Table 15.15 Proven and Probable Reserves and Stripping by Pit Phase

		Proven Reserves					Probable Reserves					Proven & Probable Reserves					Waste	Total	Strip
	Pit	K Tons	oz Au/ton	K Ozs Au	oz Ag/ton	K Ozs Ag	K Tons	oz Au/ton	K Ozs Au	oz Ag/ton	K Ozs Ag	K Tons	oz Au/ton	K Ozs Au	oz Ag/ton	K Ozs Ag	K Tons	K Tons	Ratio
Three Hills	Phase 1	-	-	-	-	-	9,653	0.018	175	-	-	9,653	0.018	175	-	-	7,984	17,638	0.83
Hasbrouck	Phase 1	2,467	0.025	63	0.493	1,217	7,915	0.018	142	0.282	2,232	10,383	0.020	205	0.332	3,449	5,091	15,474	0.49
	Phase 2	1,683	0.020	34	0.470	791	7,217	0.018	126	0.316	2,282	8,901	0.018	160	0.345	3,073	8,988	17,888	1.01
	Phase 3	1,253	0.013	16	0.300	376	8,627	0.014	117	0.281	2,420	9,880	0.013	133	0.283	2,796	10,595	20,475	1.07
	Phase 4	839	0.017	14	0.212	178	5,615	0.013	75	0.191	1,074	6,453	0.014	89	0.194	1,252	14,929	21,382	2.31
	Total	6,242	0.020	127	0.410	2,562	29,374	0.016	461	0.273	8,007	35,617	0.017	588	0.297	10,569	39,602	75,219	1.11
All Deposits	Total	6,242	0.020	127	0.410	2,562	39,028	0.016	635	0.205	8,007	45,270	0.017	762	0.233	10,569	47,587	92,857	1.05

15.5.1 Three Hills and Hasbrouck Mines In-pit Inferred Resources

Inferred resources at both Three Hills and Hasbrouck were considered as waste and not used in the economic analysis. The CIM definition of Inferred Resources is given below, with CIM's explanatory material shown in italics:

> An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.
>
> An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.
>
> *An Inferred Mineral Resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes. Inferred Mineral Resources must not be included in the economic analysis, production schedules, or estimated mine life in publicly disclosed Pre-Feasibility or Feasibility Studies, or in the Life of Mine plans and cash flow models of developed mines. Inferred Mineral Resources can only be used in economic studies as provided under NI 43-101.*
>
> *There may be circumstances, where appropriate sampling, testing, and other measurements are sufficient to demonstrate data integrity, geological and grade/quality continuity of a Measured or Indicated Mineral Resource, however, quality assurance and quality control, or other information may not meet all industry norms for the disclosure of an Indicated or Measured Mineral Resource. Under these circumstances, it may be reasonable for the Qualified Person to report an Inferred Mineral Resource if the Qualified Person has taken steps to verify the information meets the requirements of an Inferred Mineral Resource.*

In-pit Inferred resources are shown in Table 15.16. In-pit resources are presented using a 0.005 oz Au/ton cutoff grade for Three Hills, 0.008 oz Au/ton for Hasbrouck upper Siebert, and 0.007 oz Au/ton lower Siebert. The cutoff grades are reflective of the cutoffs used to report reserves. Note that resources use a cutoff of 0.005 oz Au/ton for all deposits.

Table 15.16 Total In-Pit Inferred Resources, Hasbrouck Project

	K Tons	oz Au/ton	K Ozs Au	oz Ag/ton	K Ozs Ag
Three Hills	342	0.007	2	-	-
Hasbrouck					
Upper Siebert	560	0.010	6	0.099	56
Lower Siebert	2,105	0.012	25	0.184	386
Total	2,665	0.011	31	0.166	442
Total In Pit Inferred Material	3,007	0.011	33	0.147	442

Cutoff grade for Three Hills: 0.005 oz Au/ton
Cutoff grade for Hasbrouck: upper Siebert 0.008 oz Au/ton, and Hasbrouck lower Siebert 0.007 oz Au/ton

16.0 MINING METHODS

The pre-feasibility for the Hasbrouck project includes mining at both the Three Hills Mine and the Hasbrouck Mine. These are planned as open-pit, truck and loader operations. The truck and loader method provides reasonable costs and selectivity for these deposits. Only open pit mining methods are considered for mining at the Hasbrouck project.

16.1 Definition of Mine Material Types

For production scheduling, material types were classified into ore or waste categories. Ore consists of only Proven and Probable reserves. For the Hasbrouck Mine, these are further divided into upper and lower Siebert material, which have been tracked separately in order to recognize their different metallurgical recoveries. All ore is oxide.

Waste material was defined as all material inside of the pit designs that did not meet Proven and Probable reserve classifications. All Inferred material was considered waste. A total of 7,984,000 tons of waste have been defined at Three Hills and 39,602,000 tons have been defined at Hasbrouck. Table 15.15 in Section 15.5.1 shows the tons of ore and waste to be mined by pit phase.

16.2 Mine Roads and Equipment Access

In-pit ramp dimensions were discussed previously in the Reserves section of this report. Haulage routes constructed outside of the pit were designed to all allow for two-way traffic. Sufficient running surface is to be maintained to allow for about 3.5 times the width of the haul trucks, and a sufficient berm at least half of the tallest tire of any vehicle using the road will have to be maintained. Roads outside of the pit that have a hill or dump next to them will require about 90 feet minimum width (including the berm), and roads where two berms are to be maintained will require 115 feet of width or more (also including berm widths).

The main haul roads from the pit exit to the crusher pad have been designed using gradients between 5% and 8%.

16.3 Mine-Waste Facilities

16.3.1 Geotechnical Aspects of Waste Rock Storage Areas

The waste rock storage areas ("WRSA") at the Three Hills site were investigated during the September, 2014 geotechnical field investigation. Five test pits were excavated within the footprint of the proposed facility. The WRSA is currently sited along the west slopes of the topographic feature that is identified as the Three Hills. The upper portions of the WRSA will be founded on bedrock and the lower portions are founded on granular soils located along the base of Three Hills. Bedrock within the footprint of the WRSA is composed of rhyolite and tuff. The tuff is the same rock unit that underlies the HLF and is described as weak to extremely weak, slightly to moderately weathered, and relatively unfractured. When highly weathered or pulverized, the bedrock exhibited low plasticity. The rhyolite is described as slightly to moderately weathered, welded, and medium strong with localized strong silicified zones. The tuff is considered rippable with an appropriately sized dozer, while the rhyolite is considered marginally rippable with localized non-rippable zones.

Soils encountered along the base of the Three Hills slopes are described as silty and clayey sands, likely reworked from the volcanic tuff. Bedrock was encountered within 2ft of the ground surface for the majority of the test pits, with one test pit that encountered bedrock 8ft below ground surface. Roots were present to approximately 2ft below ground surface. Groundwater is not anticipated to influence the design, construction or operation of the waste rock storage areas.

The WRSAs at the Hasbrouck Mine will be sited along the south and east slopes of Hasbrouck Peak. It is anticipated the upper portions of the WRSAs will be founded directly on bedrock, and on granular soils in the lower portions of the WRSAs. Shallow bedrock is anticipated in areas of surficial soil cover. The areas along the base of Hasbrouck Peak are mapped as alluvial deposits and form the northern perimeter of the broad alluvial drainages that transmit water during periods of heavy precipitation. Bedrock along the slopes of Hasbrouck Peak is mapped as volcanic tuff, and is anticipated to be of similar properties to the tuff observed at the Three Hills site. Groundwater is not anticipated to influence the design, construction or operation of the WRSAs at the Hasbrouck Mine, as it is at considerable depth.

16.3.2 Waste Rock Storage Area Designs

Mined waste will initially be used as fill for construction in areas as required, such as for roads and for fill around the crusher. For the Hasbrouck Mine, some waste may be used for berm construction to contain rock that may roll off of the mountain during initial mining.

Mine waste storage has been designed as a single facility for Three Hills and two waste facilities for Hasbrouck (East and South waste rock storage areas). The Three Hills waste storage area includes a haul road leading from the base of the dump in the north to the upper dump lifts. This road has been designed with a 90 foot wide ramp at less than 10% gradient to provide two-way haul truck access. In addition, the lower portion of the dump contains a built in haul road that leads around the base of the dump to the ROM heap leach pad.

The Three Hills waste dump was designed to be constructed from the base up, starting with dumping of waste material to define the haul road to the leach pad. The dump would then be constructed in 20ft to 40ft lifts depending on the efficiencies and operations preference. The dump design assumes a 34° dump face and leaves catch benches 40ft wide for every 40ft in dumping height. This gives an inter-ramp slope of about 2.5H:1V. The overall slope of the dump is approximately 3.0H:1V and minimizes the effort required for reclamation at that overall slope. The Three Hills waste storage area is shown in Section 18.1 (Figure 18.1) and in the yearly pit position maps in Appendix B.

The Hasbrouck east waste rock storage area will be used primarily for waste mined from the upper benches in each phase, and thereafter the south waste storage area will be used as the main waste storage area. The east waste dump will be accessed from roads developed directly off of the upper mining benches over to the upper portion of the waste dump. It is currently envisioned that the dump will be built by starting from the upper benches, so no ramps are built into the lower portions of it. Dumping will begin at the crest of the designed dump and continue until a dumping face between 50ft and 100ft tall is developed. MDA believes that lifts up to 100ft tall can be safely dumped in this manner; however, it will be important to monitor these dump faces for stability during operation to ensure safety.

Once the upper lift has been dumped to a height of 100ft, a road will be established to the base of the dump, or slightly higher, where a second lift will be established and built out in a similar fashion. Once the lower lift has been dumped in, dumping can be continued on the upper lift. A dump toe is to be established by leaving a berm on the lower lift so that waste dumped from the upper lift is contained leaving room for a 76ft wide catch bench. This will allow for the return of truck traffic to the lower lift if additional dumping is to be done, and also allows for grading of the dump to a 3H:1V slope during final reclamation.

The east waste storage area has been designed to have a height of up to 330ft from the final crest to the lowest dump toe. The east waste storage area is shown in Section 18.1 (Figure 18.2) and in the yearly pit position maps in Appendix C.

The Hasbrouck south waste storage area is designed to be just south of the main haul road that comes out of the pit exits as shown in Section 18.1 (Figure 18.2) and in the yearly pit position maps in Appendix C. The road is intended to be the upper boundary of the dump and to provide access for equipment onto the various lifts. The dump will be constructed in the same manner as described for the east dump, dumping from the top until a 100ft lift height is established. Then a second lift will be started at, or just above, the dump toe and extended to the south until it has a desired lift height.

The Hasbrouck south waste storage area has been designed to have a height of up to 360ft from the final crest to the lowest dump toe.

Lift heights will need to be monitored to maintain a safe dump face. When dumping, the lift gradient should rise toward the dump face between 2% and 4% to allow for settling and solidification of the dump floor. The dump face should be tended to by a dozer to maintain a proper berm to keep trucks from backing over the edge. The dozer operator should be trained to watch for issues such as cracking or sloughing at the dump face. It is important that a wide dump face is worked to allow time for settling and inspection.

16.4 Stockpiles

Long term stockpiling strategies were not used for either the Three Hills or Hasbrouck mines. All ore from Three Hills will be placed directly on the run-of-mine leach pad by haul trucks. At the Hasbrouck Mine, the ore will be hauled and directly dumped into the crusher as much as possible. A short term stockpiled has been planned near the crusher for when the crusher temporarily cannot keep up with ore haulage (such as unexpected down time at the primary crusher). This stockpile will be re-handled by the contract miner as required. The estimated mining costs include a provision that up to 3.5% of the ore would be re-handled.

16.5 Mine-Production Schedule

The pre-feasibility study has been based on contract mining. Mine production schedules were provided to multiple mining contractors for budgetary quotation, three of whom responded. The successful mining contractor is anticipated to use 100 ton capacity trucks with suitable loading equipment in order to move ore and waste specified by the production schedule.

Production scheduling was completed using Geovia's MineSched™ (version 9.01) software. Proven and Probable reserves were used to schedule mine production, and Inferred resources inside of the pit were considered as waste.

16.5.1 Three Hills Production Schedule

Three Hills production schedules have been completed based on a 15,000tpd production requirement for the ROM heap leach pad. As the ore is generally low grade, it may not be profitable to incur re-handling costs, so a major assumption was that stockpiles would not be used for Three Hills ore. In addition, a limit of 1 bench per month of mining was imposed, with the exception of the upper few benches which were not confined by a pit crest and will be small in total tonnage. The 1 bench limit was used as a rule of thumb to ensure that the mining schedule allows for the development and mining of benches in a realistic fashion and not overly aggressive.

Very little pre-stripping is required because ore is located near the surface. As such, mining is planned to start at the beginning of construction. However, some costs were applied in the pre-production year assuming that some waste would be mined for construction use from inside of the pit footprint. For example, upper benches that contain Brougher Rhyolite are planned to be sent to a temporary crusher for use as overliner material for the ROM leach pad and road construction.

The production schedule was produced using monthly periods. Material placed on the pad had a lag time applied so that gold production was not assumed at time of placement. The lag time was developed by MDA in coordination with Herb Osborne of H.C. Osborne and Associates and Carl Defilippi of KCA, who are QP's for the metallurgy and processing sections of this report, respectively. The schedule assumed that the full extraction of recoverable gold placed on the pad would take up to 8 months. Recovery used was 79%, and the percentage of that recovery assumed for each month is shown in Table 16.1.

Table 16.1 Three Hills Lag Time for Recoverable Gold Ounces

Month Placed	0.0%
1st Month	0.0%
2nd Month	54.4%
3rd Month	22.8%
4th Month	11.4%
5th Month	6.3%
6th Month	3.8%
7th Month	1.3%
Total	100.0%

16.5.2 Hasbrouck Production Schedule

Hasbrouck production schedules were completed based on a 17,500tpd production requirement. As mentioned previously, no long term stockpiles were assumed for Hasbrouck, and all ore is to be delivered to the crusher. A short term stockpile is planned near the crusher so that when the crusher is not available, trucks can dump without delay.

Mining at Hasbrouck was assumed to start during the second year of production for the project. Little pre-stripping is required as ore is located near the surface, though waste is mined early to assist in obtaining construction fill material. During the initial startup, some material may be stockpiled in the short term stockpile until the crusher is available.

The production schedule for Hasbrouck was produced using monthly periods, and like Three Hills, a lag time for gold recovery was applied to material sent through the crusher. The schedule assumed that the full extraction of recoverable gold placed on the pad would take 8 months. upper Siebert material was assigned a 61% recovery and lower Siebert was assigned a 75.8% recovery. Both material types were assigned 11% recovery for silver. The recoverable ounces were calculated, and the lag times were applied as shown in Table 16.2

Table 16.2 Hasbrouck Lag Time for Recoverable Ounces

	Upper Siebert Au	Lower Siebert Au	All Hasbrouck Ag
Month Placed	0.0%	0.0%	0.0%
1st Month	0.00%	0.0%	0.0%
2nd Month	72.13%	75.2%	63.6%
3rd Month	16.39%	13.2%	18.2%
4th Month	6.56%	5.3%	9.1%
5th Month	3.28%	4.0%	9.1%
6th Month	1.64%	1.3%	0.0%
7th Month	0.00%	1.1%	0.0%
Total	100.0%	100.0%	100.0%

All waste material will be hauled to waste dumps as previously described for both Three Hills and Hasbrouck mines.

16.5.3 Combined Annual Production Schedule

Mine and process annual production schedules are shown in Table 16.3 and Table 16.4 respectively. Yearly pit and dump positions are shown in Appendix B and Appendix C.

Table 16.3 Annual Mine Production Schedule

		Units	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Th_Ph_1	Ore Mined	K Tons	5,112	4,541	-	-	-	-	-	-	-	9,653
		oz Au/ton	0.015	0.022	-	-	-	-	-	-	-	0.018
		K Ozs Au	76	99	-	-	-	-	-	-	-	175
	Pit to Dump	K Tons	4,498	3,487	-	-	-	-	-	-	-	7,984
	Total Tons	K Tons	9,610	8,028	-	-	-	-	-	-	-	17,638
	Strip Ratio	W:O	0.88	0.77								0.83
HB_Ph_1	Ore Mined	K Tons	-	1,280	6,219	2,884	-	-	-	-	-	10,383
		oz Au/ton	-	0.011	0.018	0.026	-	-	-	-	-	0.020
		K Ozs Au	-	14	115	75	-	-	-	-	-	205
		oz Ag/ton	-	0.128	0.333	0.421	-	-	-	-	-	0.332
		K Ozs Ag	-	163	2,072	1,213	-	-	-	-	-	3,449
	Pit to Dump	K Tons	-	2,380	2,248	463	-	-	-	-	-	5,091
	Total Tons	K Tons	-	3,660	8,467	3,347	-	-	-	-	-	15,474
	Strip Ratio	W:O		1.86	0.36	0.16						0.49
HB_Ph_2	Ore Mined	K Tons	-	-	74	2,925	4,176	1,725	-	-	-	8,901
		oz Au/ton	-	-	0.008	0.015	0.019	0.020	-	-	-	0.018
		K Ozs Au	-	-	1	45	81	35	-	-	-	160
		oz Ag/ton	-	-	0.191	0.264	0.355	0.466	-	-	-	0.345
		K Ozs Ag	-	-	14	773	1,481	805	-	-	-	3,073
	Pit to Dump	K Tons	-	-	2,865	4,331	1,533	259	-	-	-	8,988
	Total Tons	K Tons	-	-	2,939	7,255	5,710	1,984	-	-	-	17,888
	Strip Ratio	W:O			38.52	1.48	0.37	0.15				1.01
HB_Ph_3	Ore Mined	K Tons	-	-	-	491	2,124	4,122	3,143	-	-	9,880
		oz Au/ton	-	-	-	0.012	0.013	0.013	0.015	-	-	0.013
		K Ozs Au	-	-	-	6	27	54	46	-	-	133
		oz Ag/ton	-	-	-	0.131	0.175	0.282	0.380	-	-	0.283
		K Ozs Ag	-	-	-	64	372	1,165	1,195	-	-	2,796
	Pit to Dump	K Tons	-	-	-	3,722	3,124	3,240	510	-	-	10,595
	Total Tons	K Tons	-	-	-	4,214	5,247	7,362	3,652	-	-	20,475
	Strip Ratio	W:O				7.57	1.47	0.79	0.16			1.07
HB_Ph_4	Ore Mined	K Tons	-	-	-	-	-	470	3,004	1,602	-	5,076
		oz Au/ton	-	-	-	-	-	0.010	0.012	0.018	-	0.014
		K Ozs Au	-	-	-	-	-	5	36	29	-	69
		oz Ag/ton	-	-	-	-	-	0.015	0.106	0.251	-	0.144
		K Ozs Ag	-	-	-	-	-	7	320	403	-	729
	Pit to Dump	K Tons	-	-	-	-	-	4,909	8,056	1,144	-	14,109
	Total Tons	K Tons	-	-	-	-	-	5,378	11,060	2,746	-	19,184
	Strip Ratio	W:O						10.45	2.68	0.71		2.78
HB_Ph_5	Ore Mined	K Tons	-	-	-	-	-	-	154	1,224	-	1,378
		oz Au/ton	-	-	-	-	-	-	0.010	0.015	-	0.015
		K Ozs Au	-	-	-	-	-	-	2	19	-	20
		oz Ag/ton	-	-	-	-	-	-	0.309	0.388	-	0.379
		K Ozs Ag	-	-	-	-	-	-	48	475	-	522
	Pit to Dump	K Tons	-	-	-	-	-	-	190	630	-	820
	Total Tons	K Tons	-	-	-	-	-	-	344	1,854	-	2,198
	Strip Ratio	W:O							1.24	0.51		0.60
Total	Ore Mined	K Tons	5,112	5,821	6,293	6,300	6,300	6,317	6,300	2,826	-	45,270
		oz Au/ton	0.015	0.019	0.018	0.020	0.017	0.015	0.013	0.017	-	0.017
		K Ozs Au	76	113	116	126	107	94	84	47	-	762
		oz Ag/ton	-	0.028	0.331	0.325	0.294	0.313	0.248	0.310	-	0.233
		K Ozs Ag	-	163	2,086	2,051	1,853	1,976	1,562	877	-	10,569
	Pit to Dump	K Tons	4,498	5,867	5,112	8,516	4,657	8,407	8,756	1,774	-	47,587
	Total Tons	K Tons	9,610	11,688	11,406	14,816	10,957	14,724	15,056	4,600	-	92,857
	Strip Ratio	W:O	0.88	1.01	0.81	1.35	0.74	1.33	1.39	0.63		1.05

Table 16.4 Annual Process Production Schedule

	Three Hills Leach	**Units**	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Yr 6**	**Yr 7**	**Yr 8**	**Yr 9**	**Total**
	Material	K Tons	5,112	4,541	-	-	-	-	-	-	-	9,653
	Placed on	oz Au/ton	0.015	0.022	-	-	-	-	-	-	-	0.018
	Pad	K Ozs Au	76	99	-	-	-	-	-	-	-	175
	Recoverable	K Ozs Au	60	78	-	-	-	-	-	-	-	138
	Recovered	K Ozs Au	43	87	8	-	-	-	-	-	-	138
	Cumulative Recovery	%	56.6%	74.4%	79.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Hasbrouck Leach											
Upper	Material	K Tons	-	1,278	4,235	1,225	136	3	-	-	-	6,877
Seibert	Placed on	oz Au/ton	-	0.011	0.017	0.020	0.025	0.008	-	-	-	0.017
	Pad	K Ozs Au	-	14	72	25	3	0	-	-	-	114
		oz Ag/ton	-	0.128	0.308	0.352	0.427	0.000	-	-	-	0.284
		K Ozs Ag	-	163	1,303	431	58	0	-	-	-	1,955
	Recoverable Au	K Ozs Au	-	9	44	15	2	0	-	-	-	70
	Recovered Au	K Ozs Au	-	2	44	20	4	0	0	-	-	70
	Cumulative Au Recovery	%	0.0%	12.3%	53.5%	59.5%	61.0%	61.0%	61.0%	0.0%	0.0%	
	Recoverable Ag	K Ozs Ag	-	18	143	47	6	0	-	-	-	215
	Recovered Ag	K Ozs Ag	-	1	137	64	13	0	0	-	-	215
	Cumulative Ag Recovery	%	0.0%	0.7%	9.4%	10.7%	11.0%	11.0%	11.0%	0.0%	0.0%	
Lower	Material	K Tons	-	2	2,058	5,075	6,164	6,314	6,300	2,826	-	28,740
Seibert	Placed on	oz Au/ton	-	0.008	0.021	0.020	0.017	0.015	0.013	0.017	-	0.016
	Pad	K Ozs Au	-	0	44	101	104	94	84	47	-	473
		oz Ag/ton	-	0.070	0.380	0.319	0.291	0.313	0.248	0.310	-	0.300
		K Ozs Ag	-	0	783	1,620	1,795	1,976	1,562	877	-	8,614
	Recoverable Au	K Ozs Au	-	0	33	76	79	71	64	36	-	359
	Recovered Au	K Ozs Au	-	-	21	75	75	77	63	48	0	359
	Cumulative Au Recovery	%	0.0%	0.0%	48.2%	66.2%	68.7%	72.5%	72.9%	75.8%	75.8%	
	Recoverable Ag	K Ozs Ag	-	0	86	178	197	217	172	96	-	948
	Recovered Ag	K Ozs Ag	-	-	53	180	175	231	188	121	-	948
	Cumulative Ag Recovery	%	0.0%	0.0%	6.8%	9.7%	9.7%	10.3%	10.7%	11.0%	0.0%	
All HBM Material	Material	K Tons	-	1,280	6,293	6,300	6,300	6,317	6,300	2,826	-	35,617
(Upper &	Placed on	oz Au/ton	-	0.011	0.018	0.020	0.017	0.015	0.013	0.017	-	0.017
Lower Seibert)	Pad	K Ozs Au	-	14	116	126	107	94	84	47	-	588
		oz Ag/ton	-	0.128	0.331	0.325	0.294	0.313	0.248	0.310	-	0.297
		K Ozs Ag	-	163	2,086	2,051	1,853	1,976	1,562	877	-	10,569
	Recoverable Au	K Ozs Au	-	9	77	92	81	71	64	36	-	429
	Recovered Au	K Ozs Au	-	2	65	95	79	77	63	48	0	429
	Cumulative Au Recovery	%	0.0%	12.3%	51.7%	63.3%	66.3%	69.6%	70.3%	72.9%	72.9%	
	Recoverable Ag	K Ozs Ag	-	18	229	226	204	217	172	96	-	1,163
	Recovered Ag	K Ozs Ag	-	1	191	244	187	231	188	121	-	1,163
	Cumulative Ag Recovery	%	0.0%	0.7%	8.5%	10.1%	10.1%	10.5%	10.8%	11.0%	0.0%	
	Total Au Production	K Ozs Au	43	89	73	95	79	77	63	48	0	567
	Total Ag Production	K Ozs Ag	-	1	191	244	187	231	188	121	-	1,163
	Total - All Leach											
	Material	K Tons	5,112	5,821	6,293	6,300	6,300	6,317	6,300	2,826	-	45,270
	Placed on	oz Au/ton	0.015	0.019	0.018	0.020	0.017	0.015	0.013	0.017	-	0.017
	Pad	K Ozs Au	76	113	116	126	107	94	84	47	-	762
		oz Ag/ton	-	0.028	0.331	0.325	0.294	0.313	0.248	0.310	-	0.233
		K Ozs Ag	-	163	2,086	2,051	1,853	1,976	1,562	877	-	10,569
	Total Au Production	K Ozs Au	43	89	73	95	79	77	63	48	0	567
	Total Ag Production	K Ozs Ag	-	1	191	244	187	231	188	121	-	1,163
	Cumulative Recovery - Au	%	56.6%	69.7%	67.4%	69.7%	70.4%	72.2%	72.5%	74.3%	0.0%	
	Cumulative Recovery - Ag	%	0.0%	0.7%	8.5%	10.1%	10.1%	10.5%	10.8%	11.0%	0.0%	

16.6 Equipment Selection and Productivities

The production schedules were established to mine required waste while fulfilling ore requirements to the leach pad or crusher. The production schedule was provided to potential contractors for budgetary quotations. Contractors were left to their own accord to specify equipment to be used. The likely combination will be Cat 992 style loaders and 100 ton capacity haul trucks. Three Hills mining productivity rates will vary between about 500,000 tons per month at startup, to around 900,000 tons of month during peak mining. Ramp up of production is done over about 4 months. The average mining rate is about 860,000 tons per month after ramp up of production.

The contractor will be required to drill and blast material. Drilling and blasting should be straight forward using ANFO as the primary blasting agent. Some emulsion may be used should wet hole conditions be encountered. However, because the mining is being done above the water table, the only wet holes that are anticipated would be due to inclement weather.

The contractor will be required to follow safe blasting procedures as prescribed by MSHA regulations, which are driven by protecting people and property. Shot blocking procedures will be developed to post operators and equipment in strategic locations to block employee and public access from areas where blasting is taking place. This is an important part of safety during blasting operations, and while the shot blocking at Three Hills is assumed to be typical for most mines, shot blocking at Hasbrouck may at times require delays of traffic along US Highway 95. The contractor will be required to coordinate traffic delays with state and local departments and officials. The contractor will also be required to maintain a berm along the project boundary to contain material that may roll off the project site and endanger the public.

The contractor will maintain appropriate mine support equipment to maintain haul roads, pit walls and floors, and dumping locations. Support equipment will include dozers, graders, water trucks, and other support equipment that the contractor deems appropriate. At times, the contractor may be required to utilize equipment that is available on site for work outside of the mining area. This is considered forced work and has been accounted for in the cost estimate.

16.7 Mining Personnel and Staffing

It is anticipated that the mining contractor will have between 20 and 40 operators and staff involved with the operation. It has been assumed that the contractor will work between 10 and 12 hour shifts, 2 shifts per day, 6 to 7 days per week. The contractor will supply personnel and equipment as required to ensure ore flow is available 24 hours per day and 7 days per week to process facilities.

Other mine personnel will be employed by the owner for general activities, including mine supervision, engineering, surveying, geology, and ore control. Table 16.5 list the owner's mining personnel. Year -1 shows fractional people used to represent that they are only required for about 4 months of the pre-production period.

Table 16.5 Owners General Mine Personnel

Mining General Personnel	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9
Mine Superintendent	0.30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Mine Engineer	0.30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Surveyor	0.30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Chief Geologist	0.30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Ore Control Geologist	0.30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Samplers	-	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	-
Total	1.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	-

16.8 Mine Pit Dewatering

All mining is anticipated to be above the water table, so no dewatering wells will be required. Storm water that enters the pit will be handled using in-pit sumps as needed. Any excess water that doesn't naturally infiltrate into the ground will be placed in water trucks using a portable pump and then used for dust control on haul roads.

17.0 RECOVERY METHODS

The Hasbrouck heap-leach project includes two separate facilities to be located approximately 5 miles apart. The proposed Three Hills Mine will be a ROM heap-leach operation with a full recovery plant and associated infrastructure. The proposed Hasbrouck Mine will be a crushed material, heap-leach operation with mining, carbon-column adsorption and support infrastructure facilities; the proposed Hasbrouck Mine will utilize the recovery plant located at the proposed Three Hills Mine site. The proposed Three Hills Mine will be constructed first, followed by the Hasbrouck Mine.

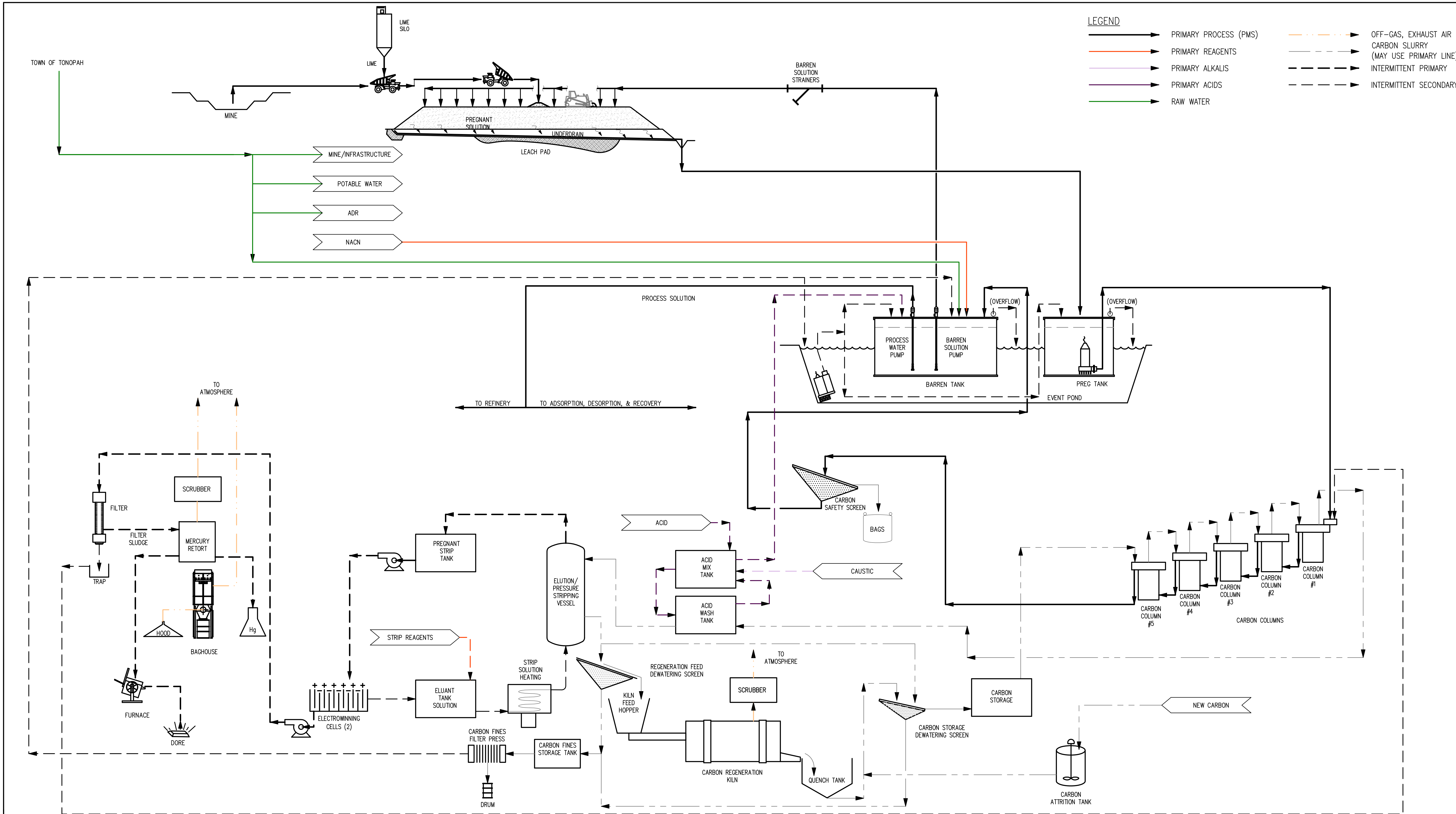
17.1 Three Hills Proposed Mine Recovery Methods

17.1.1 Three Hills Process Description Summary

The proposed Three Hills Mine will be a 15,000 ton per day ROM heap-leach operation. Processing at Three Hills will be by conventional heap-leaching of ROM material stacked on a single use pad. Gold will be leached from the mineralized material with dilute cyanide solution and recovered from the solution using a carbon adsorption-desorption-recovery (“ADR”) plant to produce doré bars.

A simplified project flowsheet for Three Hills is presented in Figure 17.1.

A general arrangement is presented in Figure 17.2.



REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

NO.	BY	CK'D	APPROVED	DATE	DESCRIPTION
A	AAH	MGG		11SEP14	ISSUED FOR REVIEW
B	AAH	MGG		06OCT14	ADDED LIME SILO; ISSUED FOR REVIEW
C	AAH	TJM		30OCT14	ADJ. LABELS; ISSUED FOR REVIEW
D	AAH	TJM		03NOV14	GEN. REVISIONS; ISSUED FOR REVIEW
E	TJM	MGG		24JUN15	ISSUED FOR PERMITTING

DESIGNED BY KCA
DRAWN BY KCA
CHECKED BY
APPROVED 1
APPROVED 2
CLIENT APP'L

PREPARED FOR WK MINING (USA) LTD.

PREPARED BY Kappes, Cassiday & Associates, Reno, Nevada — KCA

Project: THREE HILLS

Title: Fig 17.1 SIMPLIFIED OVERALL FLOWSHEET

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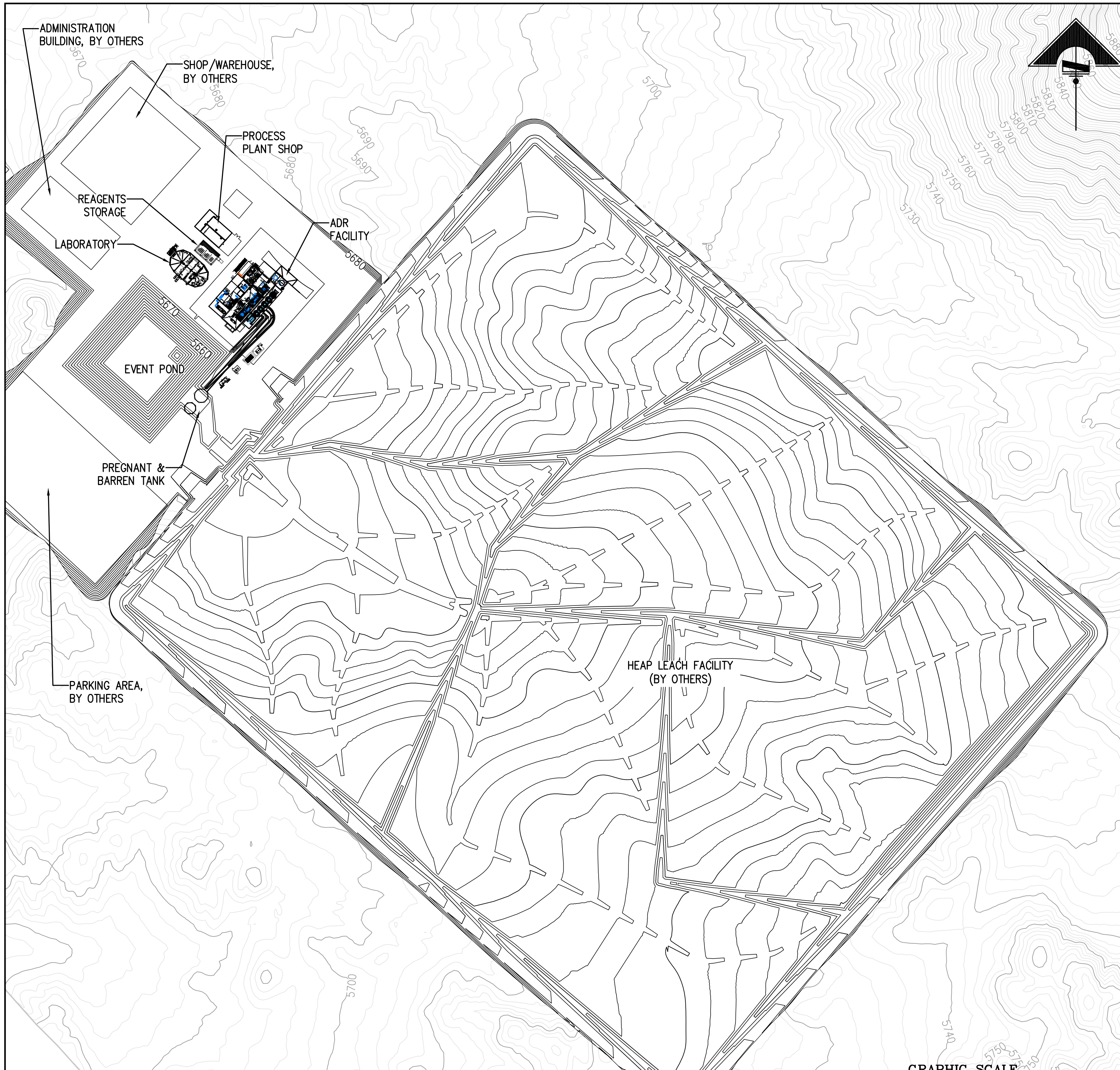
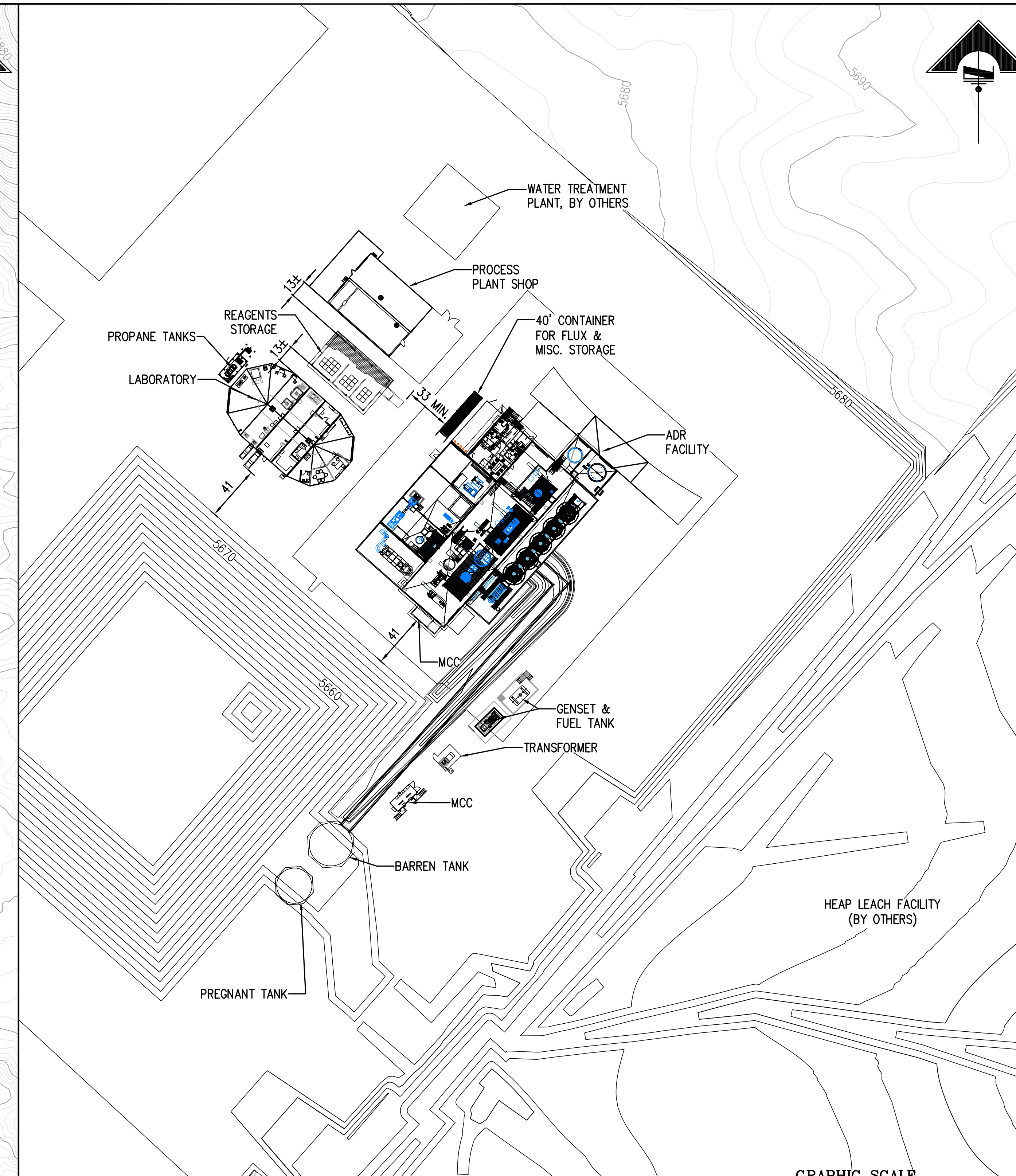
NAME: J:\DRAWINGS\Active Projects\Hasbrouck\DWG_Working\11-Flowsheets\Three Hills\8905-0000-11-0001.dwg LAST UPDATE: 24-Jun-15, 10:33 AM PLOT DATE:15-Jul-15 BY: TMANNING PLOT SCALE: 1:2.1053



HEAP LEACH FACILITIES
SCALE 1"=150'



ADR & EVENT POND
SCALE 1"=50'

REFERENCE DRAWINGS	
DWG. NO.	TITLE

REVISIONS					
NO.	BY	CK'D	APPROVED	DATE	DESCRIPTION

REVISIONS					
NO.	BY	CK'D	APPROVED	DATE	DESCRIPTION
A	AAH	MGG		16SEP14	ISSUED FOR REVIEW
B	AAH	MGG		19SEP14	ISSUED FOR REVIEW
C	AAH	MGG		15OCT14	ISSUED FOR REVIEW
D	AAH	TJM		05NOV14	GENERAL REVISIONS; ISSUED FOR REVIEW
E	AAH	TJM		28JAN15	GENERAL REVISIONS; ISSUED FOR REVIEW

DESIGNED BY KCA
DRAWN BY KCA
CHECKED BY
APPROVED 1
APPROVED 2
CLIENT APP'L

PREPARED FOR
WK MINING (USA) LTD.

PREPARED BY
Kappes, Cassiday & Associates
Reno, Nevada
KCA

Project: **THREE HILLS**

Title: HEAP LEACH FACILITIES
GENERAL ARRANGEMENT
OVERALL SITE LAYOUT
PLAN VIEW

Fig 17.2

Job No.	Scale	ACAD Filename:
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8905 **0000-13-0001** REV E

NAME: J:\DRAWINGS\Active Projects\Hasbrouck\DWG_Working\13-General Arrangement\Three Hills\8905-0000-13-0001.dwg LAST UPDATE: 28-Jan-15, 4:55 PM PLOT DATE:15-Jul-15 BY: ANDY PLOT SCALE: 1:2.1053

17.1.2 Three Hills Process Design Criteria

The criteria used for the design of the Three Hills heap-leach and ADR operation are summarized below in Table 17.1. Administrative, laboratory and maintenance support will be provided on site. The average processing rate at Three Hills is 5.475 million tons per year. Doré bars will be exported from the Three Hills property.

Table 17.1 Process Design Criteria Summary

ITEM	DESIGN CRITERIA
Annual Tonnage Processed	5.475 Million
Stacking Operation	12 hours/shift, 1 shift/day, 5 days/week, 260 days/ year
Leaching Operation	12 hours/shift, 2 shifts/day, 7 days/week, 365 days/yr
Average Production Rate	15,000 tons/day
Life of Mine	2 Years
Crushing	None - ROM
Average Gold grade	0.018 oz Au/ton
Gold Recovery	79.0%
Primary Heap Leaching Cycle	114 days
Secondary Heap Leaching Cycle	57 days

The complete process design criteria are included in the stand alone document *WK Mining Three Hills Project Design Criteria* (Manning, 2015).

17.1.3 Three Hills Lime Storage and Addition

Pebble lime will be required for pH control in the heap-leach and will have a nominal consumption of 4.0lbs/ton of material. Lime will be stored in a 150 ton silo (3.6 days capacity) equipped with a variable speed feeder, which meters the lime directly into the loaded haul trucks for delivery to the heap-leach. Lime will be added in proportion to the tonnage of material being hauled.

17.1.4 Three Hills Stacking

The material at Three Hills will be processed in a truck-stacked ROM heap-leach. Material from the mine will be loaded into haul trucks, mixed with lime for pH control as described above, and delivered to the heap-leaching facility (“HLF”) where it will be placed in 30ft lifts by the haul trucks. A dozer will be used to periodically assist the trucks in heap construction and rip the heap surface prior to the start of leaching.

17.1.5 Three Hills Solution Application and Leaching

The material will be leached using a dilute solution of sodium cyanide applied by a system of drip emitters. Leach solutions will be applied to the crushed material heap at a nominal application rate of 0.0025 gpm/ft^2.

Drip emitters will be used as they generate less evaporation than sprays and will minimize the make-up water requirement.

The dilute cyanide leach solution will percolate through the stacked material, dissolve gold and drain by gravity to a pregnant solution tank, which will store the solution prior to further processing.

Vertical turbine pumps in the pregnant solution tank will pump solution to the head tank of the carbon columns. The solution will flow by gravity, through the carbon in columns, to a barren solution tank.

High-strength cyanide solution and antiscalant will be added to the barren tank by metering pumps. The barren solution will be pumped to the heap-leach pad using a vertical turbine pump. In-line strainers will be installed on the barren solution header to minimize the plugging of sprays by fine particulates. If desired, or if the grade of the pregnant solution collected from the heap is not at the desired level, the pregnant solution can be transferred to the barren solution tank instead of the pregnant solution tank via valves and piping. This transferred pregnant solution bypasses the adsorption plant, increasing the grade of the final pregnant solution and reducing the required volume to be treated by the adsorption plant.

17.1.6 Three Hills Leach Pad Design and Solution Collection

17.1.6.1 Three Hills Basic Design

The HLF will be a multiple-lift, single-use type leach pad designed to accommodate approximately 10 million tons of ROM material. The HLF has been designed with a lining system in accordance with International Cyanide Code requirements. These requirements meet or exceed North American standards and practices for lining systems, piping systems, and process ponds, which are intended to lessen the environmental risk of the facilities to impact the local soils, surface water, and ground water, in and around the site.

The HLF has been sized using an average stacked material density of 97 lbs/ft^3 and a maximum heap height of 150ft. ROM material will be truck-stacked at an average rate of 15,000 tons per day, 360 days per year. Material will be stacked in approximately 30ft lifts. Benches provided between lifts will create an average overall slope of 3:1 (horizontal to vertical), which provides operational and post-closure stability of the heap, and minimizes grading during reclamation.

The HLF will be lined with a composite lining system consisting of a prepared subgrade, a layer of 12in thick compacted low-permeability soil layer or geosynthetic clay liner (“GCL”), and an 80mil high-density polyethylene (“HDPE”) geomembrane liner.

The HLF will be constructed in a single phase providing a total lined leach pad surface area of approximately 3 million square feet. The construction of the leach pad will include the perimeter access road, pad geomembrane lining system, solution collection system, permanent and temporary storm water diversion facilities. Solutions collected from the HLF will be conveyed to either they barren or pregnant tanks located within the geomembrane-lined event pond.

17.1.6.2 Three Hills Mine Heap Leach Facilities Geotechnical

A geotechnical investigation was completed at the proposed Three Hills mine in September, 2014 in support of the design activities. During this investigation, three boreholes and three test pits were excavated within the footprint of the heap leach facility ("HLF"). Logs of the subsurface conditions were created, and samples of subsurface materials were collected and tested in the laboratory.

Surface topography at the Three Hills HLF slopes gently to the northwest with a low relief valley that runs through the center of the proposed leach pad. The valley was dry at the time of the investigation, and appears to host water only during times of high precipitation. Sage brush and native grasses were present throughout the surface of the site.

The Three Hills HLF site is characterized with a shallow bedrock surface that is overlain by granular soils typically less than 8 feet thick and described as silty and clayey sand. The soils appear to be a reworked form of the volcanic tuff encountered elsewhere at the site, possibly transported and deposited by alluvial means. Roots were present from the surface to a depth of about 2 feet.

Bedrock was a rhyolitic volcanic tuff described as weak to extremely weak rock, slightly to moderately weathered, and relatively unfractured. Often a residual bedrock veneer, up to 2 feet thick, was present at the top of bedrock surface. When highly weathered or pulverized, the bedrock exhibited low plasticity. The tuff was relatively homogeneous through the depth of the borings with localized highly weathered and extremely weak zones. Bedrock adjacent to the slope of Three Hills was welded, locally silicified and marginally rippable, while rock encountered within the footprint of the leach pad was not silicified and considered rippable with an appropriately sized dozer.

Slope stability analysis for the Three Hills HLF was performed for both the static and seismic conditions. One cross section was analyzed for the slope stability analysis. The section considered an ultimate heap height of 150ft with ROM ore placed in 30ft lifts at the angle of repose (approximately 1.4H:1V), and subsequent lifts setback to maintain an overall slope of 3H:1V. The critical section selected for analysis is located on the northern end of the HLF, adjacent to the Event Pond. At this location the base grade slopes toward the facility toe and the HLF is at its maximum height. The modeled liner system consisted of a GCL against a HDPE geomembrane.

The results from the analysis for static conditions indicate factors of safety for both circular and block failure modes as 1.9 and 1.3, respectively. The results for the psuedostatic conditions during operations indicate factors of safety for both circular and block failure modes as 1.6 and 1.0, respectively. The results for the psuedostatic conditions during closure indicate factors of safety for both circular and block failure modes as 1.3 and 0.8, respectively. The results indicate that the slopes will remain stable throughout the lifetime of the facility for static conditions and the operating basis earthquake (475 year return event). In the event of an extreme seismic event (2,475 year return event), slope movement up to 24in may occur, which may result in minor sloughing but not compromise the integrity of the slope.

Groundwater was not encountered during the field investigation and it is not anticipated to influence the design, construction or operation of the Three Hills HLF.

17.1.7 Three Hills Solution Storage

17.1.7.1 Three Hills Event Pond

The event pond will have a total storage capacity of approximately 7.5 million gallons. The capacity is based on the runoff from the estimated 100-year, 24-hour storm event and anticipated drain-down resulting from a 12-hour power outage. Excess solution consists of a mixture of process solutions and storm water collected by the leach pad.

The event pond lining system will consist of two layers of HDPE geomembrane liner sandwiching a geonet layer to provide dual containment with leak detection. This lining system will be installed over a soil bedding layer. The pond bottom will slope towards a sump where solutions collected in the event pond will be pumped back to the process.

17.1.7.2 Three Hills Pregnant and Barren Solution Tanks

Leach solution draining from the heap will be monitored during operation with higher grade solution being routed to the pregnant solution tank and the remaining solution being routed to the barren tank. The pregnant solution tank is sized with sufficient capacity to operate for 30 minutes at the nominal primary leach rate of 3,000 gpm, which equates to 90,000 gallons of capacity.

The barren solution tank is sized to store fluids for 30 minutes of operation at the nominal secondary leach rate of 1,500 gpm plus the 3,000 gpm barren solution flow from the open-top carbon columns. This equates to a tank size of 135,000 gallons. Solution in the barren solution tank will be pumped to the active leach areas of the heap.

In the event of power outage or equipment malfunction, or if excess flows from the HLF exceed the storage capacity of the solution tanks, solution will flow into the event pond to maintain containment.

17.1.8 Three Hills Solution Management

The Three Hills process system is designed as a zero discharge facility. Based on weather data and the HLF water balance, the project will operate in a monthly water deficit under all weather conditions; cyanide neutralization will not be required.

Several methods of solution management will be employed at the HLF to maintain adequate solution storage within the process tanks and event pond, and to reduce the need for make-up water and water treatment. The following elements have been incorporated into the design:

- Large event pond for solution storage during storm events and upset conditions.
- Drip irrigation emitters on the heap.
- Barren solution tank.
- Pregnant solution tank.

The event pond will remain empty and will not have seasonal accumulation under normal operating conditions. Solution collected in the event pond during storm events will be returned to the leach system as makeup solution as soon as practical. Solution in the pregnant and barren tanks should be maintained at the mid- to lower-range of their working capacities. Solution overflowing from either tank will be directed to the event pond.

17.1.9 Three Hills Process Water Balance

Ecological Resource Consultants, Inc. ("ERC") completed a water balance for the heap-leach facility at the Three Hills Mine. The evaluation included development of a stochastic water balance that accounts for inflows such as rain and make-up water, outflows such as evaporation, and consumptive loss due to material wetting.

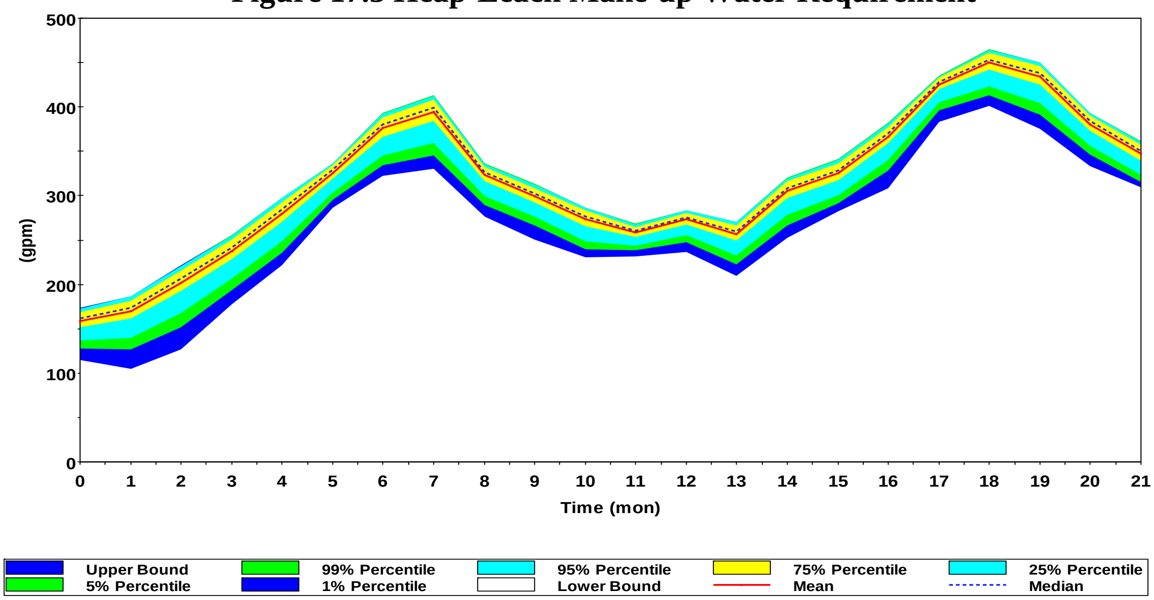
To estimate inflow and outflow water requirements, the following criteria were considered:

- Total lined leach pad area.
- Solution application flow rate and area.
- Heap-leach facility capacity.
- Climactic conditions and the 100-year, 24-hour storm event for the site, based upon data derived from local weather stations.
- Runoff coefficients for actively leached area, non-active leached area, side slopes and exposed liner.
- Make-up water volume will be available, if required.
- Average as-mined moisture content and specific moisture retention of the material.
- Nominal solution application rate of 0.0025 gpm/ft^2.
- Maximum solution application rate of 0.0040 gpm/ft^2.
- Nominal side slope solution application rate of 0.00125 gpm/ft^2.
- Nominal solution flow rate is 4,500 gpm.
- Nominal 1,800,000 square feet of the top of the heap under leach.
- Minimum 1,125,000 square feet of the top of the heap under leach.

17.1.9.1 Three Hills Process Solution and Makeup Water

Losses are expected to exceed meteorological inputs. Make-up water is expected to be required during all months in all reviewed conditions. The make-up water requirement calculated by the ERC water balance does not include water needed for dust suppression or construction. The heap-leach facility make-up water rates are anticipated to range from approximately 170 gpm at the beginning of operations to nearly 450 gpm during the second summer when evaporation losses are greatest, assuming average precipitation conditions. The anticipated make-up water requriements are presented in Figure 17.3.

Figure 17.3 Heap-Leach Make-up Water Requirement



17.1.9.2 Three Hills Precipitation Data

Estimates of monthly precipitation at Three Hills were developed based on a review of regional data published by the Western Regional Climate Center. Monthly and annual precipitation statistics used in the water balance model, including standard deviations and correlation coefficients are summarized in Table 17.2.

Table 17.2 Mean Modeled Monthly Precipitation

Month	Mean Precipitation (in)	Standard Deviation (in)	Correlation Coefficient
January	0.37	0.36	0.129
February	0.44	0.5	0.013
March	0.49	0.55	0.073
April	0.45	0.48	0.418
May	0.47	0.55	-0.027
June	0.26	0.4	0.145
July	0.47	0.53	-0.086
August	0.5	0.63	0.001
September	0.39	0.51	-0.093
October	0.43	0.48	-0.036
November	0.37	0.52	0.145
December	0.31	0.3	0.113
Annual	**4.92**	**1.96**	

17.1.9.3 Three Hills Water Balances

ERC completed a comprehensive water balance using the software GoldSim (version 9.60) which is a stochastic modeling tool that can be used to model a range of potential outcomes. A Monte Carlo Simulation model was developed using a monthly timestep for a period of 22 months, which is considered the operational period for the facility.

The water balance, in essence, tracks the inputs (process water and precipitation) and outputs (evaporation and material uptake) through the system over time. Initially, process water added to fresh material is absorbed (uptake) to increase the gravimetric moisture content ("MC") from the natural MC of 3 percent to the under-leach MC of 13 percent. Process water will be added to the heap at an average rate of 0.0025 gpm/ft^2. At the end of a leach cycle, interstitial free water will drain from the heap until a MC of 9.7 percent is achieved.

A heap loading rate of 15,000 tons per day was used in the water balance. This information was used to calculate drain down timing related to various heap heights and storm runoff from the different surface areas (heap top, heap slopes and exposed geomembrane).

The water balance was conducted using both deterministic (average precipitation) and stochastic methods. Both methods use a set of fixed variables, but the deterministic method uses average precipitation data, whereas the stochastic method uses statistics to vary the precipitation to capture maximum and minimum precipitation cycles.

17.1.10 Three Hills Adsorption-Desorption Recovery Plant

17.1.10.1 Three Hills Adsorption

The adsorption facility at Three Hills will consist of a single train of 5 up-flow, open-top carbon columns ("CIC"s). The columns are capable of holding six tons of carbon each, thus providing a CIC process inventory of 30 tons of carbon.

Pregnant solution will be pumped to the carbon adsorption feed tank of the CICs at a nominal flow rate of 3,000 gpm. A magnetic flow meter and a wire sampler will be installed on the feed to the CICs to allow the calculation of total gold ounces fed to the carbon columns.

Pregnant solution will flow by gravity through the set of 5 columns in series, exiting the lowest adsorption column as barren solution. Barren solution from the fifth, lowest, carbon column will be continuously sampled by a wire sampler for metallurgical accounting, then discharged to the carbon safety screen to recover any floating carbon particles.

Underflow from the safety screen will flow by gravity to the barren solution tank. Any carbon recovered on the safety screen will be collected into a carbon super-sack for reuse.

The adsorption columns will operate in this fashion until the carbon contained in the first, upper, column achieves the desired precious-metal loading or the barren solution grade increases to an unacceptably high level. Loaded carbon from the first carbon adsorption column will then be pumped to the acid wash vessel. Carbon in each of the lower adsorption columns will be sequentially moved up the adsorption train, counter-current to the solution flow. This will continue from the fifth carbon column to the second carbon column. Once carbon has been advanced through the carbon columns, the barren, regenerated carbon will be pumped into the fifth column.

17.1.10.2 Three Hills Carbon Acid Wash

Loaded carbon from the adsorption circuit will be advanced to an acid wash vessel. In this vessel, hydrochloric acid will be circulated through the carbon to remove calcium carbonate scale before the desorption cycle. The acid wash vessel is a fiberglass reinforced plastic lined, carbon steel vessel designed to contain 3.0 tons of carbon.

A dilute hydrochloric acid solution will be prepared in the acid mix tank and circulated through the acid wash vessel using a circulation pump. The dilute acid solution overflows the acid wash vessel and returns by gravity to the acid mix tank. Circulation will continue for several hours while process operators monitor and add concentrated acid as needed to maintain the solution's pH at or near 2. After the carbonate scale is removed, and acid is no longer consumed, the circulating acidic solution will be neutralized with caustic and pumped to the adsorption carbon safety screen for disposal as barren solution make-up water.

17.1.10.3 Three Hills Desorption

The carbon will be advanced to the elution vessel after acid washing. The elution vessel is designed to process up to three tons of carbon in a modified Zadra-type desorption cycle, typically requiring 12 to 16 hours per cycle. During this process, the gold will be removed from the carbon with a hot caustic strip solution at a temperature of 275°F and a pressure of 70psig. The solution will be heated indirectly using a diesel-fired boiler and heat exchangers. The strip solution exiting the elution column will be cooled through a heat exchanger and flow to the recovery circuit where gold will be recovered from the pregnant eluent by electrowinning. Barren eluent leaving the recovery circuit will return to the barren eluent storage tank to be heated and circulated back through the elution vessel. The elution cycle continues until the gold grade of the pregnant and barren eluents are approximately the same, or the allowed strip time is elapsed.

The elution vessel will then be discharged to the carbon dewatering screen in the carbon handling area. Pressure from the barren solution is used to push the carbon from the elution vessel on to the screen for dewatering and further carbon handling.

17.1.10.4 Three Hills Electrowinning

Pregnant eluent will flow to 2 electrowinning cells that are operated in parallel. Stripped gold from the desorption cycle will be plated from the pregnant eluent onto stainless steel cathodes. Periodically, the stainless steel cathodes will be washed with a high pressure spray to remove the gold. The resulting sludge will be filtered in a plate and frame type filter press. The filter cake will then be processed in an electric mercury retort to remove mercury from the sludge. The mercury will be recovered in a water trap collector and periodically drained from the trap into air tight vessels. Mercury will be shipped off site for disposal.

Mercury emission requirements have been investigated and Three Hills will meet all current emission guidelines as discussed in depth in the report titled *Three Hills Mine Mercury Control Report* (Gorman, 2014).

17.1.10.5 Three Hills Carbon Thermal Regeneration

Carbon will be transferred, as needed, from the carbon storage tank to the kiln feed hopper in order to maintain constant feed to the carbon regeneration kiln. The kiln is a diesel fired device that reactivates carbon, at a temperature of approximately 1,400˚F prior to reuse. Reactivation removes organic compounds that foul activated carbon, reducing the carbon's activity or capacity to adsorb gold. The kiln can treat approximately 154lbs activated carbon per hour. Assuming an average carbon advance rate of 1.7 tons of carbon per day, the kiln can reactivate 97% of the stripped carbon. See Section 17.1.13.3 for details concerning make-up carbon.

17.1.10.6 Three Hills Refining and Smelting

Retorted sludge, with low levels of mercury, will be treated in an electric induction smelting furnace. The sludge will be mixed with fluxes, typically a combination of borax, niter, soda ash and silica sand, and melted. The soda ash and niter oxidize impurities and allow them to collect into the slag phase while the bullion settles to the bottom of the crucible. Fluorspar may also be used to modify the slag viscosity. The slag and impurities are poured off into a slag mold and the molten bullion is then poured into a cascading series of molds. Gas emissions from the furnace are extracted with a blower and filtered in a baghouse (furnace dust collector) to remove particulates and discharge to the atmosphere.

The bullion, or doré, will be quenched and cooled in a water bath. Doré bars will be cleaned of slag and loose bits of metal, labeled and weighed. The doré will then shipped to an off-site refiner for further processing and sale as fine gold.

The slag will be crushed and inspected to remove visible beads of bullion that can be immediately re-melted or recycled to the pour. The remaining slag will be re-melted to settle and recover any unrecovered bullion. The resulting slag will be shipped offsite for disposal.

17.1.11 Three Hills Adsorption-Desorption Recovery Reagents and Mixing

17.1.11.1 Three Hills Cyanide

Prior to the start of a desorption cycle, the cyanide metering pump will be used to add sodium cyanide (“NaCN”) to the eluent solution storage tank to adjust the concentration to approximately 0.2 weight percent NaCN in solution. Operators will periodically sample and titrate the barren solution for free NaCN using silver nitrate. When necessary, cyanide will be added to the eluent solution storage tank batch-wise to maintain free cyanide in solution.

17.1.11.2 Three Hills Sodium Hydroxide (“NaOH”)

Sodium hydroxide (caustic solution) from the reagent area caustic mix/storage tank will be used for acid neutralization in the acid wash circuit as well as in the strip solution. The caustic will be fed using a small metering pump. Like the acid, caustic addition will be controlled based on pH measurements. Enough caustic will need to be added to neutralize the circulating water prior to disposal.

Prior to the start of a desorption cycle, the caustic transfer pump will be used to add caustic to the eluent solution storage tank to adjust the concentration to approximately 1% to 2% NaOH by weight in solution. Operators will periodically sample and titrate the barren solution for NaOH using standardized hydrochloric acid. When necessary, caustic will be added to the eluent solution storage tank batch-wise to maintain the required caustic grade in solution.

17.1.11.3 Three Hills Hydrochloric Acid

Dilute hydrochloric acid will be prepared by metering concentrated hydrochloric acid into the water that is circulating through the acid wash vessel and back to the acid mix tank. The addition of acid will be based on pH measurements of the solution made either with a meter or pH paper.

Concentrated hydrochloric acid will be fed using a small metering pump.

17.1.11.4 Three Hills - Other Reagents

17.1.11.4.1 Three Hills Flux to Smelt

A standard smelting flux will be used, composed approximately of the following components:

Silica	25%
Borax	40%
Niter	20%
Soda Ash	15%

Up to 15% fluorspar may also be added for viscosity modification. Flux will be prepared by blending in a cement mixer. It will then be added to the retorted sludge prior to smelting. The flux contains oxidants which will cause base metals, if any are present, to react so they can be dissolved in the slag phase.

17.1.12 Three Hills Carbon Handling

Stripped carbon from the elution vessel will be screened on the carbon dewatering screen, dewatered carbon will fall into the carbon storage tank, and transport water will report to the carbon fines storage tank.

Reactivated carbon from the quench tank or stripped carbon from the carbon storage tank will be advanced to the 5^{th} carbon column.

17.1.13 Three Hills Process Reagents Delivery, Storage and Consumption Estimates

Process reagents will be stored in a fenced area under a steel roof structure (Figure 17.2).

Average estimated annual consumption of reagents and reagent storage capacities are shown in Table 17.3.

Table 17.3 Three Hills Projected Annual Reagent Consumption and Storage

Reagent	Form	Storage Capacity	Annual Consumption
Pebble Lime	Bulk	150 tons	10,950 tons
Sodium Cyanide (30%)	Liquid Bulk Delivery Truck	12.3 tons	1,230 tons
Activated Carbon	1,100 lbs. Supersacks	22 tons	23 tons
Diesel (process only)	Liquid Bulk Delivery Truck	1,791 gal	111,300 gal
Antiscalant	240 gal Liquid Tote Bins	8 totes (1,920 gal)	23,400 gal
Hydrochloric Acid (32%)	240 gal Liquid Tote Bins	6 totes (1,4,40 gal)	34,200 gal
Sodium Hydroxide (50%)	Liquid Bulk Delivery Truck	15.3 tons	73 tons
Silica	Dry Solid Sacks	1 ton	1.5 tons
Borax	Dry Solid Sacks	2 tons	2.4 tons
Soda Ash	Dry Solid Sacks	1 ton	0.9 tons
Niter	Dry Solid Sacks	1 ton	1.2 tons

17.1.13.1 Three Hills Pebble Lime

Pebble lime will be used to treat the material prior to leaching. Lime maintains an alkaline pH during leach. Lime will be delivered in tanker trucks, which will be off loaded pneumatically into a silo. A variable speed feeder on the bottom of the silo will dispense pebble lime into the haul trucks in proportion to the tonnage of ROM material in each truck.

17.1.13.2 Three Hills Sodium Cyanide (“NaCN”)

NaCN will be used in the leaching, elution and, potentially, the adsorption process. Dissolved cyanide forms stable complexes with gold and silver, allowing these metals to remain in solution for eventual recovery in the ADR plant.

NaCN will be delivered in tanker trucks as a liquid at 30% concentration for storage in an 8,529 gallon steel tank. Storage capacity will be approximately equal to 2.1 days of NaCN usage.

17.1.13.3 Three Hills Carbon

Activated carbon will be used to adsorb precious metals from the leach solution in the adsorption columns. Make-up carbon is 6 x 12 mesh. Carbon will be delivered in 1,100lb supersacks. New carbon will be added to the circuit after being attritioned in the carbon attritioning tank. The new carbon requirement to replace fine carbon losses is projected at 54 lbs. per ton of carbon stripped.

17.1.13.4 Three Hills Hydrochloric Acid (“HCl”)

HCl will be used in the acid wash section of the elution circuit. The acid washing process consists of circulating dilute acid solution through the bed of carbon to dissolve and remove scale from the carbon. Acid washing is performed every elution cycle. Hydrochloric acid (28-32% by weight) will be delivered in totes, each containing 240 gallons.

17.1.13.5 Three Hills Sodium Hydroxide

Caustic will be used in the elution and acid wash process. Caustic will be delivered in tanker trucks as a liquid at 50% concentration. Caustic will be stored in a 4,887 gallon, steel tank. The caustic solution will be fed directly from the storage tank. Storage capacity will be sufficient for approximately 74 days of caustic use.

17.1.13.6 Three Hills Diesel Fuel

Diesel fuel will be required for the elution boiler, carbon regeneration kiln, and the smelting furnace. A 1,791 gallon diesel storage tank is included for the process.

17.1.13.7 Three Hills Antiscalant

Antiscalant agents are used to prevent the build-up of scale in the process solution and heap irrigation lines. Antiscalant agent is normally added to the process pump intakes, or directly into pipelines. Consumption will vary depending on the concentration of scale-forming species in the process stream. Delivery is in liquid form in 240 gallon tote bins.

Antiscalant is added directly from the supplier tote bins into the pregnant and barren pumping systems using variable speed, chemical-metering pumps. On average, antiscalant consumption is expected to be about 65 gallons per day. The recommended minimum inventory should be 2 tote bins.

17.1.13.8 Three Hills Fluxes

Various fluxes are used in the smelting process to remove impurities from the bullion. The normal flux components are a mix of silica sand, borax, and sodium carbonate (soda ash). The flux mix composition can be variable and will be adjusted to meet the project smelting needs. Fluorspar and/or potassium nitrate (niter) are sometimes added to the mix. These fluxes will be delivered dry, in 50lb or 100lb bags. Average consumption of fluxes is estimated to be 1lb flux per pound of electrowinning precipitate smelted.

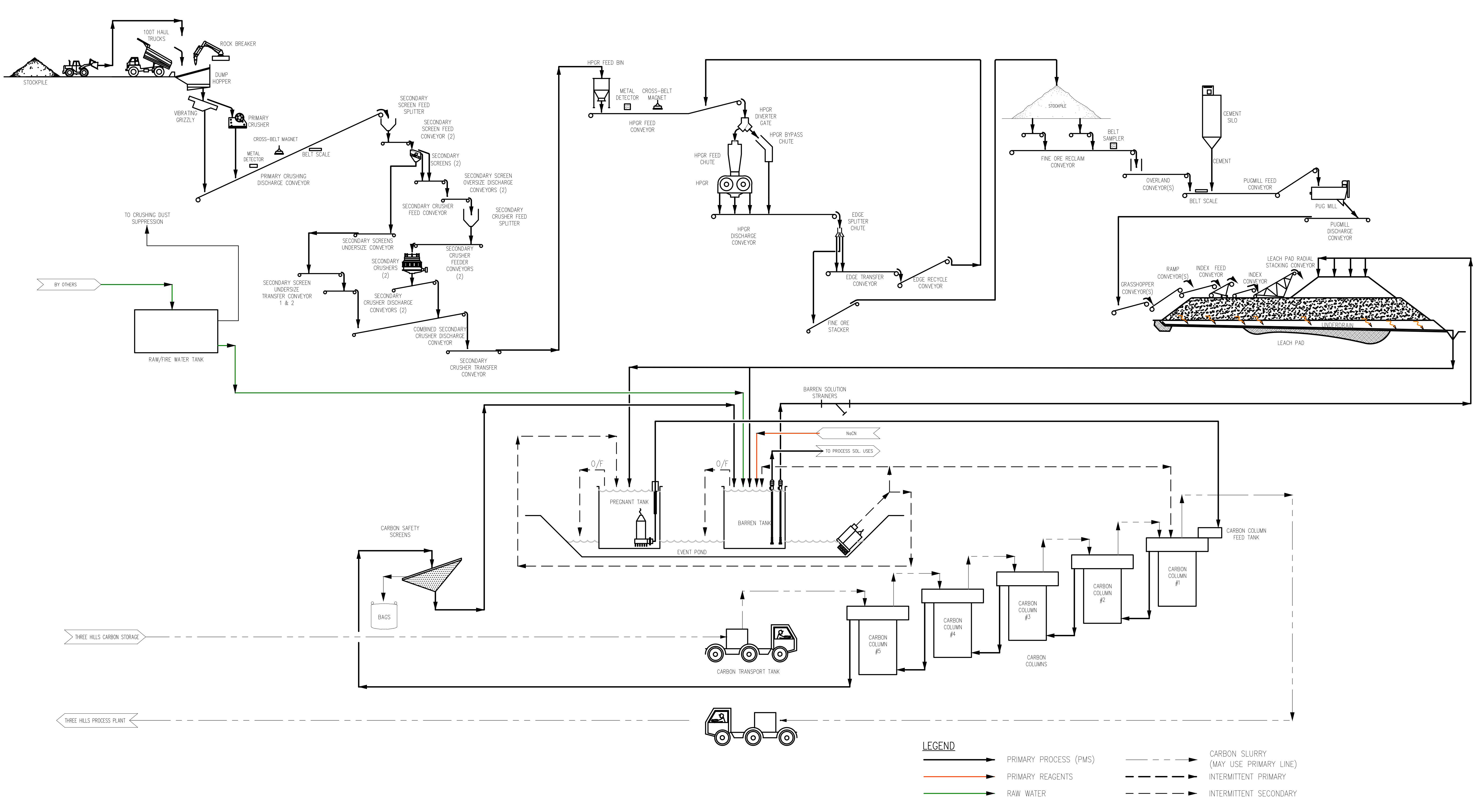
17.2 Hasbrouck Proposed Mine Recovery Methods

17.2.1 Hasbrouck Process Description Summary

The proposed Hasbrouck Mine will include a 17,500 ton per day heap-leach operation. Processing at Hasbrouck will be by conventional heap leaching of crushed material stacked on a single use pad. Gold and silver will be leached with a dilute cyanide solution and recovered from the solution using a carbon adsorption-desorption-recovery process to produce doré bars. The adsorption equipment will be located at Hasbrouck. Carbon loaded with gold and silver at the Hasbrouck adsorption plant will be loaded into bins and trucked at a rate of approximately 3tpd to Three Hills for desorption and precious metals recovery to produce doré bars. Carbon will be reactivated at the Three Hills Mine and backhauled to Hasbrouck for reuse (see Section 17.2.13).

A simplified project flowsheet is presented in Figure 17.4.

A general arrangement is presented in Figure 17.5



REFERENCE DRAWINGS	
DWG. NO.	TITLE

NO.	BY	CK'D	APPROVED	DATE	DESCRIPTION
A	TJM	–		12NOV14	ISSUED FOR REVIEW
B	TJM	–		20NOV14	ISSUED FOR REVIEW
C	WCC	AAH		28JAN15	GENERAL REVISIONS

DESIGNED BY KCA
DRAWN BY KCA
CHECKED BY
APPROVED 1
APPROVED 2
CLIENT APP'L

PREPARED FOR WK MINING (USA) LTD.

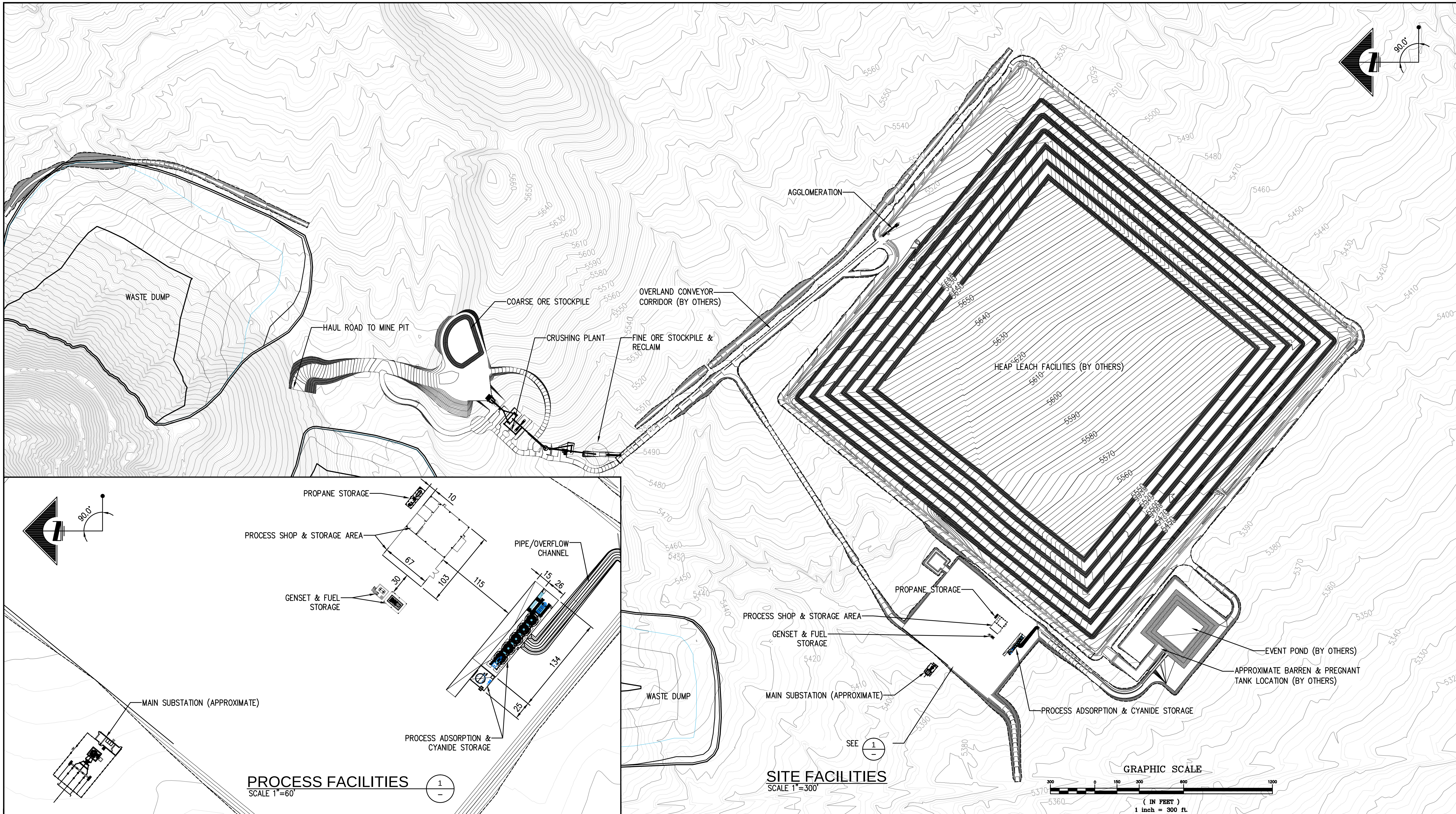
PREPARED BY Kappes, Cassiday & Associates, Reno, Nevada — KCA

Project: **HASBROUCK**

Title: Fig 17.4 — FLOWSHEET SIMPLIFIED OVERALL

Job No.	Scale	ACAD Filename:	
8905-G	N.T.S.	8905-0000-11-1100	
8905		0000-11-1100	REV C

NAME: J:\DRAWINGS\Active Projects\Hasbrouck\DWG_Working\11-Flowsheets\Hasbrouck\8905-0000-11-1100.dwg LAST UPDATE: 15-Jul-15, 10:16 AM PLOT DATE:15-Jul-15 BY: TMANNING PLOT SCALE: 1:2.1053



REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

NO.	BY	CK'D	APPROVED	DATE	DESCRIPTION
A	AAH			20FEB15	ISSUED FOR REVIEW
B	AAH			09APR15	CHANGED HPGR FEED BIN SIZE; ADJ. GRADING

DESIGNED BY KCA
DRAWN BY KCA
CHECKED BY
APPROVED 1
APPROVED 2
CLIENT APP'L

PREPARED FOR: WK MINING (USA) LTD.

PREPARED BY: Kappes, Cassiday & Associates, Reno, Nevada — KCA

Project: **HASBROUCK**

Title: SITE LAYOUT
GENERAL ARRANGEMENT
HASBROUCK FACILITIES
PLAN VIEW

Fig 17.5

Job No.	Scale	ACAD Filename:
8905-G	AS SHOWN	8905-0000-13-1001

8905 | **0000-13-1001** | REV B

NAME: J:\DRAWINGS\Active Projects\Hasbrouck\DWG_Working\13-General Arrangement\Hasbrouck\8905-0000-13-1001.dwg LAST UPDATE: 9-Apr-15, 6:48 PM PLOT DATE:15-Jul-15 BY: ANDY PLOT SCALE: 1:2.1053

17.2.2 Hasbrouck Process Design Criteria

The criteria used for the design of the Hasbrouck heap-leach operation are summarized below in Table 17.4.

Table 17.4 Hasbrouck Process Design Criteria Summary

ITEM	DESIGN CRITERIA
Annual Tonnage Processed	6.3 million
Crushing and Stacking Operation	12 hours/shift, 2 shift/day, 7 days/week
Crushing Availability	75%
Nominal Stacking Rate	17,500 tons/day
Leaching Operation	12 hours/shift, 2 shift/day, 7 days/week
Average Production Rate	17,500 tons/day
Life of Mine	5.53 years
Average Gold grade	0.017 oz Au/ton
Average Silver Grade	0.301 oz Ag/ton
Upper Seibert Gold Recovery	59.0%
Lower Seibert Gold Recovery	75.6%
Average Gold Recovery	73.0%
Silver Recovery	11.0%
Heap Leaching Cycle	115 days

The complete process design criteria are included in the stand alone document *WK Mining Hasbrouck Project Design Criteria* (Manning, 2015).

17.2.3 Hasbrouck Ore Stockpiles

The proposed Hasbrouck Mine will include two stockpiles: the ROM stockpile and the crushed material stockpile. The ROM stockpile is sized to accommodate 70,000 tons of material. The ROM material will be re-handled from the ROM stockpile by a front-end loader to supplement the direct dump feed to the ROM feed bin for the primary crushing circuit.

The crushed material stockpile is planned to have a live capacity of approximately 2,300 tons. The crushed material will be pulled from the stockpile by 2 belt feeders to the fine material reclaim conveyor in a tunnel below the stockpile. Each belt feeder will be able to feed crushed material to the fine material reclaim conveyor at an average rate of 730 dry tph. The reclaim conveyor will discharge to an overland conveyor system that will transport the crushed material to the agglomeration area.

17.2.4 Hasbrouck Crushing

ROM ore will be delivered and direct dumped, as much as possible, by haul trucks from the mine to a primary crusher's dump hopper. The haul trucks will deliver the ore to the ROM stockpile for blending or when the feed hopper is full or inaccessible due to other traffic. A front-end loader will also deliver ore from the ROM stockpile into the dump hopper, which is located above a vibrating grizzly feeder, as required, for either blending or to supplement low haul truck availability.

A stationary, 20" grizzly will be positioned above the dump hopper to prevent oversized ore from entering or obstructing the feeder. A rock breaker will be used to break up oversized material retained on the stationary grizzly. ROM ore will be delivered at an average rate of 730 dry Tph to a vibrating grizzly with a spacing of 6in. Vibrating grizzly oversized material will be crushed using a primary jaw crusher.

The primary jaw crusher will crush oversize from the vibrating grizzly to 100% passing 12in. The discharge from the jaw crusher will combine with the vibrating grizzly undersize onto a primary crusher discharge conveyor, which will feed the secondary screen-feed splitter.

The secondary screen-feed splitter will use 2 secondary screen belt feeders to feed jaw crusher product to 2 parallel secondary screens. The secondary screens will scalp material that is greater than 2in. This +2in, oversized material will be recombined and sent to a cone crusher feed splitter box where 2 belt feeders will choke feed the secondary cone crushers. Output from the secondary cone crushers and the screen undersize will combine on a conveyor belt feeding the HPGR feed bin.

The HPGR feed bin will have a storage capacity of 950 tons. A belt feeder will meter the cone crusher product onto the HPGR feed conveyor for delivery to the HPGR. The HPGR feed conveyor will have a variable frequency drive to ensure the HPGR is choke fed. The HPGR product will discharge onto the HPGR discharge conveyor. An adjustable edge splitter at the transfer point from the HPGR discharge conveyor will cut approximately 7.5% of the HPGR discharge material from each side of the belt to recycle it back to the HPGR, for a total recycle of 15%. The center material from the edge splitter chute will go to the fine material stacker and onto a fine material stockpile. Due to the high quantity of fines produces by the HPGR, there will be a foaming dust suppression system and an extendible chute at the discharge of the fine material stacker to minimize dust generation.

17.2.5 Hasbrouck Agglomeration

The crushed material will require agglomeration with cement prior to cyanide leaching. The crushed material will be conveyed from the crushed material stockpile to the agglomeration area by an overland conveyor, which will discharge on the pug mill feed conveyor. Cement will be added to the pug mill feed conveyor from a 100 ton silo with a screw feeder at a nominal rate of 5lbs per ton of crushed material. The crushed material and cement will then be fed to the pug mill for blending. Barren solution will be added in the pug mill to adjust the crushed material's moisture content to between 7 and 13%. The pug mill will discharge onto the pug mill discharge conveyor, which in turn will discharge onto an overland conveyor, which feeds the stacking system. This overland conveyor will be adjusted as necessary to accommodate stacking.

The pug mill and all downstream conveyors will be located on lined areas for containment purposes. The liner will prevent the release of cyanide solution to the environment.

17.2.6 Hasbrouck Stacking

The heap will be constructed using a conveyor stacking system. The conveyor stacking system includes the following components:

- An overland conveyor which feeds the mobile stacking system.
- Four "Ramp" portable transfer conveyors, each approximately 120ft in length for conveying crushed material up the heap for additional lifts.
- Nine "Grasshopper" portable transfer conveyors, each approximately 120ft in length for conveying crushed material across relatively flat areas.
- An 80ft long, horizontal, “Index Feed Conveyor” that transfers crushed material from the grasshopper conveyors to a “Horizontal Feed Conveyor”.
- A moveable, 125ft long, “Horizontal Index Conveyor” that transfers crushed material to the radial stacker.
- A 136ft long, telescoping, “Radial Stacking Conveyor” to stack material on the heap.

The grasshopper and ramp conveyors will transport the crushed material from the overland conveyor on the heap to the stacking conveyors. The stacking conveyors allow the radial stacker to place crushed material in 30ft lifts with minimal downtime. The radial stacker and horizontal feed conveyor together are capable of moving while slewing and stacking material in an arc. The radial stacker can retreat approximately the length of a grasshopper conveyor.

The system will be periodically stopped to add or remove grasshopper conveyors. The pad will be stacked from the down slope toe in an upslope direction for stability.

17.2.7 Hasbrouck Solution Application and Leaching

The material will be leached using a dilute solution of sodium cyanide applied by a system of drip emitters, which will discourage evaporation and minimize make-up water requirements. Leach solution will be applied to the crushed material heap at a nominal application rate of 0.0025 gpm/ft^2.

The dilute sodium cyanide leach solution will percolate through the material on the heap, dissolving gold and silver, and drain by gravity to a pregnant solution tank, which will store the solution prior to further processing. Submersible pumps in the pregnant tank will pump solution to the head tank of the carbon columns. The solution will flow by gravity, through the carbon in columns, back to a barren tank.

High-strength cyanide solution and antiscalant will be added to the barren tank by metering pumps. The barren solution will be pumped to the heap-leach pad using a vertical turbine pump. Strainers will be installed on the barren solution header to minimize the plugging of sprays by fine particulates.

17.2.8 Hasbrouck Leach Pad Design

17.2.8.1 Hasbrouck Basic Design

The Hasbrouck Mine HLF will be a multiple-lift, single-use type leach pad designed to accommodate approximately 36.1 million tons of crushed material, and will be constructed in two phases. The HLF has been designed with a lining system in accordance with International Cyanide Code requirements and meets or exceeds North American standards and practices for lining systems, piping systems, and process ponds. These standards and practices are intended to lessen the environmental risk of the facilities to impact the local soils, surface water, and ground water in and around the site.

The HLF has been sized using an average stacked material density of 93.6lbs/ft^3 and a maximum heap height of 150ft. Material will be conveyor-stacked at a nominal rate of 17,500 tons per day. Material will be stacked in approximately 30ft lifts, and benches provided between lifts will create an average overall slope of 3:1 (horizontal to vertical), which provides operational and post-closure stability of the heap, and minimizes grading during reclamation.

The HLF will be continuously lined with a composite lining system consisting of a prepared subgrade, a 12in layer of compacted, low-permeability soil layer or GCL, and an 80mil HDPE geomembrane liner.

The HLF will be constructed in two phases providing a total lined leach pad surface area of approximately 8.5 million square feet. Phase 1 will consist of constructing the northern portion of the leach pad, perimeter access road, pad geomembrane lining system, solution collection system, permanent and temporary stormwater diversion facilities, and the geomembrane-lined event pond. In Phase 2 the overland conveyor feeding the stacking system will be moved and the southern portion of the leach pad, pad geomembrane liner system, and solution collection system will be constructed.

17.2.9 Hasbrouck Mine Heap Leach Facilities Geotechnical

Geotechnical field investigations at the Hasbrouck HLF were not performed during this stage of design and are currently planned to be completed during the next phase of design activities. Surface and subsurface conditions within the footprint of the Hasbrouck HLF were characterized by surface mapping conducted by Vista Gold Corporation during their ownership of the Hasbrouck property. General topography of the site includes a north-south trending mountain range on the eastern flank of the Hasbrouck site. A large, relatively flat valley approximately 6 miles wide lies to the west of the Hasbrouck site with several broad alluvial drainages trending east to west present to the north and south of Hasbrouck Peak. Drainages are typically dry and host water only during times of high precipitation.

The current proposed location of the HLF is approximately 1 mile south of Hasbrouck Peak. Surficial alluvial deposits are mapped within the HLF footprint, with tuffaceos bedrock similar to the rock encountered at Three Hills mapped on low relief topographical highs in close proximity to the leach pad. Bedrock depth is anticipated to be shallow; however depth will need to be confirmed during future design activities.

Slope stability analysis for the Hasbrouck HLF was performed for both the static and seismic conditions. One cross section was analyzed for the slope stability analysis. The section considered an ultimate heap height of 150ft with agglomerated ore placed in 30ft lifts at the angle of repose (approximately 1.4H:1V), and subsequent lifts setback to maintain an overall slope of 3H:1V. Base grades were modeled at a continuous 4.2% and sloped toward the facility toe. This is considered the most critical slope configuration, and is representative of the south-west portion of the HLF. The modeled liner system consisted of a low permeability underliner soil against HDPE geomembrane.

The results from the analysis for static conditions indicate factors of safety for both circular and block failure modes as 1.9 and 1.6, respectively. The results for the psuedostatic conditions during operations indicate factors of safety for both circular and block failure modes as 1.5 and 1.3, respectively. The results for the psuedostatic conditions during closure indicate factors of safety for both circular and block failure modes as 1.2 and 1.1, respectively. The results indicate that the slopes will remain stable throughout the lifetime of the facility for the operating basis earthquake (475 year return event), long term basis earthquake (2,475 year return event), and static conditions.

Groundwater is not anticipated to influence the design, construction or operation of the Hasbrouck HLF.

17.2.10 Hasbrouck Solution Storage

17.2.10.1 Hasbrouck Event Pond

The Hasbrouck Mine process system will be a zero-discharge facility. The event pond will have a total storage capacity of approximately 17.7 million gallons. This capacity is based on the runoff from the estimated 100-year, 24-hour storm event and anticipated drain-down resulting from a 12-hour power outage. Excess solution consists of a mixture of process solutions and storm water collected by the leach pad.

The event pond lining system will consist of two layers of HDPE geomembrane liner separated by a geonet layer to provide dual containment with leak detection. This lining system will be installed over a soil bedding layer. The pond bottom will slope towards a sump where solutions collected in the event pond will be pumped back to the process.

17.2.10.2 Hasbrouck Pregnant and Barren Solution Tanks

Leach solution draining from the heap will be monitored during operations, with higher grade solution being routed to the pregnant solution tank and the remaining solution being routed to the barren tank. The pregnant solution tank is sized with sufficient capacity for 30 minutes operation at the nominal, primary leach rate of 3,800 gpm, which equates to 114,000 gallons.

The barren solution tank is sized to store 30 minutes of operation at the nominal leach rate of 3,800 gpm. This equates to a tank size of 114,000 gallons. Solution in the barren solution tank is pumped to the active leach areas of the heap.

In the event of a power outage or equipment malfunction, or if excess flows from the HLF exceed the storage capacity of the solution tanks, solution will flow into the event pond to maintain containment.

17.2.11 Hasbrouck Solution Management

Several methods of solution management will be employed for the HLF to maintain adequate solution storage within the process tanks and event pond to reduce the need for make-up water and water treatment. The following elements have been incorporated into the design:

- Large event pond for solution storage after storm events and upset conditions.
- Drip irrigation emitters on the heap.
- Barren solution tank.
- Pregnant solution tank.

The event pond will remain empty and will not have any seasonal accumulation under normal operating conditions. Solution collected in the event pond during storm events will be returned to the leach system as makeup solution as soon as practical. Solution in the pregnant and barren tanks should be maintained at the middle to lower range of their working capacities. Solution overflowing from either tank will be directed to the event pond.

The Hasbrouck Mine is designed as a zero discharge facility. Based on weather data and the site water balance the project will operate in a water deficit under all weather conditions; cyanide neutralization will not be required.

17.2.12 Hasbrouck Process Water Balance

KCA completed a water balance for the heap-leach facility at the Hasbrouck Mine. The evaluation included development of a water balance that accounts for inflows such as rain and make-up water, outflows such as evaporation, and consumptive loss due to wetting of material.

To estimate inflow and outflow water requirements, the following criteria were considered:

- Total lined leach pad area.
- Solution application flow rate and area.
- Heap-leach facility capacity.
- Climactic conditions for an average year, wet year and dry year.
- Make-up water volume: Solution will be applied by drip irrigation emitters.
- Average as-mined moisture content and specific moisture retention of the material.

- Nominal solution application rate of 0.0025 gpm/ft^2.
- Nominal solution flow rate is 3,800 gpm.

17.2.12.1 Hasbrouck Process Solution and Makeup Water

Process makeup water will be required for all months and for all precipitation conditions analyzed. Makeup water requirements are greatest between the months of May and August and are lowest during December and January. The HLF will require an average of 256 gal/h of makeup water for the process.

17.2.12.2 Hasbrouck Precipitation Data

Estimates of monthly precipitation at the Hasbrouck Mine site were developed based on a review of regional data published by the Western Regional Climate Center.

17.2.12.3 Hasbrouck Water Balances

Based on the rainfall data, active water balances have been calculated for an average year, extreme wet year, and extreme dry year. The calculation tables are shown in Table 17.5, Table 17.6 and Table 17.7.

Based on the water balance there is no seasonal accumulation of solutions in the event pond and the project will always operate in a water deficit condition.

Table 17.5 Average Year Water Balance, Hasbrouck Mine

Active Leach Area	1,520,000
Lined Pad/Ditch Collection Area (sq. ft)	8,100,000
Lined Pond Collection Area (sq. ft)	120,000
Total Leach Flow to Heap (gpm)	3,800
Evaporation System Flow (gpm)	0
Allowable Wet Season Accum. in Process Ponds (ft^3)	2,250,000
Wet Season Ore Absorption (%)	6.7
Dry Season Ore Absorption (%)	6.7
Average Annual Emitter Evap (%)	2.0
Average Annual Sprinkler Evap (%)	0.0
Ore Throughput per Year (ton)	6,387,500

Assumptions

Pond evap. equals 60% of pan evap. over 50% pond area
Idle heap evapotranspiration equals 75% of pan evap.
Maximum evapotranspiration = rainfall over idle area

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Annual**
Days in Month	31	31	30	31	30	31	31	28	31	30	31	30	365
Precipitation (in)	0.47	0.50	0.39	0.43	0.37	0.31	0.37	0.44	0.49	0.45	0.47	0.26	4.95
Pan Evaporation (in)	17.71	15.66	11.17	6.79	2.94	0.00	0.00	3.84	7.26	10.09	13.64	16.09	105
Emitter Evap. (%)	4.0	3.6	2.5	1.5	0.7	0.0	0.0	0.9	1.7	2.3	3.1	3.7	2.0
Sprinkler Evap. (%)													
Idle Heap Evapotrans. Area (sq. ft)	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000
Idle Heap Evapotrans. (in)	13.3	11.7	8.4	5.1	2.2	0.0	0.0	2.9	5.4	7.6	10.2	12.1	79
Ore Placed on Pad (tons)	542,500	542,500	525,000	542,500	525,000	542,500	542,500	490,000	542,500	525,000	542,500	525,000	6,387,500
Precip. Collected (cu.ft)	321,950	342,500	267,150	294,550	253,450	212,350	253,450	301,400	335,650	308,250	321,950	178,100	3,390,750
Ore Absorption (cu. ft)	1,164,462	1,164,462	1,126,899	1,164,462	1,126,899	1,164,462	1,164,462	1,051,772	1,164,462	1,126,899	1,164,462	1,126,899	13,710,603
Emitter Evap. (cu. ft)	916,287	810,223	559,275	351,304	147,204	0	0	179,449	375,621	505,200	705,711	805,617	5,355,890
Sprinkler Evap. (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotrans. (cu. ft)	257,717	274,167	213,850	235,783	202,883	0	0	241,267	268,683	246,750	257,717	142,567	2,341,383
Pond Evaporation (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evaporation System (cu. ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Net Precip. Gain(+)/Loss(-) (cu. ft)	(2,016,516)	(1,906,352)	(1,632,874)	(1,456,999)	(1,223,536)	(952,112)	(911,012)	(1,171,088)	(1,473,116)	(1,570,599)	(1,805,940)	(1,896,982)	(18,017,127)
Excess Solution Pond													
Allowable Accum. in Excess 0	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	
Accum. into Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Recycled from Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity in Excess	0	0	0	0	0	0	0	0	0	0	0	0	
Makeup Solution Required (cu. ft)	2,016,516	1,906,352	1,632,874	1,456,999	1,223,536	952,112	911,012	1,171,088	1,473,116	1,570,599	1,805,940	1,896,982	18,017,127
Solution to Treat/Discharge	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 17.6 Extreme Wet Year Water Balance, Hasbrouck Mine

Active Leach Area	1,520,000
Lined Pad/Ditch Collection Area (sq. ft)	8,100,000
Lined Pond Collection Area (sq. ft)	120,000
Total Leach Flow to Heap (gpm)	3,800
Evaporation System Flow (gpm)	0
Allowable Wet Season Accum. in Process Ponds (ft^3)	2,250,000
Wet Season Ore Absorption (%)	6.7
Dry Season Ore Absorption (%)	6.7
Average Annual Emitter Evap (%)	2.0
Average Annual Sprinkler Evap (%)	0.0
Ore Throughput per Year (ton)	6,387,500

Assumptions

Pond evap. equals 60% of pan evap. over 50% pond area
Idle heap evapotranspiration equals 75% of pan evap.
Maximum evapotranspiration = rainfall over idle area

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Annual**
Days in Month	31	31	30	31	30	31	31	28	31	30	31	30	365
Precipitation (in)	0.45	0.43	1.05	0.95	1.70	0.65	0.45	1.00	2.13	1.50	0.26	0.00	10.57
Pan Evaporation (in)	17.71	15.66	11.17	6.79	2.94	0.00	0.00	3.84	7.26	10.09	13.64	16.09	105
Emitter Evap. (%)	4.0	3.6	2.5	1.5	0.7	0.0	0.0	0.9	1.7	2.3	3.1	3.7	2.0
Sprinkler Evap. (%)													
Idle Heap Evapotrans. Area (sq. ft)	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000
Idle Heap Evapotrans. (in)	13.3	11.7	8.4	5.1	2.2	0.0	0.0	2.9	5.4	7.6	10.2	12.1	79
Ore Placed on Pad (tons)	542,500	542,500	525,000	542,500	525,000	542,500	542,500	490,000	542,500	525,000	542,500	525,000	6,387,500
Precip. Collected (cu.ft)	308,250	294,550	719,250	650,750	1,164,500	445,250	308,250	685,000	1,455,625	1,027,500	178,100	0	7,237,025
Ore Absorption (cu. ft)	1,164,462	1,164,462	1,126,899	1,164,462	1,126,899	1,164,462	1,164,462	1,051,772	1,164,462	1,126,899	1,164,462	1,126,899	13,710,603
Emitter Evap. (cu. ft)	916,287	810,223	559,275	351,304	147,204	0	0	179,449	375,621	505,200	705,711	805,617	5,355,890
Sprinkler Evap. (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotrans. (cu. ft)	246,750	235,783	575,750	520,917	932,167	0	0	548,333	1,165,208	822,500	142,567	0	5,189,975
Pond Evaporation (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evaporation System (cu. ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Net Precip. Gain(+)/Loss(-)	(2,019,249)	(1,915,919)	(1,542,674)	(1,385,932)	(1,041,770)	(719,212)	(856,212)	(1,094,554)	(1,249,666)	(1,427,099)	(1,834,640)	(1,932,516)	(17,019,443)
Excess Solution Pond													
Allowable Accum. in Excess 0	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	
Accum. into Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Recycled from Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity in Excess	0	0	0	0	0	0	0	0	0	0	0	0	
Makeup Solution Required	2,019,249	1,915,919	1,542,674	1,385,932	1,041,770	719,212	856,212	1,094,554	1,249,666	1,427,099	1,834,640	1,932,516	17,019,443
Solution to Treat/Discharge	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 17.7 Extreme Dry Year Water Balance, Hasbrouck Mine

Active Leach Area	1,520,000
Lined Pad/Ditch Collection Area (sq. ft)	8,100,000
Lined Pond Collection Area (sq. ft)	120,000
Total Leach Flow to Heap (gpm)	3,800
Evaporation System Flow (gpm)	0
Allowable Wet Season Accum. in Process Ponds (ft^3)	2,250,000
Wet Season Ore Absorption (%)	6.7
Dry Season Ore Absorption (%)	6.7
Average Annual Emitter Evap (%)	2.0
Average Annual Sprinkler Evap (%)	0.0
Ore Throughput per Year (ton)	6,387,500

Assumptions

Pond evap. equals 60% of pan evap. over 50% pond area
Idle heap evapotranspiration equals 75% of pan evap.
Maximum evapotranspiration = rainfall over idle area

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Annual**
Days in Month	31	31	30	31	30	31	31	28	31	30	31	30	365
Precipitation (in)	0.20	0.00	0.10	0.45	0.16	0.10	0.20	0.10	0.22	0.15	0.09	0.05	1.81
Pan Evaporation (in)	17.71	15.66	11.17	6.79	2.94	0.00	0.00	3.84	7.26	10.09	13.64	16.09	105
Emitter Evap. (%)	4.0	3.6	2.5	1.5	0.7	0.0	0.0	0.9	1.7	2.3	3.1	3.7	2.0
Sprinkler Evap. (%)													
Idle Heap Evapotrans. Area (sq. ft)	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000	6,580,000
Idle Heap Evapotrans. (in)	13.3	11.7	8.4	5.1	2.2	0.0	0.0	2.9	5.4	7.6	10.2	12.1	79
Ore Placed on Pad (tons)	542,500	542,500	525,000	542,500	525,000	542,500	542,500	490,000	542,500	525,000	542,500	525,000	6,387,500
Precip. Collected (cu.ft)	137,000	0	68,500	308,250	106,175	68,500	137,000	68,500	150,700	102,750	58,225	34,250	1,239,850
Ore Absorption (cu. ft)	1,164,462	1,164,462	1,126,899	1,164,462	1,126,899	1,164,462	1,164,462	1,051,772	1,164,462	1,126,899	1,164,462	1,126,899	13,710,603
Emitter Evap. (cu. ft)	916,287	810,223	559,275	351,304	147,204	0	0	179,449	375,621	505,200	705,711	805,617	5,355,890
Sprinkler Evap. (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotrans. (cu. ft)	109,667	0	54,833	246,750	84,992	0	0	54,833	120,633	82,250	46,608	27,417	827,983
Pond Evaporation (cu. ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Evaporation System (cu. ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Net Precip. Gain(+)/Loss(-)	(2,053,416)	(1,974,685)	(1,672,507)	(1,454,266)	(1,252,920)	(1,095,962)	(1,027,462)	(1,217,554)	(1,510,016)	(1,611,599)	(1,858,557)	(1,925,682)	(18,654,627)
Excess Solution Pond													
Allowable Accum. in Excess 0	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	
Accum. into Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Recycled from Excess	0	0	0	0	0	0	0	0	0	0	0	0	0
Quantity in Excess	0	0	0	0	0	0	0	0	0	0	0	0	
Makeup Solution Required	2,053,416	1,974,685	1,672,507	1,454,266	1,252,920	1,095,962	1,027,462	1,217,554	1,510,016	1,611,599	1,858,557	1,925,682	18,654,627
Solution to Treat/Discharge	0	0	0	0	0	0	0	0	0	0	0	0	0

17.2.13 Hasbrouck Adsorption

The adsorption facility at the Hasbrouck Mine will consist of a single train of 5 up-flow, open-top CICs. The columns will be capable of holding 7 tons of carbon each, providing a CIC process inventory of 35 tons of carbon.

Pregnant solution will be pumped to the carbon adsorption feed tank of the CICs at a nominal flow rate of 3,800 gpm. A magnetic flow meter and a wire sampler will be installed on the feed to the CICs to allow the calculation of total gold ounces fed to the carbon columns.

Pregnant solution will flow by gravity through the set of 5 columns, exiting the last, lowest, adsorption column as barren solution. Barren solution from the last carbon column will be continuously sampled by a wire sampler for metallurgical accounting, and then discharged to the carbon safety screen to recover any floating carbon particles.

Underflow from the safety screen will flow by gravity to the barren solution tank. Any carbon recovered on the safety screen will be collected into a carbon super-sack for reuse.

The adsorption columns will operate in this fashion until the carbon contained in the first, upper, column achieves the desired precious metal loading, or the barren solution grade increases to an unacceptably high level. Loaded carbon from the first carbon adsorption column will then be pumped to a truck for transfer. Carbon in each of the lower adsorption columns will be sequentially moved up the adsorption train, counter-current to the solution flow. This will continue from carbon column 5 to carbon column 2. Once carbon has been advanced through the carbon columns, new or regenerated carbon will be pumped into column 5.

17.2.14 Hasbrouck Carbon Handling

Carbon that is loaded with gold and silver will be transferred, by truck, to the Three Hills Mine for desorption, acid washing and regeneration, as described in Sections 17.1.10.2 and 17.1.10.3. Assuming a nominal carbon advance rate of 1.7 tons of carbon per day, the kiln can reactivate 58% of the stripped carbon in each cycle. The barren, regenerated carbon and/or new attritioned carbon is then loaded back into a truck, transferred to the Hasbrouck Mine and loaded into Hasbrouck carbon column 5.

17.2.15 Hasbrouck Process Reagents Delivery, Storage and Consumption Estimates

The proposed Hasbrouck Mine site will include storage for sodium cyanide, antiscalant and cement. Reagents required for the elution process including sodium hydroxide, hydrochloric acid, carbon, fluxes and diesel fuel will be stored and consumed at the Three Hills site and are described in Section 17.1.13. Average estimated annual reagents consumption and storage capacities for Hasbrouck are shown in Table 17.8.

Table 17.8 Projected Annual Reagent Consumables, Hasbrouck

Reagent	Form	Storage Capacity	Annual Consumption
Cement	Bulk	100 tons	15,750 tons
Sodium Cyanide (30%)	Liquid Bulk Delivery Truck	12 tonsl	2,400 tons
Activated Carbon (At Three Hills)	1,100 lbs Supersacks	22 tons	30 tons
Diesel (process only) (At Three Hills)	Liquid Bulk Delivery Truck	1,791 gal	134,000 gal
Antiscalant	240 gal Liquid Tote Bins	8 totes (1,920 gal)	23,400 gal
Hydrochloric Acid (32%) (At Three Hills)	240 gal Liquid Tote Bins	6 totes (1,440 gal)	44,000 gal
Sodium Hydroxide (50%) (At Three Hills)	Liquid Bulk Delivery Truck	4,887 gal	93 tons
Silica (At Three Hills)	Dry Solid Sacks	1 ton	4.1 tons
Borax (At Three Hills)	Dry Solid Sacks	2 tons	6.6 tons
Soda Ash (At Three Hills)	Dry Solid Sacks	1 ton	2.5 tons
Niter (At Three Hills)	Dry Solid Sacks	1 ton	3.3 tons

17.2.15.1 Hasbrouck Cement

Dry Portland cement will be purchased in bulk truck loads and stored in a silo on site. A variable speed screw feeder will meter dry cement onto the pug mill feed conveyor in proportion to the tonnage of material to be agglomerated.

17.2.15.2 Hasbrouck Sodium Cyanide (“NaCN”)

NaCN will be used in the leaching and potentially in the adsorption processes.

Cyanide will be delivered in tanker trucks as a liquid at 30% concentration. Cyanide will be stored in a 8,339 gallon, steel tank. Storage capacity will be equivalent to approximately 1.8 days of NaCN usage.

17.2.15.3 Hasbrouck Carbon

Activated carbon will be used to adsorb precious metals from the leach solution in the adsorption columns. Make-up carbon is 6 x 12 mesh. Carbon will be delivered in 1,100lb supersacks. New carbon will be added to the circuit after being attritioned in the carbon attritioning tank at Three Hills. The new carbon requirement to replace fine carbon losses is projected at 54lbs per ton of carbon stripped.

17.2.15.4 Hasbrouck Antiscalant

Antiscalant agents will be used to prevent the accumulation of scale in the process solution and heap irrigation lines. Antiscalant agents are normally added to the process pump intakes, or directly into pipelines, and consumption will vary depending on the concentration of scale-forming species in the process stream. Delivery will be in liquid form in 240 gallon tote bins.

The antiscalant will be fed from the supplier tote bins into the pregnant and barren pumping systems using variable speed, chemical-metering pumps. On average, antiscalant consumption is expected to be about 65 gallons per day. The recommended minimum inventory should be 2 tote bins.

18.0 PROJECT INFRASTRUCTURE

Project infrastructure for the proposed Three Hills and Hasbrouck mines is shown conceptually on the general arrangement maps in Figure 18.1, Figure 18.2, and Figure 18.3.

18.1 Site Facilities

18.1.1 Access and Site Roads

The proposed Three Hills Mine will have two access routes: the Knapp Avenue route and the South Access Route. The Knapp Avenue route runs west from the town of Tonopah, initially on Knapp Avenue (existing blacktop), and then transitions onto Paymaster Canyon Road ("PMC") (existing gravel) at the county line. A site access road will be installed from the PMC road running parallel to the southwest edge of the HLF to the mine parking lot and security gate area. Knapp Avenue is in Nye County and is administered by Nye county. Paymaster Canyon Road is in Esmeralda County and is administered by Esmeralda county.

The second access route to Three Hills Mine, called the South Access Route, uses existing Esmeralda county gravel roads. The route involves turning west off Highway 95, some 3 miles south of Tonopah, onto an un-named county road (existing gravel), and then turning northeast onto the PMC, and then accessing the mine site via the site access road which will be installed parallel to, and south of, the HLF.

The proposed Hasbrouck Mine will be accessed via a proposed access road from U.S. Highway 95. The access road will route traffic to the parking lot and security gate area.

Turnouts from Highway 95 to the South Access Route and the Hasbrouck Mine access will be installed in consultation with and according to the requirements of the Nevada Department of Transportation.

Nye County and Esmeralda County commissions and the Town of Tonopah Board have been briefed on the project's plan for access, and have concurred subject to entering an agreement for reimbursement for costs of maintenance and repair consequent to mine traffic.

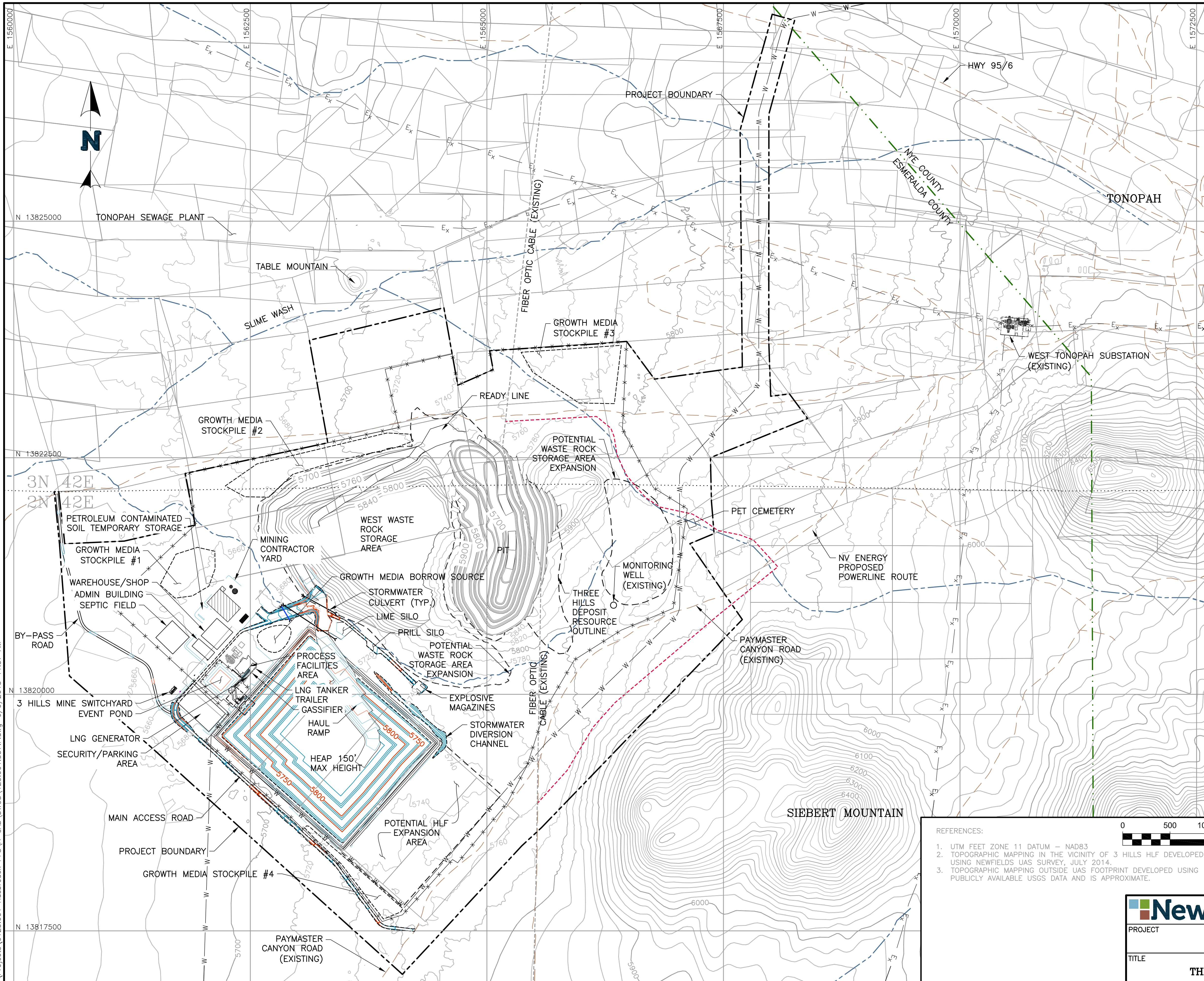
Within each site, light vehicle roads will provide access from the security gate to other areas throughout the site, including the HLF, event pond, processing facilities, administrative areas and mining contractor yard. Material deliveries for lime, prill and explosives will primarily use the light vehicle access road but will cross haul roads at the Three Hills Mine. Haul roads provide travel routes between the mine pit, waste rock storage area, mining contractor yard, and the Three Hills Mine HLF, or the Hasbrouck Mine crushing facility.

18.1.2 Security and Fencing

Both the Three Hills and Hasbrouck mines will have a main security gate allowing controlled entry and exit from each property. These gates will be unmanned, but with call boxes and video surveillance monitored by staff in the warehouse or administration buildings. Visitors' and delivery vehicle entrance will be controlled by the warehouse or administration staff. Card readers will allow company and approved contractor and visitors entrance to the sites.

Fences will be constructed around the perimeter of both sites using 3 to 4 strands of barbed wire. The pits, waste rock storage areas, heap leach facilities, haul roads, contractor yards and all other ancillary facilities will be secured areas with access controlled at the main security gates.

Internal to the sites, wildlife fencing will be installed around the event pond and pregnant and barren solution tanks. Basic chain link fencing will be used around the warehouse yard and high security fencing will be used to isolate the ADR refinery area.



LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING POWER LINE
- EXISTING DRAINAGES
- PROJECT BOUNDARY
- FIBER OPTIC ROW REALIGNMENT
- PROPOSED SECURITY FENCE
- PROPOSED WATER PIPELINE
- MINE HAZARDOUS MATERIAL STORAGE
- FUEL/OIL STORAGE
- TRUCK SHOP/WASH-DOWN AREA WITH DIRT AND OIL TRAPS
- TOWNSHIP/RANGE LINES
- 2N 42E TOWNSHIP NUMBER
- COUNTY LINE

NOTES:

1. CONSTRUCTION MATERIAL PROCESSING TO BE PERFORMED NEAR CONTRACTOR YARD.

REFERENCES:

1. UTM FEET ZONE 11 DATUM – NAD83
2. TOPOGRAPHIC MAPPING IN THE VICINITY OF 3 HILLS HLF DEVELOPED USING NEWFIELDS UAS SURVEY, JULY 2014.
3. TOPOGRAPHIC MAPPING OUTSIDE UAS FOOTPRINT DEVELOPED USING PUBLICLY AVAILABLE USGS DATA AND IS APPROXIMATE.

NewFields

CLIENT	WK MINING (USA) LTD.
PROJECT	HASBROUCK PROJECT
TITLE	THREE HILLS MINE SITE PLAN
FILENAME	125.001.537.F
FIGURE NO.	18.1
REVISION	B

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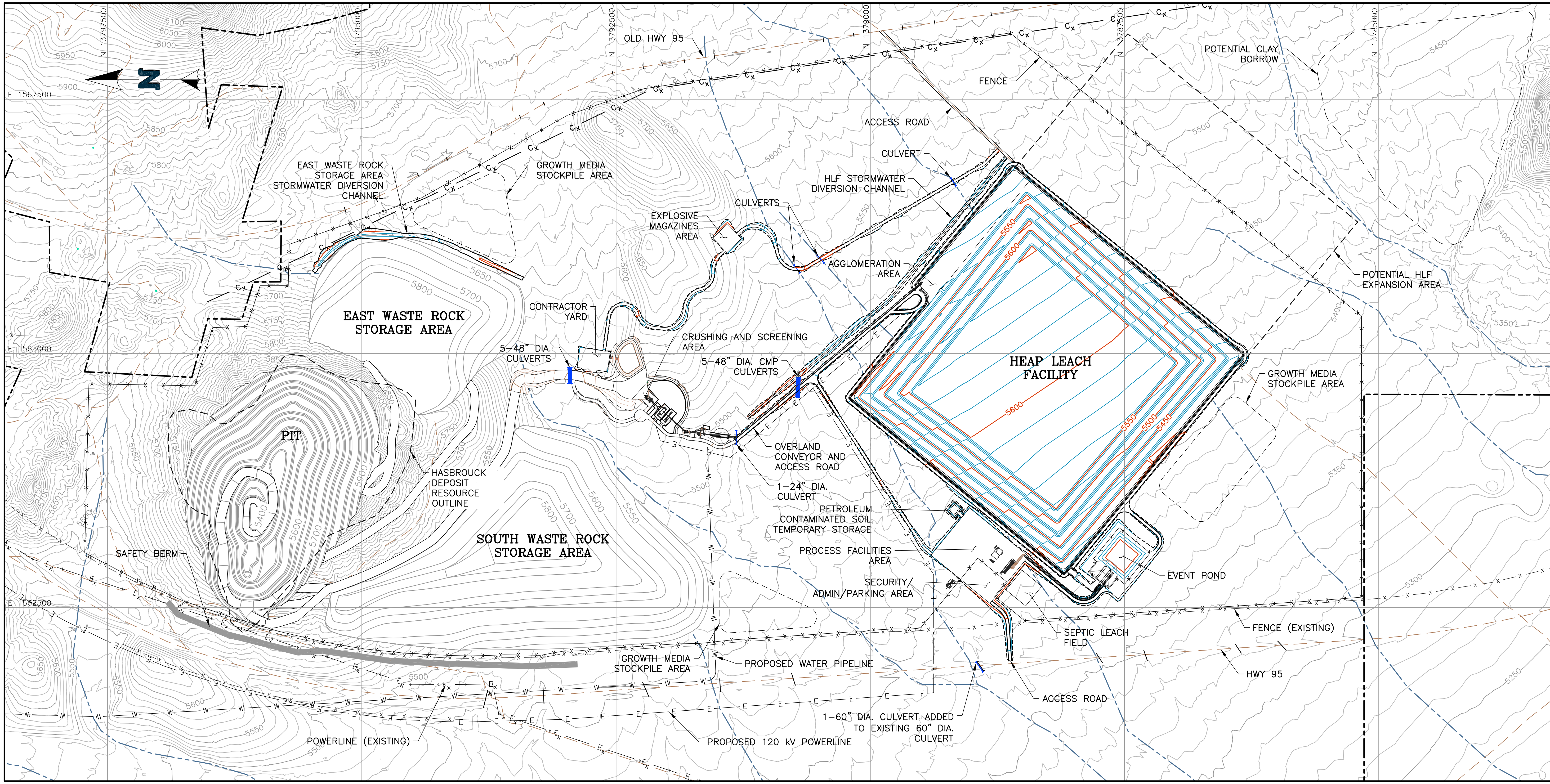

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING DRAINAGES
- PROPERTY BOUNDARY
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING POWER
- PROPOSED POWERLINE
- EXISTING FIBER OPTIC CABLE
- EXISTING CULVERT
- PROPOSED CULVERT

NOTES:

1. THE FOLLOWING FEATURES WERE PROVIDED BY MINE DEVELOPMENT ASSOCIATES:
   - MAIN WASTE ROCK STORAGE AREA
   - EAST WASTE ROCK STORAGE AREA
   - PIT
   - LONG TERM STOCKPILE
   - CONTRACTOR YARD
2. THE FOLLOWING FEATURES WERE PROVIDED BY KAPPES, CASSIDAY, & ASSOCIATES
   - CRUSHING AND SCREENING AREA
3. CONSTRUCTION MATERIAL PROCESSING TO BE PERFORMED NEAR CONTRACTOR YARD.

0 500 1000 FEET

REFERENCES:

1. UTM FEET ZONE 11 DATUM – NAD83
2. TOPOGRAPHIC MAPPING IN THE VICINITY OF 3 HILLS HLF DEVELOPED USING NEWFIELDS UAS SURVEY, JULY 2014.
3. TOPOGRAPHIC MAPPING OUTSIDE UAS FOOTPRINT DEVELOPED USING PUBLICLY AVAILABLE USGS DATA AND IS APPROXIMATE.

NewFields	CLIENT: WK MINING (USA) LTD.
PROJECT	HASBROUCK PROJECT
TITLE: HASBROUCK MINE SITE PLAN	FILENAME: 125.001.538.F; FIGURE NO.: 18.2; REVISION: B

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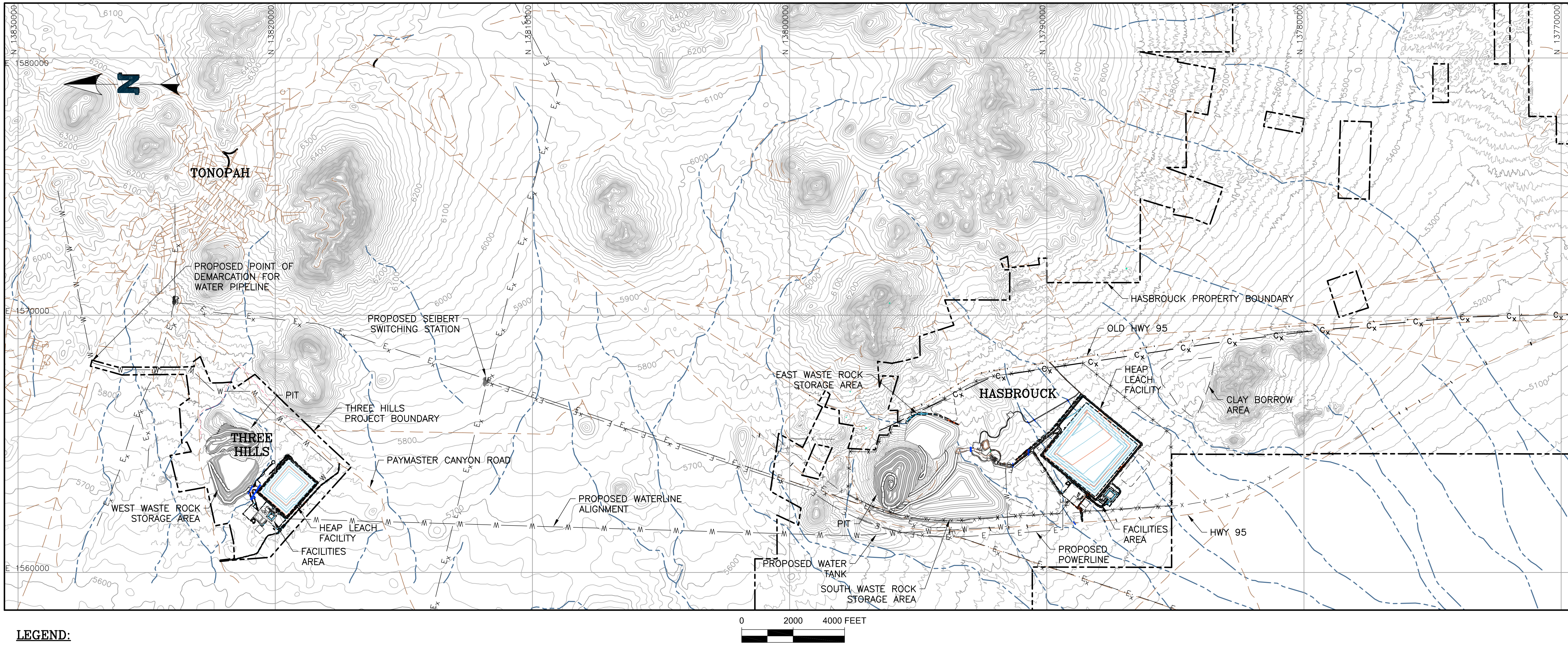


LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING DRAINAGES
- PROJECT / PROPERTY BOUNDARIES
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING POWER
- PROPOSED POWERLINE
- EXISTING FIBER OPTIC CABLE
- PROPOSED WATER PIPELINE

REFERENCES:

1. UTM FEET ZONE 11 DATUM – NAD83
2. TOPOGRAPHIC MAPPING IN THE VICINITY OF 3 HILLS HLF DEVELOPED USING NEWFIELDS UAS SURVEY, JULY 2014.
3. TOPOGRAPHIC MAPPING OUTSIDE UAS FOOTPRINT DEVELOPED USING PUBLICLY AVAILABLE USGS DATA AND IS APPROXIMATE.

NewFields	CLIENT: WK MINING (USA) LTD.
PROJECT: HASBROUCK PROJECT	
TITLE: WATERLINE ALIGNMENT PLAN	FILENAME: 125.001.539.F; FIGURE NO.: 18.3; REVISION: B

18.1.3 Water Supply

Potable water is defined in this report as water fit for human consumption, bathing, and other domestic use. It must be of drinking water quality and be delivered and stored in a system that conforms to state and federal drinking water standards. The estimated average demand for potable water at both the Three Hills and the Hasbrouck sites combined is 5 gpm.

Raw water is defined in this report as all water required by the project, other than potable water. It includes water for construction purposes, make-up water for mineral processing, water for dust control on mine roads and ore processing, and other sundry non-potable uses. Raw water is not required to meet potable water standards. The average rate of raw water that will be required at each mine is 500 gpm, with a requested service from Tonopah Public Utilities of 750 gpm average and 1,500 gpm for 2 hours for fire-fighting at Three Hills Mine.

Water for the project is planned to be obtained from the Tonopah Public Utilities ("TPU"); this will be of potable quality and thus will meet the potable water needs, as well as the raw water needs. TPU has voiced interest in selling water to the project and has the legal right to do so. While further engineering work is required to define the modifications to TPU infrastructure that will be needed, preliminary analysis of the existing water rights, ground water availability, and infrastructure support TPU's position that it can meet the project's raw and potable water requirements.

TPU's interest and ability to supply water to the project is supported by the January, 2015 TPU Water System Master Plan, together with pump tests performed at the end of 2014 on TPU wells #9 and #10 in Ralston Valley as part of the recent TPU water supply and transmission system upgrade.

West Kirkland has obtained an independent legal opinion from Parsons Behle and Latimer (Reno, NV), which confirms that TPU has the right to sell water to both mines comprising the project.

Tonopah has obtained water from the Rye Patch well field in Ralston Valley, 13 miles northeast of the town, since the early 1900s. Rye Patch has a good supply of shallow underground water, which is recharged primarily through precipitation. In 2013, TPU completed an upgrade to the town water supply and transmission system.

- construction of 2 new groundwater wells approximately 4 miles northeast of the existing Rye Patch well field;
- construction of new underground water pipeline between the 2 new groundwater wells and the existing pipeline at the Rye Patch well field;
- construction of a new access road between the existing Belmont Road and the southernmost new groundwater well;
- construction of a new overhead power line from the existing overhead power line at the Rye Patch well field to the 2 new groundwater wells;

- deactivating Well #1, Well #2, Well #3, and Well #4 at the existing Rye Patch well field;
- rehabilitating Well #5, Well #6, Well #7, and Well #8 at the existing well field;
- decommissioning and abandoning Booster Pump Station #1;
- decommissioning and abandoning a segment of the existing pipeline located between Booster Stations #1 and #2, and a segment of the existing pipeline located southwest of Booster Station #1; and,
- installing a new, larger and upgraded pipeline in place of the existing pipeline that would be decommissioned and abandoned.

18.1.4 Water Distribution

TPU will supply water to the project at a point of demarcation located on the western edge of Tonopah, immediately south of U.S. Highway 95 (Figure 18.3). From there, during the initial construction phase a buried HDPE pipeline will be installed which will run to the Three Hills Mine. During the Hasbrouck Mine construction phase a buried HDPE pipeline will be installed between Three Hills Mine to Hasbrouck Mine to meet the water required for construction and mining operations there (end of Year 1). A 350,000 gallon water supply tank will be installed near the Hasbrouck site to serve as a header tank and as a fire water storage tank.

The chosen route for the water pipeline from the TPU Point of Demarcation to the Three Hills Mine will require the consent of three landowners whose land it will cross, as well as from the Bureau of Land Management ("BLM") for where it crosses public land. The three landowners have provided written, though not legally binding, agreements for the installation of a water pipeline on their land. Approval from the BLM for the installation of a pipeline on public land will come as part of the Three Hills Mine approval required under the National Environmental Protection Act. Alternate routes for the pipeline exist and will be used should agreement for the chosen route not be achieved with the landowners involved.

The water pipeline between the Three Hills Mine and the Hasbrouck Mine, and the associated water storage tank, will be on public land and approval for their installation will be obtained as part of the approval to construct the Hasbrouck Mine required under the national Environmental Protection Act.

Should it not prove possible or economic to obtain water from TPU, raw water and potable water will be sourced from a well or wells installed next to each deposit. This would involve obtaining a water right to appropriate groundwater, which might either be a new water right issued by the state engineer on application, or be by purchase or lease of an existing water right. Water rights for this option have been applied for in 2014 and are currently under review by the state engineer.

18.1.5 Fire Water

Sources of fire-fighting water for both the Three Hills and Hasbrouck mines will be the raw and potable water expected to be supplied from TPU, or from the alternate ground water source. The water transmission system supplying the Three Hills Mine will be designed to meet the pressure and volume requirements to meet fire codes. Similarly, at the Hasbrouck Mine the water transmission system from the water storage tank to the mine will be designed to meet the pressure and volume requirements to meet fire codes. Based on the current building sizing and construction, the required fire-fighting water requirement is estimated at 1,500 gpm for 2 hours with a minimum pressure of 20 psi. At both sites, to ensure the flow, volume, and pressure requirements of the fire-fighting source are met, other drains on the system will be shut off in the event of a fire.

A fire suppression water system will be installed at each mine to provide service to the buildings. Fire protection water will feed from the fresh water storage tank. Fire hydrants will be placed at regular intervals around the buildings. An agreement will be entered into with the nearby Town of Tonopah Fire Department for fire- fighting services. Light vehicles will carry a small water supply or a fire extinguisher in order to control fires generated by exhaust or catalytic converters.

A fire alarm system will be installed in the administrative building, laboratory, warehouse, plant maintenance shop, truck shop, and ADR building. This system will be used to initiate evacuations and alert personnel of an emergency situation.

Fire extinguishers will be placed in buildings, in equipment storage yards, in vehicles, and in heavy equipment as required by MSHA. Fire extinguishers will be of the type required to address the reasonably anticipated class of fire at a given location. Fire extinguishers will be serviced regularly to ensure their proper functioning. Employees will be trained in the use of hand-held fire extinguishers and alarm systems. Locations and proper use of fire extinguishers will be reviewed with personnel on an annual basis, at a minimum, and upon assignment for new personnel.

18.1.6 Fuel Handling Facility

A fuel storage depot will be located at the contractor yard. It will include separate diesel aboveground tanks for fueling of light/intermediate and heavy vehicles. Gasoline will be obtained either from filling stations in the Town of Tonopah, or from a tank in the fuel storage depot at the contractor yard. Spill containment will be designed for 110 percent of the largest tank or tanker within the containment. Fuel will be delivered via highway-legal trucks directly to the depot. Drivers off-loading fuel will be certified and trained. Camlock fittings or other appropriate fittings will be located within the containment to collect spilled fuels. A sump will be located a one end of the containment so that spilled fuels can be pumped from the containment, using a portable pump, for appropriate disposal.

18.1.7 First Aid and Emergency Preparedness

First aid kits will be maintained in the administration building, truck shop, laboratory, process building, warehouse, and safety/security building, in addition to vehicles and heavy equipment as required by MSHA. Personnel will be trained and certified in CPR and basic first aid on an annual basis.

In the event of an emergency on site, responding mine personnel will first contact external emergency services via two-way radios installed in vehicles and heavy equipment or by cell phone. Once the emergency has been stabilized, the Sheriff's Department and additional regulatory agencies will be contacted as required. Fire and medical emergencies will be responded to by emergency services located in Tonopah.

Fire response is within the jurisdictional boundaries of the BLM, Esmeralda County, and the Town of Tonopah; therefore, these three agencies will likely be the first external responders to an emergency. The closest major medical center to both mines is the Nye Regional Medical Centre in Tonopah, approximately 5 road miles from the Hasbrouck Mine and 2 road miles from the Three Hills Mine. This has an emergency room and emergency medical personnel. lf immediate care is necessary that cannot be provided at the Nye Regional Medical Center, the Med Air Ambulance program out of Las Vegas, Nevada is equipped to provide rapid air transportation of critically injured/ill persons.

Emergency contact information for site personnel, first responders, medical care, and local and federal agencies will be provided at each mine site.

18.1.8 Communications

Both mine sites have good cellular telephone coverage. Voice and data communication at the Three Hills Mine will be either via a cable or satellite, and at the Hasbrouck Mine via satellite.

On-site communications will be by cellular telephone and two-way radio. A separate radio frequency will be established for emergency use, and emergency response and communication protocols will be established.

18.1.9 Transportation

Transportation of materials, equipment, and personnel to and from the mines will be by road-going vehicles. On-site transportation will be trucks of various types.

18.1.10 Buildings

Buildings required for the Hasbrouck project include administration, safety, mine operations, warehouse and laydown area, assay lab, process buildings, and ADR maintenance shop.

The administration building will be a double- or triple-wide office trailer with sufficient room for up to 8 offices and one conference room, as well as a first aid clinic. A second trailer approximately the same size will be used for mine operations personnel to house the mining supervision, engineering, and geology departments. A third trailer, about half of the size, will be used for safety and training facilities. Each of the buildings will be placed in service with electrical, water, and leach field sewage.

All three of these office trailers will be located at the Three Hills Mine at the beginning of operations. It is envisioned that some or all of these buildings will be relocated to Hasbrouck once operations have transitioned away from Three Hills.

18.1.10.1 Three Hills Process Area Buildings

The warehouse and laydown area, assay laboratory, and process buildings were evaluated by KCA.

Assay Lab A full service laboratory facility will be present at the Three Hills Mine site. The laboratory is housed in a sprung-structure building that is oval shaped and approximately 102ft L x 60ft W. The laboratory is broken into four sections for sample preparation, fire assay, metallurgical testing and a wet laboratory area. The laboratory also includes office space and a restroom. The laboratory is sized to process 100 solid samples per day and 150 solution samples per day.

Reagents Storage Building The reagents storage building (pre-fabricated steel roof with fencing) will be 1500 ft^2. The facility is divided into three sections with storage for carbon, hydrochloric acid, antiscalant, and other dry reagents such as fluxes.

ADR Plant and Refinery The ADR plant will be housed in a multi-sectional, pre-engineered, steel building with the main section (ADR) approximately 145ft L x 42ft W x 44ft eave height. An additional pre-engineered section approximately 14ft L x 25ft W x 20ft H for the caustic area will be attached to the ADR section. The refinery will be approximately 79.5ft L x 44.5ft W x 22.75ft H and will share a wall with the ADR building. The refinery will be constructed of concrete masonry units (“CMU”) walls with a lightweight concrete roof. The main section of the ADR facility will contain the regeneration kiln and carbon handling system, the acid wash and stripping vessel, the strip heating system, and an insulated holding tank. The secure refinery area will contain the electrowinning cells, mercury retort, flux mixing, slag granulation and the fuel-oil fired smelting furnace.

The refinery area will contain a safe which will be secured. The safe will be secured to the concrete structure of the refinery. A concrete slab measuring approximately 29ft L x 15.5ft W with a 10ft cyclone fence and lockable gates will be constructed adjacent to the refinery main door. This area will allow materials to move in and out of the refinery area without compromising security. Security cameras will be installed at strategic locations, connected to remote monitors and recorders.

A dual level office/facilities complex measuring approximately 29ft L x 29ft W x 22.5ft H will be adjacent to the refinery and ADR building. The building will contain a restroom and changing room facilities, a lunch/conference room, offices and a security area.

18.1.10.2 Three Hills Process Maintenance Shop and Warehouse

The process shop and warehouse at Three Hills will be a 2,900 ft^2, pre-engineered, steel building and located near the ADR plant. The process shop will have a main work area for repairs and maintenance, and also includes warehouse space for spare parts and necessary equipment. A bridge crane will span half the building to ease maintenance. There will be a fenced laydown area to store larger spare parts.

18.1.10.3 Hasbrouck Process Maintenance Shop and Warehouse

The process shop and warehouse at Hasbrouck will be a 3,430 ft^2, pre-engineered, steel building located near the CIC circuit. The Hasbrouck process shop will have a main work area for repairs and maintenance, such as for equipment for the crushing plant and CIC circuit, and also includes an office area, tool room and warehouse space for spare parts and necessary equipment. There will be a fenced laydown area to store larger spare parts.

18.1.11 Explosive Storage and Handling

Explosives and blasting agents will be purchased, transported, handled, stored, and used in accordance with the Bureau of Alcohol, Tobacco, Firearms, and Explosives ("BATFE"), Department of Homeland Security ("DHS") provisions, and MSHA regulations. Blasting will be done using ANFO as the primary blasting agent. Boosters and blasting caps will be used to initiate the ANFO in each hole. Ammonium nitrate prill will be stored in a silo in a secure area and mixed with diesel to produce ANFO in specialized explosive trucks. These trucks will deliver the product to the active mining bench as required for blasting.

Conceptual locations are shown in Figure 18.1 and Figure 18.2.

18.2 Electrical Power Supply and Distribution

Electrical power for Three Hills will be provided by a liquefied natural gas ("LNG") generator located on site. Electrical power for the Hasbrouck Mine will be grid power supplied by NV Energy, the local electrical distributor, which has provided preliminary designs and costs for offsite electrical distribution infrastructure. KCA has provided preliminary designs and costs for onsite electrical distribution at both mines.

18.2.1 Offsite Electrical Power

Offsite electrical supply is defined as the infrastructure necessary to bring power to the fence of the mine substation at the Hasbrouck Mine.

Electrical power for Three Hills will be provided by a rented, reciprocating piston engine generator powered by Liquified Natural Gas ("LNG") as summarized in Section 18.2.2.

A preliminary design and costs for supplying electricity to the Hasbrouck Mine site have been provided by NV Energy and indicate the following:

- A 120 kV switching station ("Siebert switching station");
- Communications equipment;
- Relaying upgrades and communications additions as required at Millers and Sandia; and
- Metering at the mine site substation.

18.2.2 Three Hills Mine Onsite Electrical Power

A budget quote for renting this equipment from Aggreko, a world-leading generating equipment rental company, has been used in this study, and is based on a unit that Aggreko is currently renting to an analogous operation in Nevada. Aggreko's equipment consists of heavy-duty, spark-arrested, turbo-charged, after-cooled engines which have a purpose-built alternator and are suitable for continuous operation in harsh environments (Figure 18.4). This engine design and the use of LNG result in low emissions and little smoke in exhaust gases. Ancillary equipment consist of a trailer-mounted gasifier and a trailer-mounted LNG tank.

Figure 18.4 Example of LNG Powered Reciprocating Piston Engine Generator

At the Three Hills mine site the estimated attached load for the water supply system, process plant including the reagents area, laboratory, and ancillary equipment will be 1.4MW, with an average draw of 0.9MW during the first two years of mine life when the mine and heap leach will be in operation (Table 18.1). The connected load and average draw during years 3 to 8, when there will be no mining or heap leach operations, but the ADR plant will be in operation, are 0.7MW and 0.4MW, respectively (Table 18.2).

Table 18.1 Three Hills Heap Leach and Process Facilities Power

Area	Attached Power kW	Peak Power kW	Average Power kW	kWh/year	kWh/ton Ore
Water Distribution	150	113	56	472,500	0.090
Heap Leach & Solution Handling	526	436	428	3,246,107	0.618
Adsorption	5	4	4	3,995	0.001
Acid Wash & Elution	31	25	24	83,036	0.016
Carbon Handling & Regeneration	67	56	53	182,597	0.035
Electrowinning & Refining	215	164	160	671,250	0.128
Reagents	7	6	5	8,069	0.002
Laboratory	234	175	108	824,067	0.157
Ancillaries	194	150	82	544,480	0.104
Total	**1,428**	**1,128**	**921**	**6,036,101**	**1.150**

Table 18.2 Three Hills Heap Leach and Process Facilities Power – Years 3 to 8

Area	Attached Power kW	Peak Power kW	Average Power kW	kWh/ year	kWh/ton Ore
Acid Wash & Elution (At Three Hills)	31	25	24	85,354	0.016
Carbon Handling & Regeneration (At Three Hills)	67	56	53	187,814	0.035
Electrowinning & Refining (At Three Hills)	215	164	160	690,429	0.128
Reagents (At Three Hills)	4	3	2	21,481	0.004
Laboratory (At Three Hills)	234	175	113	847,612	0.157
Ancillaries (At Three Hills)	194	145	73	313,470	0.058
Subtotal at Three Hills Mine Site	**744**	**568**	**425**	**2,146,159**	**0.397**

18.2.2.1 Three Hills Backup Power

A 750kW, 480V diesel or LNG powered backup generator will be installed in the process area for emergency power for those parts of the processing system that need to run continuously, which include the process solution pumps to maintain solution circulation, certain items of small equipment within the plant, and plant lighting. A diesel or LNG fuel tank will provide a minimum of 24 hours of fuel necessary to fulfill the attached equipment power requirements.

18.2.2.2 Three Hills Onsite Electrical Distribution

Within the site, power will be routed to points of use at 4,160V via overhead power lines or at 480V. Where 4,160V is used, transformers will reduce the voltage to 480V to feed the MCC and distribution panels. The ancillary loads, i.e. lighting, instruments, etc. will be fed through small, dry-type transformers with a step down from 480V to a range of 220-127V.

The detailed engineering phase will finalize the design criteria required to construct the branch feeders onsite with respect to costs, safety, reliability, underground or overhead requirements, etc., in conformance with all applicable codes and standards.

18.2.3 Hasbrouck Mine Onsite Electrical Power

The estimated attached load for the water supply system, crushing system, conveying and stacking system, adsorption plant including the reagents area, and ancillary equipment at the Hasbrouck mine site is 5.7 MW, with an average draw of 3.7 MW. Hasbrouck operations will operate in tandem with the desorption-recovery plant at Three Hills Mine, described previously. The estimated process-area electrical power consumption by project area is depicted in Table 18.3.

Table 18.3 Hasbrouck Power For Heap Leach and Process Facilities

Area	Attached Power kW	Peak Power kW	Average Power kW	kWh/year	kWh/ton Ore
Water Supply & Distribution	267	202	144	655,149	0.121
Primary Crushing	409	284	218	1,623,149	0.301
Secondary & Tertiary Crushing	3,268	2,721	2,041	17,630,667	3.265
Conveying, Agglomeration & Stacking	1,246	1,126	845	7,298,804	1.352
Heap Leach & Solution Handling	533	404	396	1,971,363	0.365
Adsorption	5	4	4	9,390	0.002
Reagents	3	1	1	336	0.000
Ancillaries	30	26	17	71,280	0.013
Subtotal at Hasbrouck Mine Site	**5,761**	**4,768**	**3,666**	**29,260,138**	**5.419**
Acid Wash & Elution (At Three Hills)	31	25	24	85,354	0.016
Carbon Handling & Regeneration (At Three Hills)	67	56	53	187,814	0.035
Electrowinning & Refining (At Three Hills)	215	164	160	690,429	0.128
Reagents (At Three Hills)	4	3	2	21,481	0.004
Laboratory (At Three Hills)	234	175	113	847,612	0.157
Ancillaries (At Three Hills)	194	145	73	313,470	0.058
Subtotal at Three Hills Mine Site	**744**	**568**	**425**	**2,146,159**	**0.397**
Total	***6,506***	***5,335***	***4,091***	***31,406,267***	***5.816***

18.2.3.1 Hasbrouck Electrical Substation

The mine site substation will have a capacity of 8,000kVA and will consist of a single transformer with a step down from 120kV to 4,160V. It will include all protective devices, switching, instrumentation, communications, relaying, and ancillaries according to the requirements of the mine and in conformance with codes, regulations, and NV Energy standards.

18.2.3.2 Hasbrouck Backup Power

A 750kW, 480V diesel-powered backup generator will be installed in the process area for emergency power for those parts of the processing system that need to run continuously, which include the process solution pumps to maintain solution circulation, certain items of small equipment within the plant, and plant lighting. A diesel fuel tank will provide a minimum of 24 hours of fuel necessary to fulfill the attached equipment power requirements.

18.2.3.3 Hasbrouck Onsite Electrical Distribution

On-site electricity will be routed to equipment at 4,160V via overhead power lines. Transformers will reduce the voltage from 4,160V to 480V to feed the MCC(s) and distribution panels. Ancillary loads, i.e. lighting, instruments, etc. will be fed through small, dry type transformers which will step down from 480V to a range of 220-127V.

The detailed engineering phase will finalize the design criteria required to construct the branch feeders onsite with respect to costs, safety, reliability, underground or overhead requirements, etc. and always in conformance with all applicable codes and standards.

19.0 MARKET STUDIES AND CONTRACTS

No market studies have been undertaken for this project. However, the commercial products from the Hasbrouck project will be gold-silver doré. Gold-silver doré is readily sold on the global market to commercial smelters and refineries. It is reasonable to assume that doré from the Hasbrouck project will be salable.

Metal prices of $1,225 per ounce of gold and $17.50 per ounce of silver have been used in this study, based on both the approximate spot price at time of publication together with various forward two- and three-year predictions of metal prices. Table 19.1 shows the 12-month gold prices with a 12-month average currently at $1,239 per ounce of gold. The three year trailing average for gold at the time of publication of this study is $1,386 per oz of gold.

Table 19.1 Kitco Reported Monthly Gold Prices (USD/oz Au – May 2014 to April 2015)

Month / Yr	Average	High	Low	3-Yr Avg	1-Yr Avg
May-14	$ 1,288	$ 1,306	$ 1,251	$ 1,530	$ 1,301
Jun-14	$ 1,279	$ 1,319	$ 1,243	$ 1,523	$ 1,296
Jul-14	$ 1,311	$ 1,340	$ 1,285	$ 1,516	$ 1,298
Aug-14	$ 1,296	$ 1,316	$ 1,275	$ 1,503	$ 1,293
Sep-14	$ 1,239	$ 1,287	$ 1,214	$ 1,489	$ 1,284
Oct-14	$ 1,222	$ 1,250	$ 1,164	$ 1,476	$ 1,276
Nov-14	$ 1,176	$ 1,204	$ 1,142	$ 1,461	$ 1,268
Dec-14	$ 1,202	$ 1,229	$ 1,176	$ 1,448	$ 1,266
Jan-15	$ 1,252	$ 1,297	$ 1,172	$ 1,437	$ 1,267
Feb-15	$ 1,227	$ 1,273	$ 1,193	$ 1,423	$ 1,261
Mar-15	$ 1,179	$ 1,213	$ 1,147	$ 1,409	$ 1,248
Apr-15	$ 1,198	$ 1,211	$ 1,180	$ 1,397	$ 1,239

Twelve-month silver prices are shown in Table 19.2. The 12-month average silver price is $17.85 per ounce.

Table 19.2 Kitco Reported Monthly Silver Prices (USD/oz Ag – May 2014 to April 2015)

Month / Yr	Average	High	Low	3-Yr Avg	1-Yr Avg
May-14	$ 19.36	$ 19.87	$ 18.85	$ 28.00	$ 20.67
Jun-14	$ 19.78	$ 21.12	$ 18.76	$ 27.55	$ 20.56
Jul-14	$ 20.92	$ 21.50	$ 20.46	$ 27.08	$ 20.66
Aug-14	$ 19.80	$ 20.35	$ 19.32	$ 26.51	$ 20.49
Sep-14	$ 18.49	$ 19.49	$ 17.11	$ 25.97	$ 20.15
Oct-14	$ 17.19	$ 17.64	$ 16.20	$ 25.55	$ 19.76
Nov-14	$ 15.97	$ 16.66	$ 15.28	$ 25.08	$ 19.36
Dec-14	$ 16.24	$ 17.07	$ 15.71	$ 24.69	$ 19.08
Jan-15	$ 17.10	$ 18.23	$ 15.71	$ 24.31	$ 18.84
Feb-15	$ 16.84	$ 17.59	$ 16.20	$ 23.83	$ 18.51
Mar-15	$ 16.22	$ 17.14	$ 15.47	$ 23.36	$ 18.14
Apr-15	$ 16.32	$ 16.86	$ 15.83	$ 22.94	$ 17.85

West Kirkland's land obligations and contracts have been summarized in Section 4. There are no other contractual obligations attributed to the project.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

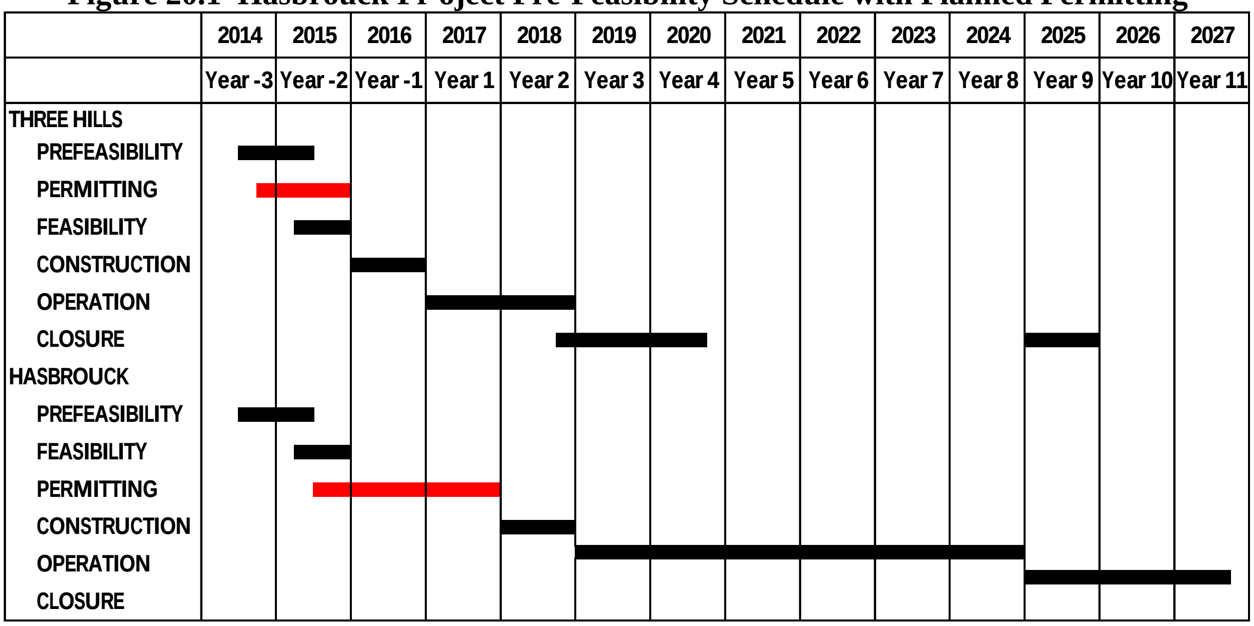
Enviroscientists Inc., an environmental permitting and government relations consultant, provided the following information on environmental considerations, permitting, and social and community impacts.

20.1 Introduction

The Hasbrouck Project, which is composed of the proposed Three Hills Mine and the proposed Hasbrouck Mine, will be permitted separately and sequentially, beginning with the proposed Three Hills Mine, followed by the proposed Hasbrouck Mine. Baseline environmental work will be carried out and permits obtained independently for each mine.

Figure 20.1 shows the anticipated schedule.

Figure 20.1 Hasbrouck Pr oject Pre-Feasibility Schedule with Planned Permitting



Mineral exploration at both the proposed Hasbrouck Mine and the proposed Three Hills Mine is authorized by the U. S. Bureau of Land Management ("BLM") under multiple Notices. Each Notice authorizes up to five acres of disturbance and is bonded with the BLM. Existing disturbances and bond amounts for each Notice are shown in Table 20.1.

Table 20.1 WK Mining (USA)'s Notices

Notice #	Disturbance Acreage	Bond Amount
NVN-91216	4.88	$ 65,450.00
NVN-89964	1.84	$ 14,033.00
NVN-89750	4.53	$ 18,758.00

WK started the process of obtaining permits necessary for construction, operation, reclamation, and closure of an open pit, heap leach mining operation at the Three Hills Mine in June, 2014. WK has recently commenced the process for obtaining permits for the Hasbrouck Mine.

In order to construct, operate, reclaim, and close mining operations at the Three Hills Mine and the Hasbrouck property, WK will be required to obtain a number of environmental and other permits from the BLM, the Nevada Division of Environmental Protection ("NDEP"), and Esmeralda County. The principal permits necessary for the mine development are:

- BLM approval for a Mine Plan of Operations ("Plan");
- Nevada Reclamation Permit ("NRP") issued by NDEP's Bureau of Mining Regulation and Reclamation ("BMRR");
- Rights-of-Way ("ROW"s) issued by the BLM;
- Water Pollution Control Permit ("WPCP") issued by the BMRR;
- Air Quality Operating Permit issued by the NDEP's Bureau of Air Pollution Control ("BAPC");
- Mercury Operating Permit issued by the BAPC;
- A road maintenance and repair agreement with Esmeralda County, and
- A road maintenance and repair agreement with Nye County..

Applications will be submitted to obtain these permits and approvals. In the case of the Plan and the NRP, there is a single application (Plan Application) that will meet the requirements of both the BLM and BMRR.

Water rights from the Nevada Division of Water Resources ("NDWR") are normally needed for a mining operation, but not in this case as the project's water requirements will be met by Tonopah Public Utilities under a service agreement.

WK will comply with applicable federal and state environmental statutes, standards, regulations, and guidelines in the permitting of the Hasbrouck project. Environmental baseline studies will be conducted at each of the two properties, and facility and infrastructure locations, to meet federal and state requirements.

The review and approval process for the Plan by the BLM constitutes a federal action under the National Environmental Policy Act ("NEPA") and BLM regulation. BLM is required to comply with NEPA and prepare either an Environmental Assessment ("EA"), or an Environmental Impact Statement ("EIS").

The following sections provide additional detailed information on the principal permits necessary to develop each property and the NEPA process, as well as the status of the WK projects relative to each permit process.

20.2 BLM Plan of Operations / BMRR Nevada Reclamation Permit

The BLM and the BMRR have implemented a process for Plan Application processing that commences prior to the submittal of the Plan Application, and continues through the review and approval process for the Plan Application. WK has submitted a Plan Application for the proposed Three Hills Mine as noted in the prior section, and will be submitting a Plan Application for the Hasbrouck property when baseline data collection in that portion of the project is complete.

20.2.1 BLM Pre-Application Planning

As part of the BLM pre-application planning process, an initial, pre-application meeting is scheduled between the proponent and the BLM to discuss the anticipated scope of the mining operation and to review the environmental resource baseline data that will likely be required for the processing of the Plan Application by the BLM. This initial meeting generally occurs one to two years prior to the submittal of the Plan, depending on the complexity of the mining operations and baseline data needs. Such a meeting between WK and the Tonopah field office of the BLM took place on October 1, 2014 for the proposed Three Hills Mine. A pre-application meeting has not yet been scheduled for the proposed Hasbrouck Mine, but is expected to take place in the second quarter of 2015.

The process for collecting baseline data generally includes developing baseline data collection work plans, which are submitted to the BLM for review and approval prior to initiating baseline data collection. Following such approval, field surveys are carried out to collect relevant baseline data. Depending on the environmental resource to be evaluated, desktop studies may be utilized in lieu of field surveys. Findings of the field surveys are then summarized in a report that documents the data collected. This report is then submitted to the BLM for review and approval. In some cases and depending on the resource being assessed, the baseline data collection process also involves the State of Nevada, particularly for geochemical and hydrological surveys.

At the proposed Three Hills Mine, the required environmental baseline data include the following: ore and waste rock geochemical characterization; hydrogeological characterization; analysis of utilizing Tonopah Public Utilities water supply; air quality modeling; botanical and wildlife surveys, including noxious weeds; socioeconomic assessment; visual assessment; cultural resources inventory; traffic study, noise study, and a blasting vibration impacts analysis. The specific baseline data needs for the proposed Hasbrouck Mine have yet to be determined, but are likely to be similar.

20.2.2 Plan of Operations Processing

The process of Plan Application involves submitting the Plan to the BLM and the BMRR for surface disturbance in excess of five acres. The single application utilizes the format of the Plan document accepted by the BLM and the BMRR. The Application describes the operational procedures for the construction, operation, and closure of the project. As required by the BLM and BMRR, the Plan Application includes a waste rock management plan, quality assurance plan, a storm water spill contingency plan, a spill prevention plan, reclamation plan, a monitoring plan, and an interim management plan. In addition, the Plan Application includes a Reclamation Cost Estimate ("RCE") for the closure of the Project. The content of the Plan is based on the mine plan design and the data gathered as part of the environmental baseline studies. The Plan includes all mine and processing design information and mining methods. The BLM determines the completeness of the Plan Application and, when the completeness letter is submitted to the proponent, the NEPA process begins. The RCE is reviewed by both agencies and the bond amount is determined prior to the BLM issuing a decision record on the Plan Application and BMRR issuing the NRP. A Plan Application for the proposed Three Hills Mine has been prepared and submitted to the BLM and the BMRR. The completeness letter from the BLM was issued on May 5, 2015.

The Plan Application will be submitted for the proposed Hasbrouck Mine when operational and baseline surveys are complete and operations and design for the project are at a level where a Plan Application can be developed to the necessary level of detail.

20.3 National Environmental Policy Act

The NEPA process is triggered by a federal action and, in this case, the issuance of a completeness letter for the Plan will be the trigger for the federal action. The NEPA review process is completed by either an EA or an EIS.

20.3.1 Environmental Assessment Process

The EA process is conducted in accordance with NEPA regulations (40 CFR 1500 et. seq.), BLM guidelines for implementing the NEPA in BLM Handbook H-1790-1 (updated January 2008), and BLM Washington Office Bulletin 94-310. The intent of the EA is to assess the direct, indirect, residual, and cumulative effects of the proposed project, and to determine the significance of those effects. Scoping is conducted by the BLM and includes a determination of the environmental resources to be analyzed in the EA, as well as the degree of analysis for each environmental resource. The scope of the cumulative analysis is also addressed during the scoping process. Following scoping and baseline information collection, the EA is either prepared by the BLM, or prepared by a third party contractor for the BLM. When the BLM determines that the EA is complete, a Preliminary EA is made available to the public for review. Comments received from the public will be incorporated into a Final EA, or included in the decision record and Finding of No Significant Impacts.
For the proposed Three Hills Mine the BLM held their internal NEPA kick-off meeting on April 30, 2015 and determined that the preparation of an EA was the appropriate approach to comply with NEPA.

20.3.2 Environmental Impact Statement Process

The EIS process is conducted in accordance with NEPA regulations (40 CFR 1500 et. seq.), BLM guidelines for implementing the NEPA in BLM Handbook H-1790-1 (updated January 2008), and BLM Washington Office Bulletin 94-310. The intent of the EIS is to assess the direct, indirect, residual, and cumulative effects of the project and to determine the significance of those effects. Scoping is conducted by the BLM and includes a determination of the environmental resources to be analyzed in the EIS, as well as the degree of analysis for each environmental resource. The scope of the cumulative analysis is also addressed during the scoping process. Following scoping and baseline information collection, a Draft EIS is prepared for the BLM by a third party contractor. When the BLM determines the Draft EIS is complete, it is submitted to the public for review. Comments received from the public are incorporated into a Final EIS, which is in turn be reviewed by the BLM and the public prior to a record of decision ("ROD"). Under an EIS there can be significant impacts. The preparation of an EIS is a lengthier and more expensive process than an EA. The project proponent pays for the third party contractor to prepare the EIS, and also pays recovery costs to the BLM for any work on the project by BLM specialists.

For the proposed Hasbrouck Mine it is expected that the BLM will require the preparation of an EIS to comply with NEPA for this project.

20.4 State of Nevada Permits

As listed above, there are a number of environmental permits issued by the NDEP that are necessary to develop the Three Hills Mine and the Hasbrouck Mine. The NDEP issues permits that address water and air pollution, as well as land reclamation. The NDWR issues water rights for the use of water at a project. Water for this project is planned to be obtained from Tonopah Public Utilities and, as such, water rights will not be necessary.

20.4.1 Water Pollution Control Permit

A WPCP must be procured from the BMRR to construct, operate, and close a mining facility in the State of Nevada. The contents of the application are prescribed in the Nevada Administrative Code Section 445A.394 through 445A.399. A WPCP application will be prepared for both the proposed Three Hills and Hasbrouck mines, and will be based on the following:

- Open pit mining, with no anticipated pit lake formation;
- Storage of non-acid generating waste rock;
- Heap leaching with associated process water tanks and event ponds;
- Adsorbtion-Desorption-Recovery (ADR) processing;
- Refining;
- Exploration;
- A water supply pipeline, associated water delivery pipelines, and power;
- A power substation and distribution system;
- Access and haul roads; and
- Ancillary facilities that include storm water diversions, sediment control basins, reagent and fuel storage, fresh water storage, monitoring wells, meteorological station, and solid and hazardous waste management facilities.

WPCP applications are to include an engineering design for waste rock storage areas and heap leach facilities, waste rock characterization reports, hydrogeological summary reports, engineering design for process components, including methods for the control of storm water runoff, and containment reports detailing specifications for containment of process fluids. Applications are also to contain the appropriate WPCP plans, including a process fluid management plan, a monitoring plan, an emergency response plan, a temporary closure plan, and a tentative plan for permanent closure of the mine.

20.4.2 Air Quality Operating Permit

The proposed Three Hills Mine will require a Class I Operating Permit to Construct (OPTC), because the mining plan for this property includes components that have the potential to emit mercury. The proposed Hasbrouck Mine will require a Class II Air Quality Operating Permit (AQOP), because no mercury emitting components are planned for that property and it is assumed the emissions would be less than Class I standards. Applications for these permits will be made using BAPC forms. Each application will include a description of each facility, a detailed emission inventory, and air quality modeling. Applications will also include locations, plot plans, and process flow diagrams.

The BAPC issues an initial completeness determination within 30 days of receiving the permit application for the Class I OPTC (ten days for the Class II AQOP), and any deficiencies in the application are addressed at that point. The BAPC then performs a technical review of the application and when complete, issues a draft permit. This permit is reviewed by the operator and, if deemed acceptable for operations, a final permit is issued. The permit issuance process is between six and nine months.

This process will be followed when permitting the proposed Three Hills and Hasbrouck Mines.

20.4.3 Mercury Operating Permit

Application for this permit is made using BAPC forms, and includes a description of each facility, a detailed emission inventory, and a maximum achievable control technology (MACT) assessment. The application will also include locations, plot plans, and process flow diagrams.

The BAPC issues an initial completeness determination within 30 days of receiving the permit application, and any deficiencies in the application are addressed at that point. The BAPC then performs a technical review of the application and, when complete, issues a draft permit. This permit is reviewed by the operator and, if deemed acceptable for operations, a final permit is issued. The permit issuance process is between six and nine months.

This process will be followed when permitting the proposed Three Hills Mine; the proposed Hasbrouck Mine will not require a Mercury Operating Permit to Construct (MOPTC).

20.5 Esmeralda County

An agreement with the Esmeralda County Board of County Commissioners will be necessary for the maintenance of the county roads. At the time of writing, negotiations between West

Kirkland and Esmeralda County are progressing amicably and no obstacles are anticipated in entering Esmeralda County's standard form of agreement.

20.6 Nye County

An agreement with the Nye County Board of County Commissioners will be necessary for the maintenance of Knapp Avenue, being one of two access routes to the proposed Three Hills Mine. At the time of writing, negotiations between West Kirkland and Nye County are progressing amicably and no obstacles are anticipated in entering Nye County's standard form of agreement.

20.7 Other Permits

In addition to the principal environmental permits outlined above, the following table lists other notifications or ministerial permits that will likely be necessary to operate the proposed Three Hills and Hasbrouck mines.

Table 20.2 Ministerial Permits, Plans, and Notifications

Notification/Permit	Agency	Timeframe	Comments
Mine Registry	Nevada Division of Minerals	30 days after mine operations begin	
Mine Opening Notification	State Inspector of Mines	Before mine operations begin	
Solid Waste Landfill	Nevada Bureau of Waste Management	180 days prior to landfill operations	
Hazardous Waste Management Permit	Nevada Bureau of Waste Management	Prior to the management or recycling of hazardous waste	
General Storm Water Permit	Nevada Bureau of Water Pollution Control	Prior to construction activities	
Hazardous Materials Permit	State Fire Marshall	30 days after the start of operations	
Fire and Life Safety	State Fire Marshall	Prior to construction	
Explosives Permit	Bureau of Alcohol, Tobacco, and Firearms	Prior to purchasing explosives	Mining contractor may be responsible for permit
Mine Identification Number	Mine Safety and Health Administration	Prior to start-up	
Notification of Commencement of Operation	Mine Safety and Health Administration	Prior to start-up	
Radio License	Federal Communications Commission	Prior to radio use	

20.8 Environmental Study Results and Known Issues

There are no known environmental issues at either property that would be expected to have a material impact on WK's ability to extract the estimated mineral resources from the proposed Three Hills Mine and the proposed Hasbrouck Mine.

For the proposed Three Hills mine, WK collected baseline data in early 2014 for environmental studies necessary for the Plan Application and permitting process. Results indicate:

- limited biological and cultural issues,
- air quality impacts appear to be within State of Nevada standards,

- traffic and noise issues are present, but at low levels, and
- socioeconomic impacts are positive.

Allied Nevada, the former owner of the properties initiated baseline data collection for the proposed Hasbrouck Mine in late 2013 and early 2014. West Kirkland collected biology and botany data at the proposed Hasbrouck Mine in May 2015.

20.9 Waste Disposal, Monitoring, Water Management

The following is based on WK's Plan Application to the BLM for the proposed Three Hills Mine. Similar measures are being developed for the proposed Hasbrouck Mine.

20.9.1 Waste Handling and Disposal

WK will institute a waste management plan that will identify the wastes generated at the site and their means of disposal. A training program will be implemented to inform employees of their responsibilities in proper waste disposal procedures. A landfill in the Project Area is not planned, and all solid wastes will be disposed off-site. Used lubricants and solvents will be characterized according to the Resource Conservation and Recovery Act (RCRA) and will be stored and disposed of appropriately. WK will have a trained response team at the site 24 hours per day to manage potential spills of regulated materials at the site. Response for transportation-related releases of regulated materials bound for the site will be the responsibility of the local and regional agencies. However, where appropriate, WK may assist with response to off-site incidents, including providing resources, based on agency requests.

20.9.1.1 Hazardous Wastes

WK may obtain a Hazardous Waste Identification Number from NDEP. The proposed Three Hills and Hasbrouck mines are expected to be in the "conditionally exempt small quantity generator" category as defined by the U.S. Environmental Protection Agency (EPA). Used solvents are the only hazardous wastes identified as potentially existing at the mines at this time.

20.9.1.2 Non-Hazardous Wastes

Used oil and coolant will be stored at the maintenance building and truck shop in secondary containment at the Three Hills and Hasbrouck sites. These will be either recycled or disposed of in accordance with state and federal regulations. Used containers will be disposed of or recycled according to federal, state, and local regulations.

20.9.1.3 Domestic Waste Disposal

Solid wastes generated by the mine and process departments at both Three Hills and Hasbrouck will be collected in dumpsters near the point of generation. Industrial solid waste will be disposed of in an off-site Class III landfill in accordance with NAC 444.731 through 444.737.

20.9.2 Waste Water (Sewage) Disposal

Sewage disposal will be handled at both sites with septic leach fields and portable toilets. Sewage drain pipes will be routed from the administrative facilities and buildings containing running water to the septic leach fields. The leach fields will be sized and permitted to accommodate the anticipated number of employees and personnel at each site. Near equipment ready-lines or other areas where running water is not available, but where toilets will be required, portable toilets will be provided and serviced by a local contractor. A septic field with the capacity to treat waste for up to 100 persons will be installed to the west of the administration and warehouse buildings at the Three Hills site.

A centralized oil-water separator will be installed adjacent to the truck shops at the Tree Hills and Hasbrouck mines to treat water from drains located at each maintenance bay and from the wash rack. The floor drains in the maintenance area will be designed to collect rainwater and snow melt from vehicles and equipment. Gray water from the oil/water separator will be collected in a tank within containment or a lined impoundment. Gray water will be recycled back to the wash system; excess water will be used for dust control. The separated oil will be stored either in a double-lined tank or a single-wall tank within a concrete containment, and collected and disposed of by a licensed waste collection contractor.

20.9.3 Waste Rock Characterization

While waste rock characterization at both deposits is ongoing, initial results indicate that ground water, rock in general, and mineralized material planned to be mined are generally non-reacting and are not acid generating. As a result, waste rock management is expected to be by random placement with only quarterly sampling of the placed materials.

20.10 Social and Community Issues

There are no known social or community issues that would materially impact on WK's ability to extract mineral resources at the Three Hills and Hasbrouck mines. Identified socioeconomic issues (employment, payroll, services and supply purchases, and tax) are anticipated to be positive. WK is in the process of negotiating a service agreement with the Tonopah Public Utilities for water supply for mining and processing at both the proposed Three Hills and Hasbrouck mines.

Some blasting at the proposed Hasbrouck Mine might require brief closures of the adjacent U.S. Highway 95. Preliminary meetings with Nevada Department of Transportation (NDOT) indicate that shutting down a highway while blasting is performed is not an unusual request and permission for this will most likely be granted..

20.11 Reclamation Plan and Mine Closure

The following is based on WK's Reclamation Plan, which is contained within WK's Plan Application to the BLM for the proposed Three Hills Mine. Similar measures are being developed for the proposed Hasbrouck Mine.

20.11.1 Reclamation

Reclamation of disturbed areas resulting from activities outlined in the Reclamation Plan will be completed in accordance with BLM and NDEP regulations. The areas proposed for disturbance can be divided into the following: open pit; waste rock storage areas; heap leach facility; borrow areas; growth media stockpiles; haul roads; buildings and yard areas; process plant; administration; laboratory; and ancillary facilities. WK anticipates that, with the exception of the open pit, surface mine components will be reclaimed and revegetated.

It is not considered feasible to reclaim the slopes of the open pit when mining is complete, due to a number of factors including pit wall stability and geology, topography of the final pit configuration, potential adverse effects to the environment associated with the activities required for reclamation, and maintaining access to mineral resources. WK is seeking exemption from NDEP BMRR under NAC519A.250 for reclamation of the slopes of the open pit.

The final grading plan for the Project is designed in part to minimize the visual impacts of the disturbance proposed by WK. Slopes will be recontoured with standard construction mine equipment (i.e., dozers, trucks, loaders, scrapers) to blend with surrounding topography, interrupt straight-line features and facilitate revegetation where practicable. Where feasible, large constructed topographic features such as waste rock storage areas, may be arranged to have rounded crests and variable slope angles to resemble natural landforms.

Reclaimed surfaces will be re-vegetated to control runoff, minimize erosion, provide forage for wildlife and livestock, and reduce visual impacts. Seed will be applied with either a rangeland drill or with a mechanical broadcaster and harrow, depending upon accessibility. Seedbed preparation and seeding will take place in the fall after grading and top-soiling of reclaimed areas.

20.11.1.1 Central Operating Area (Administration, HLF, and Process)

During final mine closure, buildings and structures will likely be dismantled and materials will be salvaged or removed to an authorized landfill. Concrete foundations and slabs will be broken using a track-hoe mounted hydraulic hammer or similar methods and buried in place under approximately 3ft of material in such a manner to prevent ponding and to allow vegetation growth. After demolition and salvage operations are complete, the disturbed areas will be covered with approximately 12in of growth media and revegetated. Alternatively, buildings and structures may be left on private land in support of other industrial or commercial, post-mining land uses.

All reagents and explosives will be removed or appropriately disposed of. Any surface pipelines will be removed and salvaged or disposed of. Underground pipeline ends will be capped and left in place. Unneeded utility poles will be cut off at ground level and removed.

HLF

The leach pad will be recontoured to an average final slope configuration not steeper than 3H:1V to provide for long-term mass stability. The toe of the recontoured slope will be inside the lined facility, and subsequently placed cover material will direct surface runoff away from the lined area of the pad. Recontoured sideslopes will include slope breaks horizontally along contour approximately every 100 vertical feet. Slope breaks will be small flat benches up to 20ft wide and blended into the slopes. The toe and crest of the facility will also be rounded to blend into the adjacent slopes. Minimizing the total continuous slope length with benches, and rounding the toe and crests, will help to limit erosion until vegetation is established.

Growth media will be hauled to the heap leach surfaces from growth media stockpiles and to the borrow areas located near the facility. The cover for the heap leach pad will generally be designed to accomplish the following;

- Limit infiltration of meteoric water;
- Isolate process materials from storm water runoff;
- Limit erosion; and
- Support successful revegetation.

20.11.1.2 Mine Pits

Operational and post-closure open pit slope configurations will be controlled by several parameters that include the geometry of the ore body, geologic and geotechnical characteristics of the host rock, equipment constraints, and safe operating practices. The open pit walls will be too steep to allow soil replacement and revegetation due to access logistics and safety concerns. Open pit ramps will be barricaded to prevent entry by the public. The open pit floor and ramps are expected to be competent rock surfaces that will be stable without reclamation. These areas have little or no potential to support vegetation. There are no plans to re-vegetate the open pit.

During final reclamation, a physical barrier (e.g., berms, fencing, or other appropriate barriers) will be installed along the open pit crest areas to control access by people, livestock, and large wildlife. Reclamation of the open pits will include construction of a physical perimeter barricade to prevent vehicular access, and deter livestock. Post-mining modifications of open pit walls to decrease slope angles are not proposed.

20.11.1.3 Mine Waste Dumps

Waste rock storage areas will be reclaimed to meet certain general objectives including the following: minimized slope erosion, mass stability, rounded edges, revegetated surfaces, and rates of soil loss consistent with the surrounding topographic features. The final slopes of the reclaimed waste rock storages area will vary, with slopes of 3H:1V or shallower, up to 100ft high benches, and 20ft wide benches to reduce surface water flow velocities and erosion. Reclamation of the waste rock storage areas will be conducted concurrently with regular mine operations to the extent reasonable. It is anticipated that the waste rock storage areas will be constructed in multiple lifts with setbacks between lifts that will facilitate final grading. As areas of the waste storage area reach their ultimate configurations and become inactive during the active mining phase, the storage area face will be recontoured. Once recontoured, surfaces will be covered with approximately 12in of stockpiled salvaged growth media and seeded.

20.11.1.4 Roads

Roads without a defined post-mining use will be reclaimed concurrent with mining operations as they become no longer needed. Where the original topography exceeds 3H:1V, road cuts will be filled with road bed material to blend with existing topography and to ensure no steeper than 3H:1V slopes, except where located generally in bedrock. There are no planned asphalt roads or parking areas. Roads and safety berms will be recontoured or re-graded to approximate original contour. Where the road is located on fill, the side slopes will be rounded and re-graded to 2.5H:1V. Finished slopes will be generally similar in character to the surrounding topography. Compacted road surfaces will be ripped, covered with growth media from the safety berms or road fill, and revegetated.

Certain access roads will be needed after mine closure to access monitoring points. As monitoring is completed and the facility is considered to be finally closed, such access roads will be reclaimed.

As determined by the BLM, roads on public lands suitable for public access, or which continue to provide public access consistent with pre-mining conditions, will not be reclaimed at mine closure. Narrow access roads may remain on large haul roads after they have been re-contoured and seeded.

20.11.2 Closure Activities

Reclamation and site closure activities shall be performed in accordance with the final NRP and WPCP for the proposed Three Hills Mine and Hasbrouck Mine, as summarized in the following sections.

20.11.2.1 Slope Stabilization

Slope stability analyses on the waste rock storage areas were performed using industry practices and experience from similar projects. Where possible, the outside areas of the final waste rock storage areas will be constructed such that variable topography will be achieved during reclamation re-contouring.

The walls of the open pit will generally have an overall slope of 35º to 45º.

20.11.2.2 Final Engineering and Monitoring Plans

WK will adhere to BMP and BMRR requirements for procedures relating to post reclamation monitoring. Standards for monitoring will be met per the requirements established by BMRR in the WPCP. Post reclamation monitoring and maintenance will include the following:

- Following mine closure, berm and sign maintenance, site inspections, and any other necessary monitoring for the period of reclamation responsibility will be conducted. Monitoring of re-vegetation success will be conducted annually until the re-vegetation standards have been met and will include noxious weed monitoring and abatement as necessary.
- WK will monitor heap-leach pad flow and chemistry. Mitigation will be developed if necessary. Post-mining ground water quality will be monitored for 5 years according to the requirements established by the NDEP upon approval of the WPCP with the goal of demonstrating the site poses no potential to degrade waters of the state through the successful implementation of the detailed Final Plan for Permanent Closure.
- Re-vegetation monitoring will be conducted for a minimum of five years following implementation of re-vegetation activities or until re-vegetation success has been achieved. Re-vegetation monitoring will occur based on seasonal growth patterns, precipitation, and weather conditions.
- Noxious weed monitoring and control will be implemented for a five-year period following closure.

20.11.2.3 Heap Rinsing and Neutralization

Drain down of residual pore water within the HLFs will continue for several years after closure. Immediately upon the onset of closure, the drain down flow rate will be near the operational flow rate. The drain down rate will eventually reach a steady state condition which will be a function of the infiltration of meteoric water through the cover. Reaching the steady state condition will take several years; however it is anticipated that lower flows that can be handled with a passive type of system within a few years after the end of operations at each HLF. Between the end of operations and conversion to a passive system, drain down will be removed through active evaporation methods. This involves using sprayers and open pond evaporation as necessary to remove fluid from the system. When drain down rates reach a low enough level, flows will be managed by a passive system.

Monitoring wells around the heap leach facility will be maintained until WK is released from this requirement by the NDEP. These wells will then be plugged and abandoned according to the requirements of the State Engineer.

20.11.2.4 Ponds and Pump Stations

When no longer needed for solution management, the Event Pond will be converted into evapotranspiration (“ET”) cells or reclaimed. Assumptions have been made to convert the Event Pond into an ET cell because the cell is a double-lined facility with leak collection and recovery system ("LCRS"). As part of the design, the converted ET cell will be covered with six inches of growth media and seeded.

Solids are expected to be present in some quantity in the process tanks and Event Pond at the time of closure. Representative samples will be obtained to determine the chemical characteristics of the pond solids. Depending on the results of the characterization testing, the solids will be left in the pond and buried in place in the Event Pond, under the ET Cell liner, or removed and placed in an approved landfill.

20.11.2.5 Roads, Diversion Works and Erosion Controls

Runoff from waste rock storage areas and other slopes will occur following precipitation events. However, re-graded slope angles, re-vegetation (including growth media placement) and Best Management Practices ("BMPs") will be used to limit erosion and reduce sediment in runoff. Silt fences, sediment traps, and other BMPs will be used to prevent migration of eroded material until reclaimed slopes and exposed surfaces have demonstrated erosional stability.

20.11.2.6 Fencing

A 20,500ft perimeter fence will be constructed around the Three Hills facilities and a 33,000 ft perimeter fence will be constructed at Hasbrouck to prevent access by livestock, wildlife, and the public. In general, three strand barbed wire fences will be used per BLM Handbook 1741-1. The area within the perimeter fence is approximately 476 acres at Three Hills and 1,288 acres at Hasbrouck mine. Chain-link fences will be erected within the perimeter fence in areas where a higher level of security is needed, such as the event pond, in order to protect livestock and other animals from entry. These will be removed at closure after the ponds are reclaimed. The perimeter fence will be monitored on a regular basis and repairs made as needed. Gates or cattle guards will be installed along roadways, as appropriate.

21.0 CAPITAL AND OPERATING COSTS

MDA has authored Section 21, Capital and Operating Costs, with subsections for Process Capital and Process Operating costs provided by KCA. NewFields has provided inputs for Processing Capital and also some input to Infrastructure Capital Costs, which are included in the Other Capital Costs (Section 21.9). H.C. Osborne and Associates have reviewed Process Operating Costs.

Capital costs at the start of the project are attributed to the startup of Three Hills Mine at a total of $54,327,000, which includes $8,992,000 of working capital. A total of $82,986,000 in capital is attributed to the startup of Hasbrouck, and there is an additional $16,296 in sustaining capital. Total life-of-project capital is $144,618, 000. Direct capital costs include sales tax.

Working capital is estimated based on the first 3-months' worth of operating costs at the start of the project. This capital is retained in account until the project is sustainable with a positive cumulative cash flow. Working capital is returned to the cash flow in month 36.

Marsh Canada advise that a surety bond to cover the full bonding amounts for both Three Hills and Hasbrouck mines should be obtainable once West Kirkland has several years of successful operating history, but that prior to a demonstrated operating history a surety bond for only half of the bond amount will be possible. Three Hills Mine initial capital includes $3,551,000 in environmental bonding costs, this being two thirds of the predicted bonding amount, the balance being covered by a surety bond. The cost to maintain the surety bonding was included in operating costs. Once West Kirkland switches to the surety bonding, it is assumed that the cash provided as the initial Three Hills bond will be released, which occurs in month 21. This has been included as part of growth capital as it is used toward construction of Hasbrouck mine.

A small amount of capital spend ($422,000) occurs for final finishes to the Three Hills heap leach and ADR plant in the first month of production. No other sustaining capital was attributed to the Three Hills mine, other than some sustaining capital for power and the ADR plant, which was attributed as sustaining capital for the Hasbrouck Mine.

Sustaining capital for the Hasbrouck Mine has been estimated to be $16,296,000. The total capital cost, including sustaining capital during operations, for the entire project is $144,618,000. Table 21.1 shows the estimated capital costs. This amount does not include working capital which has been applied to initial capital, and is assumed at an amount equivalent to the first three months of operating costs. This is returned to the cash flow as a credit in Year 3 when the project is projected to generate a positive cash balance in excess of the initial working capital amount (some equity financed capital may remain in the project). This is shown in the cash-flow portion of the economic analysis presented in Section 22.2, Table 22.4.

Table 21.1 Hasbrouck Project Capital Cost Summary

Direct Costs	**Units**	**Initial**	**Growth**	**Sustaining**	**Total**
Pre-Production	K USD	$ 633	$ 269		$ 902
Mining	K USD	$ 260	$ -	$ 448	$ 708
Plant and Recovery	K USD	$ 13,106	$ 35,148	$ -	$ 48,253
Leach Pads	K USD	$ 8,209	$ 12,176	$ 11,361	$ 31,747
Ponds and Site Infrastructure	K USD	$ 2,158	$ 3,232	$ -	$ 5,389
Water Supply	K USD	$ 3,105	$ 2,518	$ -	$ 5,622
Roads	K USD	$ 762	$ 1,161	$ -	$ 1,923
Light Vehicles	K USD	$ 490	$ 113	$ 336	$ 938
Site and Administration	K USD	$ 125	$ -	$ -	$ 125
Safety & Security	K USD	$ 82	$ 5	$ 10	$ 97
Owner's Capital	K USD	$ 6,241	$ 5,307	$ 96	$ 11,644
Total Direct Costs	K USD	$ 35,169	$ 59,928	$ 12,251	$ 107,348
Indirect Costs					
Initial Fills	K USD	$ 137	$ 1,748	$ -	$ 1,884
Indirects	K USD	$ 1,623	$ 2,699	$ 511	$ 4,833
EPCM	K USD	$ 1,915	$ 5,268	$ 625	$ 7,808
Newmont Buyout	K USD	$ -	$ 1,000	$ -	$ 1,000
Total Indirects	K USD	$ 3,675	$ 10,715	$ 1,136	$ 15,526
Contingencies					
Mining (15%)	K USD	$ 39	$ -	$ 2	$ 41
Plant and Recovery (20%)	K USD	$ 2,820	$ 6,920	$ -	$ 9,740
Leach Pads (15% - 25%)	K USD	$ 1,231	$ 3,044	$ 2,840	$ 7,116
Roads, Ponds, Water, and Infrastructure (25%)	K USD	$ 1,360	$ 1,566	$ -	$ 2,926
Other (15%)	K USD	$ 1,040	$ 814	$ 66	$ 1,921
Total Contingency	K USD	$ 6,491	$ 12,344	$ 2,909	$ 21,743
Total Capital Cost	K USD	$ 45,335	$ 82,986	$ 16,296	$ 144,618
Working Capital	K USD	$ 8,992	$ -	$ (8,992)	$ -
Total Capital Cost w/ Working Capital	K USD	$ 54,327	$ 82,986	$ 7,304	$ 144,618

Mining and re-handle operating costs were estimated by MDA based on contractor quotations. Processing operating costs were estimated by KCA. General and administrative costs and Nevada net proceeds tax were estimated by MDA. Reclamation costs were estimated by Enviroscientists, Inc., using BLM reclamation cost estimate spreadsheets.

Cost per ton processed for all material is $8.87 per ton of ore. Table 21.2 shows a summary of the operating cost estimate. Note the economic summary shown in Section 22.0 (Table 22.1) shows cost per ton of ore, and shows an apparent discrepancy with the mining cost in Table 21.2 This is due to the inclusion of re-handle costs into the mining cost per ton of ore in the economic summary. Additionally, the total costs shown in Table 22.1 are based on the definition of the World Gold Council's Adjusted Operating Cost per ton of ore. This table shows a total of $8.86 per ton of ore and includes a credit for silver production and does not include reclamation (as per the World Gold Council Adjusted Operating Cost definition). The costs in Table 21.2 do not include silver credits and do include reclamation.

Table 21.2 Operating Cost Summary

		K USD	USD per ton Processed
Three Hills	Mining Cost	$ 37,471	$ 3.88
	Process Cost	$ 25,338	$ 2.62
Hasbrouck	Mining Cost	$142,246	$ 3.99
	Process Cost	$146,826	$ 4.12
	Re-handle	$ 2,137	$ 0.06
Total	Mining Cost	$179,718	$ 3.97
	Process Cost	$172,164	$ 3.80
	Re-handle	$ 2,137	$ 0.05
	G&A Cost	$ 20,264	$ 0.45
	Reclamation	$ 12,047	$ 0.27
	Nevada Net Proceeds Tax	$ 15,334	$ 0.34
	Net Operating Cost	$401,663	$ 8.87

21.1 Mining Capital

Projected mining capital is minimized by planning to use a contractor for mining operations. Mining capital costs have been split into contract mining capital and owner mining capital, where the contractor mining capital includes mobilization, demobilization, and pre-production capital. Pre-production contract mining capital includes construction of roads and establishing initial benches prior to production mining. All pre-production contractor costs are included in the cash flow as pre-production capital.

Owner mining capital includes mining software, operations offices, office furnishings and computers, and communications equipment. Mining capital is summarized in Table 21.3 In addition, year -1 owner mining pre-production capital of $254,000 was included as pre-production capital for personnel and supplies (not shown in Table 21.3 but appears as part of the pre-production total in Table 21.1).

Estimated mining capital costs were based on vendor or contractor quotations. Note that light vehicle capital for mining is discussed in Section 21.6, Other Capital.

Table 21.3 Summary of Estimated Project Mining Capital

Three Hills - Contract Mining Capital	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Mobilization	K USD	$ 284	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 284
Pre-Production	K USD	$ 95	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 95
Total Three Hills Contract Capital	K USD	$ 379	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 379
Hasbrouck - Contract Mining Capital												
Mobilization	K USD	$ -	$ -	$ 127	$ -	$ 50	$ -	$ -	$ -	$ -	$ -	$ 177
Demobilization	K USD	$ -	$ -	$ -	$ -	$ -	$ -	$ 50	$ -	$ 167	$ 167	$ 384
Pre-Production	K USD			$ 142	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 142
Total Hasbrouck Contract Capital	K USD	$ -	$ -	$ 269	$ -	$ 50	$ -	$ 50	$ -	$ 167	$ 167	$ 703
Owner Mining Capital	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Software	K USD	$ 155	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 155
Mine Operations Offices	K USD	$ 77	$ -	$ -	$ 14	$ -	$ -	$ -	$ -	$ -	$ -	$ 91
Computers, Printers, and Plotters	K USD	$ 26	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26
Communications (phones, internet, etc)	K USD	$ 3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3
Owner Mining Capital Total	K USD	$ 260	$ -	$ -	$ 14	$ -	$ -	$ -	$ -	$ -	$ -	$ 274
Total Mining Capital Costs	K USD	$ 639	$ -	$ 269	$ 14	$ 50	$ -	$ 50	$ -	$ 167	$ 167	$ 1,356

21.2 Three Hills Process Capital

Process capital costs for the Three Hills Mine have been estimated by KCA and NewFields with input from West Kirkland. Capital cost estimates have been made using budgetary supplier quotes for all major and most minor equipment items. Where supplier quotes were not available for minor equipment items, reasonable cost estimates based on experience of other recent projects were made. All capital cost estimates are based on the purchase of equipment quoted new from the manufacturer, or estimated to be fabricated new. All costs are in fourth quarter 2014 US dollars.

Process capital and operating costs are considered to have an accuracy of +/-15% for the laboratory and recovery plant (adsorption, desorption and acid wash, electrowinning/refining), and +/-25% for all other areas. Three Hills process plant capital cost is $18.4 million (excluding working capital).

Each area in the process cost build-up is separated into the following disciplines, as applicable:

- Contractor Mobilization.
- Earthworks.
- Liners and ponds.
- Civils and Foundations.
- Structural steel.
- Platework.
- Mechanical equipment.
- Piping, Electrical and Instrumentation.
- Installation and Commissioning.
- Freight.
- Sales and Other Taxes.

The Three Hills Mine Process Capital Cost summary is presented by area in Table 21.4. The cost summary by discipline is presented in Table 21.5.

Table 21.4 KCA Three Hills Process Capital Costs by Area

Plant Totals Direct Costs	Total Supply Cost	Install	Grand Total
	US$	US$	US$
Area 0000 - Site & Utilities General	$181,882	$17,440	$199,322
Area 1403 - Laboratory	$937,648	$481,646	$1,419,295
Area 4179 - Electrical	$52,495	$4,240	$56,735
Area 4290 - Mobile Equipment	$1,483,618	$0	$1,483,618
Area 4301 - Water Distribution	$182,360	$16,160	$198,520
Area 5150 - Heap Leach & Solution Handling	$2,311,022	$1,059,982	$3,371,004
Area 5184 - Carbon Handling & Regeneration	$613,598	$304,707	$918,305
Area 5184 - Adsorption	$466,938	$292,097	$759,036
Area 5184 - Acid Wash & Elution	$680,708	$333,533	$1,014,241
Area 5186 - Electrowinning & Refining	$1,464,981	$723,696	$2,188,677
Area 6051 - Reagents	$176,249	$71,781	$248,030
Ancillaries	$486,315	$109,621	$595,935
Plant Total Direct Costs	**$9,037,814**	**$3,414,903**	**$12,452,717**
Sales Tax & Other Taxes	$702,902		$702,902
Spare Parts	$372,475		$372,475
Sub Total with Spare Parts			**$13,528,094**
Contingency	$2,820,000		$2,820,000
Plant Total Direct Costs with Contingency			**$16,348,094**
Indirect Field Costs			**$800,000**
Initial Fills			**$273,552**
Sub Total Plant Cost Before EPCM			**$17,421,646**
EPCM			**$1,010,000**
TOTAL Pre-Production Capital Cost			**$18,431,646**
Total Attached Power (kW)			**1,428**

Table 21.5 KCA Three Hills Process Capital Costs by Discipline

Discipline	Cost @ Source	Freight	Total Supply Cost	Sales & Other Taxes	Install	Grand Total
	US$	US$	US$	US$	US$	US$
Civils (Supply & Install)	$154,045		$154,045			$154,045
Mechanical Equipment	$7,259,029	$392,970	$7,651,998	$655,036	$3,152,823	$11,459,857
Piping	$482,483	$14,923	$498,690	$33,050	$173,840	$705,580
Electrical	$530,644	$0	$530,644	$5,528	$54,960	$591,133
Instrumentation	$69,236	$0	$70,383	$2,859	$7,280	$80,522
Facilities	$131,357	$696	$132,053	$6,429	$26,000	$164,482
Spare Parts			$372,475			$372,475
Contingency			$2,820,000			$2,820,000
Plant Total Direct Costs	**$8,626,794**	**$408,589**	**$12,230,288**	**$702,902**	**$3,414,903**	**$16,348,094**

Capital costs for the heap leach process facility at Three Hills have been estimated by KCA and NewFields. Newfield's scope of work was the construction of the leach pad and ponds, earthworks, liner, civils, gravity piping, and off-site water supply. KCA's scope of work was the solution application equipment (pumps, tanks, etc.), pressure piping, laboratory and laboratory equipment, reagent mixing and storage, the ADR recovery plant, on-site power supply and distribution, and certain infrastructure.

Three Hills capital costs estimated by NewFields are shown in Table 21.6. This includes capital costs for access roads to and around the Three Hills Mine site.

Table 21.6 NewFields Estimated Capital for Three Hills (K USD)

Roads	$	762
Heap Leach Facility	$	8,209
Event Ponds & Site Infrastructure	$	2,158
Water Supply	$	3,106
Total	$	14,235
Indirects	$	821
EPCM	$	998
Contingency	$	2,592
Total Estimated by NewFields	$	18,646

21.2.1 Three Hills HLF

The HLF includes the earthworks, HDPE geomembrane, gravity drain piping and gravel overliner materials within the leach pad. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

21.2.2 Three Hills Event Pond

The Event Pond includes the earthworks, HDPE geomembrane, and miscellaneous piping. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

21.2.3 Three Hills Civils and Foundations

Civils include detailed earthworks and concrete. Concrete in KCA's scope includes the reagent storage area concrete slab and containment berms, and the process plant workshop foundation; concrete is also included for the substations. Concrete for the laboratory and the ADR and refinery have been included in KCA's equipment supply quote. Concrete quantities estimated by KCA are based on similar installations, major equipment weights and on slab areas. Concrete costs have been estimated by KCA based on supplier quotes from recent projects completed by KCA in the area. These costs include all form work, footing excavation, concrete supply, rebar, water stops, and curing costs.

21.2.4 Three Hills Structural Steel

Structural steel includes steel grating, handrails and structural steel. Structural steel for all areas within KCA's scope has been included in KCA's equipment supply package quote.

21.2.5 Three Hills Platework

The platework discipline includes costs for the supply and installation of steel tanks, bins, and chutes. Platework costs for items in KCA's scope have been included in KCA's quoted equipment supply package.

21.2.6 Three Hills Mechanical Equipment

Costs for mechanical equipment are based on an equipment list developed of all major equipment for the processing facility. Costs for most major items are for new equipment and based on budgetary quotes from vendors. Costs for minor equipment items are based on supplier quotes or KCA's in-house database, or else reasonable allowances for the equipment were made.

Installation hourly costs for mechanical equipment are factored based on the equipment supply cost and include installation labor and equipment usage.

21.2.7 Three Hills Piping, Electrical and Instrumentation

Major piping in KCA's scope includes the main header to the heap leach, the solution irrigation piping and the fire water distribution piping. Costs for major piping are based on material takeoffs developed by KCA and supplier quotes. Ancillary piping, fittings, and valve costs have been estimated on a percentage basis of the mechanical equipment costs. Varying factors ranging up to 25% of the mechanical equipment supply were used to estimate the ancillary piping purchase costs for each area.

On-site electrical costs for the project are primarily based on supplier quotes based on material takeoffs and information developed by KCA. These include site distribution power lines, transformers, and substations. Off-site electrical infrastructure for delivery of grid power to the Hasbrouck Mine site has been quoted by NV energy. Miscellaneous electrical costs have been estimated as a percentage of the equipment supply cost. Varying factors ranging up to 15% of the equipment supply package have been used for miscellaneous electrical costs.

Instrumentation costs are based on a percentage of the mechanical equipment and range up to 3% of the mechanical equipment cost. An allowance of $5,000 has been included for a valve and control for the site water supply. An allowance of $50,000 has been included for a security system, which includes a closed circuit television system. Minimal instrumentation is planned for the project.

21.2.8 Three Hills Installation and Commissioning

Installation costs have been included for all items in KCA’s equipment supply package. Installation estimates for all other items are based on a sliding scale factored from the supply cost and include all installation labor and equipment usage. The hourly installation labor rates are estimated to be $80.00/hour and include provisions for wages, burdens, overhead and contractor profit. The estimated unit cost is based on information in KCA’s database and current proprietary cost guide data.

21.2.9 Three Hills Freight

Freight costs have been included in KCA’s equipment supply package. Freight estimates for other equipment, including major piping, are based on loads as bulk freight at an average percentage of equipment cost. The cost for transport of equipment items to the jobsite in Tonopah, Nevada has been estimated at an average of 6% of the equipment cost.

21.2.10 Three Hills Sales Tax and Other Taxes

Nevada sales tax in Esmeralda County has been applied to all material supply costs for the items in this area. Sales tax was applied to 50% of the value of any allowance that did not have a breakdown between supply and installation costs. The effective sales tax in Esmeralda County as of 1 April, 2014 is 6.850%.

21.2.11 Three Hills Site Earthworks Capital Costs

The site earthworks include site access roads, the haul road between the lime storage silo and the HLF, general site grading at the buildings and other facilities around the plant site and the explosives storage magazine road. The earthworks costs include shaping and grading, road wearing coarse, and any drainage components required to control and convey storm water runoff. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

21.2.12 Three Hills Power Supply & Distribution Capital Costs

Power for the Three Hills Mine will be by a rented on-site LNG-powered generator, and has been quoted by Aggreko.

Power distribution onsite has been quoted by Jensen Engineering and includes the site distribution power lines and transformers. Capital costs for the site power distribution are included in the project direct costs.

A 750kW backup generator is included in the cost estimate to provide power to the critical pumping systems and facilities in the event of a power outage.

21.2.13 Three Hills Water Capital Costs

Raw water for the project, including fire water, will be sourced from the TPU with sufficient volume and pressure. Allowance has also been made for the cost of upgrades and modifications to TPU's water system which will be performed by TPU, but which will be for West Kirkland's account. From the point of connection to the TPU system to the Three Hills mine, NewFields has estimated the costs of the pipeline and delivery system. These costs were derived from quantity take-offs from the design drawings and estimated labor and equipment rates based upon recent, similar, project experience. Costs for the raw water system within the buildings and process facilities are included in the mechanical equipment and piping disciplines.

21.2.14 Three Hills Buildings, Lighting, Fire Fighting, Support Equipment

21.2.14.1 Three Hills Buildings

Process buildings in KCA's scope for Three Hills include the laboratory building, reagent storage facility, refinery building, and process workshop. Building costs for the laboratory and refinery have been included in the KCA's equipment supply packages. Costs for the process workshop and reagents storage areas are based on steel building quotes and estimates for furnishings based on KCA's experience with similar installations. Costs for buildings have been included in the project direct costs.

21.2.14.2 Three Hills Support Equipment – Mobile Equipment

The mobile equipment capital cost estimate is based primarily on cost guide information. The equipment prices include the cost of purchase, assembly/commissioning and some operator training. Transportation costs are included in the General Services costs.

Process mobile equipment for Three Hills includes the following:

- 1 ea. 40 ton mobile crane.
- ea. ¾ ton pickup trucks.
- 2 ea. 2.5 ton forklifts.
- 1 ea. Flatbed maintenance truck.
- 1 ea. 10 ton boom truck.
- 1 ea. Backhoe.
- 1 ea. Utility trailer.
- 1 ea. All-terrain forklift (telehandler).

21.2.14.3 Three Hills Support Equipment –Communications

A lump sum allowance for communications in the form of telephones, radios, and cell phones has been made based on recent experience of similar operations.

21.3 Three Hills Indirect Capital Costs

Indirect capital costs include costs for items such as equipment rentals, temporary construction facilities, construction quality assurance/quality control and construction surveying, and consumables such as fuel power, and security. The costs have been estimated based on experience with recent, similar projects. For the facilities included in the NewFields scope of work, these costs are presented as a percentage of the capital costs for each facility/area. These vary between 3.5% and 6.3%.

21.3.1 Three Hills Spare Parts

Spare parts costs for items in KCA's scope were estimated at approximately 5% of the mechanical equipment supply. Spare parts costs provided or recommended by the supplier were used when available. Spare part costs cover all classes of spare parts.

21.3.2 Three Hills Initial Fills Inventory

The initial fills consists of consumable items stored on site at the commencement of operations. This inventory of initial fills is in place to insure that adequate consumables are available for the first stage of operation. Details of the initial fills are presented in Table 21.7. Note that $174,000 of the initial fills occurs in year -1 and is categorized as initial capital. The remaining $174,000 of initial fills occurs in month 1 of production, and is thus categorized as growth capital.

Table 21.7 Initial Fills – Three Hills

Item	Basis	Needed Weight lb or gal	Truck Loads	Quantity to Order lb or gal	Unit Price USD	Tax, Duty USD	Shipping USD	Total Cost USD (1,000)
NaCN	Full Tank			8,339	1.31	0.09		$ 12
Pebble Lime	Full Silo	200,000		200,000	0.08	0.01		$ 18
Carbon	Full Circuit	30,000		30,000	1.20	0.08		$ 38
Antiscalant	4 weeks			6,000	20.85	1.43		$ 134
Caustic Soda	4 weeks			3,000	0.47	0.03		$ 2
Hydrochloric Acid	2 weeks	1,330		1,440	2.10	0.14		$ 3
Diesel (L)	Total Fill	1,791		1,791	2.50	0.17		$ 5
Flux	4 weeks							
SiO2		100		100	0.50	0.03		$ 0
Borax		100		100	0.98	0.07		$ 0
Niter		50		50	1.75	0.12		$ 0
Soda Ash		50		50	1.70	0.12		$ 0
Lab Consumables				1	$21,179	1,451	1,271	$ 24
Lab Supplies, Process				1	$33,602	2,302	2,016	$ 38
TOTAL								**$ 274**

21.3.3 Three Hills Engineering, Procurement and Construction Management

The EPCM cost for the processing facility at Three Hills is factored from the direct costs for the plant. A factor of 3% was used for items that were bid as turnkey and a factor of 10% was used on all other items. NewFields has estimated the engineering, procurement and construction management costs for the HLF, Event Pond, site infrastructure and roads as a percentage of the capital costs. These percentages are based upon recent, similar, experience and vary by facility/area. The engineering varies between 1.5% and 10% and it largely based upon the level of design that exists at each facility. The construction management/procurement is estimated to be between 3% and 3.5% of the capital costs.

21.3.4 Three Hills Contingency

KCA has estimated the contingency for the processing facility at Three Hills to be US$2,820,000. The contingency for the processing facility was estimated as a percentage of the direct and indirect capital costs by discipline, varying between 20% and 25%. Based on the level of detail incorporated into the engineering performed to date on the site infrastructure, NewFields recommends using a 20% contingency on the roads, Event Pond and site facilities and a 25% contingency on the water supply system. The HLF engineering has been advanced farther than the other components designed by NewFields and the contingency for this facility is recommended to be 15%.

21.3.5 Three Hills Sustaining Capital

Due to the short mine life (approximately 2 years) there is no sustaining capital for the Three Hills operation.

21.3.5.1 Three Hills Exclusions

The following capital costs have been excluded from the scope of process supply and estimate for Three Hills:

- Finance charges and interest during construction.
- Escalation costs.
- Currency exchange fluctuations.

21.4 Hasbrouck Process Capital Costs

Capital expenditures for items in KCA's scope for the Hasbrouck Mine are summarized by area in Table 21.8. Capital costs have been based on the design presented in Section 17.0 and are considered to have an accuracy of +/-15% for the recovery plant and +/-25% for all other areas. Process capital costs for the Hasbrouck Mine are estimated to be $48.8 million (excluding working capital).

Capital costs have been estimated by KCA and NewFields. Equipment and material requirements and specifications are described in previous sections of this study. Capital cost estimates have been made primarily using budgetary supplier quotes for all major and most minor equipment items. Where supplier quotes were not available for minor items, a reasonable cost estimate has been made based on supplier quotes in KCA's files. All capital cost estimates have been based on the purchase of new equipment as quoted by manufacturers, or estimated to be fabricated new. All costs are in fourth quarter 2014 US dollars.

The capital costs are summarized by discipline in Table 21.9.

Each area in the Hasbrouck Mine process cost build-up is separated into the following disciplines, as applicable:

- Earthworks.
- Civils and foundations.
- Structural steel.
- Platework.
- Mechanical equipment.
- Piping, Electrical and Instrumentation.
- Installation and Commissioning.
- Freight.
- Sales and Other Taxes.

NewField's scope of work included costs for the construction of the leach pad and ponds, liner, and gravity pipe. KCA's scope of work included all solution application equipment (pumps, tanks, etc.), pressure piping, crushing, screening and agglomeration, reagent storage, power supply and distribution, water supply and some infrastructure.

Table 21.8 KCA Hasbrouck Process Capital Costs by Area

Plant Totals Direct Costs	**Total Supply Cost**	**Install**	**Grand Total**
	USD	USD	USD
Area 0000 - Site & Utilities General	$50,000	$110,365	$160,365
Area 1403 - Laboratory (At Three Hills)	$0	$0	$0
Area 4179 - Electrical	$1,857,944	$2,112	$1,860,056
Area 4290 - Mobile Equipment	$614,493	$0	$614,493
Area 4301 - Water Distribution	$363,205	$91,840	$455,045
Area 5004 - Primary Crushing	$3,368,669	$896,755	$4,265,424
Area 5023 - Secondary & Tertiary Crushing	$11,125,025	$1,644,684	$12,769,709
Area 5041 - Ore Reclaim & Stacking	$6,368,539	$996,480	$7,365,019
Area 5150 - Heap Leach Solution Handling	$3,855,384	$1,124,745	$4,980,128
Area 5184 - Carbon Handling & Regeneration (At Three Hills)	$0	$0	$0
Area 5184 - Acid Wash & Elution (At Three Hills)	$0	$0	$0
Area 5186 - Electrowinning & Refining (At Three Hills)	$0	$0	$0
Area 6051 – Reagents	$8,355	$4,010	$12,365
Ancillaries	$323,795	$10,000	$333,795
Plant Total Direct Costs	**$27,935,407**	**$4,880,991**	**$32,816,397**
Sales Tax & Other Taxes	$1,689,467		$1,689,467
Spare Parts	$219,494		$219,494
Sub Total with Spare Parts			**$34,725,357**
Contingency	$6,920,000		$6,920,000
Plant Total Direct Costs with Contingency			**$41,645,357**
Indirect Field Costs			**$1,790,000**
Initial Fills			**$1,610,945**
Sub Total Plant Cost Before EPCM			**$45,046,302**
EPCM			**$3,781,000**
TOTAL Pre-Production Capital Cost			**$48,827,302**
Total Attached Power (kW)			**6,506**

Table 21.9 KCA Hasbrouck Process Capital Costs by Discipline

Discipline	Cost @ Source	Freight	Total Supply Cost	Sales & Other Taxes	Install	Grand Total
	USD	USD	USD	USD	USD	USD
Major Earthworks			$0		$695,684	$695,684
Civils (Supply & Install)	$1,134,195		$1,134,195	$38,846		$1,173,041
Structural Steelwork (Supply & Install) - Majority included in Mechanical Equipment	$282,238		$282,238	$9,667		$291,904
Plate work (Supply & Install)	$787,580		$787,580	$50,896	$146,280	$984,756
Mechanical Equipment	$19,421,654	$975,136	$20,434,670	$1,330,385	$3,454,010	$25,219,066
Piping	$1,225,227	$17,215	$1,242,442	$83,928	$334,560	$1,660,930
Electrical	$0	$0	$4,874,828	$159,161	$299,040	$4,081,857
Instrumentation	$188,586	$0	$188,586	$11,034	$57,120	$256,741
Facilities	$0		$119,001	$5,549	$17,337	$141,887
Spare Parts			$219,494			$219,494
Contingency			$6,920,000			$6,920,000
Plant Total Direct Costs	**$23,039,479**	**$992,351**	**$36,203,033**	**$1,689,467**	**$5,004,031**	**$41,645,357**

Earthworks in KCA’s scope of work include a portion of the haul road from the mine to the crushing area and earthworks for the crushing area. The earthworks quantities have been based on quantities estimated by KCA for the following tasks:

- Topsoil stripping (12in depth)
- Material cut to fill
- Material placement and compaction (including 1 mile haul).

Unit costs for the above activities were provided to KCA by NewFields.

The site earthworks include site access roads, general site grading at the buildings and other facilities around the plant site, and the explosives storage magazine road. The earthworks costs include shaping and grading, road wearing coarse, and any drainage components required to control and convey storm water runoff. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

Hasbrouck capital costs estimated by NewFields include the heap leach facility, event ponds and associated infrastructure, water supply, and access roads. These capital costs estimates are shown in Table 21.10 NewFields Estimated Capital for Hasbrouck.

Table 21.10 NewFields Estimated Capital for Hasbrouck (K USD)

	Phase 1	Phase 2	Total
Roads	$ 1,161	$ -	$ 1,161
Heap Leach Facility	$ 12,176	$ 11,361	$ 23,538
Event Ponds & Site Infrastructure	$ 3,232	$ -	$ 3,232
Water Supply	$ 2,518	$ -	$ 2,518
Total	$ 19,087	$ 11,361	$ 30,448
Indirects	$ 908	$ 511	$ 1,419
EPCM	$ 1,394	$ 625	$ 2,019
Contingency	$ 4,610	$ 2,840	$ 7,451
Total Estimated by NewFields	$ 26,000	$ 15,338	$ 41,337

21.4.1 Hasbrouck HLF and Event Ponds

The HLF includes the earthworks, HDPE geomembrane, gravity drain piping and gravel overliner materials within the leach pad. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

The Event Pond includes the earthworks, HDPE geomembrane, and miscellaneous piping. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

21.4.2 Hasbrouck Civils and Foundations

Civils include detailed earthworks, concrete and the retaining wall for the primary crusher. Civils in KCA's scope include concrete for the crushing area, concrete for the pug mill slab foundation, concrete sleepers for the overland conveyors, the adsorption columns foundation, concrete for the site substations, and a concrete slab for the process workshop. Concrete quantities estimated by KCA are based on similar installations, major equipment weights and on slab areas. Concrete costs have been estimated by KCA based on supplier quotes from recent projects completed by KCA in the area. These costs include all form work, footing excavation, concrete supply, rebar, and curing costs. The cost for a Hilfiker-type retaining wall at the primary crusher was based on supplier quotes from recent projects.

21.4.3 Hasbrouck Structural Steel

Structural steel, including steel grating, structural steel, and handrails has been estimated based layout drawings and equipment loads. Table 21.11 shows the unit rates for structural steel. These costs are estimated based on KCA's in-house structural steel costs.

Table 21.11 Structural Steel Unit Rates

Description	Unit	Unit Cost (USD)
Grating	ft^2	$ 21.55
Structural Steel	lb	$ 2.27
Handrails	ft	$17.68

21.4.4 Hasbrouck Platework

The plate-work discipline includes costs for the supply and installation of steel tanks, bins, and chutes. Plate-work costs for the crushing plant have been primarily included in the vendor supply package with some items estimated by KCA based on experience with similar sized projects. Plate-work costs for the HPGR feed bin were based on the weight of steel required by the design. The plate-work costs for the pregnant tank, barren tank and adsorption columns were included in the quote for the adsorption circuit from KCA.

21.4.5 Hasbrouck Mechanical Equipment

Costs for mechanical equipment are based on an equipment list developed of all major equipment for the processing facility. Costs for most major items of new equipment are based on budgetary quotes from vendors. Costs for minor equipment items are based on supplier quotes or KCA's in-house database, or else reasonable allowances were made for the equipment.

Installation hourly costs for mechanical equipment were factored based on the equipment supply cost and include installation labor and equipment usage.

21.4.6 Hasbrouck Piping, Electrical and Instrumentation

Major piping costs, including process solution piping, fire water piping and heap irrigation, are based on estimated material takeoffs and supplier quotes. Additional ancillary piping, fittings, and valve costs have been estimated on a percentage basis of the mechanical equipment costs. Varying factors ranging up to 25% of the mechanical equipment supply were used to estimate the ancillary piping purchase costs for each area.

Electrical costs for the project are primarily based on supplier quotes based on material takeoffs and information developed by KCA. These include the site distribution power lines and transformers. Delivery of power to the site has been quoted by NV energy. Varying factors ranging up to 15% of the mechanical equipment supply were used to estimate the miscellaneous electrical costs for each process area.

Varying factors ranging up to 3% of the mechanical equipment supply were used to estimate the instrumentation costs. Allowances of $5,000 and $50,000 have been included for the water supply valves and site security system, respectively. Minimal instrumentation is planned for the Hasbrouck Mine.

21.4.7 Hasbrouck Installation

Installation costs have been included for all items in KCA's equipment supply package. Installation estimates for all other items are based on a sliding scale factored from the supply cost and include all installation labor and equipment usage. The hourly installation labor rates are estimated to be $80.00/h and include provisions for wages, burdens, overhead and contractor profit. The estimated unit cost is based on information in KCA's database and recent cost guide data.

21.4.8 Hasbrouck Freight

Estimates for equipment freight costs are based on loads as bulk freight at an average percentage of equipment cost. The cost for transport of equipment items to the jobsite in Tonopah, Nevada is estimated to average 6% of the equipment cost.

Where applicable, supplier quoted freight cost estimates for equipment packages are used in place of the freight estimate. Freight costs have been included in KCA's equipment supply package.

21.4.9 Hasbrouck Sales Tax and Other Taxes

Nevada sales tax in Esmeralda County has been applied to all material supply costs for the Hasbrouck Mine. Sales tax was applied to 50% of the value of any allowance that did not have a breakdown between supply and install costs. The effective sales tax in Esmeralda County as of 1 April, 2014 is 6.850%.

A 24% Contribution in Aid of Construction Tax has been applied to the applicable parts of the quoted supply costs for the delivery of power to the Hasbrouck Mine by NV Energy.

21.4.10 Hasbrouck Power Supply and Distribution Capital Costs

Capital costs for the infrastructure involved in the supply of grid power to the Hasbrouck Mine have been provided by NV Energy. Grid power will be delivered to a mine substation from a 120kV switching station to be constructed 2 miles to the north. NV Energy's cost study includes permitting review, new transmission line to the project site, a new 120kV switching station, and installation of communications at the switching station.

Costs for power distribution onsite have been estimated by Jensen Engineering and include the site distribution power lines, switchgear, and transformers. Costs for the site power distribution are included in the project direct costs.

A 750kW backup generator has been included in the cost estimate to provide power to the critical pumping systems and facilities in the event of a power outage.

21.4.11 Hasbrouck Water Capital Costs

The Hasbrouck Project raw water will be sourced from the TPU. The capital costs for the raw water system include the pipeline from Three Hills to Hasbrouck, the raw water/fire water storage tank and raw water distribution pump.

Capital costs for the supply of raw water to the Hasbrouck Mine from the TPU include the raw water/fire water storage tank and raw water distribution piping. No costs will be incurred by TPU to upgrade and modify their system above what will be required for the Three Hills Mine. Costs for the raw water system within the buildings and process facilities are included in the mechanical equipment and piping disciplines. From the point of connection near the Three Hills mine, NewFields has estimated the costs of the pipeline, water storage tank and delivery system. These costs were derived from quantity take-offs from the design drawings and estimated labor and equipment rates based upon recent, similar, project experience.

21.4.12 Hasbrouck Buildings, Lighting, Fire Fighting, Support Equipment Capital Costs

21.4.12.1 Hasbrouck Buildings

KCA's scope included the process warehouse and workshop building for Hasbrouck. The cost for the building is based on a steel building quote and an estimate for furnishings based on KCA's experience with similar installations. Costs for the workshop building have been included in the project direct costs.

21.4.12.2 Hasbrouck Fire Fighting

A raw water tank is included in the design which will have a reserve capacity for use as fire water. Fire water will be delivered by a gravity system.

Costs for the fire water systems within the buildings and facilities are included in the mechanical equipment and plate-work disciplines. Costs for the water delivery pipeline are included with the water supply capital costs.

21.4.12.3 Hasbrouck Mobile Equipment

The majority of mobile equipment for the Hasbrouck Mine will be shared with or transferred from the Three Hills Mine. Mobile equipment includes a 40ton crane, a boom truck, flatbed maintenance truck, light vehicles, two indoor forklifts, a backhoe, and an all-terrain forklift. The additional mobile equipment needed for Hasbrouck includes a Cat D6 Dozer, a 2.5ton forklift and 3 pickups.

21.5 Hasbrouck Indirect Capital Costs

Indirect capital costs include costs for items such as equipment rentals, temporary construction facilities, construction quality assurance/quality control and construction surveying, and consumables such as fuel and power, and security. These costs have been estimated based on experience with recent, similar projects. NewFields has estimated these costs as a percentage of the capital costs for each facility/area. These vary between 3.5% and 6.3%.

21.5.1 Hasbrouck Spare Parts

Spare parts costs for items in KCA's scope were estimated at approximately 5% of the mechanical equipment supply. Where available, costs for spare parts were provided or recommended by the supplier.

21.5.2 Hasbrouck Initial Fills Inventory

Initial fills consist of consumable items stored on site at the outset of operations; this includes sodium cyanide, cement for pH control and agglomeration, carbon, antiscalant, and diesel fuel. The Hasbrouck Mine initial fills also include a spare set of rolls for the HPGR. This inventory of initial fills is in place to insure that adequate consumables are available for the first stage of operation. Details of the initial fills are presented in Table 21.12.

Table 21.12 Hasbrouck Initial Fills

Item	Basis	Needed Weight lb or gal	Truck Loads	Quantity to Order lb or gal	Unit Price USD	Tax, Duty USD	Shipping	Total Cost USD (1,000)
NaCN	Full Tank		-	8,339	1.31	0.09		$ 12
Cement	Full Silo	200,000	10.0	200,000	0.08	0.01		$ 16
Carbon	Full Circuit	35	0.0	30,000	1.20	0.08		$ 38
Antiscalant	4 weeks		-	6,000	20.85	1.43		$ 134
Diesel (gal)	Total Fill	1,800	0.1	1,800	2.50	0.17		$ 5
Foam	2 Weeks							$ 6
HPGR Spare Rolls	1 set				$ 1,400,000.00			$ 1,400
TOTAL								**$ 1,612**

21.5.3 Hasbrouck Engineering, Procurement and Construction Management

The EPCM cost for the processing facility at Hasbrouck is factored from the direct costs for the plant. A factor of 2% was used for items that were bid as turnkey and a factor of 10% was used on all other items. NewFields has estimated the engineering, procurement and construction management costs for the HLF, Event Pond, site infrastructure and roads as a percentage of the capital costs. These percentages are based upon recent, similar, experience and vary by facility/area. The engineering varies between 2.5% and 15% and it is largely based upon the level of design that exists at each facility. The construction management/procurement is estimated to be between 3% and 3.5% of the capital costs.

21.5.4 Hasbrouck Contingency

The contingency for the processing facility at Hasbrouck is US$6,920,000, or 20% of the direct and indirect capital costs. Based on the level of detail incorporated into the engineering performed to date on the site infrastructure, NewFields recommends using a 25% contingency on the roads, water supply system and the HLF. A 20% contingency is recommended for the Event Pond and site facilities.

21.5.5 Hasbrouck Sustaining Capital

Sustaining capital in KCA's scope of work includes an additional overland conveyor and barren solution header pipe to the heap. The total estimated cost for these items is $900,000.

Phase 2 of the HLF has been included as sustaining capital. The HLF Phase 2 includes the earthworks, HDPE geomembrane, gravity drain piping and gravel overliner materials within the leach pad expansion area. Quantity take-offs were completed on each component, based upon the design drawings that have been completed. Unit rates for the construction activities were prepared based upon labor rates seen on recent, similar projects, equipment production rates derived from the CAT handbook, and budgetary quotes provided by material vendors.

21.5.5.1 Hasbrouck Exclusions

The following capital costs have been excluded from the scope of supply and estimate:

- Finance charges and interest during construction.
- Escalation costs.
- Currency exchange fluctuations.

21.6 Other Capital Costs

MDA estimated other capital costs for light vehicles, site and administration, safety and security, and owners capital with input from vendors and West Kirkland.

Administration capital costs are shown in Table 21.13 and all costs occur during Year -1. Building costs assume a used double- to triple- wide office trailer that will be setup at Three Hills and will remain there for the life of mine.

Table 21.13 Administration Capital

	Units	Yr -1
Administration Building	K USD	$ 77
Computers, Printers, and Plotters	K USD	$ 45
Communications (phones, internet, etc)	K USD	$ 2
Site and Administration Total	K USD	$ 125

Safety and security capital costs are shown in Table 21.14. This includes a used double wide trailer for offices and a training room as well as furnishings, office network supplies, an allocation for communications and initial safety supplies.

Table 21.14 Safety and Security Capital Costs

	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Total
Safety and Training Building	K USD	$ 40					$ 40
Computers, Printers, and Plotters	K USD	$ 15					$ 15
Communications (phones, internet, etc)	K USD	$ 2					$ 2
Initial Safety Supplies and Equipment	K USD	$ 25		$ 5	$ 10		$ 40
Total Safety and Security	K USD	$ 82	$ -	$ 5	$ 10	$ -	$ 97

Site security fencing is included within the Event Pond and facilities costing prepared by NewFields. Material quantity take-offs were calculated from engineering design drawings with unit rates being derived from recent, similar, projects.

Owner's capital costs were developed using inputs from West Kirkland and are shown in Table 21.15. Feasibility study costs for the Hasbrouck project are assumed to occur prior to the start of construction and are not included in the construction costs. However, these costs are shown in the Recommendations (Section 26.0). In addition, some permitting costs for base line studies at the Hasbrouck Mine are also expected to occur prior to construction of the Hasbrouck Mine and are also included in the Recommendations (Section 26.0).

Bonding costs are assumed to be covered in part at commencement of construction and fully at Year 2 by the use of surety bonds as discussed at the start of Section 21.0. Prior to demonstrating an operating history, the surety bond will be only possible for half of the bonding required. A bonding cost of $3,551,000 has been included in owner's capital, which is two thirds of the predicted bonding amount. The balance is to be covered by a surety bond. The cost to maintain the surety bonding has been included in operating costs. Once West Kirkland switches to a surety bond for all bonding costs at Year 2, it is assumed that the cash provided as the initial Three Hills bond will be released.

Owner management costs are primarily for temporary management personnel who will be required during the construction phase. These include a project manager and assistant, an administration superintendent, a safety and security superintendent, an environmental superintendent, and an accounts receivable - payable accountant. These positions may transfer into permanent positions within the administration structure after the project startup.

Fiber optic, power generation at Three Hills, and offsite electrical supply costs for Hasbrouck are based on vendor quotations. Note that onsite electrical distribution has been estimated by KCA and are included in the process capital estimate. Power generation at Three Hills assumes leasing of a LNG fuel station and a generator. Capital costs include a charge every two years to swap out the generator for major overhauls.

Table 21.15 Owner's Capital Costs

	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Total
Permitting - Hasbrouck	K USD	$ 911	$ 906	$ 2						$ 1,819
Land Acquisition (Eastfield, Korn)	K USD	$ 125	$ -	$ -						$ 125
Monitor Wells (Hasbrouck Mine)	K USD	$ -	$ -	$ 1,079						$ 1,079
Fiber Optic Move	K USD	$ 100	$ -	$ -						$ 100
Electrical Design and Construction (offsite & Power Generation)	K USD	$ 69	$ 3,445	$ 3,425	$ 32	$ -	$ 32	$ -	$ 32	$ 7,035
Owner's Construction Management	K USD	$ 479	$ -	$ -						$ 479
G&A During Pre-Production	K USD	$ 1,006								$ 1,006
Bonding Costs - Three Hills	K USD	$ 3,551		$ (3,551)						$ -
Total Owners Capital	K USD	$ 6,241	$ 4,351	$ 956	$ 32	$ -	$ 32	$ -	$ 32	$ 11,644

Light vehicle costs were estimated by MDA and are shown in Table 21.16. These costs are based on the number of vehicles required for each department and vendor quotations. KCA estimated the number of vehicles required for processing personnel. Taxes and fleet purchase discounts are included.

Table 21.16 Light Vehicles

	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Total
Mining	K USD	$ 143	$ -	$ -	$ -	$ -	$ 107	$ -	$ 251
Processing	K USD	$ 230	$ -	$ 113	$ -	$ -	$ 77	$ -	$ 420
Administration	K USD	$ 116	$ -	$ -	$ -	$ -	$ 152	$ -	$ 268
Total	K USD	$ 490	$ -	$ 113	$ -	$ -	$ 336	$ -	$ 938

21.7 Mine Operating Costs

Mining operating costs have been based on quotations from contractors and additional owner's mining costs that will be required for mining operations. Contractor mining costs are shown in Table 21.15. These costs were developed based on quotations from contractors. Quotations were solicited by MDA from five different mining contractors, three of which provided responses. Responding contractors were provided with initial yearly plans, which included quantities of potential ore and waste to be mined, along with re-handle amounts.

Responding contractors initially based their quotations on \$3.50 per gallon of diesel fuel and the contractors provided the quantity of fuel with their quotations. With fuel costs dropping substantially in early 2015, MDA re-estimated the costs using \$2.50 per gallon diesel, based on fuel quotations for other operations and quotations from fuel providers. Note that the cost per gallon does not include road taxes as fuel would be used in off-road operations.

During discussions with various contractors and mining companies that employ them, it became evident that discounts from the quotes received on contract mining would be reasonably expected after negotiations of contracts. MDA compared rates with other operations that are using contractors and determined up to 10% discounts from the quotations received would be possible. As such, MDA applied a 5% discount to the quotations used in order to provide a more realistic cost expectation for mining.

The production schedule was modified for the Hasbrouck Mine after contractor quotations were received. These modifications increased the mining rate at Hasbrouck to provide 17,500 tons per day of ore to the crusher (original schedules were based on 15,000 tons per day of ore). MDA used the unit rates provided by contractors to adjust the mining costs accordingly. The final contractor cost estimate is shown in Table 21.17.

Table 21.17 Mine Contractor Operating Cost

	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Contractor Mining Cost	$ US		$ 18,454	$ 22,933	$ 20,456	$ 26,647	$ 19,641	$ 26,479	$ 27,081	$ 8,239	$ -	$ 169,930
Total Other Mine Costs	$ US	$ -	$ -	$ 77	$ 378	$ 378	$ 378	$ 379	$ 378	$ 170	$ -	$ 2,137
Total Mining Contractor	$ US	$ -	$ 18,454	$ 23,010	$ 20,834	$ 27,025	$ 20,019	$ 26,858	$ 27,459	$ 8,408	$ -	$ 172,067
Total Mining Contractor	$/t Mined	$ -	$ 1.92	$ 1.97	$ 1.83	$ 1.82	$ 1.83	$ 1.82	$ 1.82	$ 1.83	$ -	$ 1.85

Owner's operating mining costs were estimated by MDA based on the personnel and supplies required to achieve the mine production schedule. These costs are summarized in Table 21.18 and include mining supervision, engineering and geology requirements, an allocation for contractor "forced work", light vehicles, and outside services.

Table 21.18 Owner Mine Operating Cost

Mine General Services	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Supervision	K USD	$ 52	$ 173	$ 173	$ 173	$ 173	$ 173	$ 173	$ 173	$ 53	$ -	$ 1,312
Hourly Personnel	K USD	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total	K USD	$ 52	$ 173	$ 173	$ 173	$ 173	$ 173	$ 173	$ 173	$ 53	$ -	$ 1,312
Engineering												
Salaried Personnel	K USD	$ 41	$ 138	$ 138	$ 138	$ 138	$ 138	$ 138	$ 138	$ 42	$ -	$ 1,050
Hourly Personnel	K USD	$ 23	$ 76	$ 76	$ 76	$ 76	$ 76	$ 76	$ 76	$ 23	$ -	$ 577
Total	K USD	$ 64	$ 214	$ 214	$ 214	$ 214	$ 214	$ 214	$ 214	$ 65	$ -	$ 1,627
Mine Geology												
Salaried Personnel	K USD	$ 70	$ 235	$ 235	$ 235	$ 235	$ 235	$ 235	$ 235	$ 72	$ -	$ 1,784
Hourly Personnel	K USD	$ -	$ 278	$ 278	$ 278	$ 278	$ 278	$ 278	$ 278	$ 85	$ -	$ 2,031
Total	K USD	$ 70	$ 513	$ 513	$ 513	$ 513	$ 513	$ 513	$ 513	$ 157	$ -	$ 3,816
Supplies & Other												
Mine General Services Supplies	K USD	$ -	$ 12	$ 12	$ 12	$ 12	$ 12	$ 12	$ 12	$ 4	$ -	$ 89
Forced Work by Contractor	K USD	$ 45	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 60	$ 1,545
Engineering Supplies	K USD	$ -	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 9	$ -	$ 222
Geology Supplies	K USD	$ -	$ 37	$ 37	$ 37	$ 37	$ 37	$ 37	$ 37	$ 11	$ -	$ 270
Software Maintanance & Support	K USD	$ -	$ 29	$ 29	$ 29	$ 29	$ 29	$ 29	$ 29	$ 9	$ -	$ 212
Outside Services	K USD	$ -	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 23	$ -	$ 548
Office Power	K USD	$ 13	$ 44	$ 44	$ 10	$ 10	$ 10	$ 10	$ 10	$ 3	$ -	$ 153
Light Vehicles	K USD	$ 10	$ 32	$ 32	$ 32	$ 32	$ 32	$ 32	$ 32	$ 14	$ -	$ 248
Total	K USD	$ 68	$ 439	$ 439	$ 405	$ 405	$ 405	$ 405	$ 405	$ 253	$ 60	$ 3,287
Total	K USD	$ 254	$ 1,339	$ 1,339	$ 1,304	$ 1,304	$ 1,304	$ 1,304	$ 1,304	$ 528	$ 60	10,042
Total	$ US/t	$ -	$ 0.14	$ 0.11	$ 0.11	$ 0.09	$ 0.12	$ 0.09	$ 0.09	$ 0.11	$ -	$ 0.11

21.8 Process Operating Costs

The estimated, annual process operating cost for the Three Hills Mine is $2.49 per ton of ore processed, and after allocation of fixed costs through the rinsing of leach pads the life-of-mine cost is $2.62 per ton of ore. The estimated first year process operating cost for the Hasbrouck Mine is $3.81 per ton of ore processed and the remaining life of mine process annual operating cost is $4.07 per ton of ore processed. After allocation of fixed costs through the rinsing of leach pads the Hasbrouck Mine life-of-mine cost is $4.12 per ton of ore. Sales tax has not been included in the operating cost estimate.