Newmont Corporation
Cripple Creek & Victor Gold Mining Company
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January 20, 2022

ELECTRONIC DELIVERY

Mr. Elliott Russell
Environmental Protection Specialist
Colorado Department of Natural Resources
Division of Reclamation, Mining and Safety
Office of Mined Land Reclamation
1313 Sherman Street, Room 215
Denver, Colorado 80203

RE: Permit No. M-1980-244; Cripple Creek & Victor Gold Mining Company; Cresson Project; Technical Revision 130 – Stormwater Improvements

Mr. Russell,

Newmont Corporation's Cripple Creek and Victor Gold Mining Company (CC&V) hereby provides this Technical Revision (TR) 130 to Permit M-1980-244, proposing improvements to stormwater controls.

Background

On August 3rd, 2021, CC&V experienced a significant rain event (1.47 inches), producing significant stormwater runoff. During the event, a surge of stormwater from the mill liner area inundated water management controls, causing material that had contacted process solution to discharge off secondary containment. All solution and material remained on site and within the operational boundary. Cyanide was not detected in analysis of discharged water. As required, CC&V immediately reported the event, and began cleaning up the material. The Division of Reclamation, Mining and Safety (DRMS) came to inspect the area on August 10, 2021.

This TR and improvement design is to comply with requirements included in the DRMS inspection report dated August 10, 2021, received on September 30, 2021. A technical memorandum including the design summary for stormwater control improvements is enclosed as Attachment 1.

Schedule

Project funding approval and construction planning activities will begin immediately upon approval of this TR. Construction will begin once project funding has been secured through Newmont's investment system and as weather permits.

Stormwater Upgrade Warranty Estimate

This TR results in no net increase over the financial warranty amounts proposed in Amendment No. 13, as controls will remain in place at closure.

The technical revision fee payment in the amount of $1,029 was made electronically via the DRMS webpage on January 20, 2022. The order identification number associated with this payment is 181404818.

Should you require further information please do not hesitate to contact Katie Blake at 719-689-4048 or Katie.Blake@Newmont.com or myself at Justin.Raglin@Newmont.com.

Regards,

PP Katie Blake

Justin Raglin
Sustainability & External Relations Manager
Cripple Creek and Victor Gold Mining Company

EC: E. Russell – DRMS
M. Cunningham – DRMS
M. Crepeau – Teller County
L. Morgan – Teller County
J. Raglin – CC&V
K. Blake – CC&V

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ATTACHMENT 1

NewFields
Perspective. Vision. Solutions.

TECHNICAL MEMORANDUM

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To: **Charles Bissue**

From: **Ryan Hunt and Adrien Butler, P.E.**

Reviewed By: **Jay Janney-Moore, P.E.**

Project: **Stormwater Improvements**

Project No: 475.0106.054

Subject: **Design Summary (High Grade Mill Stormwater Controls)**

Date: January 11, 2022

In the early fall of 2021, the Cripple Creek & Victor (CC&V) Mine in Teller County, Colorado received a high-intensity rainfall event, yielding an estimated 1 inch of precipitation in approximately 20 minutes. Existing stormwater controls in place at the High Grade Mill (Mill) and Valley Leach Facility 1 (VLF1) were inundated, resulting in contact water reporting outside the lined containment area. The Colorado Department of Natural Resources, Division of Reclamation, Mining, and Safety (DRMS) inspected the site on August 10, 2021 and provided the following compliance problems and corrective actions on September 30, 2021:

COMPLIANCE PROBLEM #2: Current stormwater controls associated with the High Grade Mill liner were overwhelmed during a storm event and impacted stormwater discharged off of the Valley Leach Facility 1 liner. The permit lacks formal plans or designs to control stormwater in this area. The current mine plan needs to be updated and clarified pursuant to C.R.S. 34-32-112 (2)(f), specifically addressing appropriate sections of Rules 3.1.6, 6.4.21(10), and 7.3.1(3). The Operator must provide sufficient information to describe or identify how the Operator intends to safely control impacted stormwater intercepted by the High Grade Mill liner.

Newmont Corporation (Newmont), owner and operator of the CC&V Mine, contracted NewFields Companies LLC (NewFields) to design stormwater control improvements to address the compliance problem. The proposed design diverts non-contact water away from lined areas (reducing the contributory watershed area for the High Grade Mill stormwater controls) and reroutes the High Grade Mill contact water onto VLF2 for controlled discharge and infiltration. NewFields also addressed nuisance flooding at the Crusher Pocket as part of this work.

1.0 DESIGN OVERVIEW

NewFields analyzed hydrology for watersheds surrounding the High Grade Mill and Crusher Pocket to determine resultant flowrates from the 100-year, 24-hour design storm event. These flowrates were used to design stormwater controls to direct non-contact water to the existing EMP-11 sediment pond. NewFields also designed a culvert to drain a depression near the Crusher Pocket to EMP-11 and confirmed EMP-11 can contain additional flows from the 100-year, 24-hour design storm. The proposed stormwater controls include the following components:

- Regraded Delivery Road with a V-ditch on the east side,
- Low water crossing to direct water from the V-ditch to the west side of Delivery Road,
- Open channel conveying water to an existing depression that will be used as a retention pond,
- Pipeline from the retention pond to EMP-11, and
- Rerouted pipeline to transfer contact runoff from the High Grade Mill containment area (collected in an existing sump) to an infiltration area on VLF2.

The existing GoldSim™ water balance model was also updated to reflect the modified drainage plan, and to verify the existing VLF2 Process Solution Storage Area (PSSA) can accommodate runoff water from the High Grade Mill area while maintaining a minimum 5 feet of freeboard throughout the VLF2 operational life.

2.0 HYDROLOGIC ANALYSIS

Relevant watersheds and estimated flow paths, shown in Figure 1, were delineating in Autodesk Civil3D using 2020 flyover topography provided by Newmont. Time of concentration and lag time were calculated using methodology presented by the Natural Resources Conservation Service (NRCS, 2010). Curve numbers for each watershed and estimated precipitation depth for the 100-year, 24-hour design storm event (4.07 inches) were previously developed by others (Knight Piésold, 2018). Peak flows and maximum water elevations were calculated using HEC-HMS (US Army Corps of Engineers (USACE), 2021). This model accounted for the attenuation effects of the retention pond, which aided in reducing resultant flows in the proposed pipeline. Table 2.1 lists key parameters for each watershed and resulting peak flowrates.

TABLE 2.1 – WATERSHED PARAMETERS AND MODELED FLOWRATES

Watershed	Land Cover (ac)	CN	Tc (min)	Lag Time	Peak Flowrate (cfs)
North Native Hillside	18.2	81	18.4	11.0	49.1
Middle Native Hillside	15.3	67.3	20.2	12.1	20.6
South Native Hillside	8.3	77	14.9	8.9	20.2
Crusher Pocket Low Area	9.2	91	3.6	2.2	46.4
Sediment Pond	6.0	91	4.6	2.8	29.6

Support calculations and HEC-HMS results are included in Attachment A and watersheds are shown in Figure 1.

3.0 HYDRAULIC CALCULATIONS

NewFields used peak flowrates from HEC-HMS and FlowMaster (Bentley Systems, 2020) to size stormwater control components. Table 3.1 lists the components, sizing, and pertinent hydraulic parameters.

TABLE 3.1 – STORMWATER CONTROL SIZING

Stormwater Control Component	Peak Flowrate (cfs)	Manning's n	Flow Depth (in)	Size	Velocity (ft/s)
North V-Ditch (Steep)	49.1	0.035	20.1	3 feet deep with 1.5H:1V side slopes	10.4
North V-Ditch (Shallow)	69.3	0.035	39.3	3 feet deep with 1.5H:1V side slopes	1.9
South V-Ditch	20.2	0.035	18.9	3 feet deep with 1.5H:1V side slopes	5.5
Trapezoidal Channel	88.7	0.035	25.2	5 ft bottom width with 1.5H:1V side slopes	5.2
HDPE Pipe (Steep)	12	0.012	5.5	18-inch diameter SDR21	28.1
HDPE Pipe (Shallow)	12	0.012	12.8	18-inch diameter SDR21	9.9
HDPE Pipe (0.5 %)	12	0.012	16.3	24-inch diameter SDR21	5.8

Detailed results from FlowMaster are included in Attachment A and proposed stormwater controls are shown on Figure 2.

4.0 WATER BALANCE MODEL UPDATES

Water from the High Grade Mill is currently collected in a sump, then pumped to a depression near the toe of VLF1; sediment accumulation in this area no longer allows water to infiltrate into VLF1 at a sufficient rate and water has recently backed up during larger rainfall events. Installing the surface water controls described herein will redirect a significant portion of the stormwater previously reporting to the sump to EMP-11, reducing the sediment load and anticipated flowrates from the sump. The depression near the toe of VLF1 will be abandoned and flows from the sump will be pumped to an area designated for infiltration on VLF2.

The existing GoldSim™ water balance model was updated to reflect rerouting sump flows from VLF1 to VLF2 by redirecting the High Grade Mill watershed (31.6 acres) to VLF2. Results showed the VLF2 PSSA can adequately accommodate the additional surface water runoff throughout Phases 1/2 (currently operating) and 3 (future; a portion of flows from Phase 3 will report to the Phase 1 and 2 PSSA) without significantly impacting the Phase 1 and 2 PSSA storage capacity or freeboard. Model results showed a minimum of 5 feet of freeboard can be maintained in the Phase 1 and 2 PSSA throughout VLF2 operation. Attachment B contains graphs from the water balance model showing the VLF2 PSSA water levels, capacity, and freeboard with the additional flows from the High Grade Mill area surface water runoff for Phases 1/2 and Phase 3.

5.0 PROPOSED CONSTRUCTION

Proposed construction components to improve stormwater controls at the High Grade Mill are described below.

5.1 Non-Contact Water

Non-contact surface water runoff previously reporting to the High Grade Mill area will be rerouted to EMP-11. Delivery Road will be regraded with a cross-slope of 1% towards its east side, where a 3-foot deep V-ditch will be constructed to capture flows from the road and the native hillside to the east. During peak design flows, portions of this ditch may overflow onto the adjacent road surface, but will not exceed the road's west edge. High velocities (up to 10.5 ft/s) were modeled at steep sections of the V-ditch during the 100-year, 24-hour design storm event. This exceeds maximum permissible velocities for soil-lined channels (5 ft/s) according to the USDA Soil Conservation Service (1947). Channels may erode during the design storm event and will need to be repaired by CC&V. Sediment will be captured in the depression used as a retention pond and by EMP-11; sediment-laden water is not expected to report downstream to any natural drainages. If erosion persists, channels will be appropriately armored by CC&V.

The V-ditch will terminate at a low water crossing at the low point of Delivery Road, consisting of a 50-foot wide, 2-foot deep trapezoidal channel graded into the road with 10% grade transitions on either side. The low water crossing will direct the collected runoff to an existing depression that will be used as a retention pond via a trapezoidal channel with a 5-foot bottom width, 4-foot depth, and 1.5H:1V side slopes. The retention pond is also expected to function as a sediment control pond, reducing the sediment load and potential for scour in the downstream pipe. An 18-inch diameter SDR21 HDPE pipe will carry stormwater from the retention pond to EMP-11; the pipe invert elevation at the EMP-11 outlet is 9732 feet. This pipeline will be installed above ground and will require minimal earthworks for most of its length. Ballast piles (loose structural fill) will be placed at grade changes, alignment/direction changes, or at other locations as needed to secure the pipe from significant movement. The final 220 feet of the pipeline will be buried to accommodate the existing grading at the Crusher Pocket. The last 430 feet will consist of a 24-inch SDR21 HDPE pipe to provide sufficient capacity at the shallow grade (0.5%) in this area. Two access roads in the Crusher Pocket will need to be regraded to provide sufficient cover fill (1 foot minimum) over the pipe.

CC&V has experienced nuisance flooding at a low area on the east side of the Crusher Pocket and requested additional improvements to allow this area to drain into EMP-11. A 460-foot long 24-inch diameter SDR21 HDPE pipe will be installed as a culvert to allow the low area (elevation 9726.5 feet) to drain into EMP-11. The pipe invert elevation at EMP-11 is 9723.5 feet, and the pond bottom elevation varies between 9723 feet and 9724 feet. During the 100-year, 24-hour design storm event, water is expected to back up in the culvert and inundate the low area shown on Figure 2 to a maximum water surface elevation of 9731 feet, corresponding to the required storage capacity of 8.7 acre-feet. The pond crest elevation is 9735.6 feet, providing 4.6 feet of freeboard at the maximum anticipated water level of 9731 feet.

In total, the proposed earthworks will require 9320 cubic yards of cut and 5800 cubic yards of fill (neat line, excluding excavation and backfilling where buried pipes and culverts cross existing facilities).

5.2 Contact Water

The immediate area around the High Grade Mill and temporary tailings storage area (contact water) will not be regraded and additional stormwater controls are not proposed at this time. A significant portion of the contributory area will be redirected to EMP-11 as described in Section 5.1, which will reduce the anticipated contact water reporting to the High Grade Mill sump by almost 90 cubic feet per second (cfs) during the 100-year, 24-hour design storm event.

The existing pipeline termination will be relocated from VLF1 to VLF2. A small depression will be excavated into the VLF2 ore surface to create a preferential infiltration area. Riprap with a D_{50} of 6 inches will be installed at the pipe outlet as needed to disperse energy and prevent eroding the VLF2 surface.

6.0 CONCLUSION

Stormwater controls at the High Grade Mill will be improved to sufficiently accommodate flows from a 100-year, 24-hour design storm event by reducing the areas reporting to the existing High Grade Mill sump and rerouting the existing sump outlet pipe to an infiltration area on VLF2. Where possible, surface water runoff from native (non-contact water) contributory areas will be routed to EMP-11 via excavated channels and an 18-inch SDR21 HDPE pipeline. A new 24-inch HDPE culvert is proposed to drain a low area within the Crusher Pocket. During the 100-year, 24-hour event, water will back up in the culvert and the Crusher Pocket low area may experience additional nuisance flooding. This is not anticipated to be a frequent condition and will only have minor impacts to operations; no contact water or sediment-laden water is anticipated to report downstream.

7.0 REFERENCES

Bentley Systems, 2020. FlowMaster CONNECT Edition Update 3, Bentley Systems Inc., Watertown, CT, USA.

Knight Piésold, 2018. “Stormwater Management Plan Evaluation – Review Findings, EMP 22 and ECOSA Facility Toe Berm Design Upgrades”. Knight Piésold and Co., Denver, CO, USA

NRCS, 2010. United States Soil Conservation Service. National Engineering Handbook. Section 630, Hydrology, Chapter 15. Washington, D.C., USA

U.S. Army Corp of Engineers (USACE), 2021. Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS), Version 4.8, USACE, Davis, CA, USA.

USDA Soil Conservation Service, 1947. "Handbook of Channel Design for Soil and Water Conservation, SCS-TP-61". March 1947, Revised June 1954

FIGURES

LEGEND:

EXISTING AND PROPOSED GROUND CONTOURS

TIME OF CONCENTRATION FLOW PATHS

NOTES:

1. CONTOURS SHOWN INCLUDE PROPOSED GRADING AND WATERSHED DELINEATIONS INCLUDE THE EFFECT OF PROPOSED GRADING.

0 300 600 FEET

Reference:

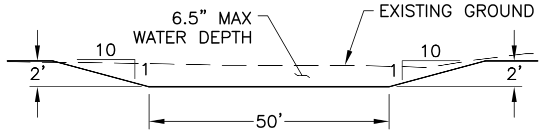
NEWMONT PROVIDED THE 2020 FLYOVER DATA TO NEWFIELDS ON JAN. 13, 2021 IN THE FOLLOWING FILE: "5ft topo 9-1-20.DWG". EXISTING GROUND INCLUDES FUTURE SCHIST ISLAND PIT CONFIGURATIONS.

P:\Projects\0106.054 Stormwater Improvements\A-CAD\FIGS\0106.054.006F.dwg-1/11/2022 1:30 PM

NewFields	CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY
PROJECT	STORMWATER IMPROVEMENTS
TITLE	WATERSHED BOUNDARIES
FILENAME	0106.054.006F
FIGURE NO.	1
REVISION	A

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING LINER BOUNDARY
- PROPOSED PIPELINE
- PROPOSED CULVERT
- RUNOFF FLOW DIRECTION
- INUNDATED AREA



A LOW WATER CROSSING SECTION

NOTES:

1. NUISANCE PONDING IN THIS AREA WILL BE MITIGATED BY BURIED CULVERT TO SEDIMENT POND. DURING A 100–YR, 24–HR EVENT, WATER WILL POND IN THIS AREA AFTER THE ELEVATION OF THE SEDIMENT POND RISES ABOVE THE CULVERT INLET.

0 200 400 FEET

NewFields

CLIENT CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

PROJECT STORMWATER IMPROVEMENTS

TITLE CONCEPTUAL SURFACE WATER MANAGEMENT MODIFICATIONS

FILENAME 0106.054.003F

FIGURE NO. 2

REVISION A

P:\Projects\0106.054 Stormwater Improvements\A–CAD\FIGS\0106.054.003F.dwg–1/11/2022 2:13 PM

ATTACHMENT A

Hydrologic and Hydraulic Calculations

NewFields

Cripple Creek & Victor Gold Mining Company
Stormwater Improvements
Lag Time Calculation

$$t_c = t_{sh} + t_{sc} = \frac{0.007(nl_{sh})^{0.8}}{P_2^{\,0.5} S^{0.4}} + \frac{l_{sc}}{3600\ KS^{0.5}}$$

$$t_l = 0.6t_c$$

t_c	Time of Concentration (h)
t_{sh}	Sheet Flow Time of Concentration (h)
t_{sc}	Shallow Concentrated Time of Concentration (h)
t_l	Lag Time (h)
l_{sh}	Sheet Flow Length (ft)
l_{sc}	Shallow Concentrated Flow Length (ft)
n	Mannings Roughness Coefficient
P_2	2-year, 24-hour rainfall (in)
K	Value of 16.13 Assumed
S	Avg. Watershed Slope (ft/ft)

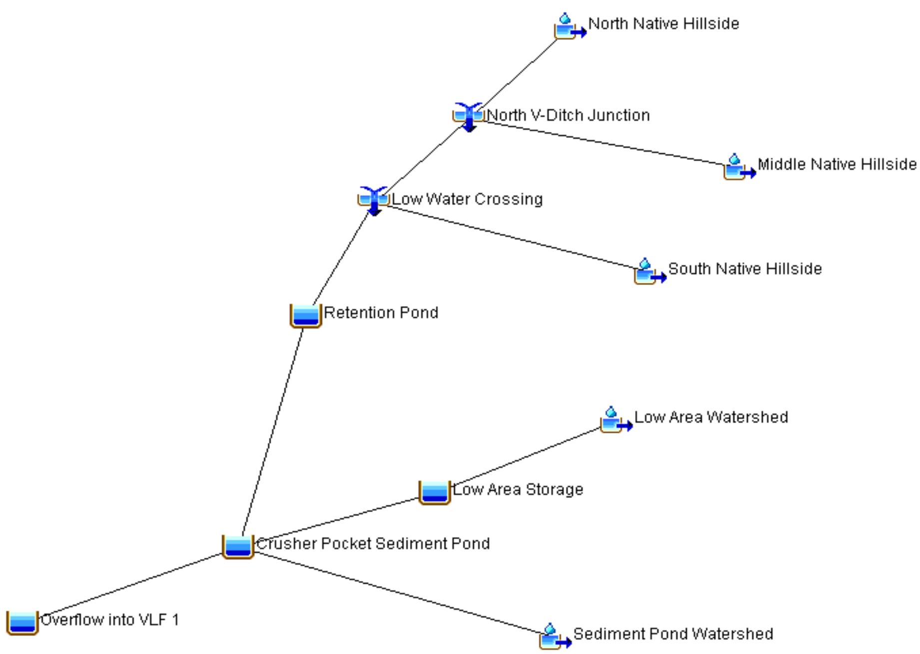
Equations, n values, and K values taken from NRCS National Engineering Handbook, Section 630 Hydrology.

Lag Time										
Basin	l_{sh} (ft)	l_{sc} (ft)	n	P_2 (in)	K	S (ft/ft)	t_{sh} (hr)	t_{sc} (hr)	t_c (min)	t_l (min)
North Native Hillside	300	1694	0.150	1.67	16.13	0.163	0.235	0.072	18.4	11.0
Middle Native Hillside	300	771	0.293	1.67	16.13	0.304	0.313	0.024	20.2	12.1
South Native Hillside	300	957	0.171	1.67	16.13	0.262	0.216	0.032	14.9	8.9
Low Area Watershed	300	544	0.011	1.67	16.13	0.121	0.033	0.027	3.6	2.2
Sediment Pond Watershed	100	1089	0.011	1.67	16.13	0.092	0.015	0.062	4.6	2.8

WATERSHED FLOW CALCULATIONS

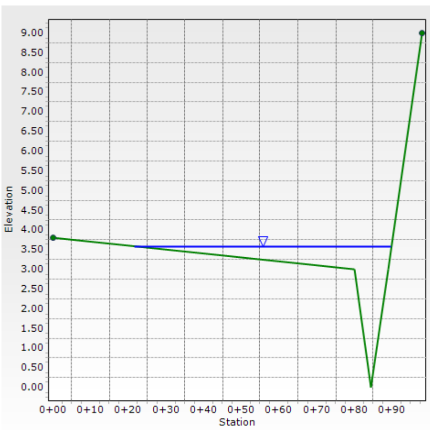
WATERSHED	Area (ac)	Length (ft)	Slope (ft/ft)	Curve Number	Time of Conc. (min)	Lag Time (min)	Peak Discharge (cfs)
North Native Hillside	18.2	1994.0	0.163	81	18.4	11.0	49.10
Middle Native Hillside	15.3	1071.0	0.304	67.3	20.2	12.1	20.60
South Native Hillside	8.3	1257.0	0.262	77	14.9	8.9	20.20
Low Area Watershed	9.2	844.0	0.121	91	3.6	2.2	46.40
Sediment Pond Watershed	6.04	1189.0	0.092	91	4.6	2.8	29.60

JUNCTION/POND	Peak Discharge (cfs)	Peak Storage (ac-ft)	Maximum storage (ac-ft)
North V-Ditch Junction	69.30	N/A	N/A
Low Water Crossing	88.70	N/A	N/A
Retention Pond	12.00	3	3.25
Low Area Storage	16.30	0.7	8.50
Sediment Pond	46.40	8.7	8.92
Overflow Into VLF 1	0.00	N/A	N/A



CHANNEL CALCULATIONS

CHANNEL	**$Q_{PEAK, 100}$ (cfs)**	**Length (ft)**	**Slope (ft/ft)**	**Bottom Width (ft)**	**Mannings n**	**Side Slopes (X:1)**	**Calculated Depth (in)**	**Design Depth (in)**	**Top Width (ft)**	**Q Area (ft^2)**	**V (ft/s)**
North V-Ditch, Shallow Slope (Flow area includes sloped road surface, see cross-section below)	69.3	512.0	0.005	N/A	0.035	1.5 (1% road surface)	43	46	68.2	36	1.9
North V-Ditch, Steep	49.1	616.0	0.091	N/A	0.035	1.5	21.2	36	5.31	4.7	10.4
South V-Ditch	20.2	620.0	0.029	N/A	0.035	1.5	18.9	36	4.72	3.7	5.5
Diversion Channel	88.7	318.0	0.010	5	0.035	1.5	25.2	48.00	11.3	17.1	5.2

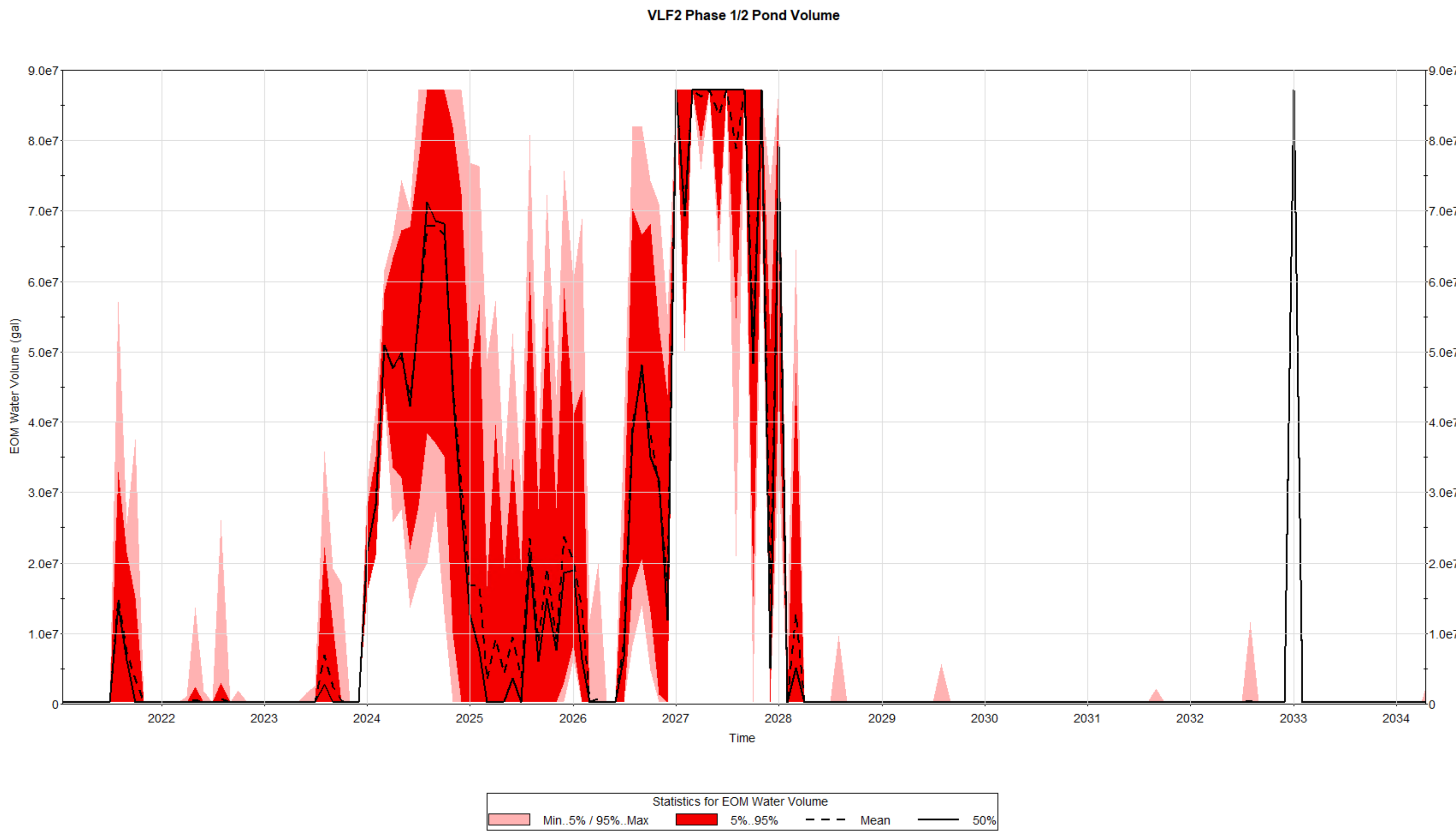


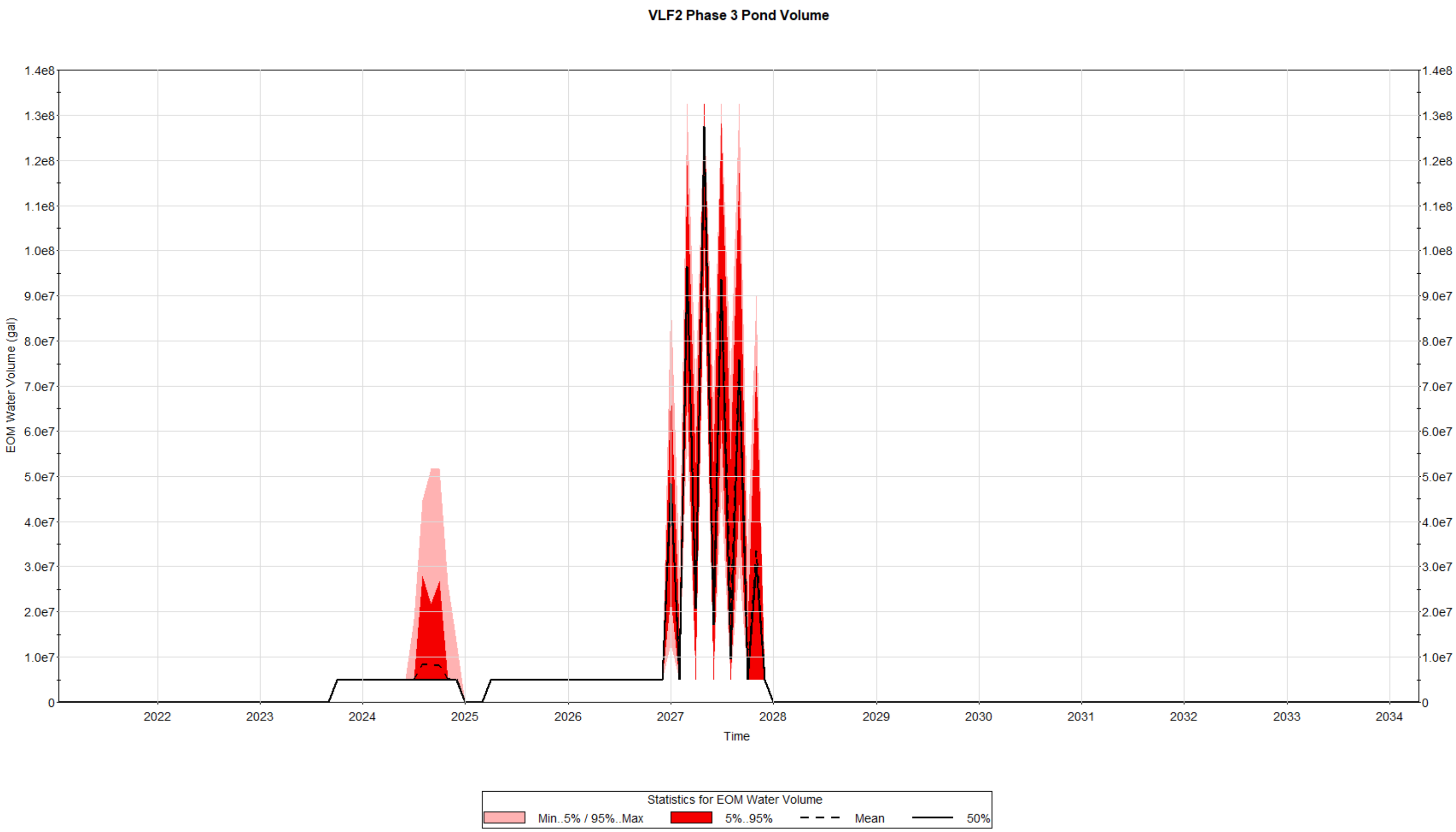
PIPELINE FLOW CALCULATIONS

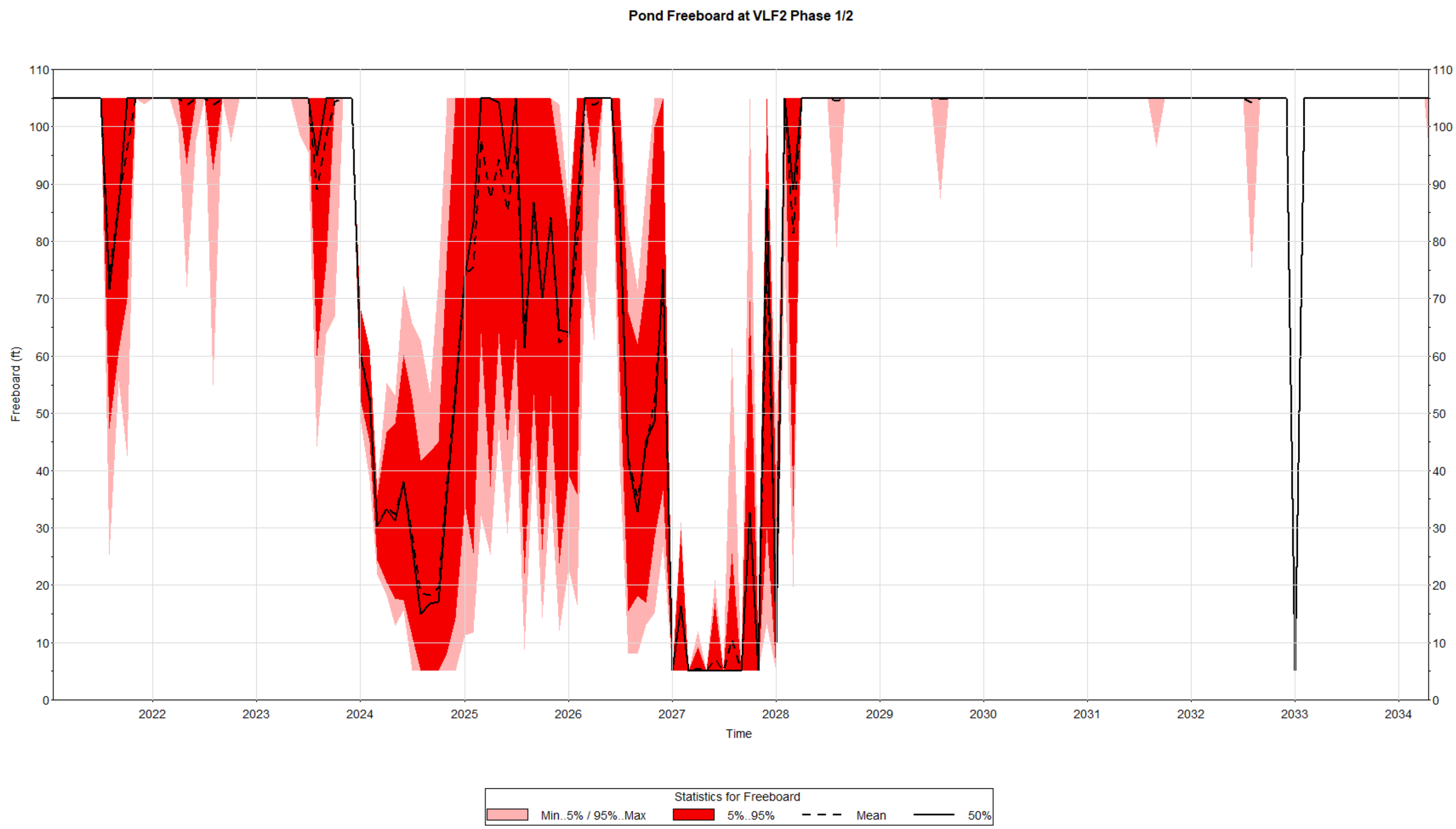
NOMINAL PIPE SIZE	SECTION	STA			$Q_{PEAK, 100}$ (CFS)	Length (ft)	Slope (ft/ft)	Mannings n	Inside Dia. (in)	Calculated Depth (in)	Q Area (ft^2)	V (ft/s)
24"	SHALLOW	0+00	TO	4+86	12	486.0	0.005	0.012	21.6	16.3	2.1	5.8
18"	SHALLOW	4+86	TO	6+17	12	131.0	0.021	0.012	16.2	12.8	1.2	9.9
18"	STEEP	8+00	TO	13+36	12	536.0	0.32	0.012	16.2	5.5	0.4	28.1

ATTACHMENT B

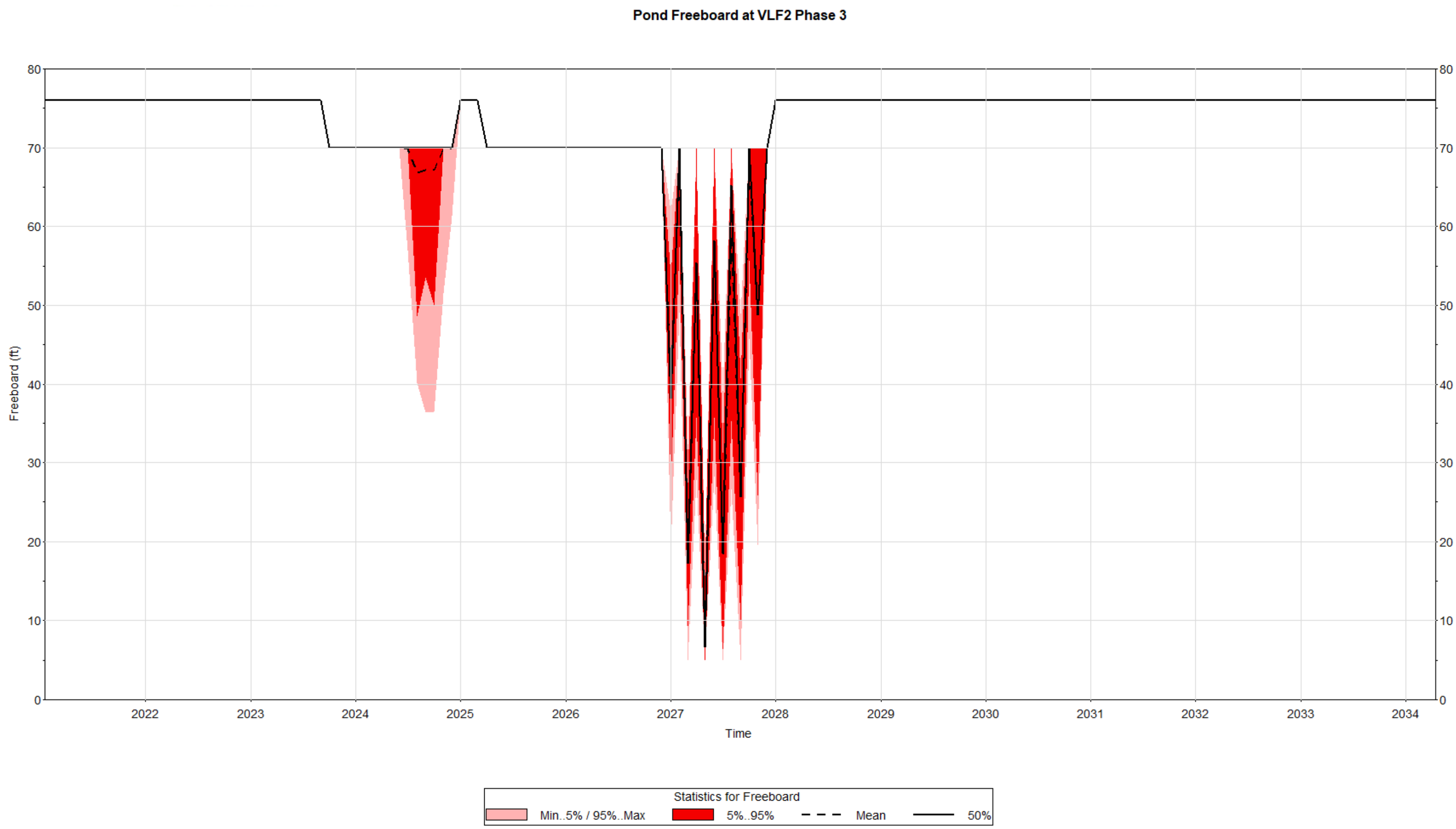
GoldSim™ Water Balance Model Output Graphs


VLF2 Phase 1/2 Pond Volume
EOM Water Volume (gal)
9.0e7
8.0e7
7.0e7
6.0e7
5.0e7
4.0e7
3.0e7
2.0e7
1.0e7
0
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
Time
Statistics for EOM Water Volume
Min..5% / 95%..Max
5%..95%
Mean
50%


VLF2 Phase 3 Pond Volume
EOM Water Volume (gal)
1.4e8
1.3e8
1.2e8
1.1e8
1.0e8
9.0e7
8.0e7
7.0e7
6.0e7
5.0e7
4.0e7
3.0e7
2.0e7
1.0e7
0
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
Time
Statistics for EOM Water Volume
Min..5% / 95%..Max
5%..95%
Mean
50%



Pond Freeboard at VLF2 Phase 1/2
Freeboard (ft)
0
10
20
30
40
50
60
70
80
90
100
110
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
Time
Statistics for Freeboard
Min..5% / 95%..Max
5%..95%
Mean
50%


Pond Freeboard at VLF2 Phase 3
Freeboard (ft)
80
70
60
50
40
30
20
10
0
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
Time
Statistics for Freeboard
Min..5% / 95%..Max
5%..95%
Mean
50%