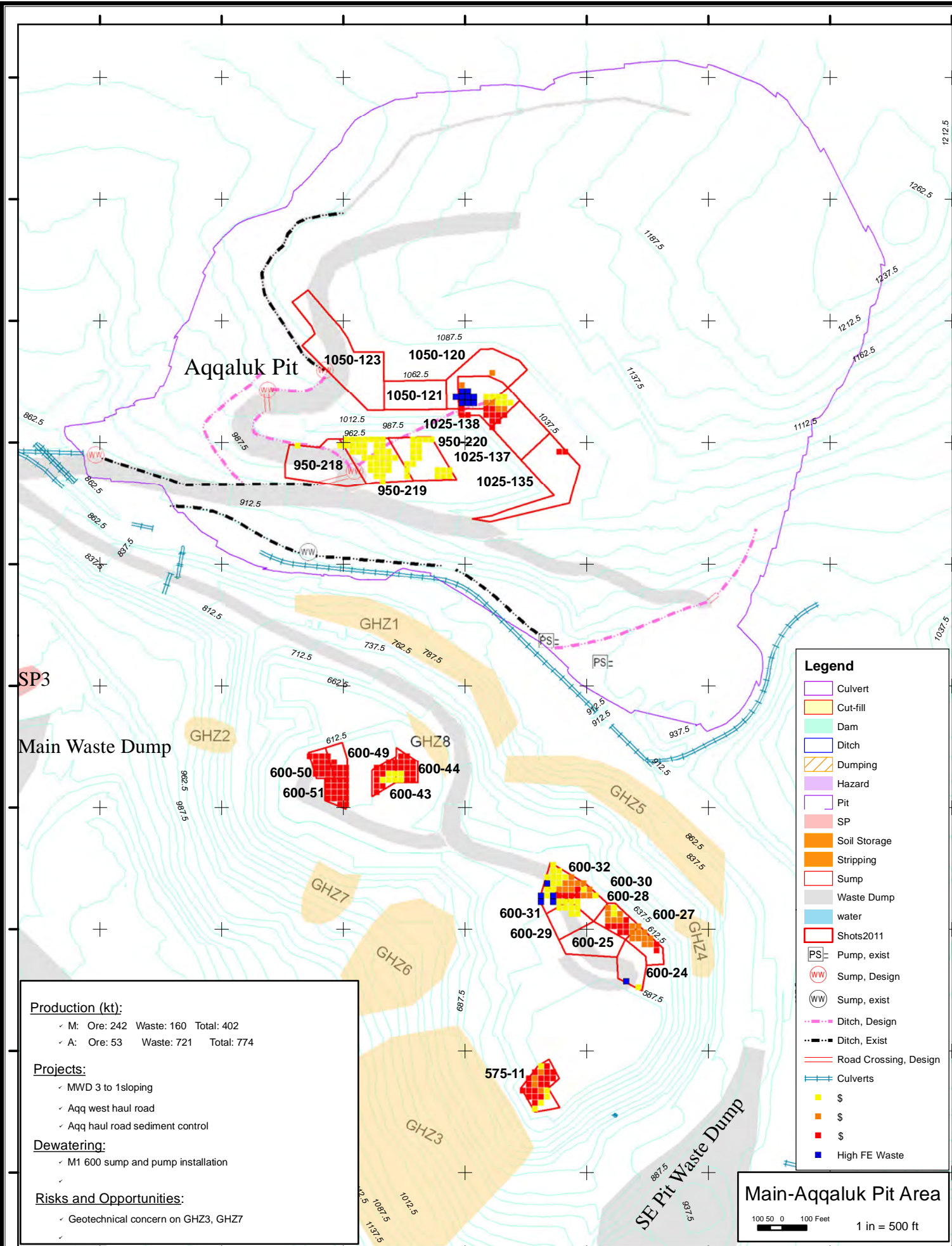


Figure 4-4 Aqqaluk Dewatering Layout with Cross Section

A summary of 2011 Aqqaluk dewatering is shown below in Table 4-1 with the approximate beginning month for each project. Water issues should not arise until later in the year, as the temperature begins to rise and breakup occurs.

2011 Aqqaluk Dewatering	
January	Complete haul road on west end of deposit Sediment ponds at 1050 and 1010 elevations Road crossing at 1010 elevation Collection ditch below haul road at 915 elevation
February	Sediment pond at 950 elevation Road Crossing at 950 elevation Begin 950 collection ditch Install conex container at 870 elevation
March	Improve drainage below Shelly Creek road Road crossing below Shelly Creek road Complete north drainage ditch to design
April - December	Remove silt from sediment ponds Use portable pump in 880 sump when required Lengthen 950 collection ditch when able

Table 4-1 Aqqaluk Dewatering Schedule



**Production (kt):**

- M: Ore: 242 Waste: 160 Total: 402
- A: Ore: 53 Waste: 721 Total: 774

**Projects:**

- MWD 3 to 1 sloping
- Aqq west haul road
- Aqq haul road sediment control

**Dewatering:**

- M1 600 sump and pump installation

**Risks and Opportunities:**

- Geotechnical concern on GHZ3, GHZ7

- Legend**
- Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - water
  - Shots2011
  - Pump, exist
  - Sump, Design
  - Sump, exist
  - Ditch, Design
  - Ditch, Exist
  - Road Crossing, Design
  - Culverts
  - High FE Waste

- Legend**
- Shots2011
  - Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - Waste Dump
  - water
  - Open Water
  - Riverine
  - Wetland

**Main-Aqqaluk Pit Area**

100 50 0 100 Feet      1 in = 500 ft



0 250 500 1000 Feet

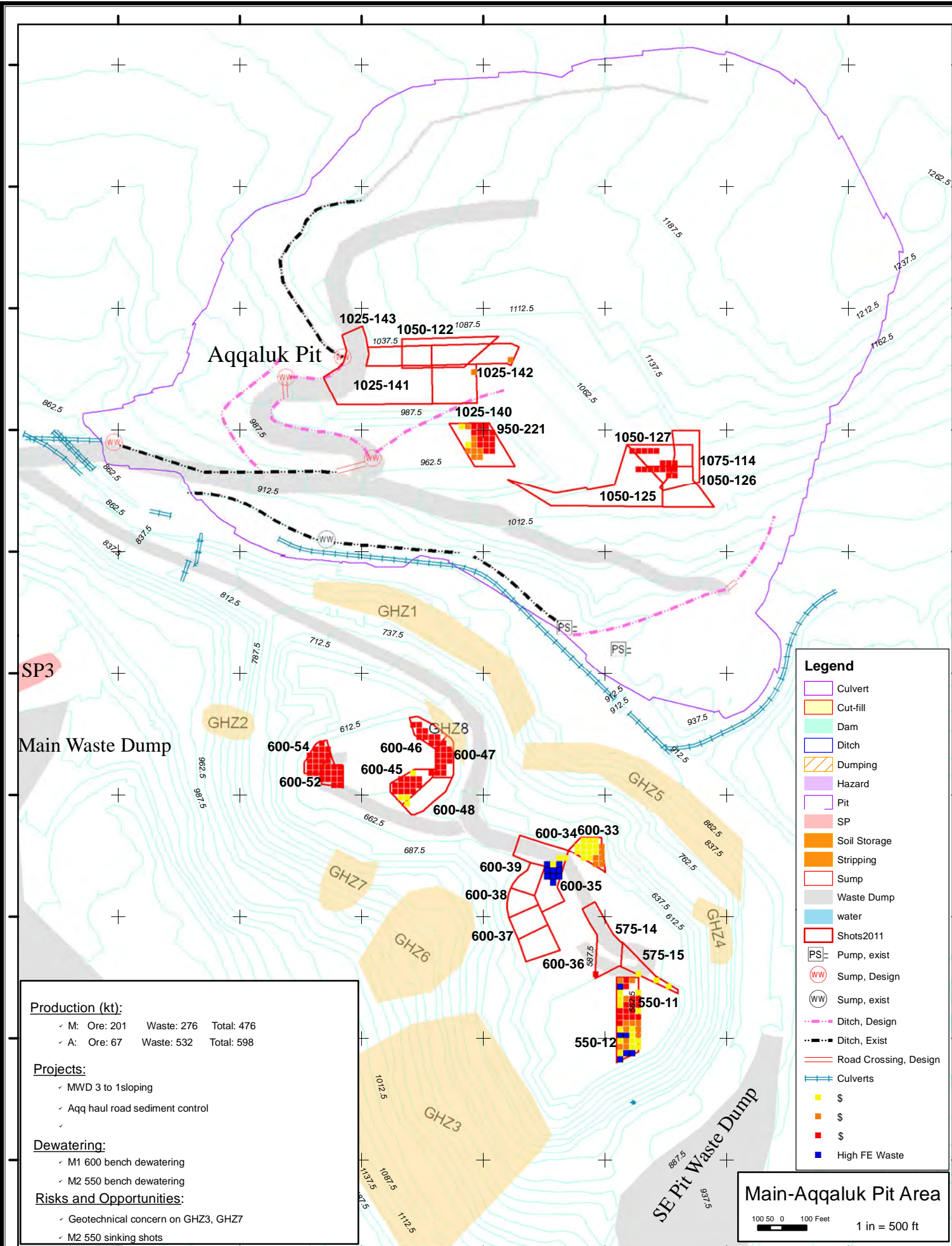
1 in = 1,000 ft

NAD\_1927\_StatePlane\_Alaska\_7\_FIPS\_5007



**RDM Mining Plan (Jan. 2011)**

Compiled by: HL      Date: 12-2010



- Legend**
- Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - water
  - Waste Dump
  - Shots2011
  - Pump, exist
  - Sump, Design
  - Sump, exist
  - Ditch, Design
  - Ditch, Exist
  - Road Crossing, Design
  - Culverts
  - \$
  - \$
  - \$
  - High FE Waste

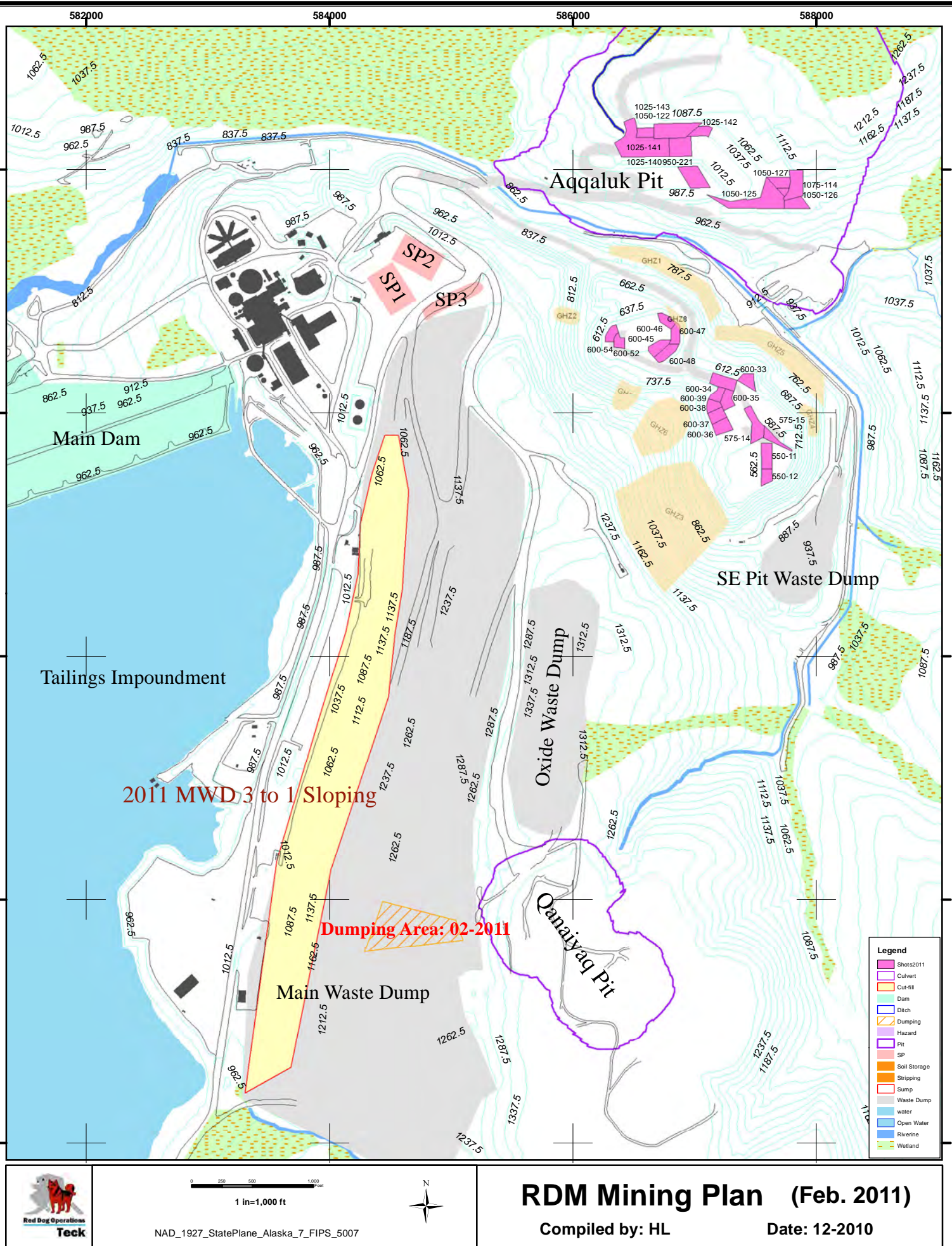
**Main-Aqqaluk Pit Area**  
 100 50 0 100 Feet      1 in = 500 ft

**Production (kt):**  
 ✓ M: Ore: 201    Waste: 276    Total: 476  
 ✓ A: Ore: 67    Waste: 532    Total: 598

**Projects:**  
 ✓ MWD 3 to 1 sloping  
 ✓ Aqq haul road sediment control

**Dewatering:**  
 ✓ M1 600 bench dewatering  
 ✓ M2 550 bench dewatering

**Risks and Opportunities:**  
 ✓ Geotechnical concern on GHZ3, GHZ7  
 ✓ M2 550 sinking shots



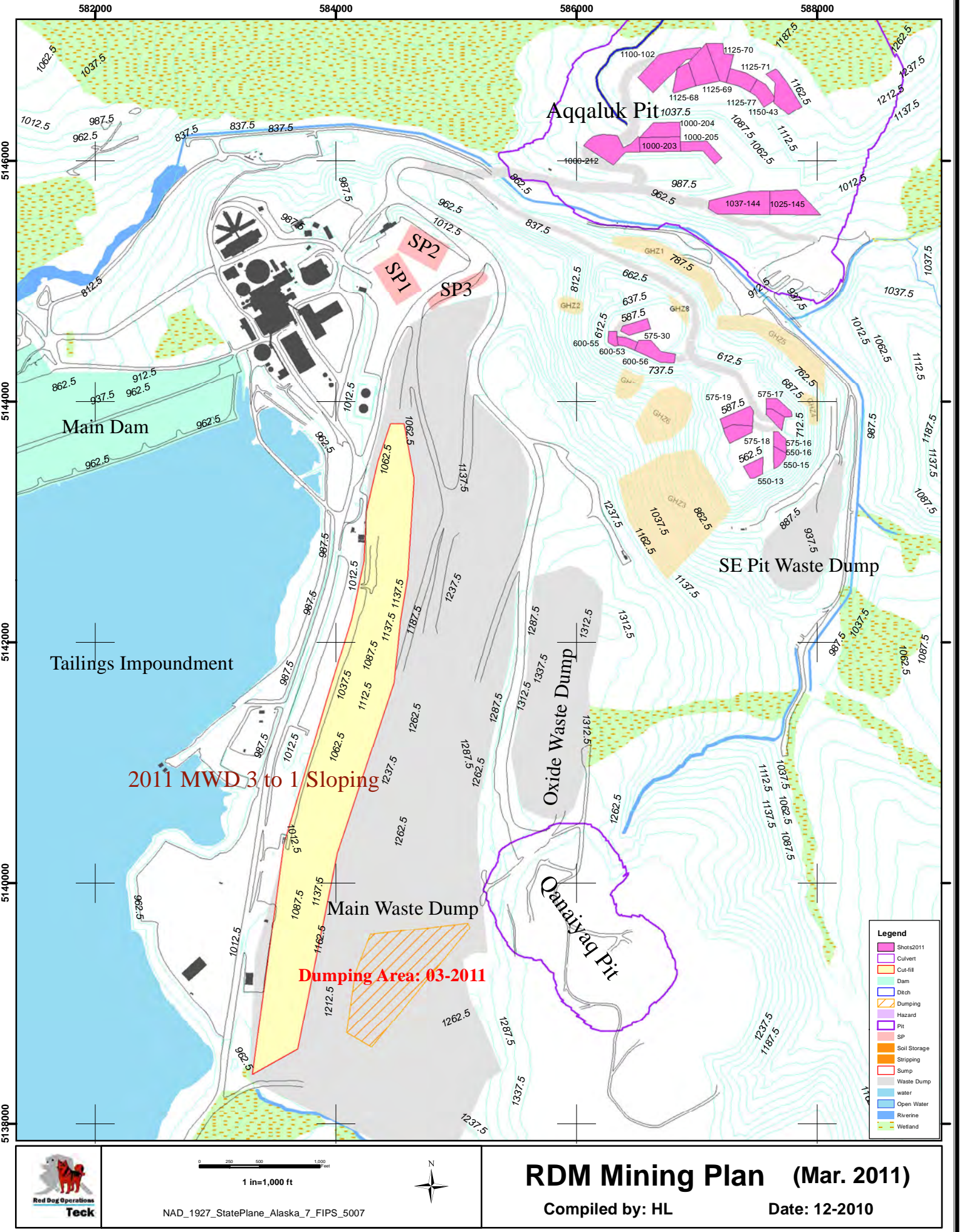
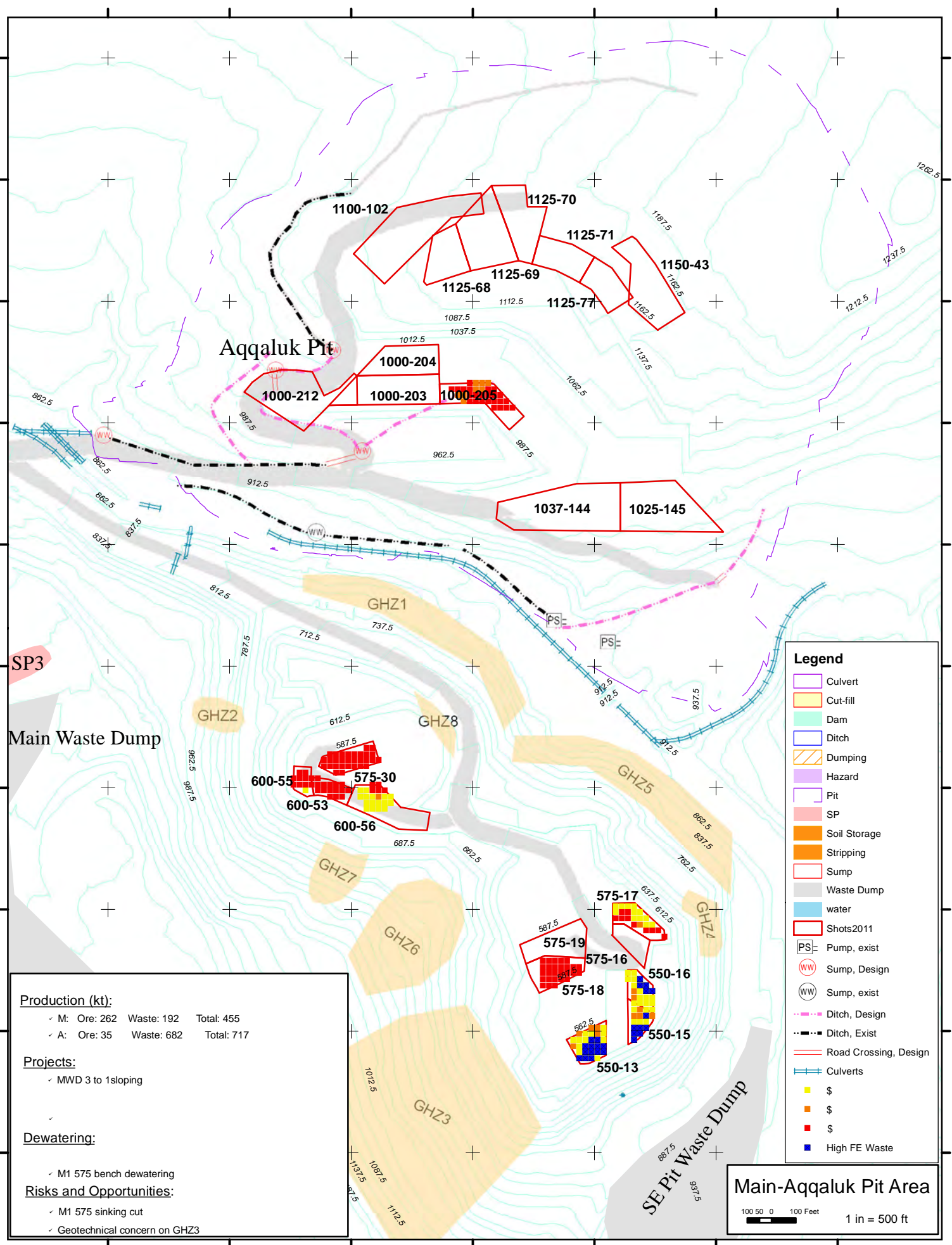
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  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - Waste Dump
  - water
  - Open Water
  - Riverine
  - Wetland



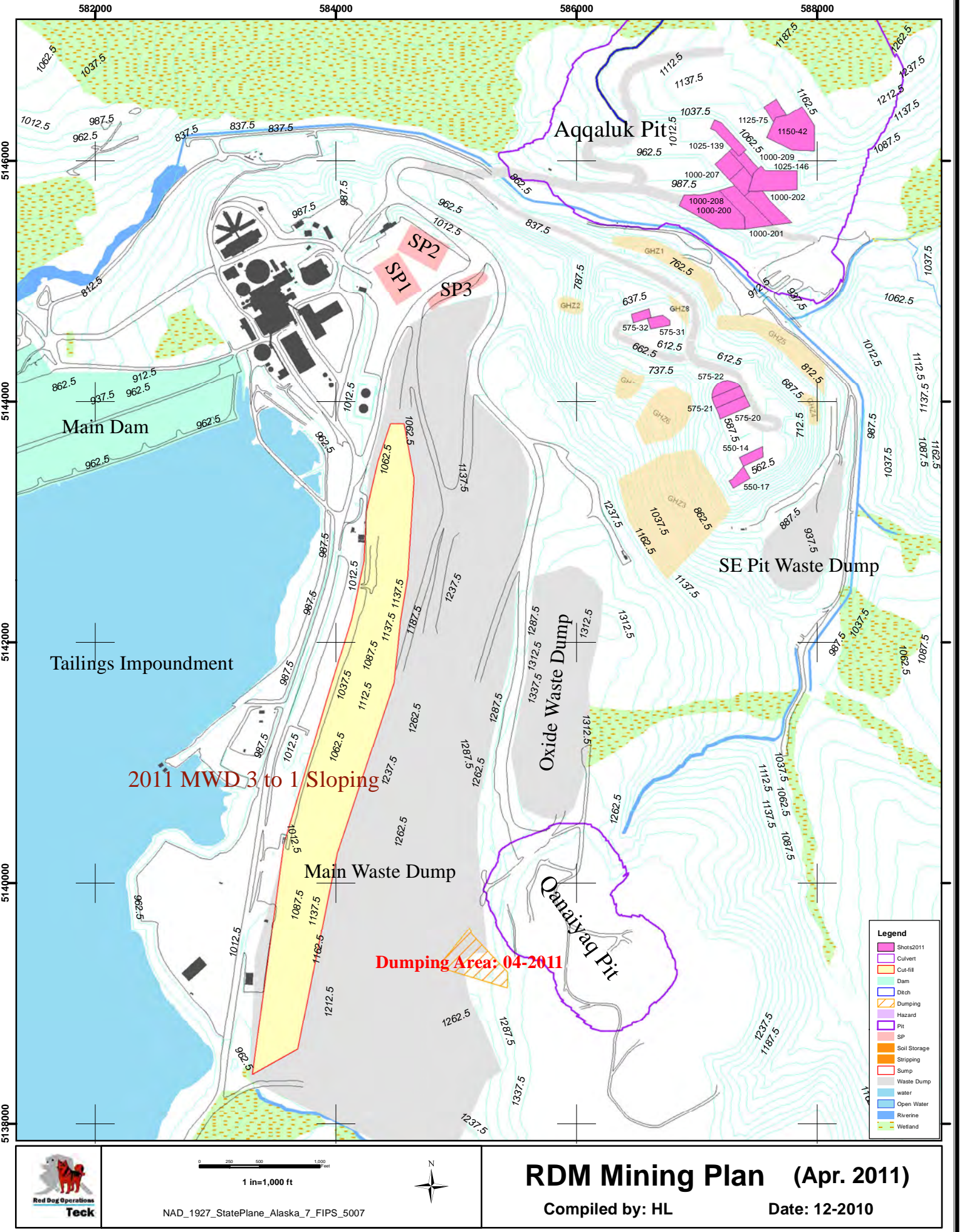
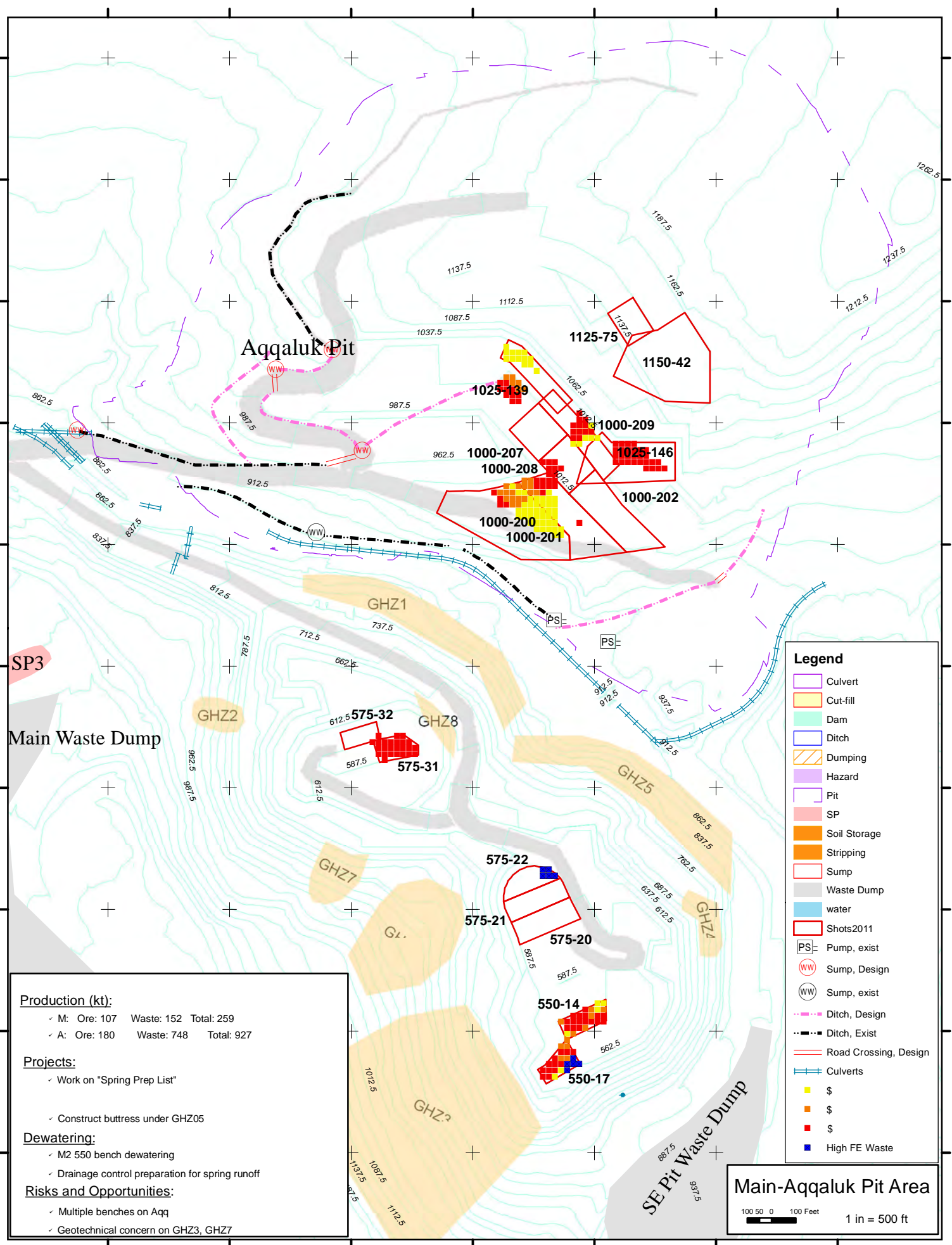
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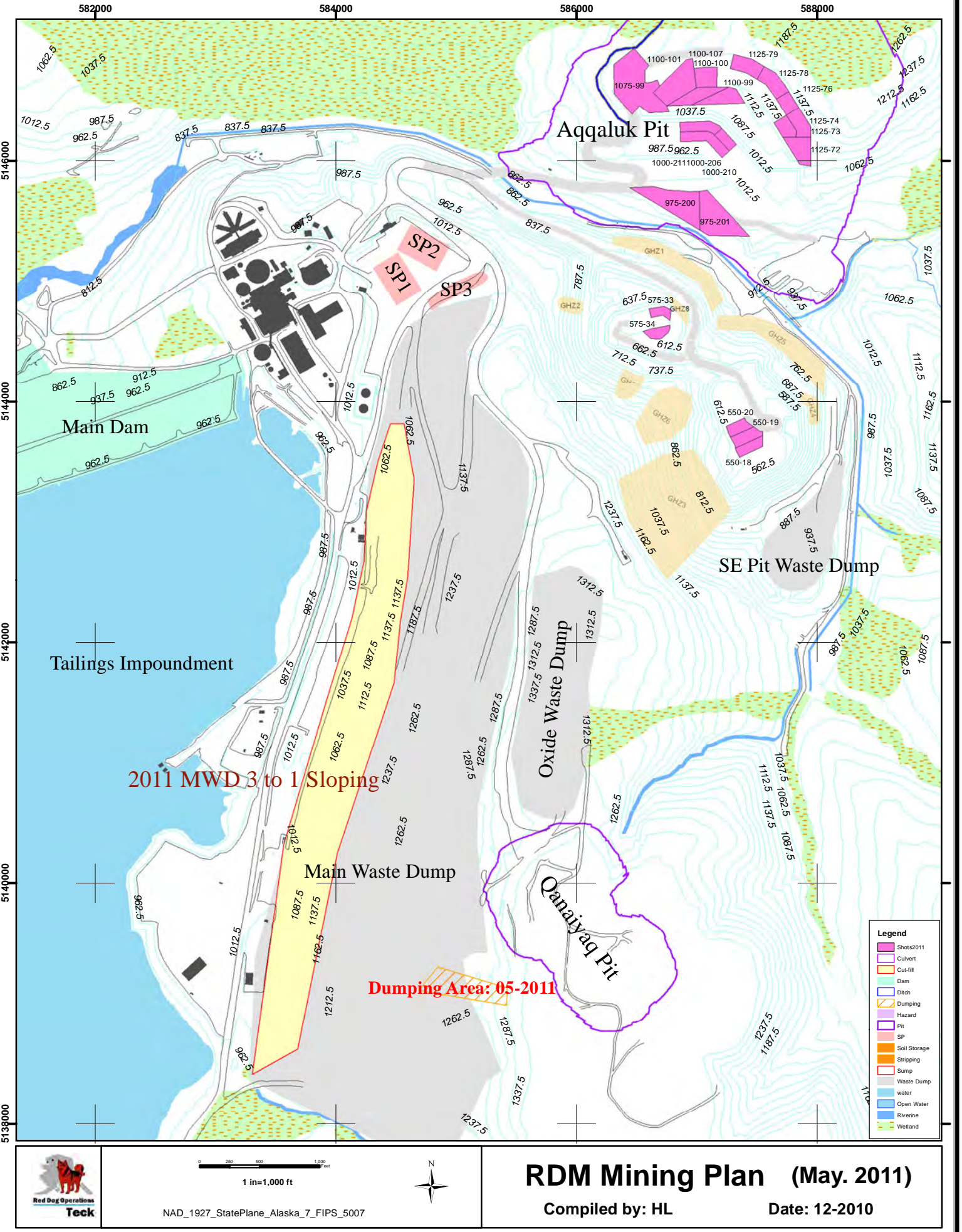
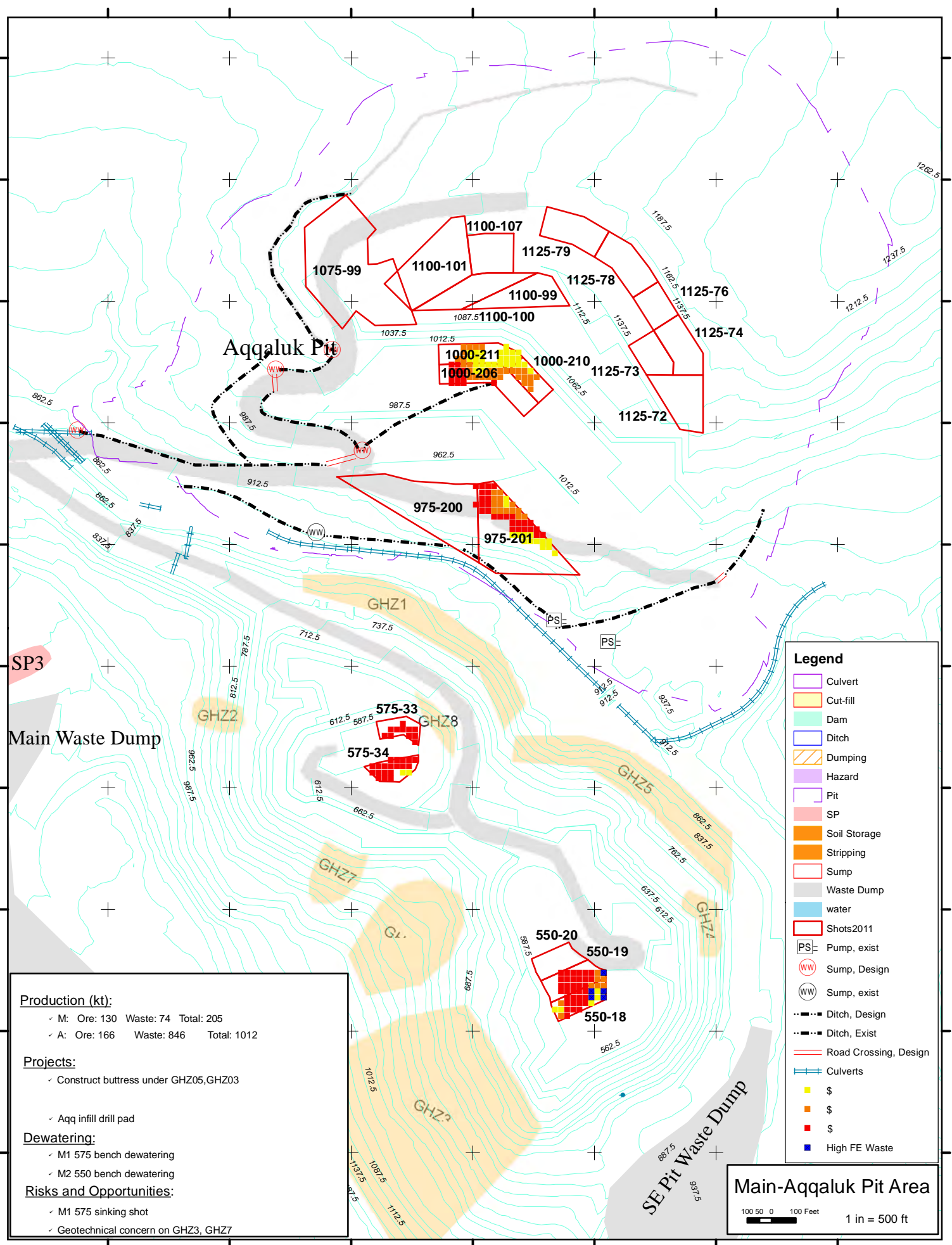


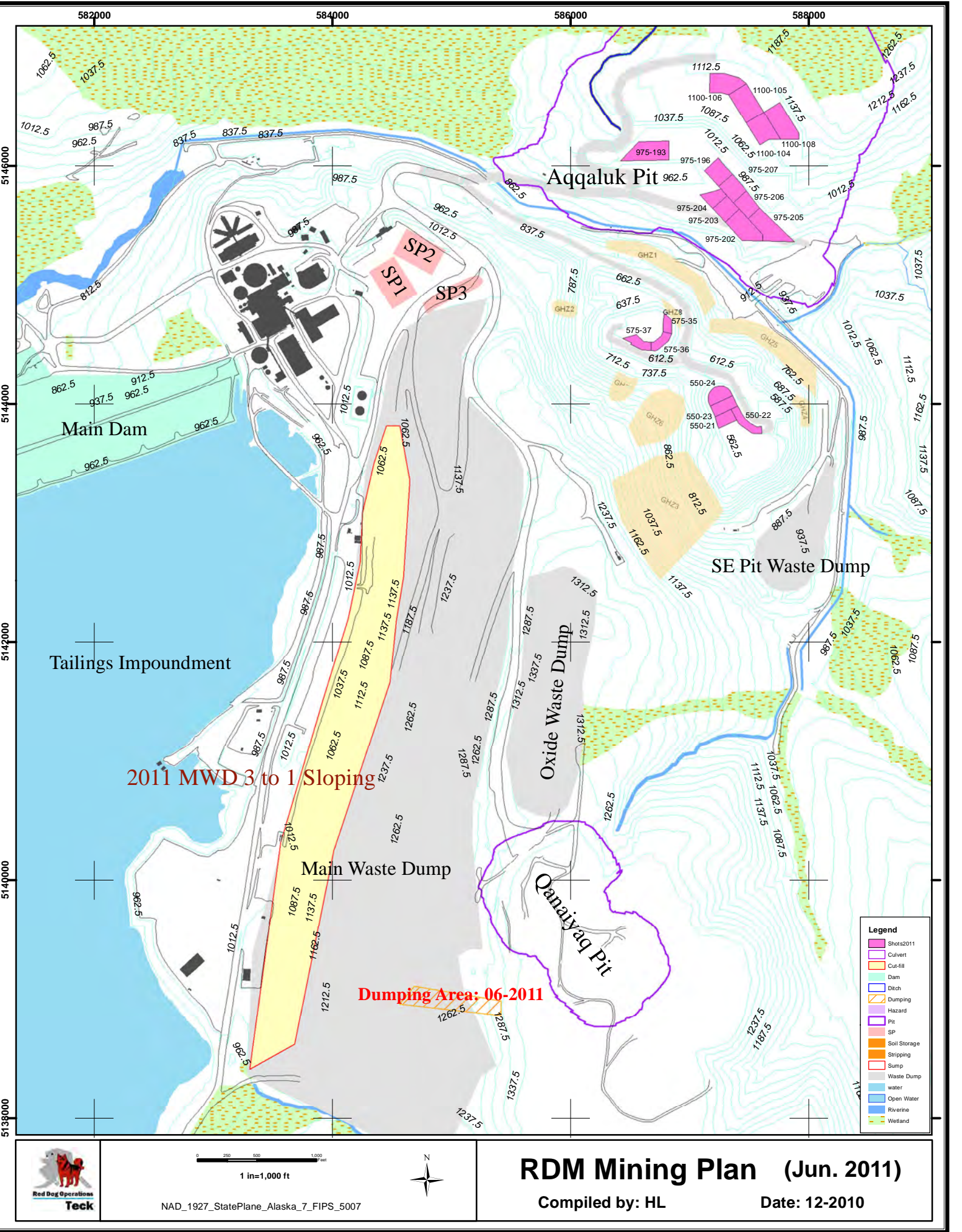
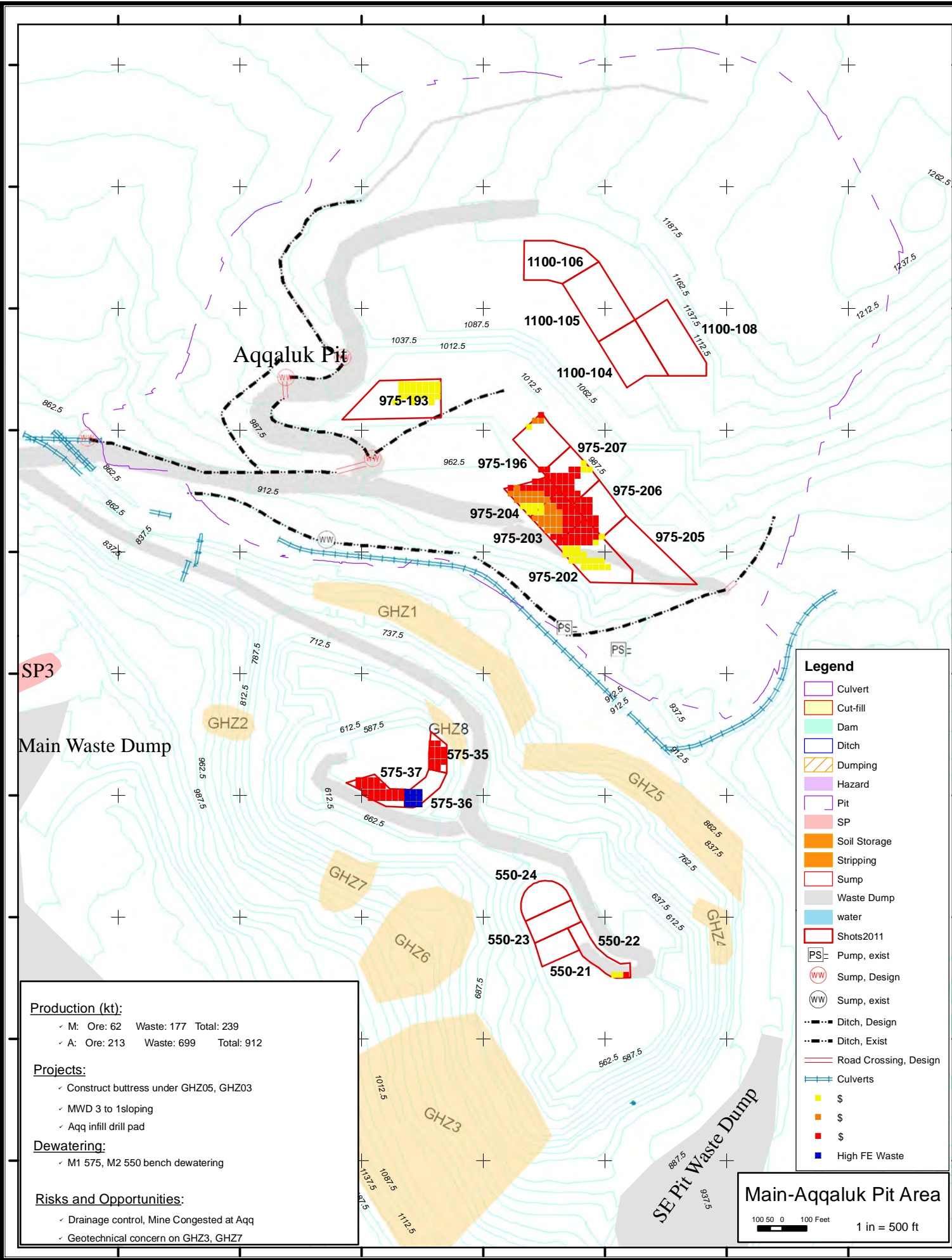
**RDM Mining Plan (Feb. 2011)**  
 Compiled by: HL      Date: 12-2010

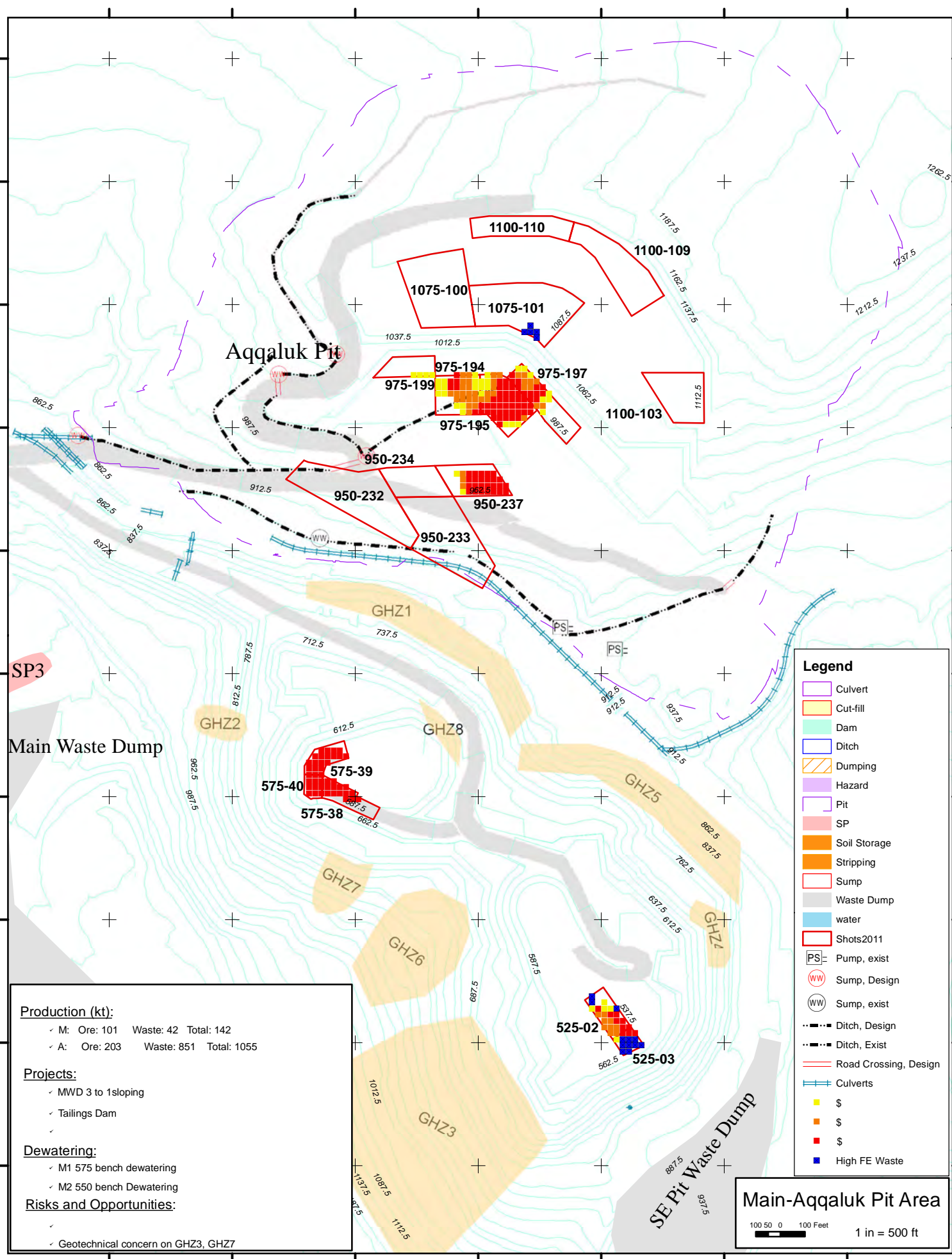












- Legend**
- Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - water
  - Waste Dump
  - Shots2011
  - Pump, exist
  - Pump, Design
  - Sump, exist
  - Ditch, Design
  - Ditch, Exist
  - Road Crossing, Design
  - Culverts
  - \$
  - \$
  - \$
  - \$
  - \$
  - High FE Waste

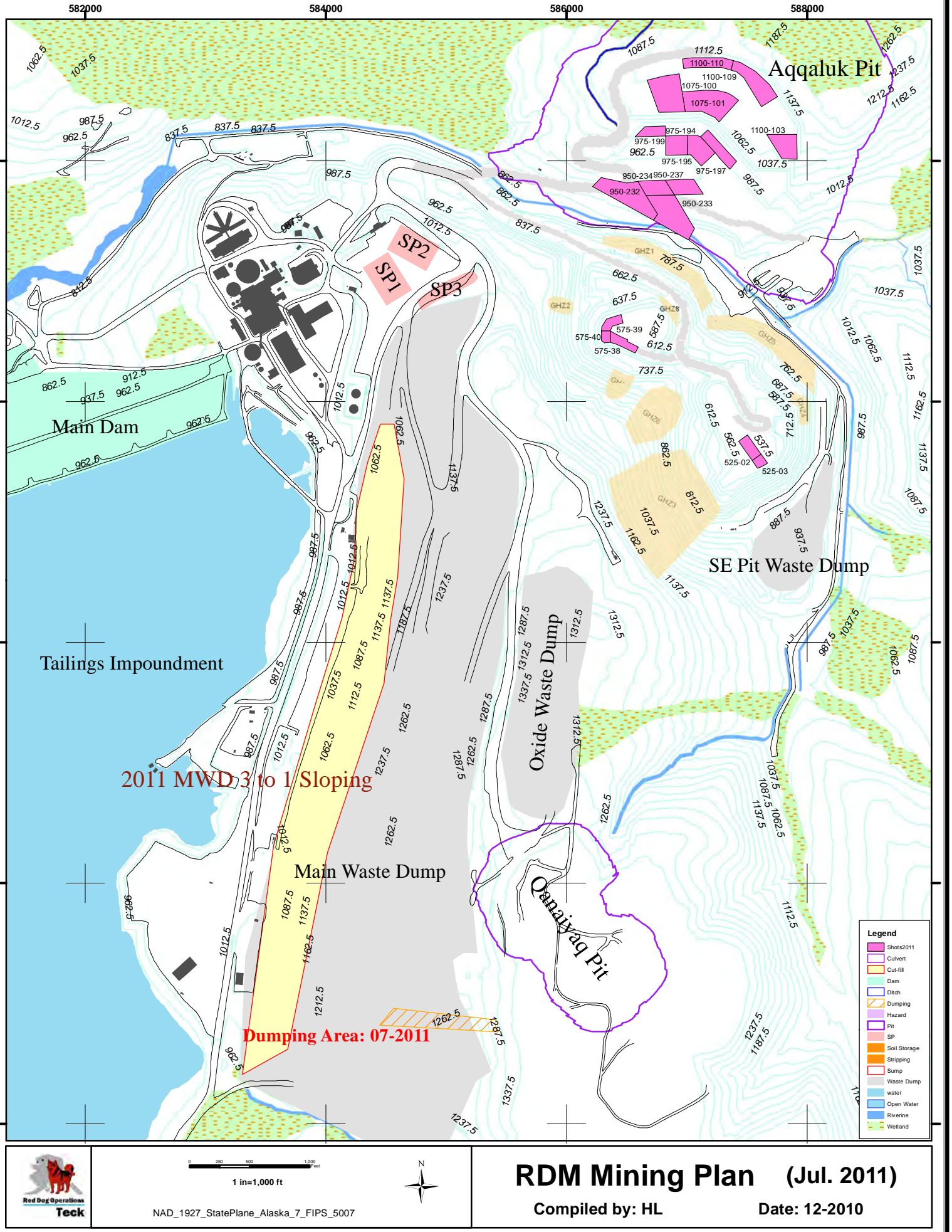
**Production (kt):**  
 ✓ M: Ore: 101 Waste: 42 Total: 142  
 ✓ A: Ore: 203 Waste: 851 Total: 1055

**Projects:**  
 ✓ MWD 3 to 1 sloping  
 ✓ Tailings Dam

**Dewatering:**  
 ✓ M1 575 bench dewatering  
 ✓ M2 550 bench Dewatering

**Risks and Opportunities:**  
 ✓ Geotechnical concern on GHZ3, GHZ7

**Main-Aqqaluk Pit Area**  
 100 50 0 100 Feet  
 1 in = 500 ft



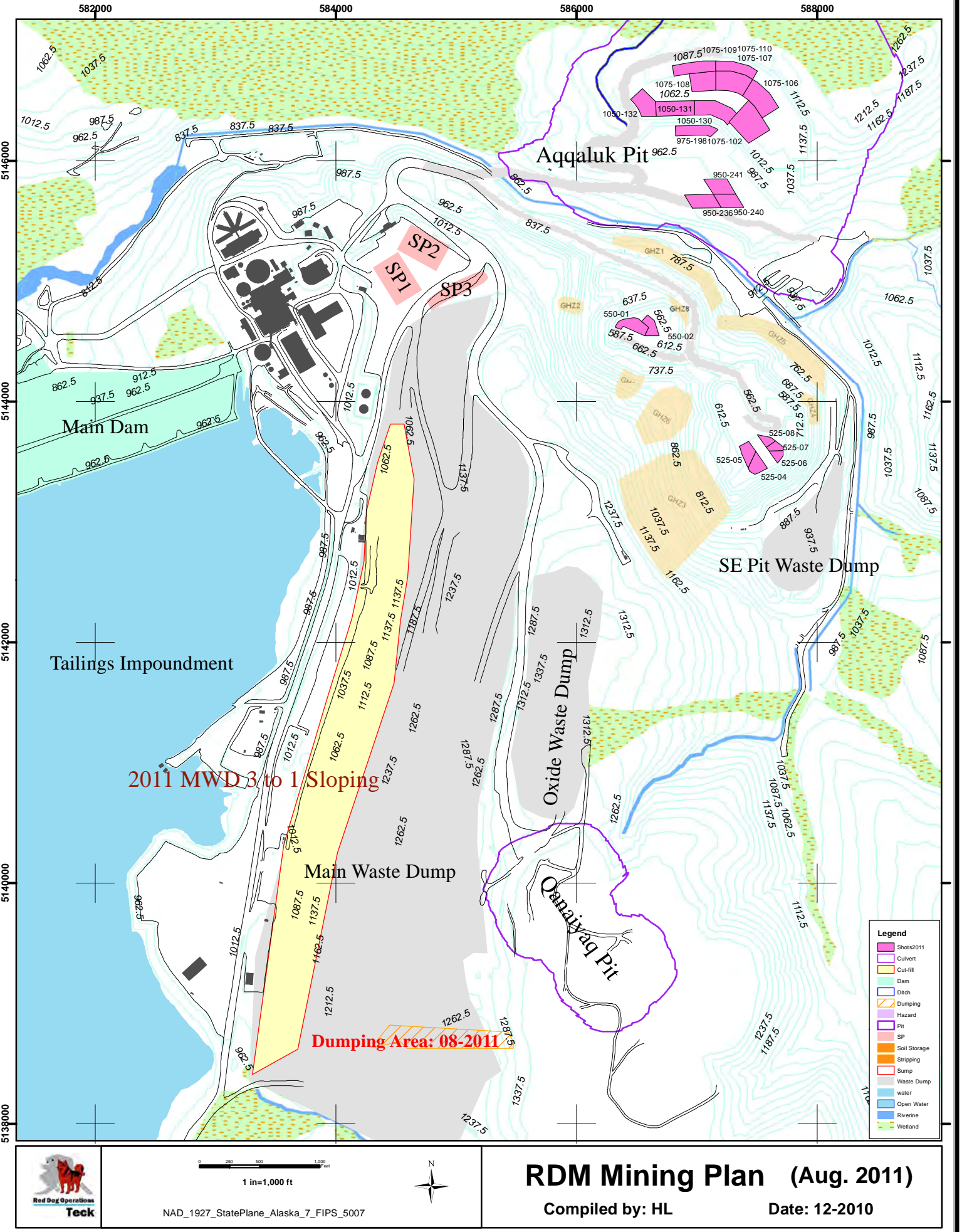
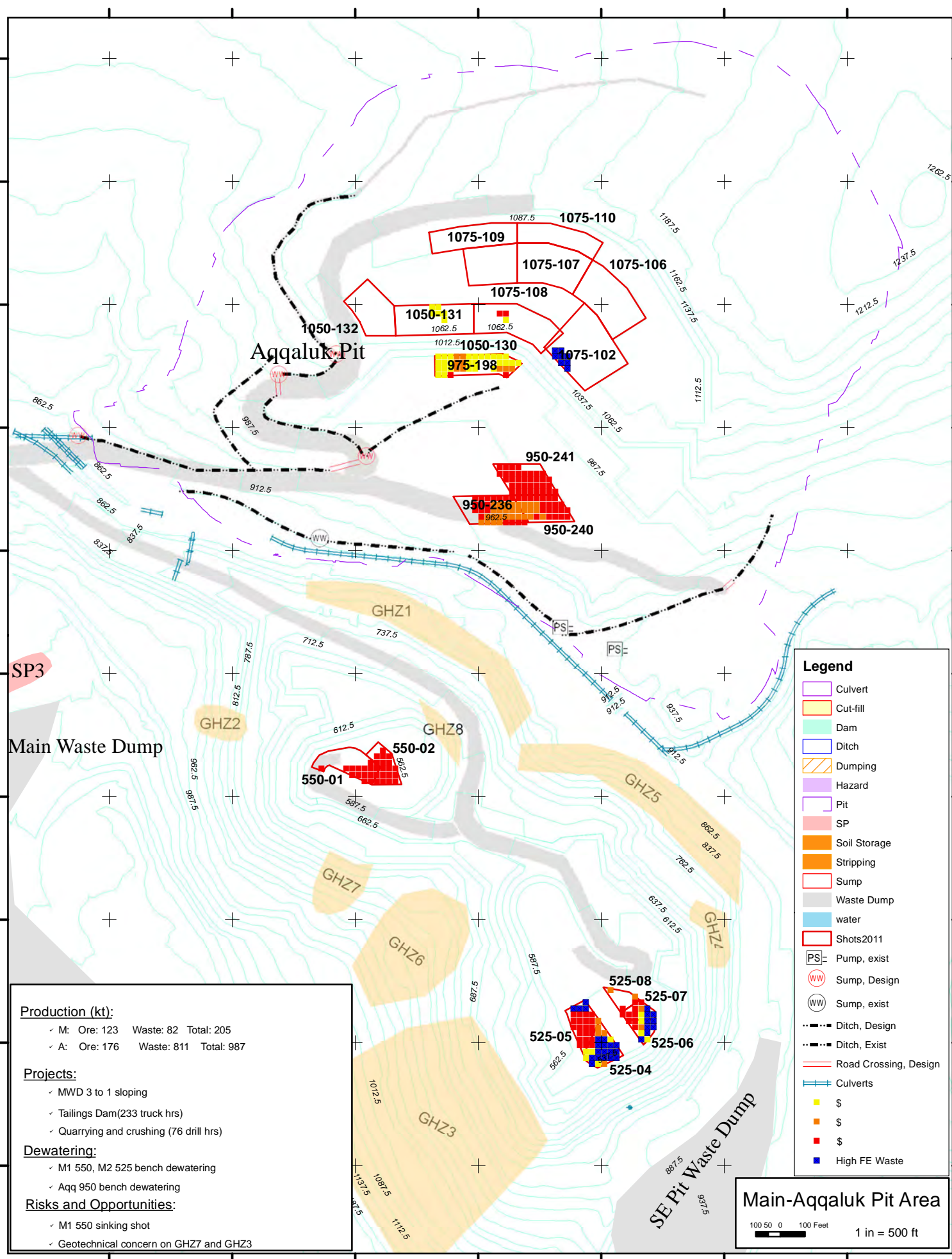
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- Shots2011
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  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - Waste Dump
  - water
  - Open Water
  - Riverine
  - Wetland

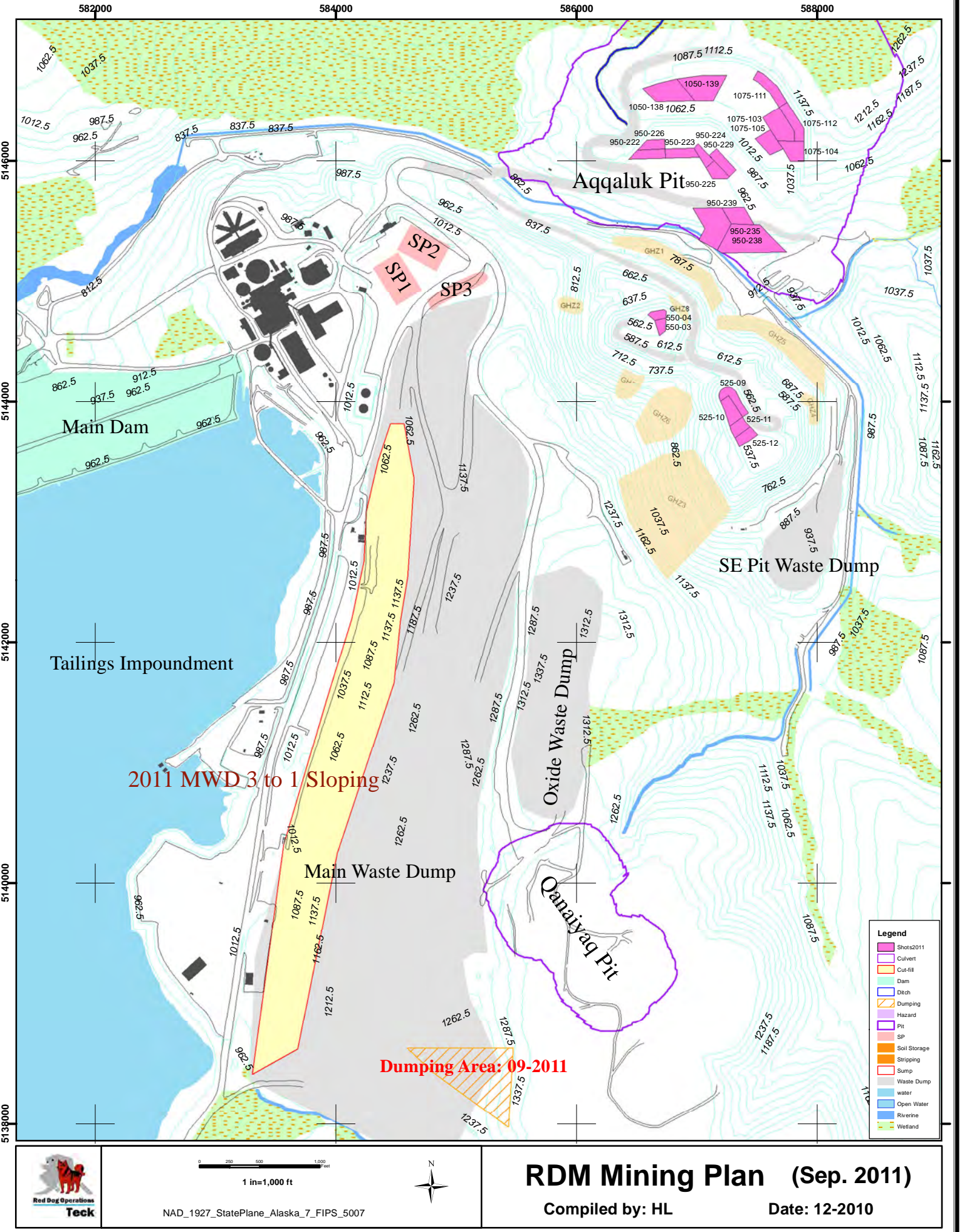
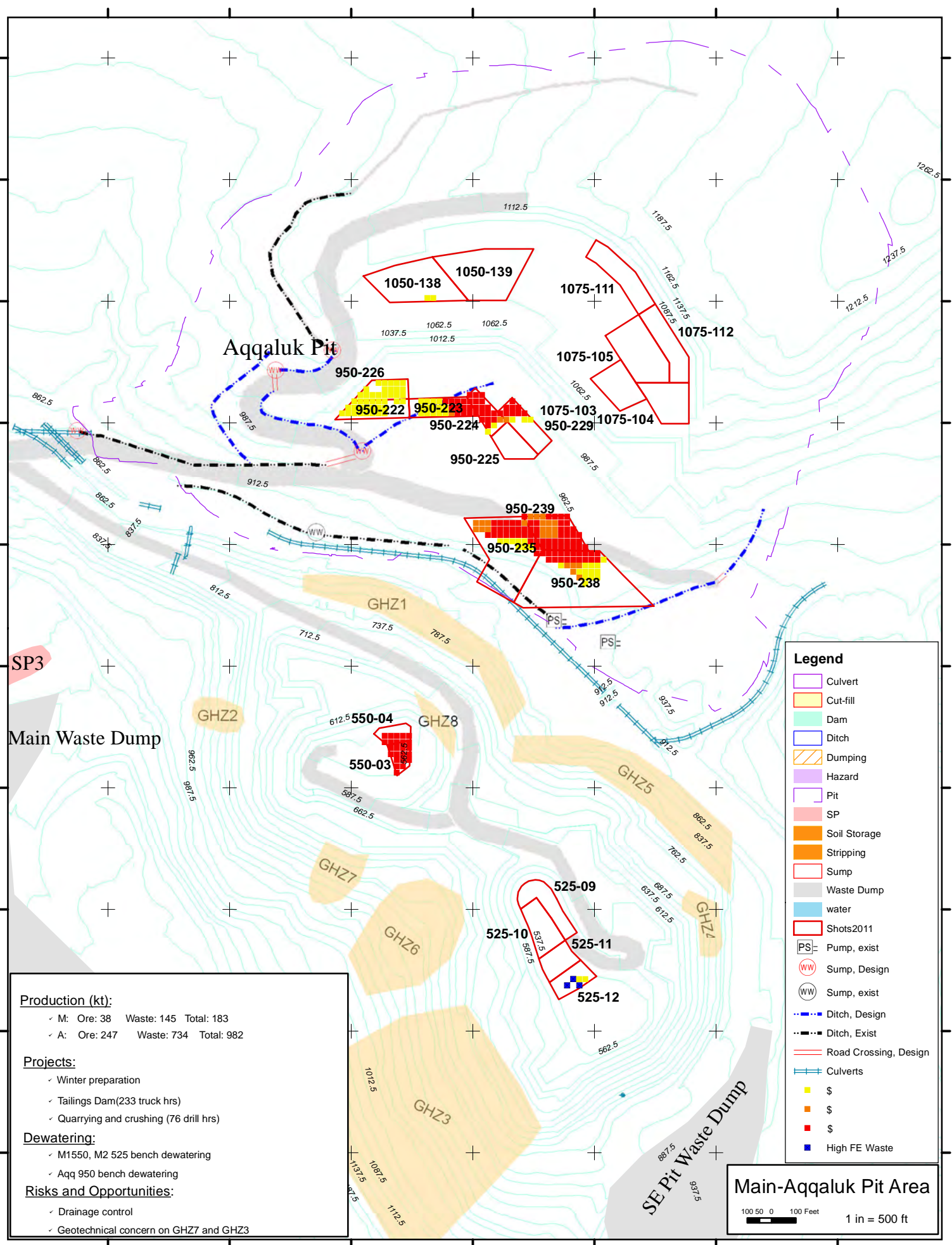


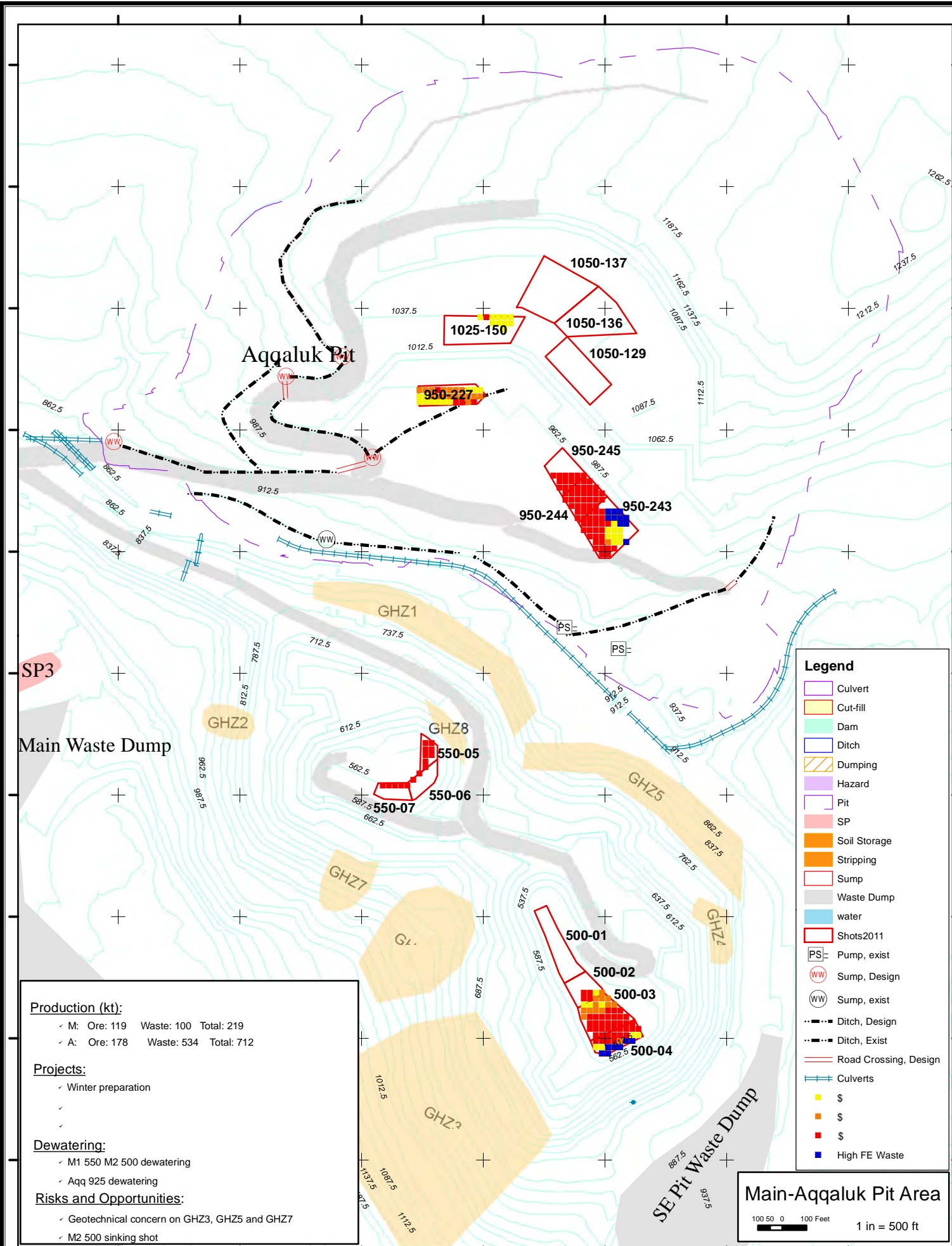
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 1 in = 1,000 ft  
 NAD\_1927\_StatePlane\_Alaska\_7\_FIPS\_5007



**RDM Mining Plan (Jul. 2011)**  
 Compiled by: HL  
 Date: 12-2010







**Production (kt):**  
 ✓ M: Ore: 119 Waste: 100 Total: 219  
 ✓ A: Ore: 178 Waste: 534 Total: 712

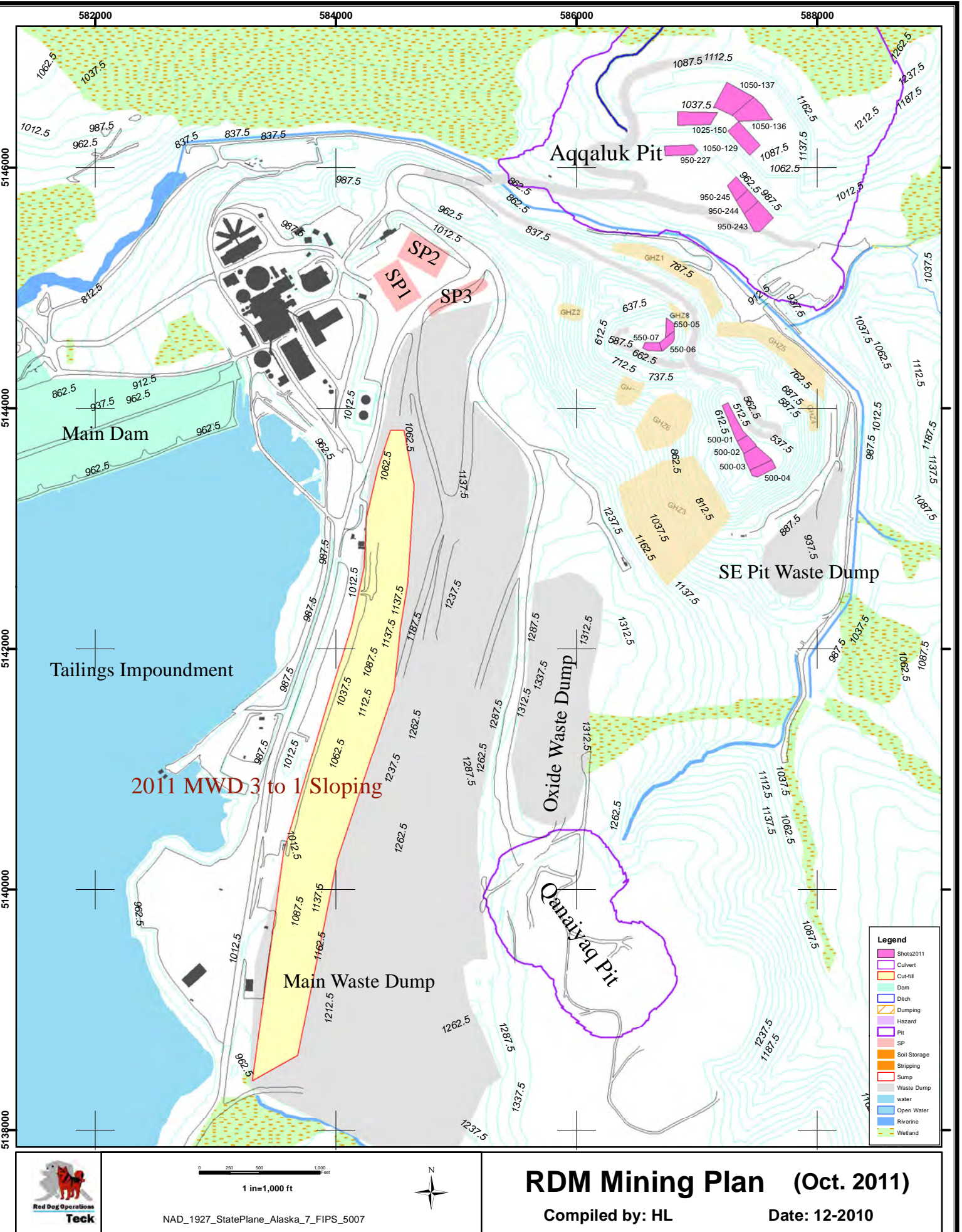
**Projects:**  
 ✓ Winter preparation  
 ✓

**Dewatering:**  
 ✓ M1 550 M2 500 dewatering  
 ✓ Aqq 925 dewatering

**Risks and Opportunities:**  
 ✓ Geotechnical concern on GHZ3, GHZ5 and GHZ7  
 ✓ M2 500 sinking shot

- Legend**
- Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
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  - Ditch, Design
  - Ditch, Exist
  - Road Crossing, Design
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  - \$
  - \$
  - \$
  - High FE Waste

**Main-Aqqaluk Pit Area**  
 100 50 0 100 Feet      1 in = 500 ft

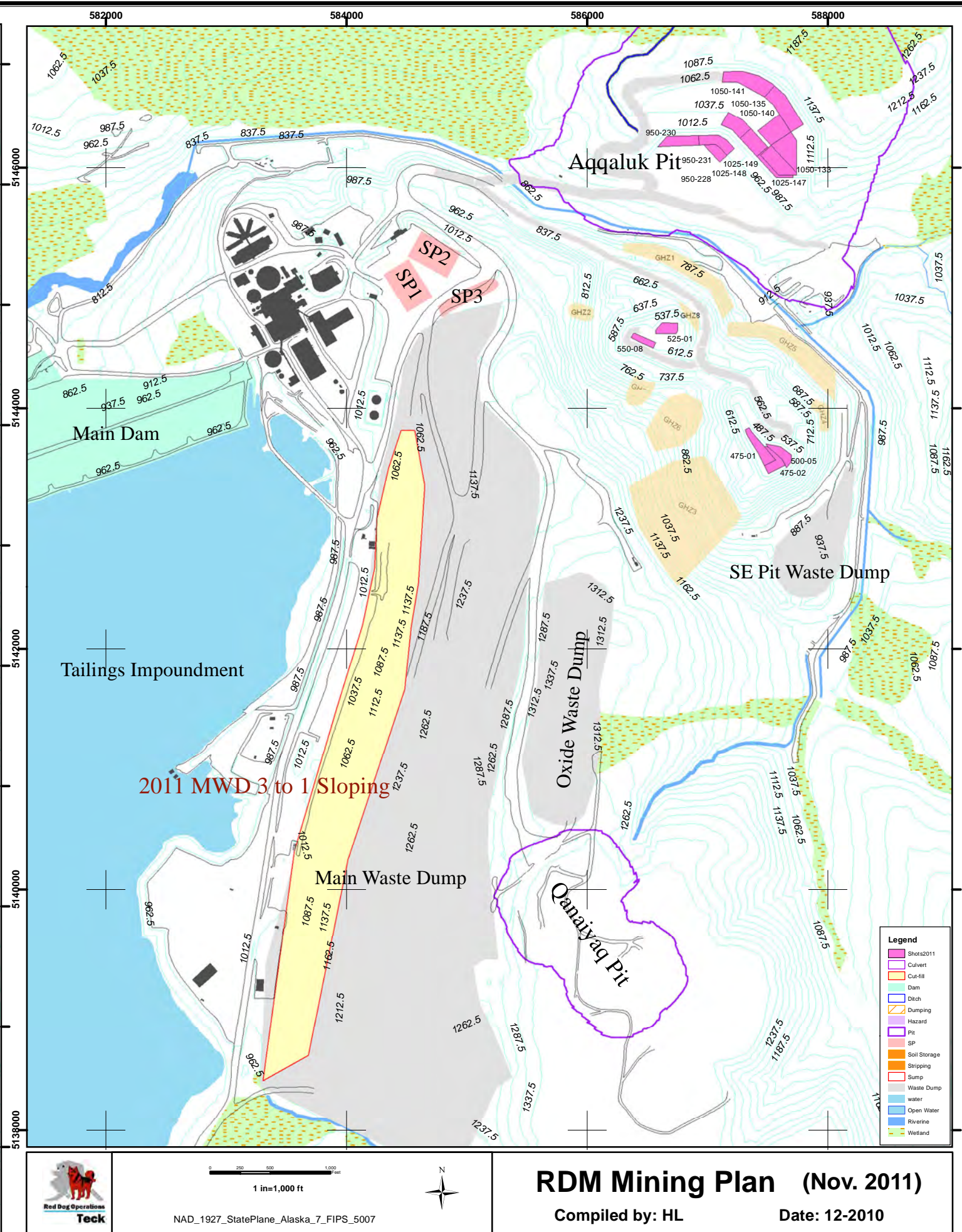
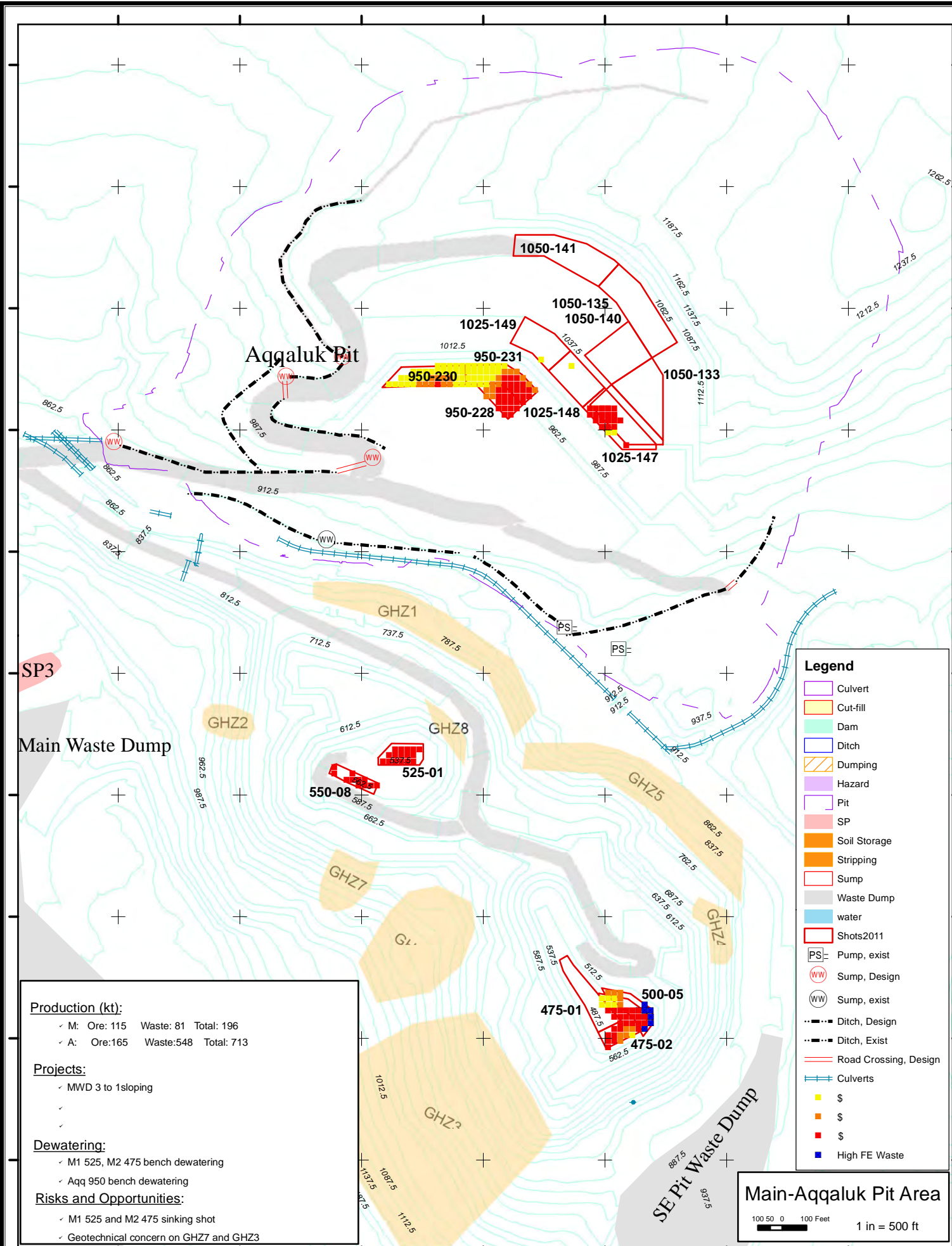


0 250 500 1000 Feet  
 1 in = 1,000 ft  
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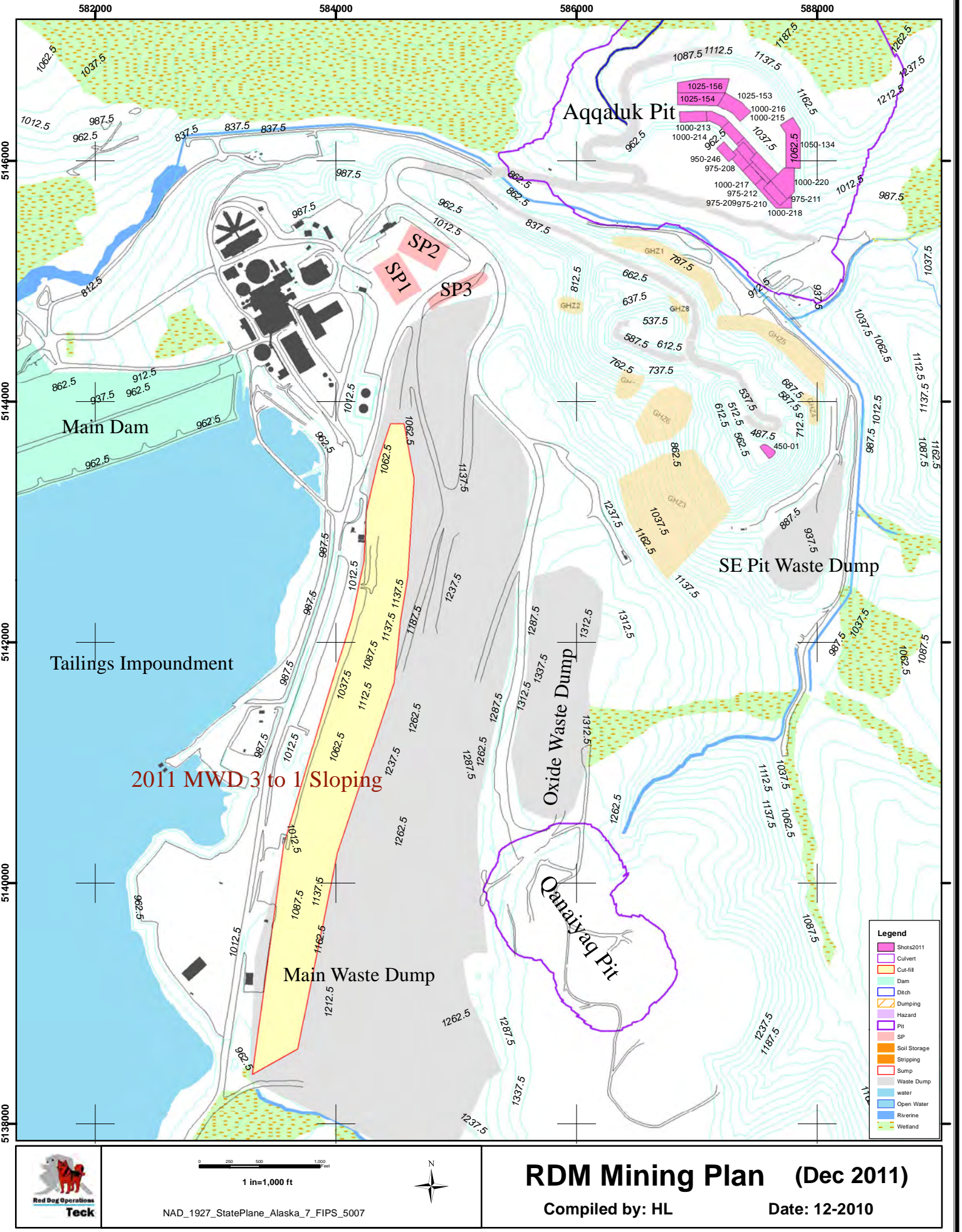
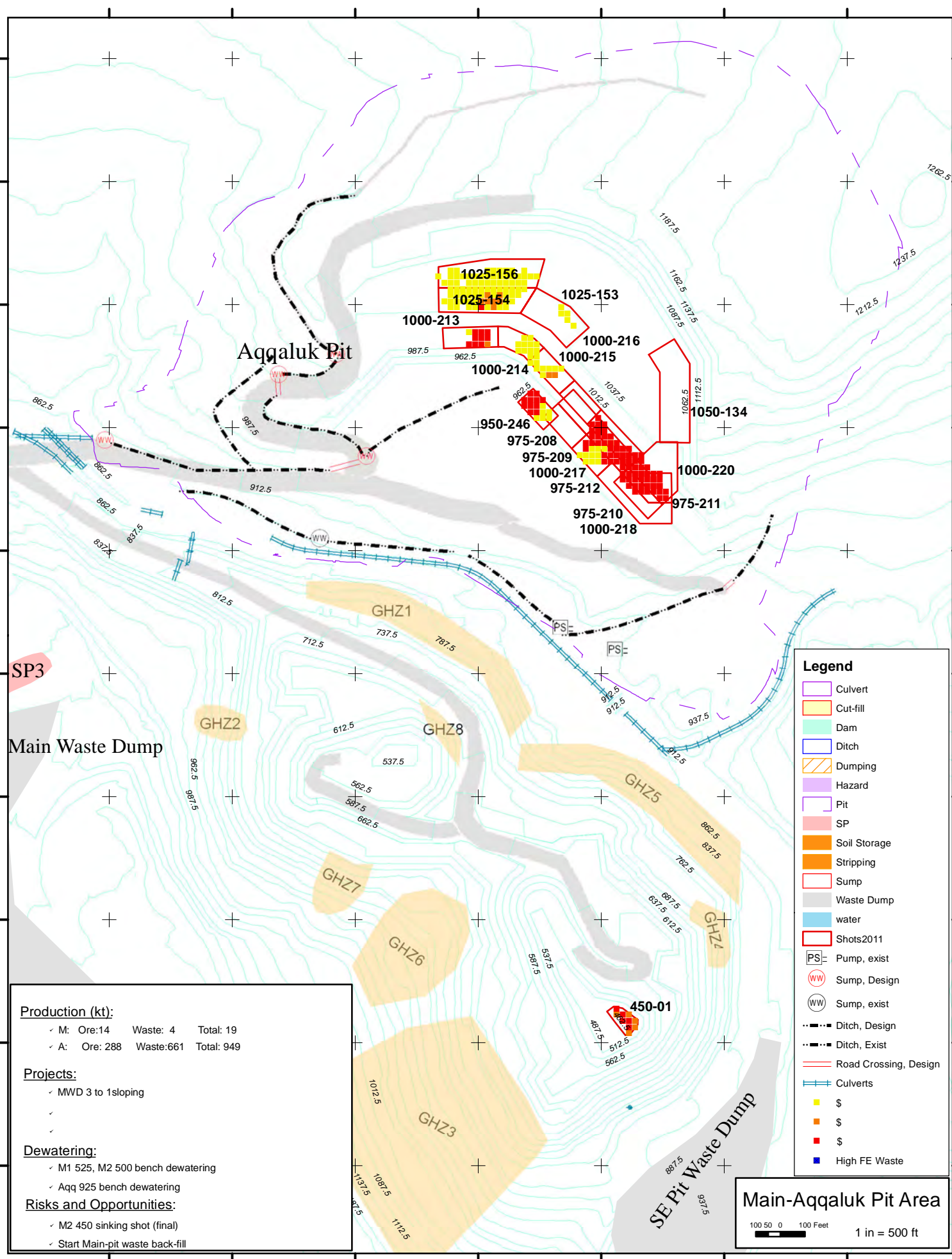


**RDM Mining Plan (Oct. 2011)**  
 Compiled by: HL      Date: 12-2010

- Legend**
- Shots2011
  - Culvert
  - Cut-fill
  - Dam
  - Ditch
  - Dumping
  - Hazard
  - Pit
  - SP
  - Soil Storage
  - Stripping
  - Sump
  - Waste Dump
  - water
  - Open Water
  - Riverine
  - Wetland



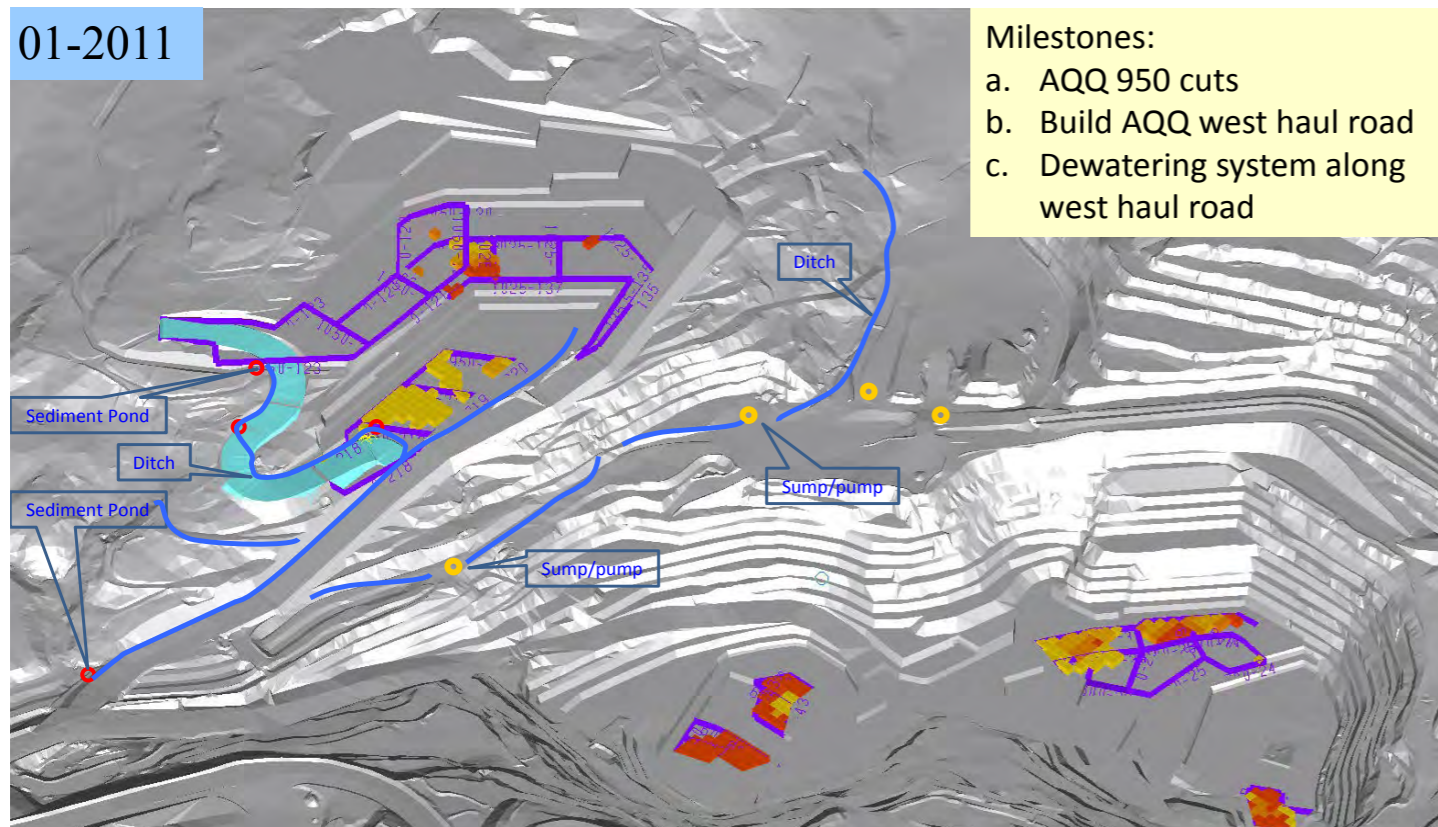




### Mine Plan 3D View and End-of-Period Surface (01-04, 2011)

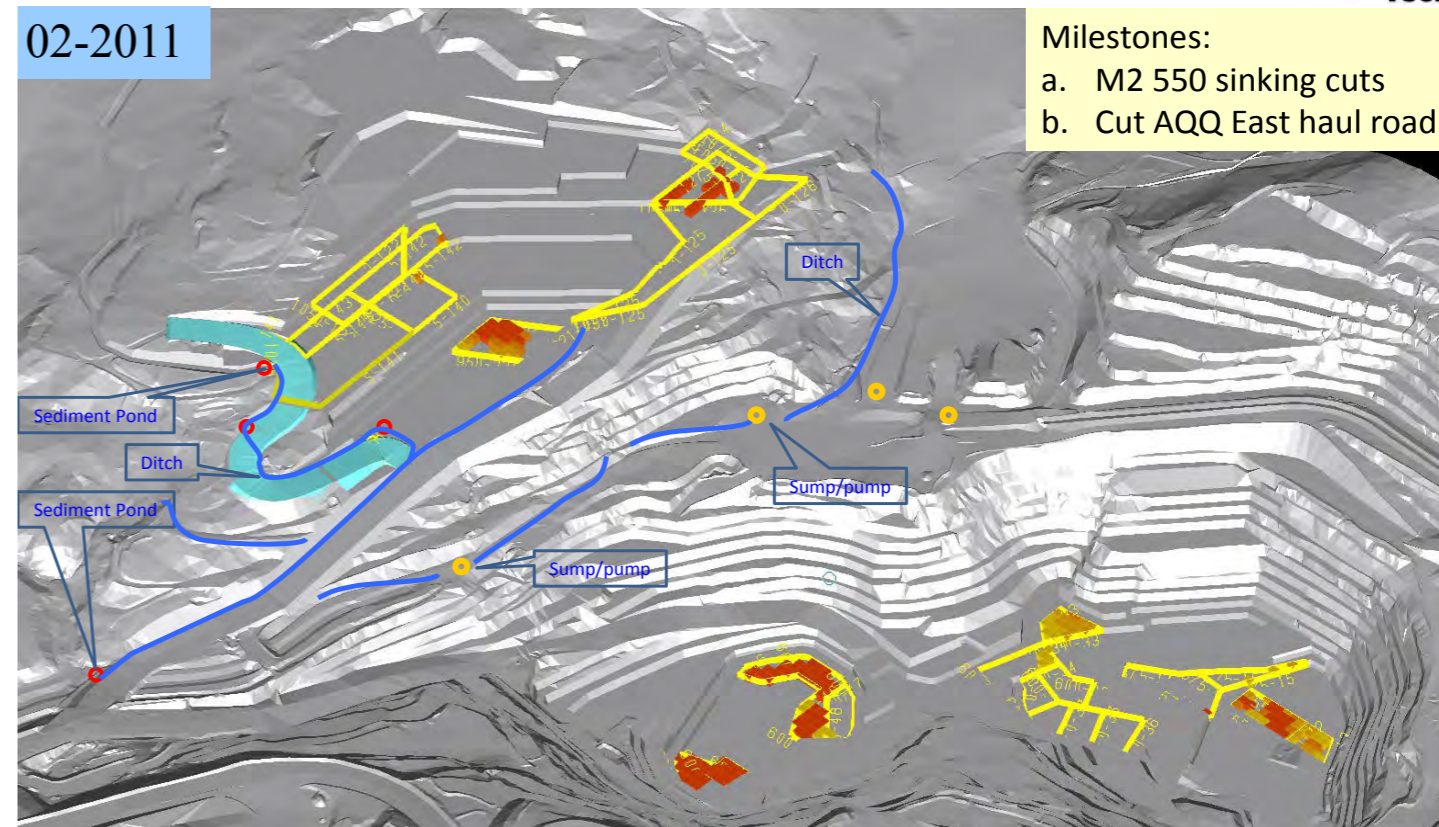
01-2011

- Milestones:
- a. AQQ 950 cuts
  - b. Build AQQ west haul road
  - c. Dewatering system along west haul road



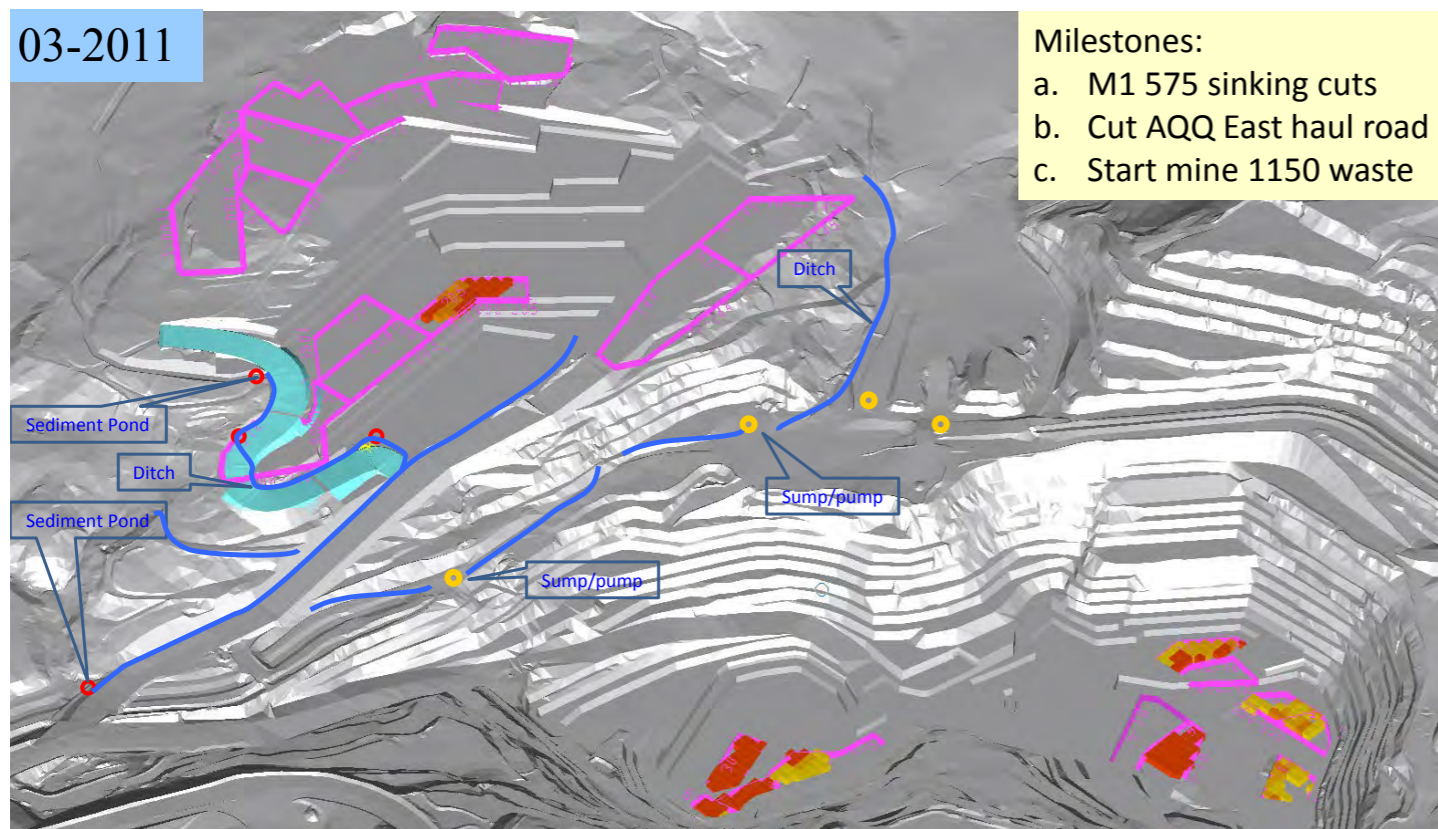
02-2011

- Milestones:
- a. M2 550 sinking cuts
  - b. Cut AQQ East haul road



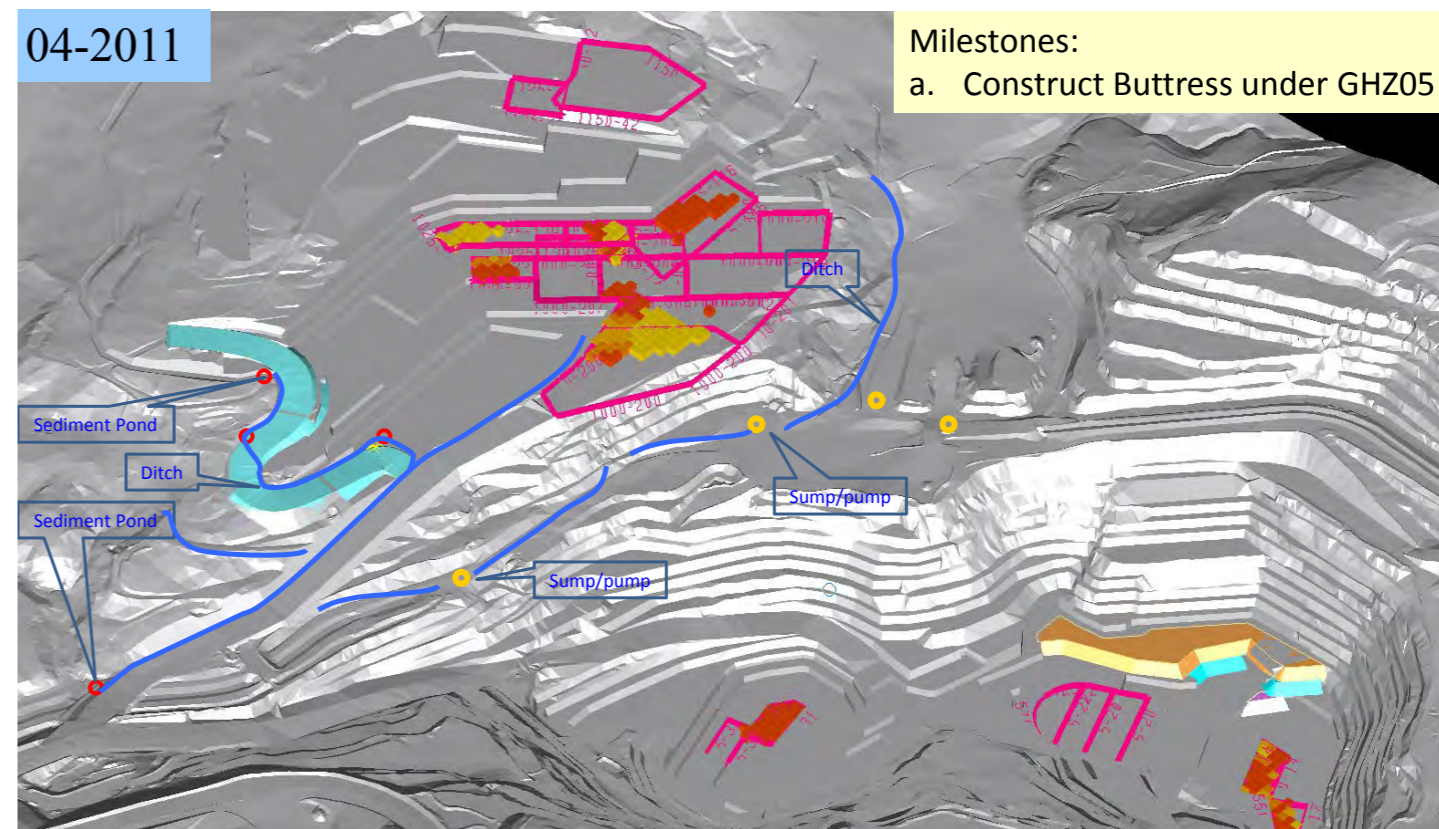
03-2011

- Milestones:
- a. M1 575 sinking cuts
  - b. Cut AQQ East haul road
  - c. Start mine 1150 waste



04-2011

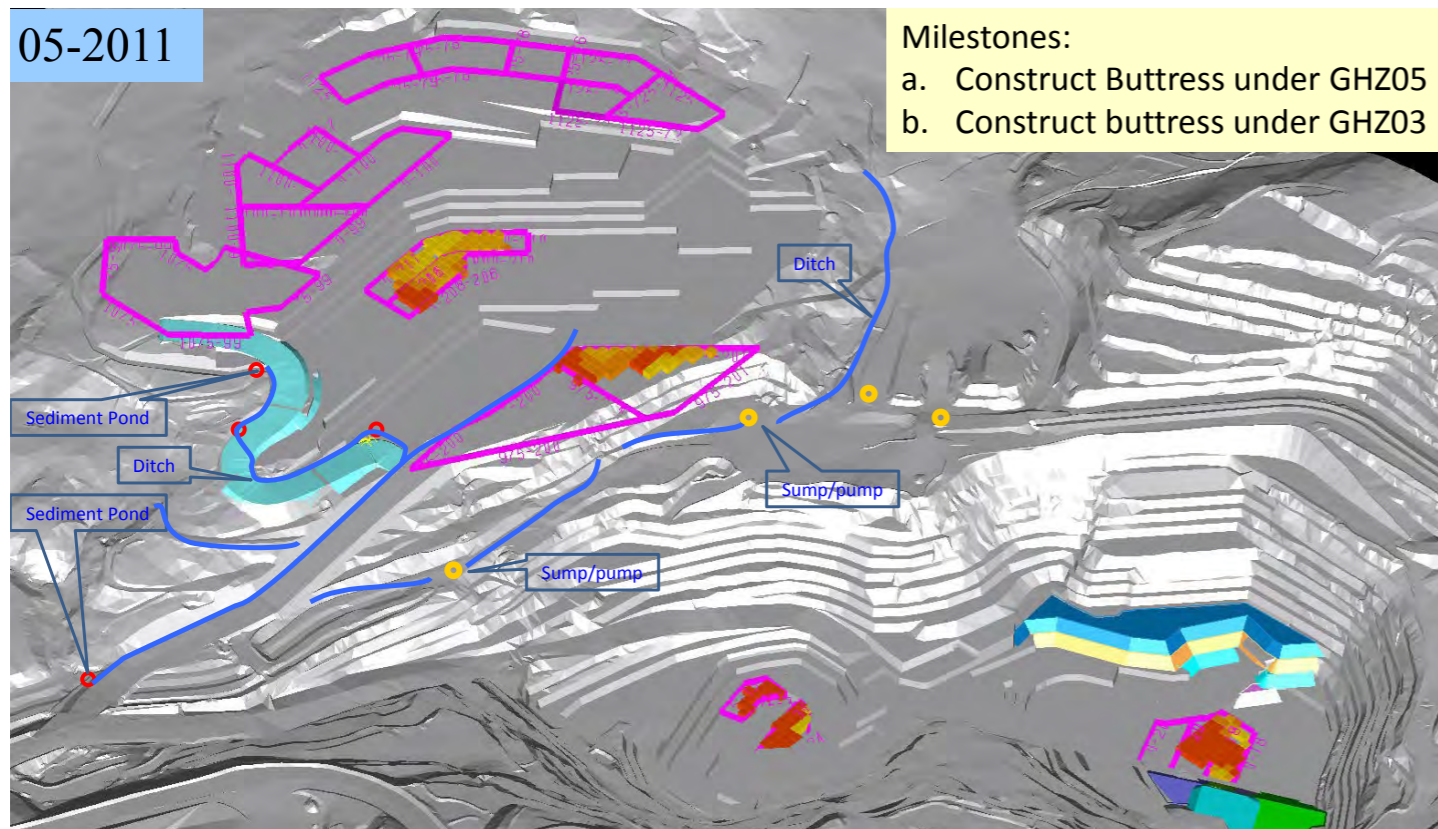
- Milestones:
- a. Construct Buttress under GHZ05



### Mine Plan 3D View and End-of-Period Surface (05-08, 2011)

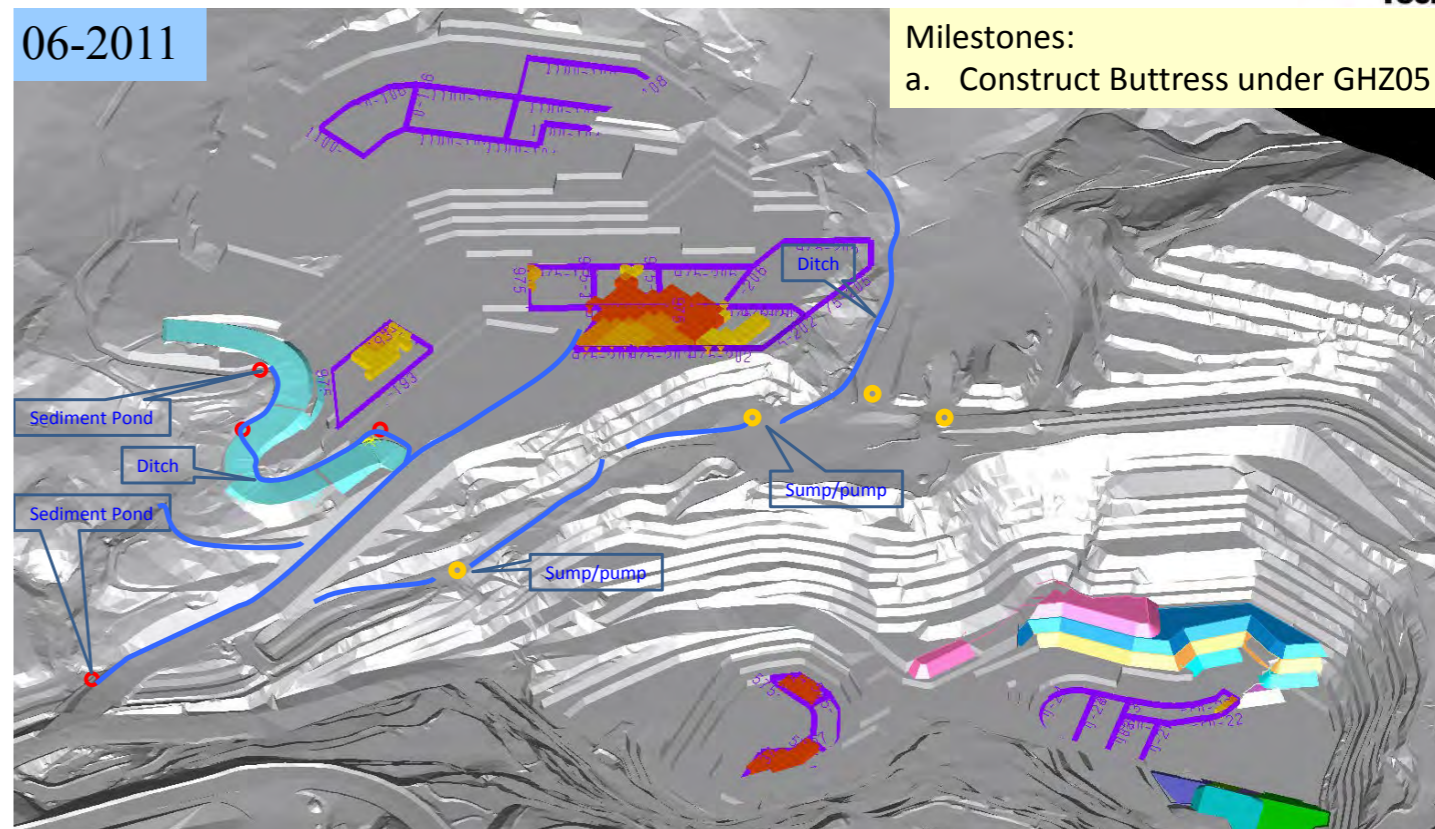
05-2011

- Milestones:  
 a. Construct Buttrass under GHZ05  
 b. Construct buttrass under GHZ03



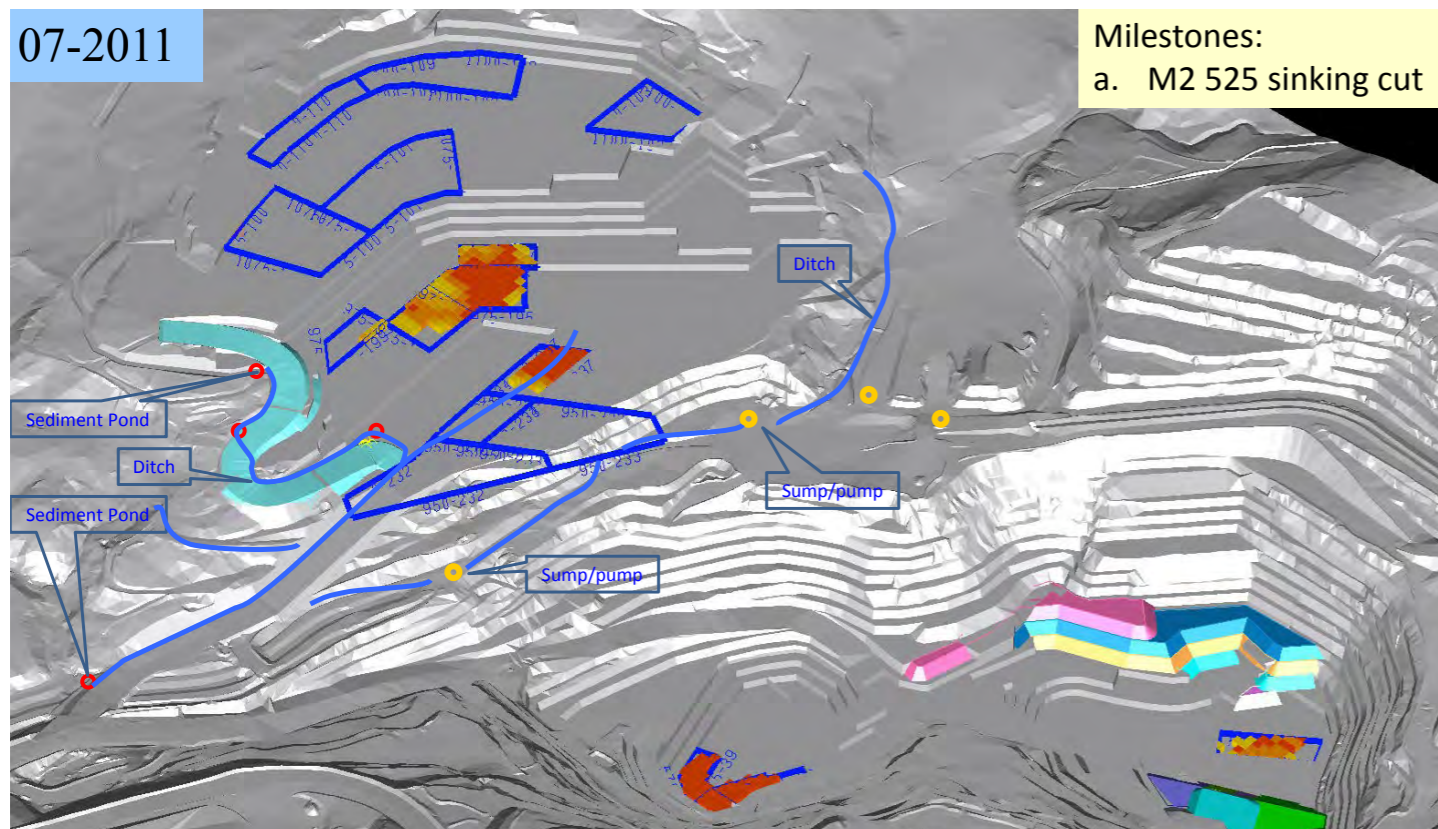
06-2011

- Milestones:  
 a. Construct Buttrass under GHZ05



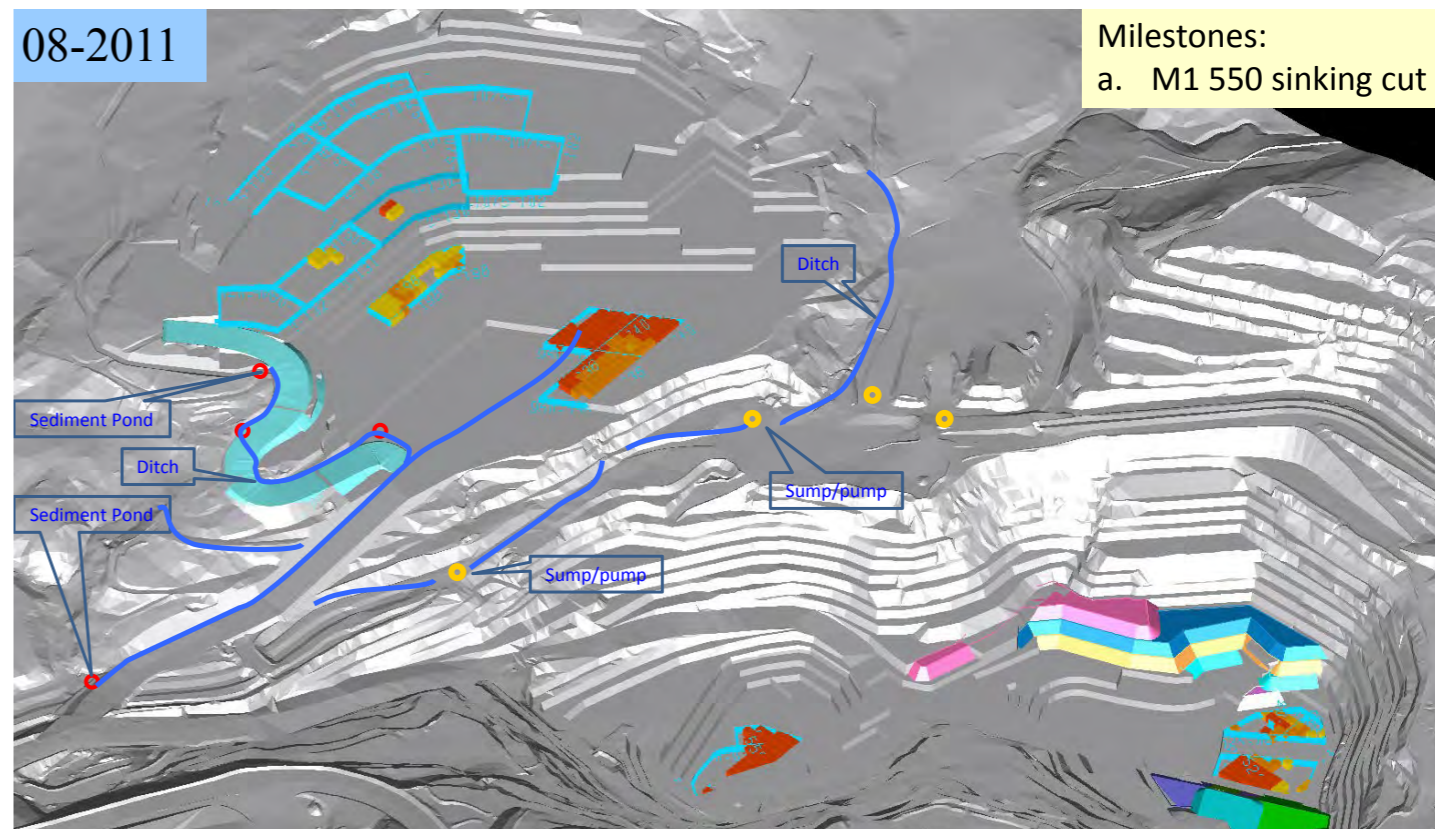
07-2011

- Milestones:  
 a. M2 525 sinking cut



08-2011

- Milestones:  
 a. M1 550 sinking cut



# Mine Plan 3D View and End-of-Period Surface (09-12, 2011)

